The Effects of Aided AAC Interventions on AAC Use, Speech, and Symbolic Gestures

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ABSTRACT

Augmentative and alternative communication (AAC) service provision can be time-consuming, and it is important to ensure that the time invested in aided AAC interventions is worth the costs. As children who use AAC are multimodal communicators, it is important to understand the effects that aided AAC interventions may have not only on AAC use but also on other communication modes, including speech and symbolic gestures. Toward these ends, this article contains a review of commonly used AAC intervention techniques, a discussion of how use of these techniques affects aided AAC use, and an examination of the effect that AAC interventions have on other communication modes, including speech and various types of gestures. Overall, current research findings indicate that aided AAC interventions can be highly effective for teaching students who use AAC to become more effective communicators and that such interventions do not have a negative effect on speech—and may, in some cases, have a positive effect on speech.

KEYWORDS: Aided AAC modeling, augmentative and alternative communication, gestures, intervention, language, speech, vocalizations

Learning Outcomes: As a result of this activity, the reader will be able to (1) describe different aided augmentative and alternative communication (AAC) intervention techniques, (2) describe the potential effects of using aided AAC interventions on AAC use, and (3) describe the effect that using aided AAC may have on the speech and gestures of children who use AAC.

Many children with severe speech impairments require the use of aided augmentative and alternative communication (AAC), which involves using some type of external communication device such as low-tech graphic symbols or a voice-output device. As...
many speech-language pathologists (SLPs) know, AAC service provision can be very
time-consuming. SLPs often carry heavy case-
loads, and they want to be sure that the time
and effort that they invest in AAC is worth
the costs. First and foremost, we need to
ensure that our aided AAC interventions re-
sult in improvements in functional and mean-
ingful communication skills. Second, children
who use AAC are multimodal communica-
tors, and it is important to understand the
effect that AAC intervention will have on
other communication modes to make in-
fomed decisions about speech and language
intervention. For example, we need to be able
to adequately speak to concerns that educators
and family members often have about the
effect of aided AAC on speech. To address
these issues, the following topics will be cov-
ered in this article: (1) a review of common
AAC intervention techniques; (2) an exami-
nation of the effect that such interventions
have on the AAC skills of children; and (3)
an examination of the effect that AAC inter-
ventions have on other communication
modes, including speech and various types of
gestures.

INTERVENTION TECHNIQUES

A growing number of AAC interventions that
focus on improving language and communica-
tion skills have appeared in the AAC literature. Some of these approaches include the fol-
lowing:

- The System for Augmenting Language has
  been used to teach school-aged individuals
  with significant intellectual impairments as
  well as toddlers and preschoolers to improve
  early receptive and expressive semantic de-
  velopment.2,3 The key components of this
  program include use of a speech-generating
device (SGD), use of individually chosen and
contextually relevant graphic symbols, prac-
tice within everyday communication con-
texts, partners’ use of augmented input, and
methods for monitoring progress.
- The Picture Exchange Communication Sys-
tem (PECS) is a graphic symbol–based pro-
gram designed to improve early symbolic
communication skills and has been used
most frequently with children who have autism spectrum disorders.4–6
- A least-to-most cueing hierarchy has been
used within role plays and natural environ-
ments to teach a wide variety of individuals
who used AAC to improve their pragmatic
skills.7 This hierarchy consists of a natural
cue, an expectant delay, a point toward the
AAC device or the person using AAC, and
an aided AAC model.
- Least-to-most cueing hierarchies have been
used within story reading contexts to teach
children with a variety of disabilities who
used AAC to improve their turn-taking
skills8,9 and to learn to consistently produce
multisymbol messages.10,11 These cueing hi-
erarchies include the following intervention
techniques: aided AAC modeling, expectant
delays, who, what, where (WH) questions,
verbal prompts, and contingent responses.
- Milieu teaching strategies (i.e., time delay
and mand-model procedures) and a matrix
strategy (i.e., systematically combining a
limited set of words from one semantic class
with a set of words from another semantic
class) have been used to teach children who
use AAC to create action-object symbol
combinations.12 For the milieu approach,
time delays are provided by inserting a
5- to 10-second pause between the natural
cue and instructional prompt, and verbal
prompts are provided by asking non–yes/no
questions, instructing the students to
verbalize (mands), and providing imitative
prompts (models). Matrix strategy instruc-
tion involves the researchers systematically
combining various action-object construc-
tions, such as “drop fork” and “drop cup.”

All of these various approaches to instruc-
tion employ a variety of intervention tech-
niques, and many of the above programs make
use of similar intervention techniques. Some of
the techniques that are commonly used are
discussed below.

Aided AAC Modeling

Most intervention programs use some type of
modeling technique to show the student how
to use aided AAC symbols. With the PECS program (which uses a most-to-least cueing hierarchy), the communication partner initially uses a hand-over-hand technique to show the student how to use graphic symbols. Most of the other programs listed above use aided AAC modeling (also known as augmented input or aided language stimulation), which has proved effective for supporting the early language skills of some children who use AAC. Here, the communication partner selects symbols on the child’s AAC device while communicating with the student. Typically, the partner also provides a spoken model. For example, if the student and educational assistant (EA) are reading Clifford the Big Red Dog, the EA can read “Hi, I’m Emily Elizabeth and this is my dog Clifford” while selecting the symbols for EMILY ELIZABETH and CLIFFORD on the student’s AAC device. Providing aided AAC models within everyday communicative contexts (e.g., various classroom activities such as story reading or science centers) helps the student to learn how to communicate effectively within those contexts.

**Expectant Delay**

Another commonly used technique is to provide an expectant delay, also known as a time delay. The clinician provides extended wait time, typically (but not always) accompanied by extended eye contact and an expectant facial expression. This cue is designed to ensure that the student is provided with the time, opportunity, and expectation to communicate. Because communication partners—including educators as well as parents—often fail to provide opportunity for communication when working with children who have severe disabilities, this is an essential technique for most AAC intervention programs, and most of the intervention programs listed above incorporated the use of expectant delays. It should be noted, however, that some children within particular ethnic and cultural groups may perceive extended eye contact and an expectant facial expression as a sign of disapproval. In such cases, an extended pause may still be used in absence of eye contact and an expectant facial expression.

**WH Questions**

WH questions, such as who, what, and where questions, also may be used to prompt communicative turns. For example, Kent-Walsh, Binger, and colleagues have included the use of WH questions within cueing hierarchies designed to increase turn-taking skills and multisymbol message use (Binger and Kent-Walsh, unpublished data). These types of questions prompt higher content turns than do yes/no questions. For example, instead of asking “Is Clifford going for a walk?” and receiving a “yes” or “no” response, the educator can ask “What is Clifford doing?” thus eliciting a response such as GO WALK. This technique can assist with both semantic development (as the child will need to use vocabulary beyond “yes” and “no”) and syntactic development (as multisymbol turns can be elicited using this technique).

**Responsivity**

Providing contingent responses to the child’s communicative turns, also known as responsivity, is another core component of most AAC intervention programs, including each of the intervention programs listed above. When communication partners respond contingently to communicative attempts, this teaches the child that his or her communication has the power to make an impact on others. To look at it another way, if communication partners do not respond to the communicative attempts that a student makes, the student may fail to continue to make those attempts; there is little point in trying to communicate when no one responds. Another potential negative outcome of failing to respond to communicative attempts is that the student may resort to challenging behaviors to relay messages if his or her original message is not acknowledged. However, if SLPs, educators, and other communication partners learn to recognize and respond to the student’s communicative attempts, these challenges often can be avoided.
IMPACT OF AAC INTERVENTION TECHNIQUES ON AAC MEASURES

Typically, the main focus of AAC intervention is to create improvements in AAC comprehension and/or use; indeed, the primary objective for nearly all of the studies discussed above was for the children using AAC to improve their AAC skills. Use of all of the described intervention programs resulted in at least some increases in AAC comprehension and/or use for most of the children in each investigation.

However, given the multimodal nature of communication, there are other potential effects on expressive communication that should be examined when implementing AAC interventions designed to target language and communication skills. In the remainder of this article, we will examine the effects of such AAC interventions on various modes of expressive communication through several illustrations, beginning with data presented in Figs. 1 and 2. All of the data in Fig. 1 are derived from an investigation involving Latino parents and their three children who used AAC, and the data in Fig. 2 are derived from a similar study involving EAs and their three students who used AAC (Binger and Kent-Walsh, unpublished data). The children in these studies had disabilities such as childhood apraxia of speech, developmental disabilities, cerebral palsy, subpalatal cleft accompanied by profound velo-pharyngeal incompetency, and suspected velo-cardial-facial syndrome. In both studies, a major aim was to improve the rate of multisymbol message productions of the children who used AAC. Both studies were single subject, multiple baseline across participant research designs. It should be noted that for the purposes of illustration, Figs. 1 and 2 are not graphed as multiple baseline designs are typically graphed; readers are referred to the original articles/presentations to view the main results of both investigations. The data in Figs. 1 and 2, and in Tables 1 and 2, represent analyses that are additional to the data presented in the original studies. In both studies, the communication partners (that is, Latino parents and EAs) were taught to use a least-to-most cueing hierarchy while reading to the children who used AAC. The hierarchy included the following steps: (1) provide a natural cue by reading the text and using aided AAC modeling (e.g., saying “Hi, I’m Emily Elizabeth and this is my dog Clifford” while selecting EMILY ELIZABETH and CLIFFORD on the child’s device); (2) ask a WH question and use aided AAC modeling (e.g., saying “What are Emily Elizabeth and Clifford going to do?” while modeling EMILY ELIZABETH and CLIFFORD on the device); and (3) answer the WH question and use aided AAC modeling (e.g., saying “I think they’re going to go for a walk” while modeling GO and WALK). In addition, in the EA study, a fourth step was added in which the EA provided a very brief verbal prompt, such as “Your turn” or “Show me two.” Expectant delays were provided between each of the above steps, and the partners were also taught to respond contingently to each of the child’s turns (e.g., if the child says WALK, the adult responds, “Yes, Clifford is going for a walk” while modeling GO WALK).

Graphs 1A and 2A on Figs. 1 and 2, respectively, display the total number of aided AAC symbols that all of the children selected within each session, each of which consisted of a 10-minute story reading activity. When comparing performance during the baseline phase (i.e., before the aided AAC intervention techniques were implemented) with the remaining phases (intervention, generalization, and maintenance), it is readily apparent from examining graphs 1A and 2A that the children in both studies made significant gains in their use of aided AAC symbols. Further, data in Tables 1 and 2 show that these increases were statistically significant for all six children. This is not surprising, as the goal of these studies was to improve AAC use (more specifically, to improve rates of multisymbol message productions).

Another important aided AAC measure is the total number of nonimitative aided AAC symbols within each session. Although imitation is an important part of language development, ideally we would like to see that the

*A second coder reanalyzed between 20% and 40% of the data for all of the measures shown on Figs. 1 and 2. Mean reliability for each measurement for each child ranged from 79% to 100% (grand mean = 93%), indicating that the data were reliably coded.
Figure 1  Symbolic communication for children in Latino parent study.
Figure 2  Symbolic communication for children in educational assistant study.
children are not simply imitating the aided AAC symbols that are modeled but instead are producing many original messages. Graphs 1B and 2B in 1 and Fig. 2, respectively, depict the children’s use of nonimitative AAC symbols within each session of the investigations. Nonimitative symbols were defined as aided AAC symbols that the child selected that did not imitate either the speech or aided AAC models of the communication partner’s immediately prior turn. By comparing graphs 1A with 1B and graphs 2A with 2B, we can examine whether or not the children’s use of nonimitative symbols increased as their overall aided AAC use increased. The patterns across these graphs reveal that such increases did, indeed, occur. The data in Tables 1 and 2 further illustrate this point. All of the children in both studies achieved statistically significant increases in their use of nonimitative aided AAC symbols when comparing baseline with postbaseline phases. In other words, the children did not simply imitate the adults’ aided AAC productions but actually created their own novel aided AAC messages a great deal of the time. The intervention packages used in these investigations (which included aided AAC models, expectant delays, WH questions, verbal prompts, and contingent responses), then, can be said to support the use of nonimitative aided AAC symbol use—a highly desirable outcome for building linguistic competence.

**Table 1 Baseline and Postbaseline Measures for Latino Parent Investigation**

<table>
<thead>
<tr>
<th>Child</th>
<th>Mean</th>
<th>Baseline</th>
<th>Postbaseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antonio</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. aided AAC symbols</td>
<td>14</td>
<td>46**</td>
<td></td>
</tr>
<tr>
<td>No. nonimitated aided AAC symbols</td>
<td>10</td>
<td>33**</td>
<td></td>
</tr>
<tr>
<td>No. syllables vocalized</td>
<td>50</td>
<td>89</td>
<td></td>
</tr>
<tr>
<td>No. points to book</td>
<td>6</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>No. gestures</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Angela</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. aided AAC symbols</td>
<td>5</td>
<td>47**</td>
<td></td>
</tr>
<tr>
<td>No. nonimitated aided AAC symbols</td>
<td>2</td>
<td>39**</td>
<td></td>
</tr>
<tr>
<td>No. syllables vocalized</td>
<td>89</td>
<td>62</td>
<td></td>
</tr>
<tr>
<td>No. points to book</td>
<td>13</td>
<td>6**</td>
<td></td>
</tr>
<tr>
<td>No. gestures</td>
<td>32</td>
<td>14**</td>
<td></td>
</tr>
<tr>
<td>Julia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. aided AAC symbols</td>
<td>8</td>
<td>39**</td>
<td></td>
</tr>
<tr>
<td>No. nonimitated aided AAC symbols</td>
<td>6</td>
<td>21**</td>
<td></td>
</tr>
<tr>
<td>No. syllables vocalized</td>
<td>209</td>
<td>214</td>
<td></td>
</tr>
<tr>
<td>No. points to book</td>
<td>43</td>
<td>23**</td>
<td></td>
</tr>
<tr>
<td>No. gestures</td>
<td>30</td>
<td>17**</td>
<td></td>
</tr>
</tbody>
</table>

\*\*p < 0.01.
Note: All names are pseudonyms. The Mann-Whitney test for statistical significance was used for all significance tests.
Source: Data from Binger C, Kent-Walsh J, Berens J, Del Campo S, Rivera D. Teaching Latino parents to support the multi-symbol message productions of their children who require AAC. Augment Altern Commun 2008; in press.

**Table 2 Baseline and Postbaseline Measures for Educational Assistant Investigation**

<table>
<thead>
<tr>
<th>Child</th>
<th>Mean</th>
<th>Baseline</th>
<th>Postbaseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oscar</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. aided AAC symbols</td>
<td>0</td>
<td>36**</td>
<td></td>
</tr>
<tr>
<td>No. nonimitated aided AAC symbols</td>
<td>0</td>
<td>18**</td>
<td></td>
</tr>
<tr>
<td>No. syllables vocalized</td>
<td>59</td>
<td>53</td>
<td></td>
</tr>
<tr>
<td>No. points to book</td>
<td>8</td>
<td>2*</td>
<td></td>
</tr>
<tr>
<td>No. gestures</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Adam</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. aided AAC symbols</td>
<td>0</td>
<td>34**</td>
<td></td>
</tr>
<tr>
<td>No. nonimitated aided AAC symbols</td>
<td>0</td>
<td>27**</td>
<td></td>
</tr>
<tr>
<td>No. syllables vocalized</td>
<td>46</td>
<td>63</td>
<td></td>
</tr>
<tr>
<td>No. points to book</td>
<td>12</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>No. gestures</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Valerie</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. aided AAC symbols</td>
<td>0</td>
<td>43**</td>
<td></td>
</tr>
<tr>
<td>No. nonimitated aided AAC symbols</td>
<td>0</td>
<td>35**</td>
<td></td>
</tr>
<tr>
<td>No. syllables vocalized</td>
<td>76</td>
<td>84</td>
<td></td>
</tr>
<tr>
<td>No. points to book</td>
<td>16</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>No. gestures</td>
<td>14</td>
<td>7*</td>
<td></td>
</tr>
</tbody>
</table>

\*p < 0.05. \*\*p < 0.01.
Note: All names are pseudonyms. The Mann-Whitney test for statistical significance was used for all significance tests.
No., number of.
Source: Data from Binger C, Kent-Walsh J, Del Campo S, Hickman S, Marquez C, Rivera D. Teaching educators and parents to support language development in AAC. Presented at: Annual Conference of the American Speech-Language-Hearing Association, November 2006; Miami, FL; and from Binger and Kent-Walsh (unpublished data).
EFFECT OF AAC INTERVENTION TECHNIQUES ON NON-AAC MEASURES

Thus far, we have focused on AAC outcomes that result from AAC-based interventions. Even though the primary focus of these interventions was on AAC, it is important to note that most of the intervention techniques discussed above actually provide support for a variety of communication modes. An expectant delay provides an opportunity for the child to take a communicative turn using any mode of communication. When a partner provides aided AAC models, he or she typically uses speech as well as aided AAC (e.g., saying “Hi, I’m Emily Elizabeth and this is my dog Clifford” while selecting EMILY ELIZABETH and CLIFFORD on the child’s device), thereby providing the child with a speech model as well as an aided AAC model. WH questions do not preclude the use of speech, and further, many WH questions can be answered with gestures; for example, a child can answer “Where’s Clifford?” by pointing to the picture of Clifford in the storybook. With respect to contingent responses, communication partners typically are instructed to respond contingently to any communication mode that the student uses. For example, Kent-Walsh16 taught EAs to respond contingently to a wide variety of turns produced by the students who used AAC, including aided AAC symbols, speech/vocalizations, manual signs, head nods/shakes, and pointing to pictures. What effects, then, do using these AAC techniques have on non-AAC measures, such as speech and gestures?

Relationship between AAC and Speech

We will begin by examining the impact of aided AAC on speech, as this is an area of great concern to everyone who works with children who use AAC. Millar and colleagues18 conducted a meta-analysis of the AAC literature to determine the impact of AAC on speech. Only a few of the studies these authors reviewed involved the use of aided AAC (most studies focused on manual sign use), and only one of these studies presented “best evidence”; that is, studies in which experimental control was used and the relationship between the use of AAC and speech could be reliably examined. The results of this study indicated that all three children in the study demonstrated increases with their speech as a result of using PECS.5

In a much larger scale study published after Millar and colleagues’ review, Yoder and Stone19 also examined the impact of using PECS on speech. Thirty-six preschoolers with autism spectrum disorders (ASD) participated in this investigation; half were randomly assigned to receive PECS intervention, and the other half received a combination of responsive education and prelinguistic milieu teaching intervention (RPMT). Responsive education is a parent instructional program designed to teach parents ways to facilitate their children’s communication and language development, and prelinguistic milieu teaching is a child directed, play-based approach to intervention designed to teach use of gestures, vocalizations, gaze, and words. Thus, the PECS group was exposed to aided AAC and the RPMT group was not. The results indicated that both groups of children demonstrated increases in their speech (i.e., nonimitative spoken communication acts and number of different nonimitative words). Further, immediately after intervention, the PECS group’s increases were actually greater than the speech gains made by the children in the RPMT group. The differences between the speech of the groups was no longer significant 6 months after treatment ended, but regardless, these findings provide strong evidence that PECS can have a positive effect on speech outcomes for children who use AAC.

After reviewing these findings, the reader may be left with questions about children with disabilities other than autism and programs other than PECS, particularly those involving the use of voice-output devices. None of the “best evidence” studies included in the meta-analysis of Millar and colleagues18 involved the use of voice-output devices. To our knowledge, graphs 1C and 2C of Figs. 1 and 2 represent two of the first data sets derived from experimentally controlled studies that examine the effect on speech from using aided AAC.
intervention programs that involve (a) the use of voice output devices and (b) children with disorders other than autism. One exception is Sigafoos and colleagues, who examined the impact of using a voice output device that contained a single message (“I want more”) on the frequency of vocalizations for three children with developmental disabilities. The findings indicated that use of the voice output device did not have a negative impact on the vocalizations of these three children. For the data depicted in Figs. 1 and 2, five of the six used voice-output devices; only one child (Angela) used low-tech communication boards. Graphs 1C and 2C depict the number of syllables that the children vocalized within each session. These productions varied widely from session to session for many of the children; few clear patterns emerge from the data, with the possible exception that the number of syllables the children vocalized decreased during the first intervention session for all but Antonio. This decrease may indicate that the children’s cognitive resources were allocated to the many changes that were taking place during this session. That is, in this session, the communication partners were using aided AAC modeling and other intervention techniques, all of which were relatively new for the children. However, the children’s rate of vocalizations recovered quickly in subsequent sessions. Tests for statistical significance, presented in Tables 1 and 2, revealed no significant differences in the number of syllables vocalized between the baseline and postbaseline sessions for any of the children. This indicates that the intervention program, which included the use of voice-output devices for five of the six children, did not have a negative effect on their speech. It is not known what the longer-term impact that using voice-output devices might have on speech. Further research that includes longitudinal data is necessary to answer this question. In the meantime, it is heartening to know that at the very least, using aided AAC should not negatively affect speech, and in many cases using aided AAC may result in speech improvements.

Relationship between Aided AAC and Symbolic Gestures

Another point to consider is the effect that using aided AAC has on symbolic gestures, such as head nods/shakes and pointing. Although there is a substantial body of literature that illustrates the multimodal nature of communication for individuals who use AAC, few studies have examined what happens to gestures and other communication modes when a child increases use of aided AAC. Lilienfeld and Alant, who used a peer-training program to help increase the classroom communicative success of an adolescent with cerebral palsy, found that once the peers began using more facilitative communicative techniques (i.e., increasing time for communication, asking open-ended questions, and other techniques), the adolescent’s use of body movements to communicate increased as a primary mode of communication. Also, this student preferred to use his speech to communicate and seldom used his voice-output device in any phase of the investigation; thus, using gestures to communicate was likely essential for attempting clarification of his speech.

In contrast, let us examine the remaining graphs on Figs. 1 and 2. Graphs 1D and 2D depict the number of times that the children pointed to pictures in a book during 10-minute story-reading sessions, and graphs 1E and 2E show the number of times the children used other gestures, including pointing to objects other than the book, head nods/shakes, and other symbolic gestures, such as raising a hand to indicate “stop.” These graphs demonstrate that for the children in these studies, their use of gestures (both pointing to pictures in books as well as other gestures) either remain at approximately the same levels or decline. The data in Tables 1 and 2 show that three of the children (Angela, Julia, and Oscar) demonstrated statistically significant decreases in their book-pointing rates, and three children (Angela, Julia, and Valerie) demonstrated significant decreases with other types of symbolic gestures (e.g., pointing to other objects, head nods/shakes).

1 It should be noted that manual signs were excluded from these data. The children in these studies seldom used manual signs; Antonio and Adam each used one sign during the entire investigation, and Oscar used six. The remaining children used no manual signs.
Why did these children decrease their use of gestures once intervention began, when the participant in the Lilienfeld and Alant study increased his use of gestures? The answer probably lies in the nature of the interventions. Although some of the same techniques were used across these studies (e.g., expectant delay, open-ended/WH questions, contingent responses), one key difference is that the intervention program for the adolescent in the Lilienfeld and Alant study did not place any particular emphasis on the student increasing aided AAC use, so he relied on speech and gestures to communicate. In contrast, the intervention program used by Binger and colleagues\(^{10,11}\) (Binger and Kent-Walsh, unpublished data) placed a significant focus on aided AAC use. The fact that some of the children in the latter studies seemed to be using their gestures to access their aided AAC devices rather than relying as much on other types of gestures is a positive finding, as it indicates that the children are using a more linguistically sophisticated mode of communication; that is, instead of using many head nods, head shakes, points to pictures in books, and other gestures, the children tended to use their communication devices. This is an important shift, as it is only through the use of language-based communication modes that children can begin to combine symbols and begin to create more complete messages.

Certainly, this does not mean that children who use AAC should be discouraged from using gestures, nor does it mean that gestures will not continue to have their place. For example, if the teacher is reading a book and asks “Where’s Clifford?” the most efficient way to answer that question may be to point to the picture of Clifford in the book, which is a perfectly acceptable response and indicates a degree of communicative competency. Ideally, children who use AAC need to learn to use multiple modes of communication efficiently and effectively, and the fact that the children in these studies continued to use their gestures, even if at lower rates, may be an indicator that they continued to use these gestures when the circumstances warranted it.

## CONCLUSION

Several conclusions can be drawn from the data discussed above. First, it is apparent that for many children, taking the time to teach children to use aided AAC is more than worth the costs. Many children who use AAC have been shown to make rapid gains in their aided AAC productions when they are exposed to facilitative intervention techniques. Second, experimentally controlled research studies have shown that there is no negative effect on speech from using aided AAC (Figs. 1 and 2; Tables 1 and 2), and using aided AAC may result in improvements in speech for many children.\(^{19}\)

Using aided AAC also may result in some children using fewer gestures that do little to build expressive language skills (such as pointing to pictures in a book); instead, children begin to use their energies to access their AAC devices, which can provide them with the means to vastly expand their level of linguistic competence. Overall, then, research findings to date indicate that implementing aided AAC intervention programs can yield very positive outcomes for aided AAC use without compromising other communication modes and may have a positive effect on speech for some children.

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