Function-Based Intervention to Support the Inclusive Placements of Young Children in Korea

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Abstract: This study examined whether FBA and function-based intervention methods developed in the U.S. would be effective if applied in a public school classroom in South Korea. Participants were three young children with severe mental retardation whose severe challenging behaviors put them at risk for removal from an inclusive kindergarten program. The study was conducted in two phases, and all conditions were conducted within the context of naturally occurring classroom activities. In Phase 1, FBAs identified that all three children behaved better when they had access to preferred activities and very poorly when they were engaged in non-preferred activities. In Phase 2, a function-based intervention in which instruction was embedded within preferred activities produced improvements in the behavior of all three children. Probes conducted at the children's residence showed good generality to a different setting. Finally, on a social validity questionnaire, teachers who implemented the intervention gave very positive ratings to the FBA and function-based-intervention process.

Since the early 1990s, researchers have been involved in developing and evaluating effectiveness of functional behavioral assessment (FBA) and function-based intervention methods appropriate for school settings. Through this work, consensus has developed on the essential elements of FBAs. Specifically, critical components include (a) gathering of relevant information, often through interviews and direct observation, (b) identification of antecedent and consequent variables that control a problematic behavior, and (c) design of interventions that address the controlling variables, with emphasis on teaching and supporting appropriate (replacement) behavior (Sugai et al., 2000). Recent reviews of this work (e.g., Ervin et al., 2001; Kern, Choutka, & Sokol, 2002) support effectiveness of the approach.

While a few studies have been conducted with students from minority populations (Blair, Umbreit, & Bos, 1999; Umbreit & Blair, 1997), the majority has not, which raises questions about the applicability of function-based assessment and intervention methods with students from culturally and linguistically diverse backgrounds (Salend & Taylor, 2002). Attention to this area is important. Of 47.7 million students enrolled in U.S. public schools in 2000, nearly 40 percent were reported to be from racial or ethnic backgrounds other than White/non-Hispanic, an increase of more than 10 percent from 1985 (U.S. Department of Education, 2002).

Also important is investigation of whether FBA and function-based intervention methods, which were developed in the U.S., will be equally effective when applied in other countries. Although researchers have occasionally examined effectiveness of U.S.-based practices in other countries (e.g., Aranda, Sanchez-Escobedo, & Williams, 2002; De Groot, Koot, & Verhulst, 1994), we can find no assessment of effectiveness of function-based intervention outside the U.S. Effectiveness of these practices cannot be assumed, especially in coun-

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tries in which the history, language, and culture is quite different than in the U.S.

The purpose of this study was to examine effectiveness of FBA and function-based intervention in a public school classroom in South Korea with three young children with severe mental retardation whose severe challenging behaviors put them at risk for removal from an inclusive kindergarten program.

Method

Settings

The primary setting was a kindergarten classroom at a public elementary school in South Korea. The classroom served 18 five-year-old children, 15 of whom were typically developing. All students attended daily from 9:00 a.m. until 12:30 p.m. The typical classroom schedule consisted of circle time, center activities, snack, teacher-directed whole-group activities (e.g., science, art, cooking), and outdoor play. Challenging behaviors occurred most often during teacher-directed group activities and transitional periods.

The secondary setting, used only for collecting generality data, was a residential program that served 96 individuals with severe disabilities. Among these 96 residents, half were school age, 12 were infants or preschool-age, and the rest were adults. At the residence, two care assistants were available for each group of 10 residents. Toys and manipulative materials were provided in children’s bedrooms. In addition, care assistants facilitated activities in a playroom that included materials for gross motor activities and free play.

Participants

Mina, Nari, and Hyun were the primary participants. All were diagnosed with severe mental retardation, and all regularly engaged in severe challenging behaviors both at school and in the residential program. They had been included in the inclusive kindergarten classroom for about six months when the study began.

Mina was echolalic and used only a few words to ask for items. On the Korean Social Maturation Scale, she obtained a Social Quotient (SQ) of 57.1. At the beginning of the school year, she had not been able to pass most developmental milestones for 2-year-olds. Nari also had very limited communication skills and had obtained an SQ of 53.8. At the beginning of the school year, she also had not been able to pass most developmental milestones for 2-year-olds. Hyun lived in an orphanage before transferring to the residential program at age three. His SQ on the Korean Social Maturation Scale was 49.5. At the beginning of the school year, he had not been able to pass most developmental milestones for 1-2 year-olds.

Other participants included the classroom teacher and co-teacher. The teacher was a certified early childhood educator with 10 years experience including 6 months of attempting to include children with disabilities. Her primary methods of managing behavior included using reprimands, raising her voice, yelling, and time-out. She occasionally provided verbal praise for appropriate behavior. The co-teacher was a certified early childhood special education teacher with 17-years experience who primarily provided direct instructional activities to Mina, Nari, and Hyun, either individually or as a group. Although the children had been included in the classroom for about six months, they primarily interacted with the special education teacher. Because of their frequent challenging behaviors, the children seldom participated in the regular classroom routine.

Behavioral Definitions

Each child presented different challenging behaviors. For Mina, problem behaviors included being out-of-seat, running around the classroom, turning over classroom materials, aggressing toward peers (hitting, pinching, scratching, throwing objects), screaming, crying, and taking off her clothes. For Nari, problem behaviors included being out of her seat, being off-task (engaged in activities other than those directed), and aggressing toward peers (hitting and grabbing). For Hyun, problem behaviors included screaming, self-injury (biting his fingers), being out-of-seat, aggressive behavior (pushing, pulling hair), and crying. All attempts to engage in these actions, respectively for each child, were scored as problem behaviors.
For each child, appropriate behavior was scored whenever the student (a) stayed in the seat, followed the teacher’s directions, and engaged in the assigned task, or (b) interacted positively with peers by sharing and/or asking for toys.

**Phase 1: Functional Assessment**

**Procedure**

A separate FBA was conducted for each child to identify variables that occasioned and maintained their problem behaviors. Assessment involved conducting structured interviews with staff, followed by collecting direct observational data in the classroom, and then developing hypotheses about apparent controlling variables. Hypotheses were then tested experimentally in the classroom.

**Structured interviews.** Interviews were conducted individually with teachers and with caregiver from the residence. Interviews followed the *Preliminary Functional Assessment Survey*, a 22-item questionnaire originally developed by Dunlap, Kern-Dunlap, Clarke, and Robbins (1991). Questionnaire items (available on request) are designed to gather information about challenging behavior in classroom situations. Specific questions/items focus on identifying conditions under which a target behavior is very likely and very unlikely to occur. It also includes items that identify when and how often the behavior occurs, and whether its occurrence could be related to skill deficits (e.g., limited communication skills), medication, deprivation conditions (e.g., thirst, hunger, etc.), or discomfort.

**Structured observations.** A-B-C data (Bijou, Peterson, & Ault, 1968) were collected separately for each child to corroborate information reported during interviews. During A-B-C data collection, an observer recorded antecedent conditions that preceded each occurrence of a problem behavior, and consequences that followed each occurrence. Three 15 min observations were conducted for each child during teacher-directed group activities because interviews had indicated these were times when challenging behaviors were most likely to occur.

**Hypothesis development.** Interview results and A-B-C data indicated that certain variables appeared to occasion and maintain the children’s problem behaviors. Interviews with staff indicated that all children behaved better when they had access to preferred activities and very poorly when they were engaged in non-preferred activities. Staff also identified a second potentially important variable for each child: for Mina, frequent attention from staff; for Nari, access to favored tangible items; and for Hyun, the opportunity to choose among activities.

A-B-C data were consistent with the staff’s reports. All children were likely to engage in appropriate behavior when they were engaged in preferred activities. Engagement in non-preferred activities almost always resulted in problem behavior that, in turn, often resulted in gaining access to preferred activities. Occurrences of problem behavior often resulted in increased staff attention for Mina, access to preferred tangible items for Nari, and the offering of choices among activities to Hyun.

Based on results of interviews and direct observational data, we concluded that problem behaviors of all children were maintained by positive reinforcement in the form of gaining access to preferred activities. The children, individually, were also positively reinforced by gaining access to attention (Mina), gaining access to favored tangible items (Nari), and gaining the opportunity to select specific activities (Hyun). Based on interviews and observations, the following hypotheses were developed:

Mina would engage in high levels of appropriate behavior during group activities (a) when the activities incorporated her preference or interests, and (b) when the early childhood special education teacher provided attention frequently (i.e., at least once every 30 s).

Nari would engage in high levels of appropriate behavior during group activities (a) when the activities incorporated her preference or interest, and (b) when access to favored materials was allowed.

Hyun would engage in high levels of appropriate behavior during group activities (a) when the activities incorporated his preference or interest, and (b) when choice among activities was allowed.

**Experimental analysis.** The teaching staff and researchers jointly developed procedures
to test the hypotheses within the context of the natural classroom routines. Hypotheses were tested using an alternating treatment design. The nature and order of assessment conditions for each child appears in Table 1. All assessment conditions were tested during teacher-directed whole-group activities because this was the situation in which the children’s problem behaviors occurred most often. Each assessment session was 10 min long.

In order to implement assessment conditions, teachers first had to identify activities that were preferred and non-preferred for each child. Teachers identified several activities and then evaluated each based on the following criteria. An activity was considered to be preferred if the child (a) engaged in it immediately when given free access, (b) continued the activity for at least 2 min, and (c) objected when the activity was terminated. Conversely, an activity was considered to be non-preferred if the child (a) did not engage in it immediately when given free access, (b) did not continue the activity for at least 2 min, and (c) did not object when the activity was terminated. For Mina, the attention condition required a staff member to interact with her at least once every 30 s. For Nari, the desired materials condition required the provision of specific, known favored tangible items. For Hyun, the choice condition required that he be allowed to choose between at least two possible activities.

### Table 1

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Mina</th>
<th>Nari</th>
<th>Hyun</th>
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<tr>
<td><strong>Preferred Activities</strong></td>
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<tr>
<td>Condition 1</td>
<td>Attention</td>
<td>Access to desired materials</td>
<td>Choices</td>
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<tr>
<td>Condition 2</td>
<td>No Attention</td>
<td>No access to desired materials</td>
<td>No Choices</td>
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<td>Condition 3</td>
<td>Attention</td>
<td>Access to desired materials</td>
<td>Choices</td>
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<td>Condition 4</td>
<td>No Attention</td>
<td>No access to desired materials</td>
<td>No Choices</td>
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<td>Condition 5</td>
<td>Attention</td>
<td>Access to desired materials</td>
<td>Choices</td>
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<tr>
<td>Condition 6</td>
<td>No Attention</td>
<td>No access to desired materials</td>
<td>No Choices</td>
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<td><strong>Non-Preferred Activities</strong></td>
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<tr>
<td>Condition 1</td>
<td>Attention</td>
<td>Access to desired materials</td>
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<td>Condition 2</td>
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<td>Condition 3</td>
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### Data Collection

During each assessment condition, two independent observers recorded data on occurrence of problem and appropriate behavior using a 10s partial interval recording method. At the end of each interval, observers recorded the presence of problem and/or appropriate behavior during the interval. Intervals scored identically by each observer were considered agreements. Interobserver agreement was calculated using an exact interval-by-interval method (Kazdin, 1982) by dividing total number of agreements by total number of agreements plus disagreements and multiplying by 100. Across all sessions, agreement averaged 97%, with a range of 93-100.

Treatment integrity (Billingsley, White, & Munson, 1980; Gresham, 1989) was assessed in a similar manner in all sessions except that a whole-interval recording method was used. At the end of each interval, observers recorded whether all of the required assessment conditions were implemented correctly throughout the entire interval. Once again, interobserver agreement was calculated using the exact interval-by-interval method. Treatment integrity was 100% in all sessions.

### Results

Results of assessments for Mina, Nari, and Hyun are presented in Figures 1, 2, and 3.
respectively. These data reveal that each child engaged in high levels of appropriate behavior and low levels of problem behavior when they had access to preferred activities. Data also show the reverse pattern – high levels of problem behavior and low levels of appropriate behavior – when children had access only to non-preferred activities. These data support the hypotheses with respect to preferred activities. However, the second hypothesis for each child was not confirmed. Although addition of a second variable (attention for Mina, desired materials for Nari, and choice for Hyun) reduced the levels of problem behavior during the non-preferred activity conditions, it did not appreciably increase levels of appropriate behavior during the preferred activity conditions. Children’s problem behaviors seldom occurred during preferred activities regardless of whether attention, desired materials, or choices were provided.

Phase 2: Function-Based Intervention

Procedure

Researchers and teaching staff worked collaboratively to develop a function-based inter-
vention. The first consideration was whether children were able to perform the replacement (appropriate) behaviors. Observations during A-B-C data collection and assessment had confirmed that all children were able to perform these behaviors. The second consideration was whether the classroom environment was designed to support appropriate behaviors from the children. An analysis of the existing classroom structure revealed that several antecedent and consequent modifications were needed. All antecedent modifications were designed to increase the likelihood that the children would engage in appropriate behavior, rather than problem behaviors. All consequent modifications were designed to provide positive reinforcement for appropriate behavior, and to reduce the chance that inappropriate behaviors would be reinforced.

The following curricular and environmental modifications were implemented throughout the school day. First, children’s IEP goals and curriculum were embedded within (i.e., taught through) activities that were known to be preferred activities for the children. To do this, teaching staff identified 30 activities from the regular kindergarten curriculum that met the criteria for ‘preferred activities’ described earlier. Staff incorporated these activities within their curriculum according to integrated themes. Second, the IEP goals and objectives of each individual child were modified so that both developmental and functional skills could be enhanced during existing natural classroom activities and routines. Previ-ously, emphasis had been given to facilitating developmental skills during isolated teacher-directed individual and group activities. Staff made sure to include at least one preferred activity during group instructional activities in which the children were included. They also allowed the children to have access to the same preferred activity during free choice play. If children exhibited high interest and engagement in activities, staff extended the time on the activity and the theme of the week.

Third, preferred activities were structured to require active engagement, initiative, and age-appropriate behavior useful for many inclusive contexts and situations as a way to decrease children’s reliance on the special education teacher. Fourth, learning centers were structured to incorporate children’s preferences while still using instructional and play materials that facilitated learning. Fifth, circle time was changed to incorporate physical movement activities with games and music to enhance the children’s engagement. Fifth, staff ignored problem behaviors as much as possible. Finally, to enhance communicative behaviors, staff used picture symbols to teach children to request desired materials and activities during free choice play activities.

**Design**

A multiple baseline design across subjects was used to evaluate the intervention’s effects. During baseline, children participated in
teacher-directed regular group activities with their peers. The early childhood special educator sat behind the children and responded to their problem behaviors either by reprimanding them or by putting them in time out. Baseline conditions were in effect for each child until the intervention was implemented on Day 6 for Mina, on Day 8 for Nari, and on Day 12 for Hyun. Once the intervention had been implemented in the classroom for each child, the care assistant made similar modifications in the playroom activities offered at the residential program.

Data Collection

Procedures used to collect data, calculate interobserver agreement, and evaluate treatment integrity were identical to those used in Phase 1. Data were collected daily in the classroom for 36 sessions (approximately seven weeks). In addition, probes were conducted to assess generality of the intervention to another setting (the residence). Generality probes were conducted approximately twice per week during baseline, and approximately once per week during intervention. Interobserver agreement data for the dependent measures (problem and appropriate behavior) were collected in all sessions. Treatment integrity data were collected twice per week throughout the study. Interobserver agreement for dependent measures averaged 98%, with a range of 95-100. Treatment integrity also averaged 98%, with a range of 97-100.

Social Validity

Social validity was assessed using a questionnaire that included five questions using a five-point rating scale (5 = Strongly Agree; 1 = Strongly Disagree). The purpose was to assess the acceptability and feasibility of the function-based intervention. Items targeted staff’s levels of satisfaction with the overall functional assessment process and intervention results, difficulty of implementing the assessment-based procedures and modifying curriculum goals and activities, and the possibility of continued future use of the approach. Both teachers completed the questionnaire.

Results

Data on effects of the intervention are presented in Figure 4. During baseline, all children demonstrated high levels of problem behavior (80-95% of the intervals) and low levels of appropriate behavior (0.0-6.6% of the intervals). When intervention was introduced, problem behaviors reduced substantially (8.3-23.6%) and appropriate behaviors increased (41.6-93.3%). Generality probes from the residence produced similar results. Finally, teaching staff’s responses to the social validity questionnaire indicated strong support for the function-based intervention, with scores averaging 4.5 (out of 5), and all individual item responses being rated a 4 or 5.

Discussion

This study examined whether FBA and function-based intervention methods developed in the U.S. would be effective if applied in a public school classroom in South Korea. Participants were three young children with severe mental retardation whose severe challenging behaviors put them at risk for removal from an inclusive kindergarten program. The study was conducted in two phases, and all conditions were conducted within the context of naturally occurring classroom activities. In Phase 1, FBAs identified that all three children behaved better when they had access to preferred activities and very poorly when they were engaged in non-preferred activities. In Phase 2, a function-based intervention in which instruction was embedded within preferred activities produced dramatic improvements in the behavior of all three children. Probes conducted at the children’s residence showed good generality to a different setting. Finally, on a social validity questionnaire, teachers who implemented the intervention gave very positive ratings to the FBA and function-based intervention process.

This study provides initial evidence that function-based intervention procedures can be used successfully with students from non-English language populations and in settings outside of the U.S.. In addition, data are consistent with previous research showing (a) the positive impact of embedding curricula within preferred activities (Blair et al., 1999; Clarke
et al., 1995; Dyer, 1987, 1989; Foster-Johnson, Ferro, & Dunlap, 1994; Umbreit & Blair, 1996, 1997) and (b) the effectiveness of function-based intervention in supporting inclusive placements that are threatened because of persistent problem behaviors (Blair et al., 1999; Umbreit, 1995; Umbreit & Blair, 1996, 1997).

 Certain limitations and questions should be noted. Children who participated were severely mentally retarded. With respect to cross-cultural validation of function-based int-

Figure 4. Percentages of appropriate behavior (open circles) and problem behavior (closed circles) during baseline and intervention, and problem behavior (open squares) during generality sessions for each child.
tervention, developmental characteristics of the students and their limited language development raises the possibility that culture and language were not a significant factor in this study. Additional research with students of similar background, but more normative developmental characteristics, would provide valuable comparative data that would strengthen the argument that function-based interventions are applicable across cultures, languages, and nationalities.

In this study, preferred and non-preferred activities were identified by using criteria suggested and employed in previous research (Blair et al., 1999; Dyer, 1987, 1989; Umbreit & Blair, 1996, 1997). Specifically, these criteria were (a) immediate engagement upon free access, (b) continued activity for at least 2 min, and (c) objection when the activity was terminated. Unlike previous studies, in which activities were empirically assessed, preference assessments in this study consisted of teachers identifying several activities and then rating each child’s preferences on the same set of criteria. Further research should consider whether these two methods of determining preferences result in identification of similar activities.

Teachers gave very high social validity ratings to the FBA process and to the function-based intervention that resulted. This finding is important because follow-up research with parents (Reimers, Wacker, Cooper, & DeRaad, 1992) has shown that social validity/treatment acceptability influences whether or not people continue to use an intervention; high treatment acceptance indicates long-term continuation. The social validity measure used in this study was developed by the researchers. This was a necessity because no psychometrically evaluated instruments are available in the Korean language. However, questions used to evaluate social validity in this study were representative of those present in more widely used measures.

Research literature on use of function-based interventions continues to grow and to show that the approach is effective across an increasingly broad array of problem behaviors and student characteristics. However, its applicability with students from different cultures, including those from different countries, remains largely untested. Continued efforts to validate application of function-based intervention with students from diverse backgrounds should provide greater insight into the elements that make this set of methods effective. Further research across varying cultures, languages, and nationalities is also likely to enable researchers and practitioners to extend the benefits of function-based intervention to diverse student populations.

References


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