

Critical Review: What are the attitudes and beliefs of school-age peers toward children who utilize Augmentative and Alternative Communication (AAC) to communicate?

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Augmentative and Alternative Communication (AAC) allows a child with severe speech and language difficulties to interact with their peers and develop important friendships. AAC devices can also negatively influence the attitudes and perceptions of these peers towards the AAC user, creating a difficult social environment for the child to develop and build communicative competence. This critical review examines the impact that AAC devices have on the attitudes of school-age peers towards children who utilize AAC, and the various factors that may influence these attitudes. A literature search using computerized databases was completed resulting in six articles meeting the inclusion criteria, which were subsequently evaluated for level of evidence, validity, and clinical importance. Overall, the research indicates that various factors influence the attitudes of children towards peers who utilize AAC. These include familiarity with children with disability, gender, familiarity, as well as AAC message length. The implications of these influencing factors are discussed further.

Introduction

Friendships in school-age years play a significant role in development. Psychosocial, emotional, communication and academic performance are all impacted by these friendships (Anderson, Balandin & Clendon, 2011). Limitations on communication can cause difficulties in socialization and in developing these friendships in school-age years (Anderson et al., 2011). Augmentative and alternative communication (AAC) is one strategy used by individuals with severe speech and language difficulties to improve participation and communication (Beck, Fritz, Keller & Dennis, 2000a). However, AAC devices may also negatively influence the perceptions and attitudes of peers (Beck et al., 2000a).

Negative attitudes of children towards peers who use AAC can have detrimental effects on the AAC user's ability to interact and confidently communicate with peers (Beck et al., 2000a). Negative communicative interactions can cause the child utilizing AAC to adjust their communication style to become more simplified, and to interact more with adults (Beck et al., 2000a). This can create a positive feedback loop of negative communication experiences, generating further negative perceptions of the child.

Understanding the attitudes of peers of children who utilize AAC during these critical school-age years is very important. By considering these perceptions, the cycle of negative attitudes and poor communicative interactions can be broken, and social interaction and communicative competence supported.

Various types of AAC devices can be utilized for a number of communication difficulties. These devices range from a non-electronic picture board; where the AAC user points to the words they want to communicate; to an electronic device that generates a voice to communicate. The speech generating devices can be an app downloaded on to an i-pad, or an electronic device specifically designed for communication purposes. These are the two main types of AAC seen in the literature, and are discussed throughout the current critical review.

Objectives

The primary objective of this paper is to critically evaluate existing literature regarding the attitudes of school-age children towards peers who utilize AAC.

Methods

Search Strategy

Computerized databases including: Pubmed, psycINFO, and Scopus were searched using the following search terms:

(augmentative and alternative communication)
OR (AAC) OR (augmentative communication)
AND (child attitudes) OR (peer attitudes)

Selection Criteria

Studies selected for inclusion in the current review were required to investigate the attitudes of peers at the elementary school level (grade one to eight) towards similar aged peer users of AAC. Articles were required to be available in English and accessible through Western Libraries.

Data Collection

The results of the literature search yielded six articles that met the selection criteria: two randomized control trials (RCT), two classroom level randomized control trials, one randomized block design, and one within group crossover design.

Results

Randomized Control Trial

Randomized control trial (RCT) is a research design in which participants are randomly allocated to one of two groups and then results are compared between the two. An RCT produces the highest level of research evidence compared to other study designs, as they provide the most control over variables. An opportunity for bias (confirmation and response bias) is still present, particularly if blinding of participants and researchers does not occur. Interpretation of results from the following studies should be viewed with mild caution due to a lack of blinding.

Hyppa-Martin et al. (2016) investigated grade one students' attitudes towards speech generating AAC and non-electronic AAC devices. Overall attitudes were measured, as well as preference towards both personal and peer use. Grade one students from three different schools, 115 students total, were randomly allocated to watch one of two videos. The videos were of a similarly aged child utilizing AAC in conversation. The two videos were consistent aside from one video the child used a speech generating device, while the other showed a non-electronic communication board. Each participant was then shown a final video describing both devices for the purpose of assessing preferences.

An appropriate and valid tool for measuring the attitudes of school-age children towards AAC devices was used. Two questions regarding the preferences towards the type of AAC were then asked: 1) Which one would you rather use; and 2) Which one would the child in the video rather use. The influence of gender was also explored in both attitudes and preferences. Appropriate statistical analysis was used to assess the variables of interest.

Results indicated no significant effect of type of AAC device on the attitudes of grade one children. Overall attitude scores were neutral. Although effect size was small, girls' attitudes were more positive towards a peer utilizing AAC. A general trend towards preference of the speech-generating device was found for both genders, however did not reach significance.

Strengths of this study include consistency between the two videos in variables outside of AAC type, as well as

the randomization of participants. Weaknesses include limited demographic information provided and small sample size. Also, it was not made clear whether participants in the current study were familiar with children with disability or not, however it was stated that they attended an inclusive school.

Overall this study provides suggestive evidence for a difference in attitudes towards peers who utilize AAC based on gender, however further research is required, and caution should be taken in generalization.

Beck, Bock, Thompson, Bowman & Robbins (2006) investigated the impact vocabulary, gender, and grade had on the attitudes of grade-school children towards a peer using AAC. Children in grades 4-5 who were familiar with peers who have disability participated, with 84 students meeting the participant criteria.

Participants attended one of two schools in the same community. One school requested classroom level randomization in order for the children to stay in their own classrooms for the study. The children from the remaining school were randomized to view one of two videos. Both videos were of a peer communicating with a speech generating AAC device, with the only difference being that one video utilized formal English while the other utilized both formal and age-appropriate informal English.

An appropriate, valid and reliable scale was used to measure the attitudes of participants immediately following the video. Appropriate statistical analysis was used to assess the participants' attitudes, including the effect of gender.

Results from the current study indicate no significant difference in attitudes as a result of vocabulary generated by an AAC device. Although overall results were relatively neutral, a gender effect was discovered, with girls' overall attitudes being more positive. The Girls' attitudes became more positive from grade 4 to 5, while boys attitudes became less positive.

The strengths of this study include the consistency of variables between each video, as well as control of factors that may have created biases (i.e. only viewing the forearm and hand of the AAC user). Weaknesses include the inability to fully randomize their participants, as well as limited demographic data and small sample size.

Overall, the study conducted by Beck et al., (2006) provides suggestive evidence for a difference in attitudes based on gender.

Classroom Level Randomized Control Trial

A classroom level, or pseudorandomized, control trial is an RCT where classroom groups (rather than individual participants) are randomly allocated to one of two study groups. Results are then compared between these two groups. This is an appropriate design for testing hypotheses within a school due to the difficulty in separating children from their classrooms. This design allows a level of control and randomization to decrease potential biases, while keeping children within their classroom divisions. Blinding remains a tactical way to decrease the potential for response and confirmation bias, and the following studies need to be interpreted with caution due to a lack of blinding.

Beck et al., (2000a) conducted clinical trials to accomplish two goals. First, to develop a tool for measuring the attitudes of elementary school-age children towards peers who utilize AAC. Second, to analyze the impact that types of AAC systems (speech generating vs non-electronic) as well as physical ability of the AAC user has on the attitudes of peers. For the purpose of the current review, the second aim of the study will be discussed further. Two schools participated in the study, with 128 children in grades 1, 3 and 5 meeting selection criteria. Participants were familiar with children with disabilities. Classrooms were randomly assigned one of two videos. The first video had a peer communicating with a speech generating AAC device, while in the other the same peer utilized a non-electronic communication board. Within each class group, participants were then randomly assigned one of two photographs of a peer whom they were told was the AAC user. One photograph depicted a child sitting in a wheelchair, while the other was of the same child standing with no signs of physical disability.

An appropriate, valid and reliable measurement tool was developed in the initial aim of the study, which was then utilized in measuring the participants' attitudes in the study of interest. Appropriate and detailed statistical analysis was completed to assess the impact of various factors on attitudes.

No overall effect of type of AAC system on attitudes of school-age children was found. Results indicated an interaction effect between type of AAC device and physical disability in grade 1 only, with the speech generating AAC device and picture of a disabled peer scoring significantly lower (negative), while the non-electronic and disabled picture scored higher (positive). Overall girls had a more positive attitude towards their peer, regardless of the type of AAC system. However, in grade 1 the boys scored more positive and decreased to lower than girls with age, while the girls started

lower, increased in grade 3, then decreased again in grade 5.

Strengths of this study include the consistency of possible factors between videos, as well as the detailed and clear description of their methods as well as results. A weakness is seen in their small sample size, and limited demographics.

Overall, Beck et al., (2000a) present suggestive evidence for gender differences in attitudes towards peers who utilize AAC, as well as potential evidence for an impact of physical appearance of disability on attitudes.

Lilienfeld & Alant (2001) conducted clinical trials to first develop a tool to measure the attitudes of school-aged peers towards individuals who utilize AAC, and then investigate the impact that the type of AAC device (speech generating device vs. non-electronic) as well as gender had on the attitudes of unfamiliar peers. For the purposes of the current review, Lilienfeld & Alant's (2001) second aim will be discussed further. Two schools participated, with 115 children in grades 6-7 meeting selection criteria for the current study. Classes were randomly assigned one of two videos. The first video was of a child using a speech-generating device, while the second was of the same child utilizing the same device, but with the voice output turned off.

A measurement tool developed to meet the first aim of the study, and was tested for validity and reliability, was utilized. This tool assessed attitudes across three dimensions; affective/behavioural, cognitive/belief, and communicative competence. Appropriate analysis was completed to assess the effects of variables on the attitudes of children.

Results demonstrated overall more favourable attitudes towards speech-generating AAC devices, particularly in affective/behavioural and communicative competency scores. More positive attitudes were seen for speech-generating devices in the area of cognitive competency; however this did not reach statistical significance. Girls had significantly more positive attitudes towards their peer in all areas measured.

Strengths of this study include the control and consistency of possible influencing factors between the two videos. Weaknesses include the potential impact of the participant seeing the peer, as well as limited demographic diversity. Some of the methods and analysis were difficult to follow and understand.

Overall Lilienfeld & Alant (2001) provide suggestive evidence for gender effects on the attitudes of children

in grade 6-7, as well as evidence for more positive attitudes towards voice output systems.

Randomized Block Design

In a randomized block design, participants are divided into subgroups based on a common variable. Participants within each group are then randomly assigned to the experimental conditions. This is an appropriate design when an influential variable cannot be randomized (for example, past experiences and knowledge), as it allows a way of controlling the extraneous factor between groups. This can often be the case when investigating factors influencing attitudes or perceptions. Results should be generalized with caution, as it may not represent the general population.

Beck, Kingsbury, Neff & Dennis (2000b) investigated the impact that phrase length has on the attitudes of children, both familiar and unfamiliar with disabilities, towards peers who communicate with AAC. Beck et al., (2000b) utilized a randomized block design, with a fixed factor of familiarity vs unfamiliarity with children with disability.

Participants were from three schools in grades 3 and 5, with 172 children meeting selection criteria. Participants were divided in to two groups based on their familiarity with children with disabilities (familiar vs unfamiliar) and then randomly selected to watch one of two videos. The first video was of a peer using a speech generating AAC system to converse using only one word utterances, while in the second video the peer used longer utterances.

An appropriate, reliable and valid tool was used to measure the participants' attitudes. Appropriate and detailed analysis of results was completed, and results were provided in a clear and concise format.

Beck et al., (2000b) found a significant positive impact on the overall attitudes of familiar children. The length of the speech generated utterances did not have a significant impact on familiar peers. The attitudes of unfamiliar peers however were significantly impacted by the message length, with more positive attitudes associated with longer messages. Overall boys' attitude scores were lower (more negative), particularly in the familiar group.

Strengths of this study include the consistency of extraneous factors between videos, as well as its relatively larger sample size. Weaknesses include limited demographic data, and although sample size is relatively large participants were from one of only three schools in the same area. The motor complexity of the

longer responses may impact attitudes, which were not controlled for in the current study.

Overall Beck et al., (2000b) presented suggestive evidence of the influence of familiarity with disability on a child's attitude towards peer users of AAC. Suggestive evidence is also provided for a possible impact of message length with unfamiliar children.

Within Groups Crossover

Within groups crossover designs expose participants to both experimental conditions, and then compare a group's outcomes across multiple trials. This design is appropriate in analyzing the impact different AAC devices have on the attitudes of school-aged children due to the relatively small subject population. This design allows each participant to act as their own control, and receive both variables of interest. With this design a carryover effect can be seen, and should be addressed in the study or results may be impacted.

Dada, Horn, Samuels & Schlosser (2016) conducted a study aimed at investigating the impact that the type of AAC (speech-generating vs non-electronic) has on the attitudes of children towards an unfamiliar peer. Children aged 9;0-12;11 from one school participated, with 78 meeting selection criteria. All participants but one denied prior interaction with a child with disability or AAC. Participants were randomly divided in to two groups, both of which watched the same two videos but in alternating order. In the first video a peer utilized a speech generating AAC device, while in the second video the same peer utilized a non-electronic communication board.

A measurement tool designed and validated to measure the attitudes of children aged 11-13 years was used, which is an inappropriate tool for the age range of the current study. This tool measures the attitudes of children in three areas; affective/behavioural, cognitive/belief, and communicative competence. Appropriate analysis was completed to compare measurements within the groups.

Results showed overall favourability towards the speech-generating AAC device in the area of communicative competence. In the remaining domains the sequence of videos appeared to impact the attitudes of participants. Results also indicated a more positive attitude overall from girl participants.

Strengths of the current study include clear demonstration of demographic data, procedures, and results, as well as appropriate analysis. Carryover effect was analyzed and addressed. Weaknesses include the use of a measurement tool not validated for the age

range of the current participants. Another weakness is the small sample size and limited demographic area represented. There was also one participant that did not meet selection criteria of unfamiliarity with children with disability, but remained in the study, opening up the possibility of incorrect findings.

Dada et al. (2016) presented equivocal evidence regarding a potential impact of the type of AAC, however there are many weaknesses that influence the reliability of their data.

Discussion

A critical analysis of the existing literature revealed significant factors influencing the attitudes of elementary school-age children towards peers who utilize AAC. Suggestive evidence of familiarity with children with disabilities on the attitudes of children was found, as well as the length of utterance while using a speech-generating device. Mixed evidence was noted on the effect of type of AAC device on attitudes. A recurring effect on attitude additionally found in each study was gender.

Girls demonstrated overall more positive attitudes towards peers with AAC than boys across all six studies. Beck et al. (2006) also found an interaction effect between gender and grade, demonstrating a trend of boys' attitudes towards children with AAC becoming more negative with increasing grade, while the girls trended in the opposite direction. This interaction was supported by Beck et al. (2000a), who demonstrated a similar trend.

This difference in attitudes based on gender was supported by each study, and therefore provides strong evidence for a factor that should be addressed in future attempts at finding strategies to improve the attitudes of children.

The study conducted by Beck et al. (2000b) found that familiarity and experience with peers with disabilities positively impacted the overall attitudes of school-age children. Beck et al. (2000b) also demonstrated that unfamiliar children are affected by factors that familiar children are not. The attitudes of participants who were unfamiliar with disability were more influenced by the message length used by the AAC user (demonstrating significant differences) than unfamiliar children (no significant effect).

Although Beck et al. (2000b) was the only study that compared familiarity as a factor on the attitudes of children, an interesting trend across studies can be noted that may support these findings. The type of AAC

device as an influencing factor on attitudes was the main research goal in four of the studies reviewed. Of these, two investigated the attitudes of familiar children, while the remaining two investigated unfamiliar children. Of notable interest, no significant effect was found in the studies investigating familiar children (Beck et al, 2000a; Hyppa-Martin et al., 2016). However, this contradicted the significant findings found in both studies on unfamiliar children (Dada et al., 2016; Lilienfeld et al., 2001). This may demonstrate further influencing factors on the attitudes of unfamiliar children that familiar children may not be impacted by in the same capacity.

Although an interesting trend, caution should be taken in interpreting these contradicting findings. Different measurement tools were utilized for the studies of unfamiliar than those with familiar children. Different populations were also studied for each, and therefore further research is needed to investigate this potential relationship.

The above findings suggest that familiarity of school-age children with disability not only impacts their overall attitudes towards their peers who use AAC, but also impacts the effect other variables have on their attitudes (length of message and type of AAC). Therefore, the attitudes demonstrated in the studies of familiar peers may be significantly different (likely more positive) than peers of similar demographics that are unfamiliar with children with disability. This raises concern of the potential negative attitudes that may be seen in children who are unfamiliar with disability, and the impact that this may have on their peers who utilize AAC.

In order to promote positive communicative interactions and social engagement in school-age children who utilize AAC, the negative attitudes of children who are unfamiliar with disability needs to be further explored. According to the research, unfamiliar children demonstrated more negative attitudes overall, and more significant differences in attitudes based on various factors. However, the full impact of this unfamiliarity and of the various other factors is not fully understood. A more complete understanding of these, as well as strategies to improve a child's familiarity with disability and AAC may be beneficial in improving the overall attitudes and therefore social interactions of these peers.

General limitations across all six studies were limited sample sizes and limited demographic areas. Participants in each study were from a limited number of schools from similar regions and socioeconomic backgrounds. This makes generalization as well as comparisons across studies difficult. Each study

procedure also demonstrated a positive interaction between an AAC user and an adult, with no communication breakdown demonstrated. Although this remained consistent between videos and therefore should not impact the overall effects found for independent variables, attitudes may not be representative of a “real life” scenario.

Clinical Implications

Although the studies reviewed were limited in their applicability to clinical practice, they provided important information to direct future research. Based on the current findings, further investigations on the attitudes of unfamiliar school-aged children towards peers who utilize AAC is an area of significant interest. Through the identification of influencing factors, strategies can then be explored to increase familiarity and knowledge of disability to positively influence the attitudes of these children and improve interactions with peers who use AAC.

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