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Turkish Special Education Teachers' Implementation of Functional Analysis in Classroom Settings

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Abstract: Three Turkish special education teachers conducted a functional analysis to identify variables that might initiate or maintain the problem behaviors of three children with developmental disabilities. The analysis procedures were conducted in natural classroom settings. In Phase 1, following initial training in functional analysis procedures, the teachers generated hypotheses regarding the function of children's problem behaviors. Hypotheses emerged from parent interview and direct observation data. In Phase 2, the hypotheses were tested using functional analysis procedures developed by Iwata and his colleagues. For two of the three children, functional analysis results were consistent with hypotheses developed during Phase 1. Results for all children suggested that special education teachers were able to implement the descriptive and experimental phases of functional analysis procedures. Turkish teachers effectively identified specific contingencies that were likely to initiate or maintain problem behavior for each of the three children.

Functional assessment and functional analysis procedures are an information gathering process useful in identifying the stimuli that cause and/or maintain problem behaviors (Stichter, Shellady, Sealander, & Eigenberger, 2000). These procedures are conducted to: (a) define problem behaviors, (b) identify stimuli that elicit or extinguish the problem behaviors, and (c) determine the functions of problem behaviors (Horner & Carr, 1997; O'Neill, Horner, Albin, Storey, & Sprague, 1994).

Functional analysis procedures have been used successfully by many researchers over the past 20 years to analyze and intervene on a variety of problem behaviors. These behaviors have included vocal tics (Carr, Taylor, Wallander & Reiss, 1996, Watson & Sterling, 1998), stereotypic behaviors (Lerman, Iwata, Zarcone, & Ringdahl, 1994; Mace, Browder, & Lin, 1987), and drug ingestion (Chapman, Fisher, Piazza, & Kurtz, 1993).

Descriptive assessment and experimental analysis are two different procedures that have been used to identify the functions of problem behaviors. Descriptive assessment, also known as functional assessment, is the process of developing hypotheses about the functions of problem behaviors (Fowler & Schnacker, 1994; Gable, 1996; Groden, 1989; O'Neill et al., 1994). In descriptive assessment, direct (observations) and indirect (interviews) assessment techniques are used to gather information about the potential functions of the problem behavior. Experimental analysis or functional analysis is the process of testing the

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hypotheses that were developed during the descriptive assessment phase (Gable; Horner & Carr, 1997; O'Neill et al.).

The majority of researchers have implemented functional analysis procedures in strictly controlled clinic and research settings. Given the increasing number of empirical studies that have documented the clinical benefits of functional analysis procedures, it is surprising that so few studies have been conducted in applied settings, such as classrooms, community contexts and homes.

Some researchers have shown that teachers and school staff were able to conduct functional analysis with on-going consultation from researchers (e.g., Northup et al., 1994; Sasso et al., 1992). However, replications across research teams and countries are needed to further advance the use of functional analysis procedures in natural settings.

The concept of functional assessment and analysis is an area that has not been studied in Turkey. Turkey is a country that has relatively few personnel preparation programs in the area of special education, and within these programs teachers receive limited training on handling challenging behaviors (Vuran, 2000). Furthermore, both US educators (CCRS FY03 Needs Assessment Survey, Joseph & Strain, 2003; Walker, Stiller, & Golly 1999) and Turkish educators (Özen, Çolak & Acar 2002; Sucuoğlu, 1995) identify challenging behaviors as one of their most significant training needs. The current study on functional assessment and analysis procedures was an initial effort to replicate and extend these procedures to Turkish teachers.

Method

Participants, Settings, and Target Behaviors

Three children with developmental disabilities and three teachers participated in this study. Ozlem was a 7 year old girl, while Aytug and Gokhan were 4 and 8 year old boys, respectively. Ozlem and Aytug had limited expressive language skills (ten words in their repertoire) and were able to follow one-step directions. Gokhan communicated using simple sentences and he was able to follow two-step directions. The children were ambulatory with no major gross or fine motor difficulties. However, each participant relied on adult assistance to complete all self-care activities. The children enjoyed being around other people. Physical examinations revealed that both hearing and vision skills were within normal limits for all participants.

Two of the three teachers who participated in this study had Bachelor's degrees, and one had a master's degree in special education. Their teaching experiences ranged from three to 12 years. They all had participated in a behavior management course, but had not participated in any pre-service or in-service training on functional analysis methodology at the time of the study.

The children and teachers were recruited from the Research Institute for the Handicapped (IRH) at Anadolu University in Eskisehir, Turkey. Children with developmental disabilities, ages 3 to 18, attend this school. The study was conducted in the self-contained classrooms of each participant. Four to six students with developmental disabilities, three or four pre-service teachers (senior students in special education), and one special education teacher (i.e., participant) were in each classroom during the functional analysis sessions. These classrooms have one special education teacher. The ratio of adults to children was high during the course of this study due to student teachers being placed at this site as part of their pre-service training. Functional analysis sessions were 10 minutes in length and occurred during academic instruction time in each class.

Target behaviors were determined based on interview and observation procedures developed by O'Neill and colleagues (1994). Teachers interviewed the parents of the three focal students and conducted observations in the classrooms. Based on teacher and parent concerns the following problem behaviors were targeted: (a) Gokhan's throwing objects, defined as throwing any object at least half a meter in front of him, (b) Aytug's out of seat behavior, defined as the student wandering around the classroom without completing his activity or approaching the classroom door without teacher permission, and (c) Özlem's problem behaviors were included the following chain of behaviors: temper tantrums, defined as wandering around the

classroom, biting her clothes, and making loud noises.

Data Collection and Inter-observer Agreement

Experimental sessions were videotaped for data analysis. Data on target behaviors were recorded using a 10 s partial interval recording system and are reported as percentage of intervals. Reliability data were calculated on a randomly selected 20% of experimental sessions for each condition. Observers were two graduate students in special education, who were naïve to the purpose of the study. Inter-observer agreement was calculated using a point-by-point agreement method in which number of agreements on occurrences was divided by number of agreements plus disagreements on occurrences and multiplied by 100. Inter-observer agreement on occurrences ranged from 96.50% to 100% (M = 98.95) across all target behaviors.

Procedural fidelity data were collected to assess the implementation of experimental procedures. A checklist was developed (see Table 1), which included the critical behaviors that teachers needed to perform during the experimental analysis phase. To gather data, occurrences and non-occurrences of each teacher behavior were marked on the checklist.

To collect reliability data on procedural fidelity, 50% of the video segments were selected randomly. Procedural reliability was calculated by dividing the number of occurrences for each step on the checklist by the number of occurrences plus non-occurrences, and multiplying by 100. Percentage of agreement on procedural reliability was 98.95% to 100% (M = 99.95) across the three teachers.

Experimental Design and Procedure

Prior to the study, teachers were trained in functional assessment and analysis procedures by the first author. Training consisted of lecture and reading materials about functional analysis, watching videotaped simulation of experimental conditions, participating in consultation meetings, and receiving ongoing performance based feedback. The teachers were trained together as a group. However, consultation meetings and performance-based feedback sessions were conducted individually with each teacher.

Following training, the study was conducted in two phases. The purpose of Phase I was to formulate hypotheses regarding the functions of each student's problem behavior. In Phase I (descriptive phase), the teacher participants conducted parent interviews and direct observations using the procedures developed by O'Neill and colleagues (1994). Observations were conducted for one hour per day for five days on each focal child. Results of Phase 1 are presented in Table 2. After teachers generated hypotheses regarding the function of the problem behaviors, they tested the validity of these hypotheses in Phase 2 (experimental phase) using a multi-element design. Test conditions (teacher's provision of attention, demand, play, and tangible) were similar to the conditions implemented in Iwata, Dorsey, Slifer, Bauman, and Richman's study (1982). However, unlike the Iwata study, a tangible condition was included in the analysis instead of an alone condition (see Table 1 for a description of these procedures). Teachers in the current study hypothesized that obtaining access to tangibles was a potential function of all three students' problem behaviors. To test this hypothesis, student participants were allowed to play with a highly preferred item, identified by his or her teacher, for 1 minute. Then, the favorite item was placed out of reach but within the student's view. The teacher pretended to be busy as she read or completed paperwork in the opposite corner of the classroom. Immediately after the student exhibited the target (problem) behavior during the session, the teacher gave the item to the student and allowed him or her to play with it for 30 seconds. If the item was edible, the student was given a small piece to eat. No demands were placed on the participant. The sequence of the conditions (e.g., attention, demand, play and tangible) was determined randomly and counterbalanced by providing the same number of sessions for each teacher during the study. Two conditions were conducted per day; sessions lasted approximately 5 min. each. At the minimum, a one-hour break was provided between conditions. If a session was not completed within 5 min., then an additional 3 min. was

TABLE 1

Procedural Fidelity Checklist

Experimental Condition	*Teacher Behaviors*
Attention condition	1. Set the timer for 5 minutes.
	2. Direct the child's attention towards the toys and educational materials that are set on the table (e.g., "look at that")
	3. Say something like "I am very busy right now, you go ahead and play"
	4. Sit down within child's view and pretend to be busy (e.g., do paper work)
	5. Provide attention only contingent upon problem behavior (e.g., move next to the student and say something like "please do NOT throw your toys away")
	6. Terminate the session when the timer goes off
Demand condition	1. Set the timer for 5 minutes
	2. Present child with an unpreferred task (e.g., lacing beads).
	3. Provide a clear task direction for the student to begin the task (e.g., "lace the beads")
	4. If the child responds within 5s of the task direction, praise (e.g., "Nice job lacing the beads!")
	5. If the child does not respond within 5s of the task direction, repeat the task direction and model for correct response
	6. If the child responds correctly within 5s of the second model, praise him/her
	7. If the child does not respond within 5s of the second model, repeat the task direction, and provide hand over hand assistance.
	8. When the child performs the task with hand over hand assistance, do not praise
	9. If the child exhibits problem behavior any time during the session, let her or him escape from the task (e.g., immediately remove the materials and yourself from child's view to terminate the trial).
	10. 30s after termination, start the second trial and follow steps 3–9
	11. Terminate the session when the timer goes off.
Play condition	1. Set the timer for 5 minutes
	2. Direct the child's attention towards his/her favorite items (e.g., "look at that")
	3. Stay close to where the child sits
	4. Deliver attention every 30 sec. contingent on appropriate behavior (e.g., when the child does not show problem behavior, attend to the child every 30s and say phrases such as "good job playing so nicely")
	5. If the child exhibits problem behavior, ignore his/her behavior
	6. When the child exhibits a problem behavior during the interval in which you will provide attention (i.e., at the end of the 30s interval), wait for 5s to deliver attention
	7. Anytime the child exhibits appropriate behavior (e.g., asks a question to the teacher, or gives a toy to the teacher), respond to him/her
	8. Terminate the session when the timer goes off
Tangible condition	1. Set the timer for 5 minutes
	2. Direct the child's attention towards preferred toys and educational materials that are set on the table (e.g., "look at that")
	3. Allow the child to play with a preferred item or give him/her an edible item.
	4. After 1 minute, place the item out of reach but within the child's view
	5. Give the item(s) to the child contingent on problem behavior and allow him or her to play with it for 30s
	6. Immediately after 30s, place the item out of reach but within view again
	7. Ignore other behaviors that occur during the session
	8. Terminate the session when the timer goes off

TABLE 2

Results of Phase I

Student	*Teachers' Hypothesis*
Gökhan	Gokhan engaged in problem behaviors to obtain adult attention.
Aytug	Aytug engaged in problem behaviors to obtain an item or an activity.
	Aytug engaged in problem behaviors to escape difficult or unpreferred tasks.
Özlem	Özlem engaged in problem behaviors to escape difficult or unpreferred tasks.

allocated for implementation of the procedures.

Results

Results of the functional analysis for the three students are shown in Figure 1. While results for Gokhan are clear, results are somewhat difficult to interpret for Aytug and Özlem. Information gathered during Phase 1 revealed that Gokhan's problem behavior was consistently followed by attention from the teacher. This information mirrored results of the functional analysis as data show that a higher percentage of Gokhan's problem behaviors occurred during the attention condition (M = 59% of intervals versus 17% for tangible and 31% for demand).

Information gathered on Aytug during Phase 1 revealed that his problem behaviors were occasioned by high levels of task demands. This suggested an escape function. Problem behaviors typically resulted in access to preferred items or activities, suggesting a tangible function. These hypotheses were further tested during Phase 2 where results show that Aytug's problem behaviors were highest during the tangible condition (M = 45.25% of intervals). However, Aytug also engaged in problem behaviors during the attention (M = 23% of intervals) and demand conditions (M = 24.75 % of intervals), although to a lesser extent.

Finally, as hypothesized in Phase 1, Ozlem's problem behaviors were highest during the demand condition (M = 55.25% of intervals). However, she showed high levels of problem behaviors during both the attention (M = 40% of intervals) and tangible conditions (M = 40.50% of intervals). For both Ozlem and Aytug results were not as clear as for Gokhan.

Discussion

This study was an initial effort to use functional assessment and analysis procedures in Turkey, a country in the early stages of providing special education services to individuals with disabilities and preparing educators to work as special educators. Results suggest that Turkish special education teachers were able to implement the descriptive and experimental phases of functional analysis adequately after they received training. These results are consistent with findings shared by Northup et al. (1994) and Sasso et al. (1992).

Findings of this study also suggest that combining the descriptive and experimental phases of functional analysis was useful for teachers because the experimental phase helped them realize that some of their initial hypotheses about the functions of problem behaviors were not necessarily correct (e.g., Aytug's behavior). In other words, because they actively engaged in planning and implementing both phases, the three teachers had a better understanding of the underlying causes of their students' problem behaviors. Such participation might make teachers more receptive to implementing interventions based upon findings of functional assessments and analyses. Furthermore, teachers' participation in the descriptive phase strengthened their understanding and implementation of the analyses phase because they first learned how to gather and use information to develop hypotheses (Phase 1) and then decided which conditions would be created in Phase 2 to test their hypotheses.

Although findings of this study are encouraging, it is important to note that Turkish teachers reported difficulties with implementing the functional analysis procedures in their classrooms. They reported that these procedures interfered with on-going activities and instruction. They stated that this occurred most often during the play and demand con-

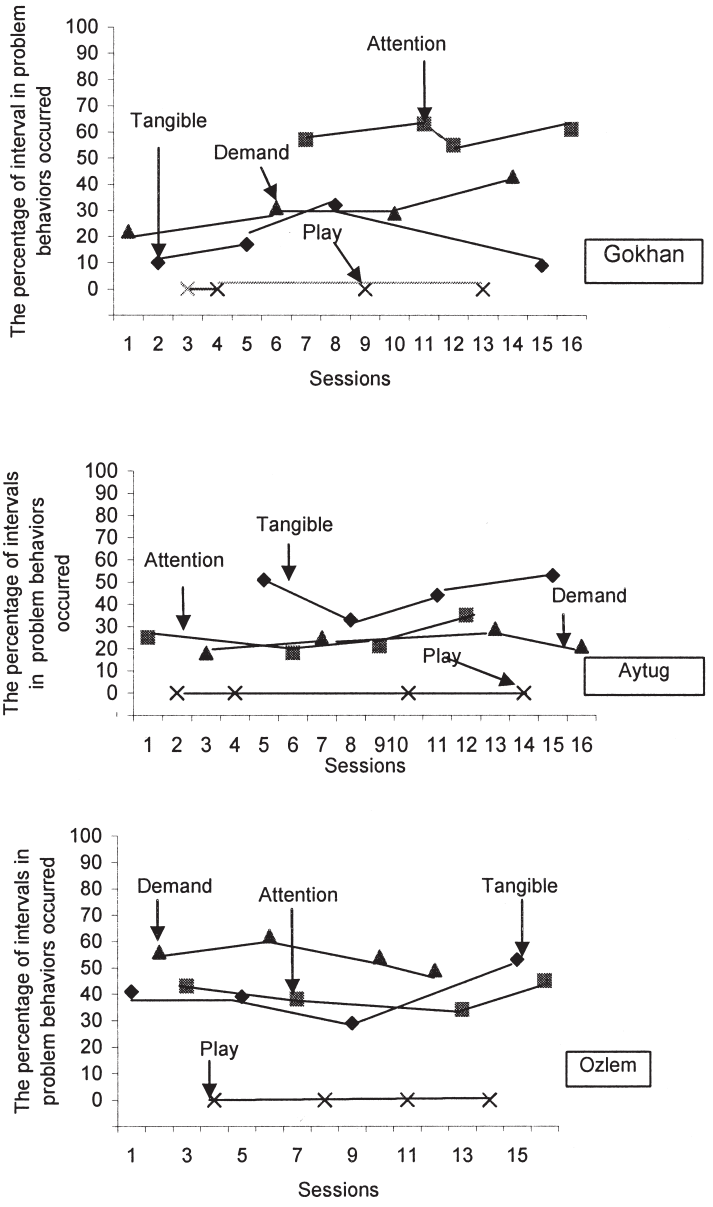


Figure 1. Percentage of intervals of problem behaviors for Gokhan, Aytug, and Ozlem, across experimental conditions.

ditions. This finding is not surprising given that during the demand condition the teachers were expected to present a difficult task to the students every 30 s. Similarly, during the play condition, they delivered non-contingent attention every 30 s. We believe that functional analysis procedures might require some adaptations when they are implemented in classroom settings. For example, teachers might conduct a brief functional analysis in which each experimental condition is conducted only once and if a child exhibits problem behavior more frequently during any of these conditions, those conditions are retained (Northup et al., 1994). Alternatively, teachers might conduct functional analyses

during activities such as free play, small group instruction, and non-academic tasks so that the procedures would not interfere with critical teaching (e.g., literacy instruction) or other teacher-directed activities. This might contribute to the clinical utility of these procedures across natural settings.

Prior to discussing limitations of this study, it is important to provide some information about the characteristics of the setting in which study was conducted. One might question the clinical utility of the current findings since this study was conducted in a classroom setting affiliated with a research institution. However, in the Turkish public school system, students with disabilities predominantly receive services in self-contained classrooms or segregated schools. Therefore, participants' classrooms in this study were very similar to classrooms in public schools. The only difference is that the adult: child ratio was higher than in the public schools (e.g., 1:2 versus 1:5).

Three major limitations warrant discussion. First, results of Phase 2 revealed somewhat unclear patterns for two participants. It appeared that multiple variables interacted with Ozlem's and Aytug's problem behaviors. It is likely that their problem behaviors might serve multiple functions. It also is possible that these two participants were not able to discriminate between the experimental conditions due to their significant cognitive delays. Second, items used in the tangible condition were chosen based on teacher report; however, a systematic preference assessment including classroom observations and controlled assessment procedures was not conducted. Third, even though the teachers helped design the intervention programs to address their students' problem behaviors (based on results of functional analyses), effects of the intervention programs were not examined. Therefore, the clinical validity of the functional analyses procedures described in the current study was not assessed.

In conclusion, this study was an initial effort to replicate functional assessment procedures in three Turkish classrooms. Because special education teachers implemented the procedures, they became more aware of the variables that contributed to their students' problem behaviors. Such participation might result in a better understanding of how to address these problems. More importantly, in Turkey, there are few "experts" who have the knowledge and expertise to provide services for students with challenging behavior. Preparing teachers through pre-service and inservice training to understand and intervene with these children is critical. Findings from this study provide further evidence that promising practices exist which are replicable across cultures and can help bridge the research to practice gap.

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