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Grammatical Morpheme Intervention Issues for Students Who Use AAC

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Abstract

Many children who use AAC experience difficulties with acquiring grammar. At the 9th Annual Conference of ASHA's Special Interest Division 12, Augmentative and Alternative Communication, Binger presented recent research results from an intervention program designed to facilitate the bound morpheme acquisition of three school-aged children who used augmentative and alternative communication (AAC). Results indicated that the children quickly began to use the bound morphemes that were taught; however, the morphemes were not maintained until a contrastive approach to intervention was introduced. After the research results were presented, the conference participants discussed a wide variety of issues relating to grammar acquisition for children who use AAC. Some of the main topics of discussion included the following: provision of supports for grammar comprehension and expression, intervention techniques to support grammatical morpheme acquisition, and issues relating to AAC device use when teaching grammatical morpheme use.

Children who require augmentative and alternative communication (AAC) have a high risk of developing grammar disorders (Binger & Light, in press). One particularly challenging area of grammar, at least for some children who use AAC, is with comprehending and using grammatical markers. For example, Blockberger and Johnston (2003) included 20 children with complex communication needs (CCN) in a study designed to assess comprehension and production of bound morphemes. The children with CCN performed more poorly on the bound morpheme tasks than both typically developing and language-matched controls. In another study in which the written output of adolescents and young adults was analyzed, all six participants who used AAC demonstrated expressive grammatical errors (Kelford Smith, Thruston, Light, Parnes, & O'Keefe, 1989).

Bound Morpheme Intervention Study

Unfortunately, very little research has been conducted to date to teach morphological skills to individuals who use AAC. To address this need, Binger (2008) recently completed an investigation designed to teach bound morphemes to elementary school-aged students who used AAC, and the results of this investigation were presented at the 9th Annual Conference of ASHA's Special Interest Division 12,

Augmentative and Alternative Communication. Three students—Alex, Jessie, and Ian—participated in the study, and three morphemes were targeted for each child (see Table 1). Each child used a speech-generating device (SGD) to communicate, specifically, either a Vantage or Vanguard (manufactured by Prentke Romich Company); with these Minspeak™-based devices, each bound morpheme is accessed by selecting a separate symbol on the device; that is, there is a separate symbol for progressive *-ing*, plural *-s*, possessive *'s*, etc.

Table 1. Participant Information for Binger, 2008

Name ^a	Age	Diagnosis	TACL-3 GM ^b Age Equivalent Scores	Intervention Targets
Alex	11	Cerebral palsy	6 yrs, 3 mo	- present progressive <i>-ing</i> - possessive <i>'s</i> - 3rd person singular <i>-s</i>
Jessie	6	Childhood apraxia of speech	4 yrs, 9 mo	- possessive <i>'s</i> - regular past tense <i>-ed</i> - plural <i>-s</i>
Ian	9	Cerebral palsy	5 yrs, 0 mo	- regular past tense <i>-ed</i> - possessive <i>'s</i> - present progressive <i>-ing</i>

^aPseudonyms have been used to protect the confidentiality of the participants.

^bTest of Auditory Comprehension of Language, 3rd ed. (Carrow-Woolfolk, 1999, #104) – Grammatical Morphemes subtest

Binger (2008) used storybook reading as a context for intervention. Each child selected a series of books that he or she enjoyed reading (*Scooby-Doo*, *Muppet Babies*, and *Teenage Mutant Ninja Turtles*). The intervention techniques that were used to teach bound morpheme use included modeling and recasting. Models and recasts have been used successfully to teach grammatical morpheme use to many children with language disorders who rely on speech to communicate (e.g., Fey, Cleave, Long, & Hughes, 1993). Models and recasts were adapted to ensure suitability for students who use AAC. To provide models, Binger used an aided AAC modeling procedure (Binger & Light, 2007); that is, in addition to spoken models of the targeted morphemes, symbols were selected on the students' SGDs. For example, while reading a *Scooby-Doo* book with Alex, the researcher could say, "Scooby-Doo is running from that scarecrow!" and then select *HE IS RUN + ING* on Alex's SGD. Recasts took one of two forms: (a) revising the students' errors; for example, if Alex said *HE ARE EAT* using his SGD, the research could reply, "Yes, He is eating" while modeling *HE IS EAT + ING* on the SGD; or (b) completing the students' sentences; for example, if Ian said *THEY* using his SGD, the research could say "They kicked" while selecting *THEY KICK + ED* on Ian's SGD.

To evaluate the effectiveness of the program, Binger (2008) used a single subject, multiple baseline across targets design. Probe items served as the dependent variable and were used to track the students' progress. The researcher administered 10 randomly selected probes (from a pool of 50 probes for each bound morpheme) at the beginning of each session. Each probe item consisted of clipart figures that were placed on a felt board. For example, for one of the plural -s probes, the researcher placed a clipart figure of a horse on the felt board while saying, "Here is one horse," and then placed a second figure on the board while continuing, "and here are two ____." The child was expected to complete the sentence using his or her SGD (i.e., *HORSE + S*).

Results indicated that all of the students quickly began using the first targeted morpheme fairly rapidly; all reached criterion (i.e., at least 80% accuracy on probes for three consecutive sessions) after less than 2 hours of instruction (1 session = 15 minutes). Interestingly, however, none of the students maintained use of the first bound morpheme that he/she learned; 2 weeks after meeting criterion, all children demonstrated 0% accuracy on the probes. Alex's first target was present progressive (auxiliary verb + main verb + *ing*); he made a variety of errors that included failing to use the auxiliary verb, failing to use *-ing*, and using the wrong bound morpheme (possessive 's instead of *-ing*). Jessie did not use any bound morphemes during her first maintenance check (target = possessive 's). Ian, whose first target was past tense *-ed*, failed to use bound morphemes on some probes (e.g., *SHE TALK TO A DOG*) and used the wrong bound morpheme in other cases (e.g., *HE COOK + 'S*).

Obviously, failing to maintain use of the morphemes was not an acceptable outcome for the students; therefore, a second intervention phase was introduced in which the research introduced a contrastive intervention technique, in addition to continuing use of models and recasts. The researcher provided contrastive models of the first and second targets. For example, Ian's first target was progressive *-ing*, which he sometimes confused with the second target, possessive 's. Therefore, the researcher provided models that contrasted use of the present progressive form (e.g., *DOG IS RUN + ING*) with the possessive form (*DOG + 'S HAT*). Following completion of the second intervention phase, all students maintained use of the bound morphemes.

With respect to the remaining targets, both Alex and Ian used the second and third targets successfully and maintained use of those morphemes for up to 5 months. Jessie required a second intervention phase for her second target (regular past tense *-ed*), but she also eventually maintained use of all three bound morphemes.

The findings from this intervention program, then, indicated that modeling and recasting appeared, at first, to have been an effective approach to intervention, as all three students reached criterion. However, the fact that they failed to maintain use of the first targeted morpheme indicates that the students did not truly acquire the morphemes initially. There are many potential explanations for this. First, it is possible that the students learned rote patterns without learning the meaning of the morphemes. That is, they may have learned that whenever the researcher asked them to do something, they were supposed to hit a particular symbol on their SGD (e.g., the *-ED* symbol). Another possibility is that intervention was simply not long enough; that is, the students may have been able to acquire and retain correct use of the morphemes if they had participated in more sessions. For Ian, a third option arose: at times, when he created longer sentences, he failed to use bound morphemes. For example, Ian frequently failed to use past tense *-ED* when he added words after the

verb, such as *SHE TALK TO A DOG*, even though he used the *-ED* ending fairly consistently in shorter sentences such as *HE WALK + ED*. Encouragingly, Ian eventually began to self-correct errors in his longer sentences.

Bound Morpheme Intervention: Key Issues and Questions

The findings from this initial investigation raise many issues regarding the development of grammatical morphemes for children who use AAC. At the 2008 Division 12 Conference, the conference participants engaged in a lively discussion about various issues relating to this topic. Some of the key points of the discussion are summarized below.

Comprehension vs. Expression: What Should We Teach?

One of the most basic questions the participants discussed was whether or not it is worth the costs in time and effort, to both the clinician and the child, to target bound morpheme use in children who use AAC. Some participants suggested that one key to intervention may be to place a primary focus during the children's early years on grammatical comprehension to ensure that the child has built a strong foundation for understanding various grammatical structures, and to wait to target use of grammatical morphemes until later stages of language development. One participant noted that language development research has revealed that children at the single-word stage of language development and who are as young as 16 months have been shown to demonstrate sensitivity to word order differences (Golinkoff, Hirsh-Pasek, Cauley, & Gordon, 1987). It may be possible, then, to develop effective grammar comprehension programs for children who use AAC who are at the early symbolic stage of language development.

Several participants pointed out, however, that comprehension can often be improved through production, and clinicians may be doing a disservice to children who use AAC by not providing opportunities to produce grammatical structures. Although some children may possess an underlying degree of grammatical competence, this will not be true for all children who use AAC (e.g., Blockberger & Johnston, 2003). Being able to explore the use of grammatical morphemes—including the production of both correct and incorrect structures—may be a key component to acquiring grammatical concepts. Perhaps, then, an integrated approach in which clinicians provide grammar comprehension intervention to “keep the comprehension side moving,” as one participant put it, while simultaneously providing at least some exposure to grammar production opportunities would benefit many young language learners who use AAC.

Intervention Techniques for Teaching Bound Morpheme Production

As discussed above, Binger (2008) used aided AAC modeling, recasting, and contrastive intervention techniques to teach bound morpheme use. With respect to aided AAC modeling, one participant wondered how much intervention actually would be necessary if parents were taught to immerse the child in aided AAC very early in development. AAC theorists and researchers frequently have recommended providing models using the communication modes that the child is expected to use (e.g., Smith & Grove, 2003; Sutton, Soto, & Blockberger, 2002). New findings from Light and Drager (2007), in which the interventionists immersed children who were as young as 6 months of age in aided AAC activities, supports notion of immersing young children in AAC.

Participants also discussed the role that recasting plays when using aided AAC. Binger noted that when she used recasts with the children in the bound morpheme intervention study, the aided AAC recasts seemed to be much more corrective than spoken recasts. For example, if Alex said *CLIFFORD ARE WALK* on his device, the interventionist provided a recast by pointedly selecting the symbols *CLIFFORD IS WALK + ING*. This is quite different from a quick, spoken model; aided AAC recasts take a significantly longer period of time than spoken recasts, and this may interrupt the fluidity of the interaction. The participants offered several ideas for improving the nature of recasts. First, one person suggested that if aided AAC models were provided consistently during interactions—not just after the child’s errors—the recasts might soon cease to seem so pointedly corrective to the child. Another participant suggested using a laser pointer to indicate which symbols the child should select, as has been recommended by Goossens’ and colleagues (Goossens’, Crain, & Elder, 1995). Finally, Quach (2007) recently introduced a technique known as “dual screen guidance,” in which children are guided to make appropriate selections on a shared display screen of a second monitor; in other words, the interventionist is not actually working directly on the child’s device but is using a second monitor to provide selection guidance.

The participants also discussed the role of contrastive intervention techniques for teaching bound morphemes and other grammatical structures to children using AAC. One participant noted that when grammar intervention is provided for children with specific language impairment (SLI), intervention often begins with contrastive intervention techniques—that is, providing contrasts of the child’s form with the adult form through the use of recasts (Fey, Long, & Finestack, 2003). This approach highlights the saliency of the contrasted grammatical patterns from the very beginning of the intervention. As children with SLI typically omit grammatical structures, the interventionist contrasts omitted grammatical structures with the correct grammatical structures. In contrast, children who use AAC may produce unusual errors at times (Binger & Light, in press) instead of simply omitting grammatical structures. For example, in Binger’s (2008) study discussed above, Ian sometimes replaced past tense *-ed* with possessive *'s* (e.g., *HE ROLL + 'S* instead of *HE ROLL + ED*). Researchers and clinicians who develop grammar intervention programs, then, should consider providing contrastive intervention techniques when intervention first begins, and they should be sure to contrast the children’s actual errors—which may consist of omissions or unusual replacements—with correct grammatical markers.

AAC Device Issues

Using an aided AAC device to produce grammatical structures such as bound morphemes introduces unique factors to the task of grammatical expression. One question that arose during the conference discussion related to the metalinguistic demands of using aided AAC devices. When typically developing children first begin to use bound morphemes, they are quite young and do not have the metalinguistic skills required to talk about or analyze the morphemes that they are using. Accessing bound morphemes via aided AAC, however, is a very different task. When using a Minspeak™-based device, for example, such as the children in Binger’s (2008) bound morpheme study, all bound morphemes are represented using separate symbols (e.g., one symbol for *-ing*, another for plural *-s*, another for possessive *'s*). Conference participants questioned whether or not children who use AAC must have metalinguistic skills to use grammatical markers appropriately. It may be the case that children need metalinguistic skills to accurately select and use bound morphemes when using aided AAC. However, it may be possible that some children, with enough

exposure to aided AAC modeling, might be able to use such markers automatically (i.e., by established motor patterns on the device), similar to the way that a typically-developing 3 or 4 year old uses such markers. If the latter is possible, researchers and clinicians must consider whether or not such an accomplishment is worth the costs, in terms of time and effort. Clearly, research is required to address these complex issues.

It is also important to consider ways to represent grammatical markers other than selecting each marker as a separate symbol. Some software programs, such as WordPower™ (available on devices such as the DynaVox V [DynaVox, Inc.] and ECO-14 [Prentke Romich Company]), automatically affix word endings in some cases; for example, if the individual selects *I AM*, all of the verbs convert to their *-ing* forms (*RUNNING*, *WALKING*, etc.). Another possibility is to switch the verb tense of all messages until the individual changes the tense again. For example, the individual might select the “PAST” button to talk about past events, and when she is done, she selects the “PRESENT” button. This feature is a part of TALK Boards (available from Mayer-Johnston), a software program designed to enhance the rate of communication for literate individuals who use AAC (Todman, 2000). Currently, then, there are a number of different options available for using grammatical markers on AAC devices, and the potential viability and impact of each approach for a child who uses AAC must be analyzed carefully. One final option suggested by Janice Light (personal communication, January 3, 2008) is to teach children to express grammatical morphemes in conjunction with literacy skills, instead of accessing separate symbols on AAC devices. With this approach, in the period before the child has the literacy skills to produce grammatical morphemes, the clinician must ensure that the child is gaining grammatical competence via comprehension intervention.

Clearly, research is required to determine which approaches will work best with different children who use AAC. As multiple conference participants indicated, the AAC field is fortunate to have a number of AAC manufacturers who are aware that AAC software must be evidence-based, and these manufacturers are striving to accomplish this challenging task. Ongoing partnerships between AAC researchers, clinicians, and manufacturers are required to meet these challenges.

Conclusions

The work of determining how to approach the task of building the grammar skills of children who require AAC is in its infancy. Addressing the many issues relating to what skills to teach, how to teach those skills, and how to spend clinical resources wisely will require much work in the coming years. The great interest in this topic demonstrated by the 2008 Division 12 Conference participants indicates that the coming years promise to be fruitful ones.

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