Effects of a Positive Support Approach to Enhance Communicative Behaviors of Children with Mental Retardation who have Challenging Behaviors

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Abstract: This study investigated effects of a positive behavior support plan accompanied by an augmentative and alternative communication (AAC) intervention on the reduction of challenging behaviors manifested by children with moderate and severe mental retardation. A multiple-probe design across participants was used for collecting data on various challenging behaviors exhibited by students including: self-injurious behaviors, pinching, pulling, screaming, and crying. All behaviors were assessed using functional assessment, followed by a positive AAC support plan created by the school team. Participants were taught to use more appropriate alternative means to communicate. Results indicated a reduction in the percentage of intervals of challenging behaviors. The positive support plans created by the whole school staff used AAC for enhancing communicative behaviors. This plan provided students with alternatives, which also enabled them to enhance the learning of class material.

Communication difficulties place individuals with developmental disabilities at risk for developing significant behavior problems (Sigafoos, Pennel, & Graves, 1999). Challenging behaviors may include aggression, extreme tantrums, self-injury, and destruction of property. These behaviors may appear during early developmental stages and remain throughout the school years (Sigafoos, 2000). The impact of these behaviors can be to impede the individual’s learning progress and the development of social relationships. These behaviors may also result in disruptions of positive classroom environment and, as a consequence, present challenges to the personnel supporting the classroom (Sigafoos).

Researchers have found a strong relation between the difficulties children have with their communication and the existence of aberrant behaviors (e.g., Carr & Durand, 1985; Horner & Day, 1991). A recent review of research revealed that many interventions relating to aberrant or challenging behaviors included use of functional analysis and functional communication training as the primary strategy to reduce inappropriate behaviors (Mirenda, 1997). In some studies, augmentative and alternative communication (AAC) strategies were used during the intervention process (Mirenda). Some of these strategies included use of switches accompanied with symbols depicting messages that replaced inappropriate behaviors. For example, a switch with a repeated message was used for attracting attention of an adult by a toddler with aggressive behaviors (Peck et al., 1996). Research demonstrates that when inappropriate behaviors were assessed and a functional communication intervention was applied, children demonstrated fewer challenging behaviors and increased their communicative behaviors (e.g., Carr & Durand; Horner & Day; Horner, Sprague, O’Brien, & Hearthfield, 1990).

Functional intervention includes a systematic assessment of the function of the problem behaviors followed by an intervention procedure intended to substitute the inappropriate behaviors with more acceptable and functionally equivalent ones. In the study by Carr and Durand (1985), for example, a systematic assessment evaluated the communicative func-
tions of four students with mental retardation who engaged in significant challenging behaviors including self-injury and property destruction. Once the functional analysis was completed and the communicative function was identified (i.e., adult attention seeking), a communication intervention was implemented to replace the challenging behaviors with positive communicative phrases (Carr & Durand). The use of challenging behavior as an attention-getting strategy was demonstrated in several studies using functional analysis to investigate and treat problem behaviors (Carr & McDowell, 1980; Hall & Belfiore, 1997; Taylor & Carr, 1992). These inappropriate strategies that served as the most efficient means to transmit the messages, were possibly learned in early childhood (Sigafoos, 2000).

Providing individuals with opportunities to engage in new, more efficient, and more appropriate means to obtain attention is an effective strategy for reducing challenging behaviors. However, the need to use elaborate measures to analyze the functions of the behaviors, and the need to follow rigorous procedures used to eliminate previous behaviors by substituting them with new appropriate behaviors, has been difficult for teachers (Matson, Bamberg, Cherry, & Paclawskyj, 1999). Positive behavior support has the potential for providing a systematic framework for altering inappropriate communication behaviors manifested by children with mental retardation (Sugai, Sprague, & Horner, 1999).

Positive behavior support is defined as an approach for reducing behavior problems associated with deficits within the environment. Positive behavior support uses functional assessment to identify the function of the behavior. After identifying the challenging behaviors and their functionality, a systematic instruction plan is created to assist the environment (i.e., teachers and other support staff) in providing positive support to help students substitute inappropriate behaviors with ones that are appropriate (Weigle, 1997). This approach is based on team activities that evaluate the behaviors and plan a systematic intervention using a positive behavior support plan. The positive behavior support plan occurs within a long-term plan using broad lifestyle intervention.

This study was designed to use the positive behavior support approach to identify communicative functions of challenging behaviors exhibited by children with moderate and severe mental retardation, and to provide teachers and staff with a positive intervention procedure applicable within the classroom. The goal was to provide the school team with tools to develop the functional assessment and the intervention plan, and to implement them within their own classrooms. The intervention strategies applied AAC strategies using voice output devices accompanied with recorded messages and appropriate symbols depicting the substitute messages. The purpose of this study was to examine effects of training teachers and the school team to identify and use a positive AAC support system to replace challenging behaviors with appropriate communicative behaviors among students with moderate and severe mental retardation.

Method

Participants

Children with mental retardation were selected to participate in the study according to the following criteria: (a) formal diagnosis of moderate or severe mental retardation, (b) between 12-19 years of age, (c) classified according to school records as having a history of challenging behaviors for at least three years, and, (d) use gestures and/or verbalization for requesting. Selection information was collected through formal clinical diagnostic reports, school records, direct observation, and interviews with speech-language pathologists and classroom teachers. All participants came from a school for children with moderate mental retardation (with some children diagnosed with severe mental retardation) located in a medium size city in Israel. All children attended the school for several years prior to this intervention.

Larry, a 14-year-old boy, diagnosed with moderate mental retardation, used touching and gestures for requesting and rejecting and was able to use only a few one- or two-word utterances. He usually manifested behaviors such as tugging a staff member, pulling his pants down, pulling and biting classroom peers, and screaming. Hank, a 12-year-old boy, diagnosed with moderate mental retardation,
with no physical disabilities, used mostly gestures and vocalization to indicate basic requesting and rejecting. He usually manifested behaviors such as pushing, pinching, spitting, and pulling the hair of peers and staff. Al, a 16-year-old boy, was diagnosed with severe mental retardation and cri-du-chat syndrome (“cat-cry”). He used vocalization, pointing, and only a few one- or two-word utterances to indicate requests and rejection. His behaviors were usually aggressive including pushing and throwing items, running away from the classroom, and self-injurious behaviors that typically included lying on the floor while banging his head. Dan, a 19-year-old boy, diagnosed with moderate mental retardation and Down syndrome, used gestures such as pointing to indicate requests, and manifested behaviors such crying, laughing, passivity, and ignoring. Jo, also a 19-year-old boy, diagnosed with severe mental retardation, used vocalization, pointing and a few one- or two-word utterances for requesting and rejecting. Jo’s challenging behaviors in school included: sitting on the floor while banging his head, screaming, jumping on chairs, and manipulating pieces of paper.

Setting and Materials

All students worked in their respective classrooms following their regular schedules (Larry, Hank and Al in one classroom while Dan and Jo were in another classroom). Each participant had an individual desk stacked with materials appropriate for the classroom schedule. Each classroom had seven or eight students with one teacher and one assistant. Several professionals attended the classroom during the school day for specific instruction periods.

Five forms were created for the study: (a) a participant personal information form used to record personal information, level of abilities, communicative abilities, and behavioral difficulties; (b) a general information form used to record activities, challenging behaviors, staff responses, and the description of the various situations in which those behaviors occurred; (c) a direct observation form used to record antecedents, responses, consequences of all challenging behaviors, and their length of time; (d) a direct observation checklist that included a list of challenging behaviors and the time they lasted; and, (e) a procedures form.

Single switches and other voice output communication devices (with 2, 12, and 16 messages) accompanied with picture communication symbols (PCS) were used for augmenting participants’ communication during intervention.

Design

A multiple probe design across subjects was used (Kazdin, 1982; Poling, Methot, & LeSage, 1995). The dependent variable was calculated as percentage of intervals in which the challenging behaviors occurred. Data collection was based on a direct observation checklist of challenging behaviors. Specific behaviors recorded included instances of: (a) screaming, (b) pushing, (c) pinching, (d) kicking, (e) destroying property, (f) lying on the floor, (g) lying on the floor and hitting head on ground, (h) sitting on the floor and hitting head on ground, (i) jumping on furniture, (j) pulling hair, and (k) all other behaviors. Observations were conducted once a day, three times a week, using 30-second intervals, for 20 minutes each session. A positive AAC support plan compiled by the classroom team was the independent variable (see Table 1). Using this approach, the team conducted functional analyses to assess each child’s behavior. Once function was determined, the team identified a communicative substitute for the challenging behavior. This behavior was created as a means to transmit the communicative messages. The messages were used to acquire information, to gain attention, to express rejection, or to indicate requests.

Procedure

Prior to intervention the entire staff was involved in a school-wide program that included lectures and simulations for teaching about augmentative and alternative communication (AAC) and positive behavior support. Teachers were introduced to the communicative nature of challenging behaviors, use of functional assessment and functional analysis for determining the functions of the students’ behaviors, and were taught how to teach stu-
<table>
<thead>
<tr>
<th>Participant/Classroom #</th>
<th>Preliminary Mode of Communication</th>
<th>Challenging Behaviors</th>
<th>Communicative Function</th>
<th>Intervention Phrases</th>
<th>AAC Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Larry 1</td>
<td>Touching &amp; gestures for requesting &amp; rejecting, able to use one- or two-word utterances</td>
<td>Screaming; pulling and biting classroom peers &amp; staff; pulling his own pants down</td>
<td>Attention seeking Request for assistance</td>
<td>“Teacher, come please”</td>
<td>Single switch</td>
</tr>
<tr>
<td>Hank 1</td>
<td>Gestures &amp; vocalization for basic requesting &amp; rejecting</td>
<td>Pushing; pinching; spitting; pulling hair of peers and staff</td>
<td>Attention seeking Request for assistance</td>
<td>“I will go on working” “Teacher, I need help” “Yes/ no/ more/ stop/ angry/ good morning”</td>
<td>VOCA (16 messages)</td>
</tr>
<tr>
<td>Al 1</td>
<td>Vocalization; pointing; one- or two-word utterances to indicate requests and rejection</td>
<td>Aggressive pushing &amp; throwing items; running away from the classroom; self-injurious behaviors</td>
<td>Escape from activity</td>
<td>“More,” “No more” “Principal’s office,” “Restroom,” “Secretary’s office”</td>
<td>2 single switch devices + Symbols laminated to table</td>
</tr>
<tr>
<td>Dan 2</td>
<td>Gestures such as pointing to indicate requests</td>
<td>Crying; laughing; passivity &amp; ignoring, putting head on table, sitting under the table</td>
<td>Escape from tasks &amp; general refusal to communicate with staff</td>
<td>“Cut/ paint/ more/ no more” + conversation phrases</td>
<td>VOCA (12 messages)</td>
</tr>
<tr>
<td>Jo 2</td>
<td>Vocalization, pointing &amp; one- or two-word utterances for requesting &amp; rejection</td>
<td>Screaming; jumping on chairs; high rate paper activity; self-injurious behaviors</td>
<td>Attention seeking Request for assistance</td>
<td>“Teacher, I need help” “Want/ Don’t want”</td>
<td>Single switch &amp; VOCA (1 + 2 messages)</td>
</tr>
</tbody>
</table>
dents functional skills for replacing challenging behaviors while providing positive reinforcements. As part of instruction, teachers were asked to bring students’ individual education programs and school reports concerning communication patterns of students in their classroom (see form a in Setting and Materials section). Following the preliminary meeting with school staff (i.e., teacher, assistant teacher, counselor, speech language pathologist, physical therapist, and occupational therapist), a functional assessment procedure was implemented (see forms b and c in Setting and Materials section). Interviews and observations were conducted in the classroom prior to baseline sessions to gain information about each of the students participating in the study. Interviews and observations were then used to prepare a functional assessment to be used during intervention (see Table 1). During a following team meeting communication patterns were discussed, and the school team working with the children developed a program for implementing a positive AAC support plan with each child. All sessions were conducted in the regular classroom setting with the classroom team working with the student during sessions implementing the program. Participants were enrolled in two different classrooms. Larry, Hank, and Al were enrolled in classroom 1. Dan and Jo were enrolled in classroom 2. All observations and data collection procedures were conducted by two independent observers who came to the school during scheduled times. Times were selected randomly throughout the day based on the classroom’s daily plan. Observers also collected data on procedures used by the teachers in the classroom and filled out the forms for procedural integrity.

Baseline measures were obtained for all five participants three times a week for 20 minutes during regular classroom activities. All behaviors were measured using the checklist form (see form d in Setting and Materials section). Once a clear baseline was established, classroom staff met to refine the findings and establish a systematic positive support intervention plan using AAC to enhance appropriate functional communication. The first child from classroom 1 (Larry) and the first child from classroom 2 (Dan) were assessed by the respective staff. During the meeting, a positive AAC support system was planned. Challenging behaviors exhibited by the first two participants were evaluated and a functional communication plan was established. Messages were created based on the functional assessment of those children. Appropriate messages were created for each child to use during classroom activities (see Table 1). Messages included words or short phrases recorded on a voice output communication device/aid (VOCA) with PCS symbols depicting the message/s. The team selected the symbols and messages with the assistance of the child’s speech-language pathologist. All team members were responsible for implementing the intervention with the child.

During the meeting, role-playing was used to practice the intervention with the staff, to teach all team members how to use the devices, and to practice how to introduce the messages and uses with the participant. During practice, staff learned to recognize the first indicators of the communicative function typical for each child according to the functional assessment and learned how to assist the student in using the substitute messages appropriately. The first indicators were identified before the challenging behaviors appeared, and the staff assisted the students in learning to use the VOCA’s for communicating with the staff. Teachers used natural reinforcement by responding immediately to the child’s message. Assistance included a procedure using the following hierarchy with 3 second intervals: (a) a verbal prompt to use the switch; (b) a verbal prompt with a gesture toward the appropriate message on the switch; (c) a partial physical prompt with the verbal prompt and a gesture; and, (d) full physical guidance leading the participant’s hand to activate the message (the last prompt was used only once with three of the participants and twice with two of them).

Intervention began once the assessment terminated and the team agreed on the messages and the communication plan (see Table 1). Students were independent in using the devices. The prompt hierarchy was used to introduce the new messages to the first pair of students and was used only when needed (prompts were needed only during the first 1-2 sessions). Once the message was transmitted, the staff responded immediately to the
message voiced by the student activating the device. As in baseline, all challenging behaviors (identified as inappropriate messages) were ignored. Data were collected during all intervention sessions.

Criterion was set as a reduction of at least 30% in frequency of challenging behaviors for three consecutive sessions (20% for Dan, due to the passive nature of his challenging behaviors). Once criterion was met for the first pair of participants, a meeting was set to evaluate the communicative functions of the second pair of participants, to select the appropriate messages, and to begin intervention. As with the first participants, the team selected the messages based on each child’s functional analysis. Once criterion was met, a team meeting analyzed the third set of functional assessments, and the third intervention began. Follow-up sessions were conducted one week after ending the intervention and then again six weeks after the last follow-up session.

Interobserver Agreement

Two observers (graduate students) were trained to collect data using the direct observation forms. One observer collected data during all sessions while the second observed the classrooms randomly for 20% of the sessions for interobserver agreement purposes. Interobserver agreement data were calculated by dividing the overall number of agreements by the number of agreements and disagreements, multiplied by 100. Results indicated 87% agreement for the percentage of challenging behaviors and 94% for accuracy in identification of the behavior types. Procedures were followed accurately 92% of the time.

Results

Results for the multiple probe design across participants for classroom 1 presented in Figure 1 indicate percentage of challenging behaviors for each participant across all sessions. All three participants demonstrated a reduction in the amount of challenging behaviors demonstrated in the classroom after intervention was implemented. Levels of challenging behaviors during baseline sessions were 36%, 48%, and 54% for Larry, Hank, and Al, respectively. Reductions for these students were 33%, 41%, and 39%. Results indicated that for Larry, the challenging behavior stabilized at 13%, but only after 5 sessions, while for Hank and Al, changes were faster and stabilized immediately after intervention at 6% and 15%. Changes demonstrating Larry’s performance were gradual and inconsistent at first. The inconsistency of behaviors and level of challenging behaviors demonstrated by Larry were consistent with the inconsistency in responses made by staff in the classroom. During the second and fourth sessions after starting the intervention, staff did not respond immediately to Larry’s messages. After activating the message, and once Larry detected no response to his switch initiation, he reverted immediately to the familiar behaviors. After refreshing procedures with staff, and after understanding the importance of consistency, staff started to demonstrate stability in their response to his initiations, and the behaviors decreased. Data recording of all procedures indicated that the response procedure remained consistent for the three students. Those results remained steady during follow-up sessions.

Figure 2 presents percentage of challenging behaviors for each participant from classroom 2. During baseline, levels of challenging behaviors were 30% and 52% for Dan and Jo. Dan and Jo demonstrated noticeable changes and reduction in the amount of challenging behaviors demonstrated in the classroom after intervention was implemented. Results for the level of change obtained were 22% for Dan and 37% for Jo. The new level of challenging behaviors was 7% for Dan and 16% for Jo after intervention was implemented. Results remained similar during the follow-up sessions that took place several months later. Data recording of the procedures indicated that the procedures and the responses remained consistent for the students during all sessions.

Teachers recorded information during the school year regarding the students’ behaviors, interactions with peers, time on task, and academic performance. All participants used their messages for all activities throughout the school day. Teachers recorded changes throughout the school day during all academic and social activities. After intervention, changes in other students’ behaviors were observed: the behaviors changed and the partic-
participants decreased their aggressive behaviors with their class peers; participants began initiating and engaging in social behaviors; more time on task was apparent and more academic behaviors were recorded.

Discussion

The purpose of this study was to investigate effects of a positive behavior support plan using AAC on the challenging behaviors manifested by children with moderate and severe mental retardation. All five participants exposed to the intervention demonstrated noticeable decreases in their challenging behaviors as they learned to use their communication devices. Use of the positive AAC support plan provided effective results for all students regardless of their behaviors and the functions they served.

![Figure 1. Percentage of challenging behaviors for Larry, Hank, and Al.](image)
As presented in Table 1, the communication messages and the devices used varied across the five participants. However, after intervention became consistent and the staff’s response was steady, all participants reduced their inappropriate behaviors regardless of the strategy used. For example, Larry used his switch to indicate to the teacher to come to him. When he needed the teacher to add material for him to resume activity, he used the switch to call her. Achieving this goal with Larry was the result of using demonstration and prompting along with consistent acknowledgment of his appropriate communicative attempts, each time they were initiated. At first, school staff was inconsistent and did not follow the procedures during some of the sessions. As a result, Larry’s challenging behavior appeared immediately. Larry returned to his old patterns of attention seeking as soon as there was no response and the indication of the new communicative messages did not result in the desired effect. It took staff time to understand the direct relation between their response and Larry’s behavior. When staff’s behavior started to be consistent and they responded to his request, Larry used his new means to transmit his messages for getting attention, as they were proved to be both effective and efficient. These results are consistent with previous research that found that when students achieved their goal using their behaviors in an effective and efficient way, they tended to adopt the new and appropriate behaviors (e.g., Carr & McDowell, 1980; Horner & Day, 1991). More so, even if the new behavior was efficient and easy to use, only when it was also consistently effective, did it replace the previous behavior.

Hank desired frequent recognition from the teacher that he was engaged in on-task behaviors. He learned, through careful assistance provided to him at critical times, how to use the sentence “I will go on working” to regain attention and approval from the teacher. The staff participated in the consistent reaction to the statement and Hank worked with no interruptions or inappropriate...
ate behaviors. With Hank, the team was consistent at all times. During an informal review of the team’s response type, they indicated that after observing the need for consistency with Larry, they were careful to remain consistent with other students in the classroom. They indicated that this consistency also generalized to the other classroom students. Future research should look at the generalized effects of using a preferred method of intervention with one student on the responses towards the other students in the classroom.

Al’s desire to leave the room for specific reasons was addressed by using a single switch and a communication chart with a few symbols. The symbols provided the possible places he usually wanted to select when he left the room (i.e., the principal’s office, the restroom, the secretary’s office). Using the switch and the symbols to indicate his desired destination resulted in a reduction in tantrums. Previous research investigating use of functional communication training for reducing escape behaviors supports the finding of this study (Lalli, Casey, & Kates, 1995). Future research should address the impact of the students’ ability to inform the staff of their desires on the decrease in their challenging behaviors.

Dan changed his behavior patterns from passivity and crying to active participation and initiating activities using a VOCA that had several messages on it. Once he learned to use his VOCA and the several messages available, he began responding to the teacher and other members in the classroom. He also started to initiate spontaneously, began taking active roles, and accepted greater responsibility for completing classroom tasks.

The changes with Jo were apparent especially when he learned to use the “Don’t want” switch for taking a break or changing an activity. Referring to his needs and indicating to him the time left for each activity seemed to enhance the positive behaviors and reduce the inappropriate screaming and self-injurious behaviors. All these behaviors were found to be effective and efficient for the students and for the staff, who maintained their consistent responding.

Changes occurred across all activities throughout the school day. As the teachers were responsible for implementing the intervention they were able to put the intervention into practice with school staff for all classroom activities. Teachers observed changes in students’ behaviors and spontaneous use of messages across different academic tasks.

Following the participant’s behavior change and reduction in challenging behaviors, additional changes in other students’ behaviors were observed. First, behavioral changes occurred with other class peers as the participants decreased their aggressive behaviors with their class peers and began initiating and engaging in social behaviors. Second, more time on task was apparent, as the students were less engaged in inappropriate behaviors. Third, the staff began to address the children more in reference to academics rather than behavioral issues. These results, although anecdotal and not recorded, could signify the change of atmosphere in the classroom and account for consistent use of the strategy over time (Sigafoos, 2000). Further research should clarify the positive side effects of this systematic approach on the behaviors of the communication partners. The new communicative behavior generalized to all activities during school hours. Students carried their messages to other classrooms and to other activities, and the challenging behaviors decreased during other activities. Previous research investigating the effects of functional communication training to reduce challenging behaviors in new settings was also successful (Durand & Carr, 1991). Future research should investigate the effects of this intervention in other environments such as in the community and at home.

The present study was designed to incorporate use of the model that uses positive behavior support as a systematic paradigm to enable implementation of an AAC intervention for children demonstrating challenging behaviors. The first, and most important component implemented during this study was the functional assessment that assisted in establishing the nature of the behavior. Thus, all the children that had clear challenging behaviors were assessed for potential participation in the study. Of the seven students demonstrating clear challenging behaviors, one of the student’s communicative functions was not clear and a communicative alternative could not be identified and an additional stu-
dent was moved to an institution due to the inability of the family to cope with his challenging behaviors. The first student was later evaluated again by a psychiatrist who diagnosed her as having a psychotic reaction to a traumatic event in her past. For all other students participating, the communicative function of their behaviors was clearly established, resulting in development of an intervention plan by the classroom team. Thus, challenging behaviors may not always be associated with inappropriate communicative behaviors. Further research should assess and clarify the major categories for identifying the communicative function of challenging behaviors.

Once a meaningful and appropriate communicative alternative that met the student’s needs was introduced to each participant, the student and staff members indicated a preference for its use. As a preferred mode of communication, it was used more frequently and resulted in a reduction of challenging behavior. This means, that when an effective alternative is provided to an individual trying to convey a message, it will be used. Additionally, if that alternative is easy to manipulate (i.e., an easy method to activate a switch accompanied with a voice output), the previous means to communicate could be replaced. Previous studies support these findings (e.g., Horner & Day, 1991; Horner et al., 1990).

It should be noted that complete elimination of inappropriate behaviors was not achieved at any of the stages for any participant. Each had several occasions in which they reverted to their previous patterns of behaviors. For example, Hank liked hands-on activities and used the new methods of communication successfully during work and art activities. However, when the class had circle time, he would not wait for his turn or listen to others communicating. At those times, he reverted to challenging behaviors. Further research should investigate the use of other assessments for establishing an understanding of positive solutions to these frustrating moments of multiple interactions and turn taking in larger groups.

This study poses possibilities for using positive behavior support along with AAC for enhancing the functionality of appropriate communication manifested by children with mental retardation who demonstrate challenging behaviors. Further research is needed to replicate these findings and to expand on additional environmental factors that are associated with communicative functions, social interactions, and positive support.

References


Received: 7 January 2002
Initial Acceptance: 1 March 2002
Final Acceptance: 15 June 2002