

**Critical Review:
Variables Affecting Perceived Communicative Competence of Adult AAC Users**

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This critical review examined the variables affecting perceived communicative competence of adult AAC users. Study designs included three balanced incomplete block designs and one randomized block design. Variables examined included aided message length, partner reauditorization, observer background, speech output type, and pre-utterance pause length. Overall, the evidence from this review suggests that aided message length and pre-utterance pause length may influence perceptions of communicative competence. Recommendations for future research and clinical practice are provided.

Introduction

Communicative competence is the “quality or state of being functionally adequate in daily communication and of having sufficient knowledge, judgment, and skills to communicate effectively” (Light, 1989, p.138). The perception of communicative competence is an important area of research because speech-language pathologists are often required to evaluate communicative competence in adult augmentative and alternative communication (AAC) users. To be a competent communicator, one must have the opportunity to use one’s knowledge, judgment and skills. Without the opportunity to use those skills of judgment and knowledge, they will have limited function (Light and Gulens, 2000). Unfortunately, adults who are dependent on an AAC device for communication often are not given the opportunity to fully communicate and make decisions. The perception of communicative competence is an important consideration with regard to other individuals in the AAC users’ social environment. If other individuals, such as family members, medical personnel and rehabilitation professionals incorrectly perceive an individual’s communicative competence to be lower than it actually is, they may preemptively make decisions for the individual and take communicative opportunities away from the AAC user (Light and Gulens, 2000). Thus, it is important to identify the factors that may influence the perception of communicative competence in individuals who are evaluating adult AAC users.

Objectives

The primary objective of this paper is to critically evaluate the research related to the factors that may affect perceived communicative competence of adult AAC users. Multiple factors such as pre-utterance pause length, speech output type, message length and reauditorization have been suggested to influence perceptions of communicative competence of adult AAC users.

Methods

Search Strategy

Computerized databases including PubMed, CINAHL, Cochrane Library, Medline-OVID, Psycinfo, and SCOPUS were searched using various combinations of the following search terms:

- Augmentative and alternative communication (and AAC)
- Competence
- Communication (and communicative)
- Perception (and perceive)

Reference lists from appropriate articles found during the search were then explored for other related articles.

Selection Criteria

Studies selected for inclusion in this critical review were required to investigate factors affecting the perception of communicative competence of adult of AAC users. No limits were set on the demographics of research participants or outcome measures.

Data Collection

Results of the literature search yielded four studies that met the criteria outlined above. Three studies used a balanced incomplete block design (this technique produces a weighted ranking of variables, showing the relative importance of each variable and allowing comparison of process and content elements) and one study used a randomized block design.

Results

The results for the first three studies (involving a balanced incomplete block design) are reviewed in the following section. In the first study, Bedrosian, Hoag, Calculator, and Molineux, (1992) examined the effects of aided message length, partner reauditorization (i.e.,

repetition of the AAC user's message without rising intonation), and observer background on perceptions of communicative competence for adults using AAC. Participants were divided into one of two groups to study the impact of observer background on perceptions of communicative competence. To be included in the first group (N = 24), participants had to have "a) have no educational or professional experiences related to AAC, developmental disabilities or allied health, b) have no or limited experience seeing or conversing with individuals with severe speech impairments and c) possess functional vision and hearing" (Bedrosian et al., 1992). To be included in the second group (N = 24), participants had to "a) have 2 or more years of paid professional experience working with AAC users, b) be currently working with a minimum of two AAC users, c) hold at least state or provincial certification in speech and language pathology and d) possess functional hearing and vision" (Bedrosian et al., 1992). To examine the influence of message length on perceptions of communicative competence, two levels of message length were used: "a) production at the single word level and b) production at the phrase level involving two to four lexical items per message" (Bedrosian et al., 1992). For partner reauditorization, two levels were employed: a) presence of partner reauditorization and b) absence of partner reauditorization.

Four conversational conditions were used to examine the different combinations of the two experimental variables. Conversational scripts were developed and used to allow for manipulation of the experimental variables and to help reduce the influence of other conversational variables. Response latency was monitored closely across all conversational conditions. Each conversation was prerecorded and involved the same two participants: a nondisabled participant and an actor portraying an adult AAC user with cerebral palsy (CP) communicating via an ALLTALK device, which produces digitized speech.

At the time of this research there were no extensive and valid questionnaires that evaluated communicative competence. Therefore, the authors developed a Likert-type questionnaire specifically for their study. A balanced incomplete block design was used to eliminate between-person variability because subjects served as their own controls. An ANOVA was used to assess the results (i.e., the participants' ratings on questionnaire items). If a significant interaction effect was found, then Fisher's least significant differences test for comparing two way means was used.

A significant interaction effect was found between observer background and message length, in that the speech-language pathologists rated the AAC user as

more competent when using phrases than when using single words. There were no significant differences in observer background with conditions using phrases. For naïve participants, no significant result was found for message length, however naïve observers rated AAC users higher than did speech-language pathologists for the single-word condition. This study did not find a significant effect for aided message length or partner reauditorization using a digitized device. However, the authors hypothesized that if they had used a device with synthesized speech output there may be a significant effect for message length due to reports that synthesized speech is less intelligible than digitized speech output devices (Mirenda & Beukelman, 1990). In a follow-up study examined below, these issues are addressed.

This study provides guarded evidence for the effect of observer background on perceptions of communicative competence, suggesting that observer background contributes to differences in perceptions of communicative competence, in that naïve participants rated AAC users as more competent than did SLPs specifically when the messages were single words instead of phrases. The study also provides fair evidence to support the hypothesis that message length may influence perceptions of communicative competence, but only in those with more exposure to and/or training with adults using AAC devices for communication.

In the second study, Hoag and Bedrosian (1992) examined the effects of speech output type, aided message length, and partner reauditorization on naïve listeners' perceptions of communicative competence adult AAC users. This study was a follow-up to the study examined above by Bedrosian, Hoag, Calculator, and Molineux, (1992). Participants in this study were 48 naïve, nondisabled adults. In order to participate in the study, participants have to "a) have no educational training or professional experiences related to AAC or developmental disabilities, b) have no or limited experience seeing or conversing with individuals with severe speech impairments, c) possess functional hearing and vision" (Hoag and Bedrosian, 1992). Conversational scripts that manipulated the independent variables (i.e., speech output type, aided message length and partner reauditorization) were employed. The first variable compared two types of speech output: synthesized speech output (an adult male using a SMOOTHALKER) versus digital speech output (an adult male using an ALLTALK). Definitions for the remaining variables, conversational scripts used during video taping, and the questionnaire used for evaluating the perceived communicative competence of the AAC user were all identical to those used in the previous study analyzed above (Bedrosian et al., 1992). Twenty-

four subjects were assigned to the conditions with synthesized speech and the remaining 24 participants were assigned to the conditions using digitized speech. Four conversational conditions which were prerecorded were used to examine the different combinations of the two experimental variables. Each subject viewed two of the four conversational conditions for a given speech output type, viewing one condition during each of the two sessions scheduled 5 to 7 days apart.

The dependent variable (the result on the questionnaire) was analyzed using an ANOVA. Results showed a significant main effect for aided message length only. The conditions in which the AAC user communicated using phrases instead of single words received higher ratings on the questionnaire. Interestingly, there were no significant main or interaction effects found for speech output type or for partner reauditorization. Combined with the results from the previous study suggesting the effect of message length on perceptions of communicative competence in speech-language pathologists (Bedrosian et al., 1992), this study adds support to the hypothesis that message length has an effect on perceptions of communicative competence in adult AAC users.

In the third study, Bedrosian, Hoag, and Calculator (1998) examined the effects of aided message length, and partner feedback on perceptions of communicative competence by adults with severe speech impairment associated with CP. Participants were 12 nonambulatory adults with CP who met all the selection criteria outlined in the study. Definitions for message length, the conversational scripts used during video taping, and the videotaped recordings were identical to those used in the study by Bedrosian, Hoag, Calculator, and Molineux, (1992). The partner reauditorization variable was renamed “partner feedback” and the definition for it was identical to that used in the initial study (Bedrosian et al., 1992). As in the previous two studies, response latency was monitored closely across all conversational conditions. The questionnaire used to evaluate the depended variable (perceptions of communicative competence) was identical to that used in the previous two studies by these authors. As in the previous studies, each subject was randomly assigned to view two of the four conversational conditions, viewing only one condition during each of two sessions which were scheduled 5 to 7 days apart.

Tests of fixed effects analyses were run on the summed score of the participants’ ratings on the questionnaire. No significant effects were found for any of the variables. In other words, message length and partner feedback did not have an effect on the perceptions of communicative competence in adult individuals with

severe speech impairments due to CP. This study did not support the hypothesis that message length and partner feedback may have an effect on perceptions of communicative competence in adult AAC users. However, there are multiple factors to consider before drawing any definite conclusions regarding what variables influence perceptions of communicative competence. Those factors are addressed in the discussion section below.

In the fourth study (involving a randomized block design), Todman and Rzepecka (2003) examined the effect of pre-utterance pause length on perceptions of communicative competence in adult AAC users. Participants included 3 adults with CP who used AAC devices (i.e., VOCAs), 5 conversational partners, and 28 psychology student volunteers who rated nine conversations. The AAC users had “getting-to-know-you” conversations with speaking partners. During the conversations there were no restrictions on topic. The conversations were pre-recorded. Video editing technology was used to select 5 minute extracts from the middle of the conversations and then to remove the pauses before all utterances made by the AAC users. New versions were created by replacing the deleted pauses with new pauses of 3 specific lengths (2seconds, 6 seconds, and 10 seconds). Previous research by McLaughlin (1984) has found 3 seconds to be the “awkwardness limit” for unaided conversation (as cited in Todman & Rzepecka, 2003). These new versions provided 4 levels for the independent variable (pause length): 2s, 6s, 10s, and the natural pause of approximately 16s.

The raters listened to extracts of each of the conversations in one of their four variations (pause time). The order in which the rater heard the nine conversations were individually randomized. Raters were then asked to rate each conversation extract using 14 statements on a 7 point Likert-type scale. The scale was devised from the questionnaire developed by Bedrosian et al. (1992).

The results were analyzed using a two-stage analysis. The first stage of the analysis was a one-way ANOVA of rating means with repeated measures on levels of pause time, with no missing data. The Greenhouse Geisser correction was used for testing the pause time effect. The effect was found to be large and significant. Support was found for the hypothesis that a decrease in pause time would result in an increase in perceived communicative competence. This study provides strong support for pre-utterance pause time to be a variable influencing perceived communicative competence in adult AAC users. There was also found to be a significant effect for AAC the different users.

Discussion

Three of the four articles were written by the same group of authors. Any biases or methodological weaknesses inherent in one of their studies may have influenced their subsequent studies. One strength of having the same group of authors work on multiple studies was that some of the weaknesses noted by these authors during the first study were addressed in their follow-up studies.

AAC Users Own Perceptions of Competence

The first two studies involved the perceptions of non-disabled individuals and one critique was that those studies should also address how AAC users or other individuals with disabilities would be affected by these variables (Bedrosian et al., 1998). However, a subsequent study, also included in this critical review, did investigate how these variables affect the perceptions of communicative competence AAC users themselves.

Variables

In the studies addressing the influence of aided message length there were two distinct levels, phrase and single word. The phrases level included just 2 to 4 lexical items, (e.g., 'Watch TV' would be an entire phrase). Longer phrases or sentences would likely be more realistic and reveal a significant effect for message length.

One of the weaknesses of the study by Todman & Rzepecka (2003) is that by asking participants to rate conversations with varying pause times, pause time becomes a highly salient feature and more attention might have been paid to it than would normally be the case in daily conversation. A between subjects research design might help to eliminate this potential problem.

With regard to the study by Todman & Rzepecka (2003) there was also found to be a significant effect for AAC users, which was hypothesized to be due to experience using the AAC device. Interestingly, experience was a classification variable rather than an experimental variable, thus it is possible that this effect was due to some other personal characteristic of the AAC user rather than their experience using the device.

All four studies used just one outcome measure, a questionnaire developed by the authors themselves, to determine if the independent variables influenced perceptions of communicative competence. The authors should have included multiple questionnaires or

measures assessing perceptions of communicative competence.

Participants

In all of the balanced incomplete block design studies, an actor portraying an individual with cerebral palsy was used in the videotaped recordings of an individual using AAC. There are likely to be differences in how an actor and a real AAC user would interact during the conversation. The authors addressed this concern in one of the studies, stating that they used an actor so that there were more predictable motor movements to have consistency across conversational conditions.

One weakness of the study by Todman and Rzepecka (2003) is that two of the three original communication partners did not complete the entire study and had to be replaced. This may have resulted in potential differences due to personal characteristics of the original communication partners. One of the strengths of all three of the other studies was that they each used the same two speakers across all studies and across all participants.

Population Studied

All four articles critically examined in this review had participants with CP, or nondisabled actors portraying individuals with CP. CP is typically acquired at or near birth, and so the findings of this critical review may not be generalizable to adults with acquired communication disorders. The search for studies on perceived communicative competence for adult AAC users yielded no studies with adults with acquired conditions.

Recommendations

It is recommended that further research be conducted on variables affecting perceptions of communicative competence. It is recommended that future research take the following into consideration:

- a) The participants in every study were third party observers. Future research should examine how perceptions of communicative competence might vary if the participants participated in the communicative exchange directly.
- b) The influence of message length may be probed deeper by using longer phrases for the 'phrase condition' as opposed to phrases consisting of two to four lexical items.
- c) Research employing a between subjects design or a mixed design might help to reduce the salience

placed on pause length when pause length is the only variable being manipulated.

- d) Future studies should include more than one scale measuring perceptions of communicative competence in order to detect subtle changes in this dependent variable.
- e) Using experience with the AAC device as an experimental variable rather than a classification variable might reveal an influence on the perception of communicative competence.
- f) Future research should involve a study in which the confederate is a true AAC user, rather than an actor, because there may be differences in communication that impact how others view the subject's communicative competence.
- g) Future research in the area of perceived communicative competence of adult AAC users with acquired communication disorders is strongly recommended.

Clinical Implications

More research needs to be completed, but some evidence was found to suggest that aided message length and pre-utterance pause length were factors influencing perceptions of communicative competence. This is important when a speech-language pathologist is helping to guide a client in choosing or programming an AAC device. The SLP should keep in mind which variables influence perceptions of communicative competence to ensure that adults who use AAC to communicate will choose a device or program that will allow them to accurately demonstrate their communicative competence.

References

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Appendix A – Summary of Studies on Perceptions of Communicative Competence

Reference	Purpose of Study	Participants	Outcome Measure	Data Analysis	Results
Bedrosian, J. L., Hoag, L. A., Calculator, S. N., & Molineux, B. (1992).	Examined effects of aided message length, partner reauditorization, & observer background	2 groups of subjects – naïve adults with minimal exposure to nonspeaking persons and speech language pathologists currently working with AAC users	No appropriate questionnaires that evaluated communicative competence existed, therefore authors developed a 5-point Likert-type scale questionnaire	ANOVA was run on dependent variable (i.e., summation of subjects' ratings of AAC user on the 30 questionnaire items)	Sig interaction effect found b/w subject group and aided message length. Ratings by SLPs showed ↑ ratings for phrase vs. single word conditions. No sig dif b/w phrase conditions with naïve adults. No sig results found for partner feedback.
Hoag, L. A., & Bedrosian J. L. (1992).	Examined effects of speech output type, aided message length, & partner reauditorization	48 naïve adults with minimal exposure to nonspeaking persons.	Same questionnaire as above	ANOVA was run on dependent variable	Sig main effect found for aided message length only (↑ ratings for phrase vs. single word conditions). No sig main or interaction effect found for other variables.
Bedrosian, J. L., Hoag, L. A., & Calculator, S. N. (1998)	Examined effects of aided message length, & partner feedback	12 nonambulatory adults with severe speech impairments associated with CP	Same questionnaire as above	Tests of fixed effects analyses were run on dependent variable	No significant results were found.
Todman, J. & Rzepecka, H. (2003).	Examined effect of pre-utterance pause length	3 adult AAC users with CP, 5 speaking participants, 28 psychology student volunteers (none had experience communicating w/ someone using a VOCA)	A scale comprised of statements derived from previously used questionnaire (see above). Dependent variable comprised of the scale using all 14 items.	ANOVA with repeated measures on levels of pause time. Greenhouse-Geisser correction used for testing pause time effect.	Sig effect found for pause time (i.e., ↑ pause time, ↓ ratings).