

# Effectiveness of Time-Based Attention Schedules on Students in Inclusive Classrooms in Turkey

Elif Sazak Pınar<sup>a</sup>

Abant İzzet Baysal University

## Abstract

This study examines the effectiveness of fixed-time (FT) and variable-time (VT) schedules and attention on the problem behaviors and on-task behaviors of students with and without intellectual disabilities in inclusive classrooms in Turkey. Three second-grade students with intellectual disabilities, three students without intellectual disabilities, and three teachers participated in this study. The ABAC reversal design of the single-subject design was used. A1 and A2 were the baseline conditions; in the B condition, an FT schedule of attention (every four minutes) was implemented, and in the C condition, a VT schedule of attention (average four minutes) was utilized. The results demonstrated that FT and VT schedules of attention decreased problem behaviors, and increased on-task behaviors during lessons. Moreover, in the VT schedule of attention, gains were noted to be faster and more consistent, and teachers performed VT more easily.

**Keywords:** Time-based attention schedule • Fixed-time schedules • Variable-time schedules • Non-contingent reinforcement • Intellectual disability

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## a Correspondence

Assoc. Prof. Elif Sazak Pınar (PhD), Department of Special Education, Abant İzzet Baysal University, Bolu Turkey  
Research areas: Inclusion; Applied behavior analysis; Problem behavior interventions; Social skills training; Intellectual disabilities  
Email: [elifsazak@hotmail.com](mailto:elifsazak@hotmail.com)

According to the 2002 definition from the American Association on Intellectual and Developmental Disabilities (AAIDD, 2014) ([http://www.aaidd.org/content\\_100.cfm](http://www.aaidd.org/content_100.cfm)), intellectual disability originates before the age of 18 and is "characterized by significant limitations, both in intellectual functioning and adaptive behavior, which covers many everyday social and practical skills." Students—with and without intellectual disabilities—frequently exhibit problem behaviors in classrooms (Erbaş, 2008). Problem behaviors are defined as those behaviors which are considered abnormal in the given culture and which are so intense, frequent, or lengthy that the physical safety of the person, or those around them, is compromised. Problem behavior may arise from the limitation or denial of access to public facilities (Emerson, 1995). These behaviors may decrease the benefits of instruction for individuals, and lead to rejection by their peers and others in society (Chandler & Dahlquist, 2002). Therefore, teachers need to know how to implement behavior analysis strategies to manage problem behaviors in the classroom, and engage students in academic activities in a better way (Alberto & Troutman, 2013).

To decrease or prevent problem behaviors, teachers need to identify the causes and functions of the behaviors and prepare an intervention plan accordingly (Iwata, Dorsey, Slifer, Bauman, & Richman, 1994). Iwata et al. (1994) included escape from demands and adult attention as functions of problem behavior. Whenever students notice that the teacher is not attending to them, or that they cannot otherwise draw attention, they may demonstrate problem behaviors, such as non-compliance, shouting or screaming (Sucuoğlu, 2012).

One of the procedures used in classrooms to decrease problem behavior is the implementation of a fixed-time (FT) schedule (Austin & Soeda, 2008; Cooper, Heron, & Heward, 2007; Riley, McKeivitt, Shriver, & Allen, 2011). FT schedule (sometimes known as non-contingent reinforcement) involves the delivery of a stimulus, independent of behavior after a set period of time has elapsed (Borrero, Bartels-Meints, Sy, & Francisco, 2011). An FT schedule requires teachers to reinforce the first correct response after a predetermined amount of time has passed, but the reinforcer delivers, independent of behavior. An FT schedule is easily implemented, however, its limitations may include students becoming accustomed to the time interval, and thus, the withdrawal of the reinforcement may result in a sudden decrease in the frequency of target behaviors. It is possible that these limitations

could be eliminated by using a variable-time (VT) reinforcement schedule, following an FT schedule. For a VT schedule, the first correct response is reinforced after a predetermined average amount of time has passed. Since the students cannot predict the duration of the interval, target behaviors reinforced in a VT schedule are more consistently performed (Alberto & Troutman, 2013).

An FT schedule requires teachers to direct their attention to the students after a predetermined amount of time has passed. In this procedure, during the intervals, all student behaviors were ignored; attention was paid to the target behaviors and positive behaviors were reinforced and negative behaviors were redirected toward a more appropriate behavior only when the reinforcement time was signaled. Requirements for teacher attentiveness (both corrective and the use of praise statements) that is presented with an FT schedule may be useful because this procedure decreases problem behaviors by offering reinforcement independently (Austin & Soeda 2008; Riley et al., 2011).

A substantial number of studies have documented the effectiveness of FT schedules in reducing problem behaviors in various populations (Austin & Soeda, 2008; Ringdahl, Vollmer, Borrero, & Connell, 2001; Riley et al., 2011; Vollmer, Iwata, Zarcone, Smith, & Mazaleski, 1993). These studies have demonstrated that problem behaviors and off-task behaviors of students decreased under an FT schedule. For example, Austin and Soeda (2008) identified that attention delivery that included an FT schedule decreased the off-task behaviors of two third-graders with normal developmental patterns in a general education classroom. The teacher provided attention to students at four-minute intervals during an FT attention treatment, reinforcing their on-task behaviors with appropriate praises and ensured redirections when they presented off-task behaviors. All behaviors (regardless of their appropriateness) were ignored during the four-minute intervals. Additionally, researchers have found that on-task behavior engagement is associated with teacher praise. Riley et al. (2011) replicated Austin and Soeda's study; investigated attention delivery at five-minute intervals, during a five-minute FT schedule of attention, to raise the level of on-task behaviors of two general education students. In their study, the teacher provided attention and responses to students between intervals in her regular manner, and increased her attention during the FT schedule periods. The study by Riley et al. supports other findings that an FT schedule of attention method was

admissible in terms of increasing on-task behavior while decreasing those behaviors that interfered with learning and teaching. Riley et al. also expanded on the previous study by Austin and Soeda by examining the efficiency of the FT attention delivery method, when attention delivery was not excluded between intervals. They concluded that the method was efficient in either case at increasing the desired on-task student behavior.

The current study replicated those studies (Austin & Soeda; 200; Riley et al., 2011), thereby adding to the literature on the use of a VT reinforcement schedule, and the existing findings on the effectiveness of FT and VT schedules of attention on students with and without intellectual disabilities. There are a limited number of studies in the literature, highlighting that both FT and VT schedules can be effective (Carr, Kellum, & Chong, 2001; Van Camp, Lerman, Kelley, Contrucci, & Vorndran, 2000). However, there is a need to demonstrate the effectiveness of both schedules inside classroom settings. It is also important to investigate alternating FT with VT schedules, and to examine which schedule was preferred by teachers. Furthermore, this study expanded on previous studies (Austin & Soeda, 2008; Riley et al., 2011) by examining whether FT attention and VT delivery were effective in reducing off-task and increasing on-task behaviors, without including extinction between intervals. Moreover, in Turkey, where the current study was conducted, studies that have been conducted in inclusive classrooms have generally focused on evaluating teachers' attitudes and knowledge. According to the researcher, there have not been any experimental studies conducted till date that involve directing students' behaviors. Therefore, the purpose of this study is to examine the effectiveness of FT and VT schedules, and attention on problem behaviors and on-task behaviors of students with and without intellectual disabilities.

## Method

### Participants and Settings

The participants of this study were three students with intellectual disabilities and three students who displayed typical development. All six students were attending second grade at a mainstream public primary school in Bolu.

The following five criteria were used to select participants with intellectual disability: (a) attendance at a mainstream classroom, (b) appearance of a mild/borderline intellectual

disability, (c) teacher-reported problem behaviors, (d) no previous systematical behavior analysis interventions, and (e) parental and teacher consent to participate. The Provincial Directorate for National Education in Bolu granted additional necessary permissions. Next, the functional definition of problem behaviors and behavioral examples were provided to the teachers. They were asked to indicate which students demonstrated the most challenging (disruptive) behaviors. Three students who met the aforementioned criteria were selected.

The students with intellectual disabilities belonged to three different classes: Hasan, an eight year-old boy; and Efe and Metin; both nine year-old boys, who were diagnosed with mild intellectual disabilities. Intelligence quotients of the students ranged from 70 to 80. They did not have any other disabilities or delays, other than mild intellectual disability and problem behaviors. Teacher's reports, and observations made prior to intervention showed that these students frequently exhibited problem behaviors, such as talking irrelevant topics with the teacher or peers, raising their hand accompanied by standing up or shouting, engaging in off-task behaviors and non-compliance. These students were not receiving any support services such as resource rooms, teacher aides, or a consulting special education teacher.

Three typically developing peers were then selected from each classroom. The names of these students are Mesut, Deniz and Ada. They were selected according to teachers' opinions and because their age (nine years old) and gender matched the students with intellectual disabilities. They were average students in terms of academic achievement and behavior. Observations and teacher interviews prior to intervention revealed that these students exhibited some problem behaviors, such as standing up when raising their hand, engaging in off-task behaviors, and disobeying instructions.

All sessions were conducted in inclusive classrooms, with teacher training taking place in the school library, prior to the commencement of the study. An independent observer was present in the classrooms during the lessons. The classroom teachers were three women; aged 29, 33, and 39, who had graduated from the department of elementary education, and had work experience ranging between five and twelve years, and had two to three years' experience of having students with intellectual disabilities into their classrooms. They did not have any previous systematic training in behavior management, and volunteered to participate in this study.

### Dependent Variables and Measurement

The dependent variable for all participants was the frequency of problem behaviors and on-task behaviors. In this study, walking around without permission, lying on top of a desk, looking around the room, talking about matters unrelated to course content, self-stimulatory behaviors (rocking back and forth on a chair, putting fingers in mouth, biting nails), using materials unrelated to course purposes, and objection/non-compliance were observed as problem behaviors. On the other hand, on-task behaviors were defined as actively (e.g., writing, raising hand) or passively (e.g., listening to the teacher, silent reading) engaging in academic activities (Briesch, Chafouleas, & Riley-Tillman, 2010; Greenwood, Horton & Utley, 2002). In this study, on-task behaviors were listed as writing (on paper, in a notebook, or on the board); reading aloud (from a book, notebook, projector, with class or alone); silent reading (from a book, notebook, board, projector, with class or alone); raising hand; talking to the teacher or a peer about ongoing classroom activity; listening to the teacher; and listening to a peer answer a question.

Dependent variables were measured by observation forms that were developed based on a literature review (Aman, Singh, Steward, & Field, 1985; Briesch et al., 2010; Gresham & Elliott, 1990; Sucuoğlu, Akalin, & Sazak-Pinar, 2008). Undergraduate students conducted direct observations of the participants' problem behaviors and on-task behaviors, using a 10-s momentary time sampling recording procedure. At the beginning of the cued interval, the observers first took note of the students with intellectual disabilities, recording problem behaviors and on-task behaviors, respectively, and then placing a mark in the appropriate box on the scoring sheet. After this, the observers took note of the students displaying normal development and recorded behaviors in the same manner. If the behaviors listed on the forms were observed, the observers put a mark (×) in the related box, and if they were not observed, the boxes were left blank. Each mark was counted as one point, and the frequency and percentage of the total scores were calculated. Direct observations were conducted in this way four or five times a week, during 30 minute classroom sessions in which teacher-led, large-group instruction was being carried out. Data was recorded over 22 sessions during the spring semester of the 2013 academic school year.

We also checked for inter-observer agreement. Three observers were a part of this study. Graduate

students received training on the 10-s momentary time sampling procedure and on how to code behaviors using the variables from the observation forms. Observer training was simultaneously but independently implemented, using videos of classrooms that had been recorded for another study (Sucuoğlu et al., 2008). The training included teaching and reviewing the procedures, providing examples of behaviors that could be coded, and practicing the coding procedures. Inter-observer agreement was calculated by dividing the number of intervals with agreements by the number of agreements plus disagreements and multiplying by 100%. The means of the inter-observer reliability percentages were 92.3% (range = 87.6%–100%) for problem behavior and 90.4% (range = 88.2%–98%) for on-task behaviors, which can be considered as acceptable.

### Procedure

Informed consent was obtained from the participating teachers. The researcher first met with the teachers to explain the benefits of using FT and VT schedules, and attention with students in their classrooms. She then described the FT and VT schedule and attention procedures, including the teacher's role during the baseline and intervention conditions, and a brief description of the data collection procedures and interrater observations. The total duration of the training, which included modeling and role-playing of reinforcement and attention aspects, was three hours.

### Design

We used the ABAC reversal design for the purpose of this study (Tekin-İftar, 2012). During the baseline conditions (A), the teacher was asked to respond to the participants' behavior in her usual manner. During the first intervention condition (B), FT schedule and attention; and during the second intervention condition (C), the VT schedule and attention were implemented.

### Functional Assessment

The purpose of functional behavior assessment (FBA) is to draw conclusions regarding the functions of a behavior by collecting data on it, that is, to determine the function of the behavior in question (Sucuoğlu, 2012). Functional assessment is conducted through interviews with individuals who know the particular student well (indirect data collection) and by observing student behaviors

(direct data collection). This study utilized both methods; classroom teachers of target students (who were also the participants of the study) were interviewed, and were also asked to complete a Functional Behavioral Assessment Inventory. The aim of the form was to identify the environmental and physical factors that could result in problem behaviors and understand the functions of problem behaviors. The second phase of function identification included direct data collection (Sucuoğlu, 2012). Direct data collection involved Antecedent, Behavior and Consequence Analysis. Firstly, target problem behaviors were objectively identified and student behaviors recorded on a number of occasions (in Turkish, Social Studies and Mathematics Classes) in the regular environment (classroom). This analysis helped identify the frequency and length of problem behaviors, environmental antecedents prior to behaviors, and the responses subsequent to the behaviors in order to determine the functions of these behaviors. Results indicated that the function of problem behaviors with the specific target students was to draw the attention of teachers and peers.

### Baseline

The dependent variables were observed until enough consistent data had been collected. The teachers did not present reinforcement, nor give attention to students with and without intellectual disabilities, or redirect student behaviors. In the current study, the amount of attention the teachers paid to the students' behavior, or how much they rewarded them was not evaluated. However, in a previous study conducted in a similar context (Sazak Pinar & Güner Yıldız, 2013) revealed that teachers paid more attention to inappropriate behavior of students, both with and without intellectual disabilities; they responded with negative reactions (such as warnings, shouting, occasional punishment), and that they did not attend to the positive behavior of students with intellectual disabilities.

In the baseline conditions, the teacher was asked to respond to the students in her own typical manner. Direct observations took place by one observer by recording the problem behaviors and on-task behaviors of each student with or without intellectual disabilities.

### FT Schedule and Attention

Teacher attentiveness was defined as saying the name of the student and providing instructions, such as "get back to your task," "read your book," "look at the board," or "listen to me," following inappropriate behaviors demonstrated by students with intellectual disabilities, and then, redirecting the students toward the correct behaviors. In this research, teacher attention was implemented for both groups of students; however, they used confirmatory and rewarding responses for the students with intellectual disabilities and only rewarding responses for those without.

The FT schedule and attention was based on a four-minute period. This schedule was chosen based on previous research results (Austin & Soeda, 2008; Riley et al., 2011), teacher opinion, and the ease of recording student behaviors. The teacher first attended to the student with an intellectual disability every four minutes (five at the most) following a signal from the timer. Upon receiving the cue, the teacher provided brief, individualized attention, first to the student with an intellectual disability. If the student with intellectual disability engaged in appropriate classroom behavior, the teacher was required to say the name of the student, as well as to use reinforcing words, such as "Hasan, you're listening to me, well done," "you're working really carefully," or "you're in your seat, great." If the student engaged in inappropriate classroom behavior, but not in the course content, the teacher was required to say the name of the student and provide an instruction, such as "Hasan, get back to your task," "read your book," "look at the board," or "listen to me." Then the teacher provided brief, individual attention to the student without intellectual disability who was engaging in appropriate behavior, and the teacher was required to say his name and reinforce the appropriate behavior, for example, "Hasan, good job, great, you're listening to me, well done."

The FT schedule and attention (every 4 minutes) were introduced and used until the criteria for the target behaviors (for problem behaviors 0%–10% and for on-task behaviors 90%–100%) was achieved. During the intervention condition, the teacher was allowed to redirect and reinforce the students' behavior between intervals, as she typically would.

### VT Schedule and Attention

In the second intervention condition, reinforcement and teacher attentiveness were used according to a

VT schedule. In this phase, the teachers attended to behaviors of students, both with, and without intellectual disability, on an average of every four minutes; either reinforcing appropriate behavior or redirecting students back to the academic activity. Teachers presented reinforcement after three, four or five minute intervals, so as not to cause too much disruption to their teaching activities. Since the behaviors needed to be reinforced, on average, every four minutes, teachers used a timer to prompt reinforcement. The timer was set to randomly select an interval duration of three, four or five minutes so that the intervals averaged out at four. The VT schedule and attention were used until the criteria for the target behaviors was achieved. During the intervention condition, the teacher was allowed to redirect and reinforce the students' behavior between intervals, as she typically would.

### Inter-coder Reliability and Procedural Integrity

Since the school management did not permit video recordings of the classrooms, reliability data was collected via the direct observation of an independent observer. The observer was a senior from a special education undergraduate program, and had previously worked in a similar study (Sazak Pınar & Güner Yıldız, 2013). She received further training with regard to the research design of this study and learnt how to use the partial interval recording technique. She randomly observed one of the three lessons in the intervention phase in order to gather data for 30% of the observations. In total, 144 sessions were coded. Therefore, data was collected from 45 randomly selected sessions for inter-coder reliability and procedural reliability. For every session, percentages of agreement and disagreement between the observer and the independent observer were calculated. The inter-observer reliability percentage was calculated using the following formula:  $\text{number of agreements} / [\text{number of agreements} + \text{number of disagreements}] \times 100$  (Tekin-İftar, 2012). The means of the inter-observer reliability percentages were 92.3% (range = 87.6%–100%) for problem behaviors and 90.4% (range = 88.2%–98%) for on-task behaviors.

During the study, data was collected to observe FT and VT schedules and attention delivery to students in order to examine the procedural integrity of the intervention. FT conditions required that teacher attention must be presented at four-minute intervals. Given that the teacher was busy with many tasks in the classroom; from providing instructions to the whole group to providing

individual assistance, he/she was given permission when required to provide attention five seconds after her usual cue and this was also accepted in the regular schedule as appropriate delivery. The method of calculating procedural integrity was done by dividing the number of intervals when the teacher provided attention by the number of intervals the teacher was cued, then multiplying by 100%. The mean scores for procedural reliability were 93.5% (range = 92%–96%) for the B phase and 96.6% (range = 95%–98%) for the C phase.

### Social Validity

Social validity data for this study was collected using a subjective assessment approach (Vuran & Sönmez, 2008). A subjective assessment process was implemented with teachers, students with intellectual disabilities and their mothers. For this purpose, a questionnaire was developed for each group, and consisted of open-ended questions and a three point Likert-type scale (agree, neutral, and disagree) about the convenience and usefulness of the FT and VT schedules and attention. The teachers and mothers filled in the questionnaires, which were handed back in a sealed envelope, whereas the independent observers completed the students' questionnaires by individually asking them each question. Data was analyzed using qualitative techniques.

### Data Analysis

The problem behaviors and on-task behaviors of each student were recorded in the same way during the baseline and intervention phases to allow for an analysis of the effects of the intervention. This design demonstrated the relations between the implementation of the intervention and the changes in target behavior (Riley et al., 2011; Tankersley, Harjusola-Webb, & Landrum, 2008). Having collected the student data, the response rate (the frequency of problem behaviors and on-task behaviors) of students with and without intellectual disabilities was calculated using the following formula:  $\text{Response Rate (Percentage of Intervals)} = \text{Frequency of Responses} / \text{Frequency of Observation (Interval)} \times 100$  (Tekin-İftar, 2012). Moreover, effect sizes of the data were also calculated and a line graph was used to present the data. A Percentage of Non-overlapping Data (PND) was calculated for the behaviors to be increased, and a Percentage of Zero Data (PZD) was calculated for the behaviors to be decreased (Scruggs & Mastropieri, 2001).

Results

Effectiveness Data

**Figure 1 Shows the Results for Students with Intellectual Disabilities:** Results relating to the effectiveness of the FT and VT schedules and attention on problem behaviors and on-task behaviors of students with intellectual disabilities.

Means of problem behaviors and on-task behaviors, for the first baseline level were 88.7% (range = 85%–100%) and 36% (range = 30%–45%), respectively. For the first intervention condition, which included FT and VT schedules and attention, the means of

problem behaviors and on-task behaviors were 10.3% (range = 0.00%–50%) and 84.99% (range = 50%–100%), respectively. Means of problem behaviors and on-task behaviors for the second baseline level were 69.7% (range = 43.3%–90%) and 54% (range = 40%–65%), respectively. For the second intervention condition, which utilized VT schedule and attention, means of problem behaviors were 07.03% (range = 0.00%–40%), and on-task behaviors were 88.74% (range = 70%–100%).

When we examined the findings related to FT and VT schedules and attention (Figure 1), it was noticed that the mean for problem behaviors was 86.3%

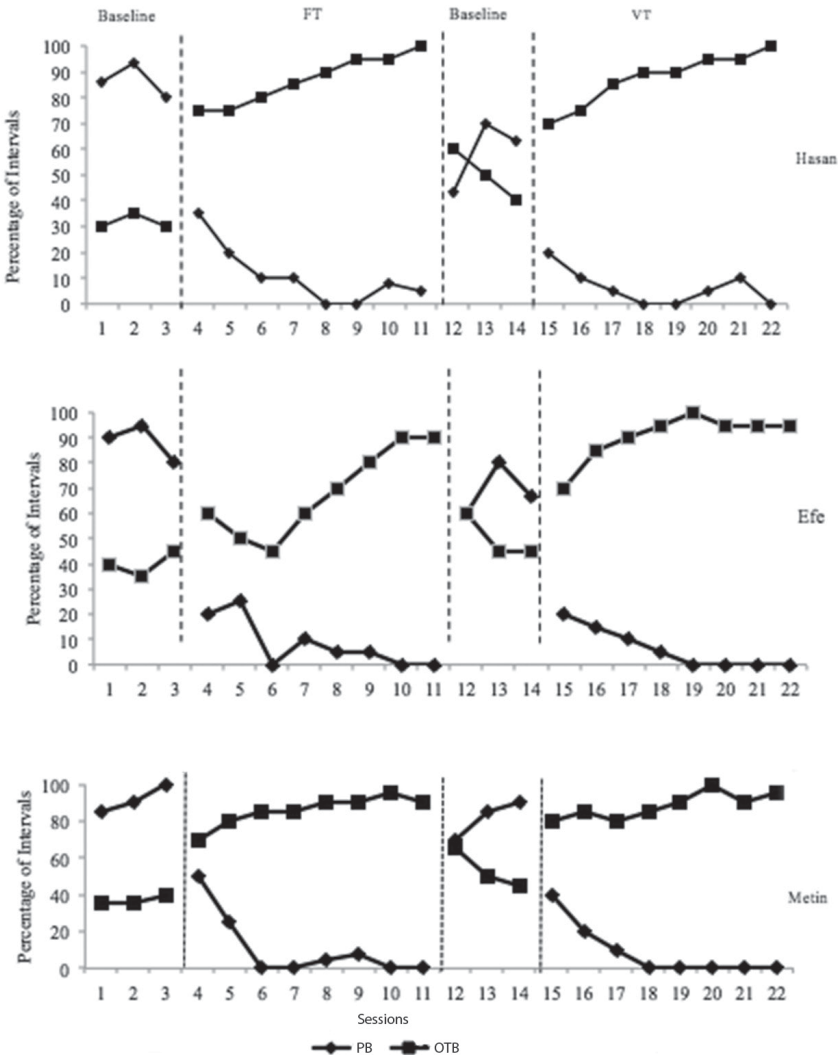


Figure 1: Percentage of intervals in which problem behaviors (PB) and on-task behaviors (OTB), for Hasan, Efe and Metin (the students with intellectual disabilities) during baseline, fixed-time (FT) and variable-time (VT) conditions.

and 31.6% for on-task behaviors for Hasan in the first baseline condition. After eight sessions with an FT schedule and attention, the mean percentage of Hasan's problem behaviors was 5% and 100% for on-task behaviors. For the second baseline level, in the first session, his percentage of problem behaviors increased to 43.3% and his on-task behaviors decreased to 60%, and during the second baseline level his mean for problem behaviors was 58.8%, and 50% for on-task behaviors. After eight sessions with a VT schedule and attention, the percentage of Hasan's problem behaviors and on-task behaviors were 0.0% and 100%, respectively.

When we examined the results for Efe (see Figure 1), we noticed that, for the first baseline level, his mean percentage for problem behaviors was 88.3% and for on-task behaviors, 40%. After eight sessions with an FT schedule and attention, Efe's mean percentage of problem behaviors was 0% and on-task behaviors was 95%. For the second baseline level, his percentage of problem behaviors increased to 60% and on-task behaviors decreased to 60% in the first session, and during the second baseline level the mean percentage for his problem behaviors and on-task behaviors were 68.86% and 50%, respectively. After eight sessions with VT schedule and attention, the percentage of his problem behaviors was 0.0% and on-task behaviors was 95%.

Before implementing an FT schedule and attention, the mean percentage of problem behaviors for Metin was 91.6% and on-task behaviors 36.6%. After eight sessions with an FT schedule and attention, the mean percentage for his problem behaviors and on-task behaviors was 0% and 90%, respectively. During the second baseline level, in which intervention was withdrawn, the percentage of his problem behaviors increased to 81.6% and on-task behaviors decreased to 53.3%. After a VT schedule and attention were introduced, the percentage for his problem behaviors decreased to 0% and his on-task behaviors increased to 95%.

When the PND was calculated, the effect sizes for the FT and VT schedules and attention were 100% for on-task behaviors for all subjects. The PZD calculations for the effect sizes of the FT and VT schedules and attention for problem behaviors were 62% for Hasan and Efe, and 68% for Metin.

**Figure 2 Shows the Results for Students without Intellectual Disability:** The problem behaviors and on-task behaviors of students without intellectual disabilities.

For Mesut, Deniz and Ada, there was a clear and immediate decrease in problem behaviors (pb) at the start of the intervention ( $M_{pb} = 08.0\%$ , range 0%–10%;  $M_{pb} = 9.37\%$ , range 0%–20%;  $M_{pb} = 13.8\%$ , range 0%–30%), relative to the baseline ( $M_{pb} = 68.3\%$ , range 60%–75%;  $M_{pb} = 55.0\%$ , range 50%–60%;  $M_{pb} = 61.6\%$ , range 55%–70%, respectively). This decrease in the percentage of intervals of problem behavior was maintained throughout the second intervention condition ( $M_{pb} = 0.07\%$ , range 0%–10%;  $M_{pb} = 8.73\%$ , range 0%–30%;  $M_{pb} = 20\%$ , range 0%–30%, respectively) while the second baseline condition saw an increase ( $M_{pb} = 56\%$ , range 40%–70%;  $M_{pb} = 43.3\%$ , range 40%–50%;  $M_{pb} = 36.6\%$ , range 30%–40%, respectively).

According to on-task behaviors (OTB), there were average levels in the first baseline condition ( $M_{otb} = 48.8\%$ , range 35–55%;  $M_{otb} = 40$ , range 30%–45%;  $M_{otb} = 33.3\%$ , range 30%–40%, respectively) and in the second baseline condition ( $M_{otb} = 51.6\%$ , range 40%–60%;  $M_{otb} = 46.6\%$ , range 40%–55%;  $M_{otb} = 36.6\%$ , range 30%–40%, respectively). After both intervention conditions, on-task behaviors also increased in the three students without intellectual disabilities (In first intervention condition,  $M_{otb} = 85.1\%$ , range 85%–100%;  $M_{otb} = 80.6\%$ , range 60%–95%;  $M_{otb} = 75\%$ , range 50%–85%; in second intervention condition,  $M_{otb} = 96.8\%$ , range 90%–100%;  $M_{otb} = 87.5\%$ , range 75%–100%;  $M_{otb} = 83.7\%$ , range 70%–100%, respectively).

### Social Validity

Data for social validity was collected by examining the opinions of the teachers and parents of students with intellectual disabilities, regarding the method and importance of the results of this study. All three teachers indicated that using the FT and VT schedules and attention positively affected the behavior of students with and without intellectual disabilities. The students' on-task behaviors increased and their problem behaviors were almost non-existent. They also stated that the VT schedule (in particular) of teacher attentiveness and reinforcement did not interrupt the flow of the lessons, and they would use this type of schedule during other lessons, too. The teachers reported that recognizing and reinforcing student behaviors was highly useful and practical. One of the teachers articulated the following:

“I saw positive changes in the classroom behavior of the student. I observed that he was listening carefully to me and not engaging in distractive



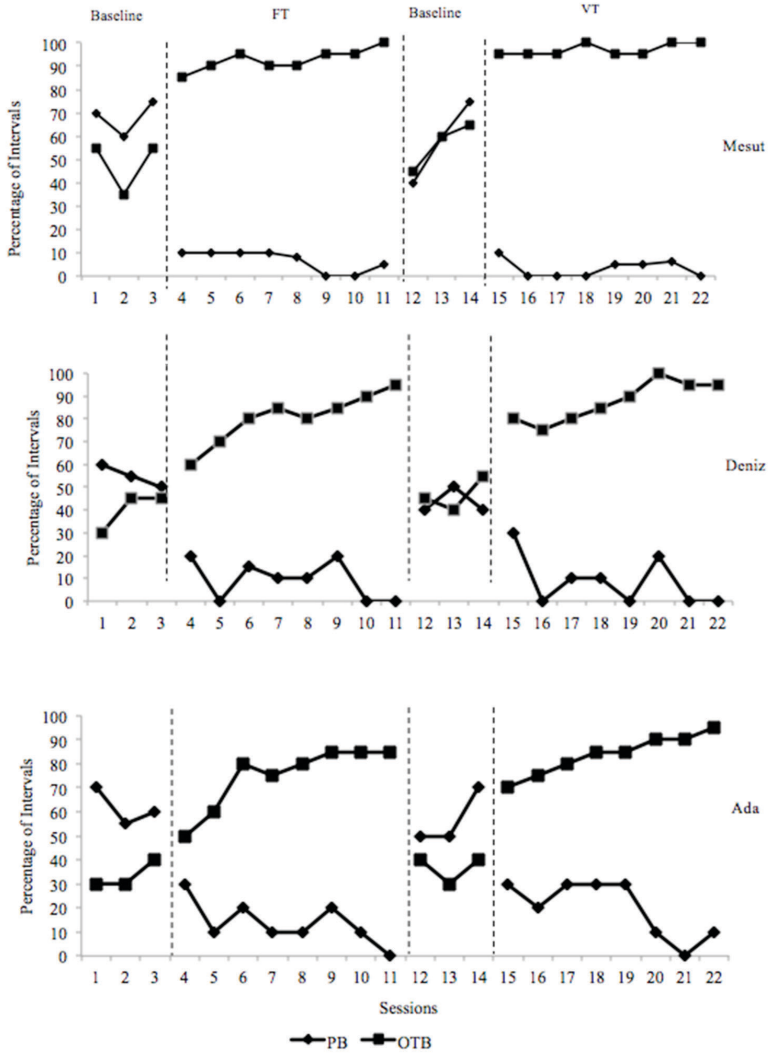


Figure 2: Percentage of intervals in which problem behaviors (PB) and on-task behaviors (OTB) for Mesut, Deniz and Ada (students without intellectual disabilities) during baseline, fixed-time (FT) and variable-time (VT) conditions.

behaviors. Not only the target student, but also other students concentrated more easily on the lessons; they tried to listen carefully to my lectures, and they tried hard not to make any noise.”

Mothers of students with intellectual disabilities reported that they saw differences in their children’s behavior at home in the month following the study, and their children had started to demonstrate a more appropriate behavior. They also stated that their children were more eager to go to school, engaged more easily in social activities, and communicated with less difficulty.

Students with intellectual disabilities indicated that they were very pleased with the reinforcement they, or their peers, had received from their teachers for their appropriate behaviors, and that they really liked receiving rewards.

**Discussion**

This study examined the effects of FT and VT schedules and attention paid to the problem behaviors and on-task behaviors of students with and without intellectual disabilities. The findings of this study revealed that students with intellectual

disabilities exhibited very high levels of problem behavior before the first and second intervention conditions; however, students without intellectual disabilities exhibited moderate levels of problem behavior. Moreover, the problem behaviors of all students who participated in this study decreased, and eventually became non-existent. Similarly, on-task behaviors, which had low levels of occurrence before the introduction of the FT and VT schedules and attention, rapidly increased after it. These findings are consistent with previous research studies on the effectiveness of FT schedules and attention (Austin & Soeda, 2008; Rasmussen & O'Neill, 2006; Riley et al., 2011; Ringdahl et al., 2001; Tomlin & Reed, 2012) and VT schedules and attention (Carr et al., 2001; Van Camp et al., 2000). Based on these results, we can conclude that FT and VT schedules and attention were effective in increasing desirable behaviors and decreasing undesirable behaviors of students with and without intellectual disabilities in inclusive classrooms.

In this study, the effectiveness of the FT and VT schedules and attention was due to several factors. First, they were both very easy to use. Teachers knew when to reinforce the students with a timer. Implementing FT and VT reinforcement is cost-effective and does not waste any time (Austin & Soeda, 2008). Both FT and VT reinforcement are acceptable practices for teachers because they prefer to use interventions that are less challenging and require less time (Riley et al., 2011). The higher the acceptance of the intervention by teachers, the higher the procedural reliability and success of the intervention (Mautone, Manz, Martin, & White, 2009; Riley et al., 2011). Second, the teachers themselves decided on the reinforcement intervals. Austin and Soeda (2008) suggested that when teachers decided on the FT schedule, acceptance and success of the intervention increased. Third, teachers had not received any training on behavior management or reinforcement prior to this study. Studies conducted in Turkey have shown that teachers have limited knowledge about classroom and behavior management (Güner, 2010). Moreover, they do neither attend to, nor reinforce desired student behaviors, and rather than redirecting students to the appropriate behaviors, they tend to criticize undesired behaviors (Sazak Pınar & Güner Yıldız, 2013). Teachers reported that they had not attended to positive student behaviors prior to taking part in this study, and that they usually attended to negative behaviors. However, after this study, they indicated that their responses had completely changed. Moreover, the

level of effectiveness of the FT and VT schedules and attention showed that they definitely did reduce problem behaviors, and increased on-task behaviors. Future research studies could include observation of classrooms to assess whether the changes in teachers' reactions were being maintained.

The findings of this study support the use of a VT schedule and attention. Problem behaviors were only observed during 0%–10% of the intervals in the second intervention condition. Students not only reached the desired criteria more rapidly in the second intervention condition, but also exhibited achievement that was more consistent. These findings can be explained in two ways. First, as Alberto and Troutman (2001) suggested, students may have demonstrated appropriate behaviors more consistently, since they could not predict the reinforcement intervals in VT. Second, because the problem behaviors of students had continued for an extended period, and the students had received reinforcement for these behaviors, it may have taken longer to alter this behavior.

This study contributes to the field of educational research in two ways. First, in terms of literature, FT and VT schedules and attention had previously been used more outside the classroom, however, in this research these schedules were used in classroom settings rather than in clinics. Effectiveness was demonstrated with the use of the schedules for students with and without intellectual disabilities. Therefore, this study supports and adds to the findings of previous research studies in which FT and VT schedules and attention have been used. Second, this is the first experimental study in Turkey in which an intervention for problem behaviors of students in inclusive classrooms was the target, and that introduced reinforcement schedules and redirection to change students' behavior.

In Turkey, teachers working in inclusive classrooms have often complained about students' problem behaviors. Teachers need to learn effective behavior management strategies and how to implement them without disrupting their regular lesson teachings (Sazak Pınar & Güner Yıldız, 2013). This research highlights how teachers can easily implement FT and VT schedules and attention in the classroom. Once teachers have learnt how to use appropriate reinforcement and behavior redirection strategies, students' problem behaviors will decrease, and their on-task behaviors should increase. The study also showed that a VT schedule was implemented more easily by the teachers than an FT schedule. Teachers

indicated that at the end of the first intervention condition they had to stop the flow of the lesson (for example, while lecturing or talking to a student) when they heard the timer, and it was difficult for them to reinforce and attend to behaviors. However, after the second intervention condition, they reported that they used the VT schedule and were able to attend to behaviors without difficulty, given they did not have to stop in the middle of a sentence. Thus, it can be suggested that a VT schedule and attention is more acceptable and more easily implemented than FT. Mautone et al. (2009) also found that simple and flexible schedules were implemented more easily by teachers.

This study has some additional limitations. First, the experimental functional analysis, to determine whether the children's behavior was actually maintained by attention, was not conducted. However, the data obtained from functional assessment activities, including interviews with teachers and observations of students, helped to conclude that social attention was the maintaining reinforcement for the participants' problem behavior. This procedure, known as informant assessment, has been found to be highly unreliable and frequently invalid (Hanley, 2012), however, indirect methods are commonly used and they generally allow researchers to obtain preliminary information in order to identify functions of problem behavior (Sterling-Turner, Robinson, & Wilczynski, 2001). The second limitation of the study was the extent to

which teachers attended to the students' behaviors during baseline was not measured. On the other hand, previous studies in a similar context (Sazak Pınar & Güner Yıldız, 2013) have shown that teachers paid more attention to problem behavior rather than on-task behavior. The third limitation was that the FT and VT schedules were not counter-balanced across classrooms. FT intervention always occurred prior to VT intervention. The fourth limitation was that the differences in each of the behaviors observed were not separately assessed and thus, the behaviors that were most positively affected by the implementations could not be identified. Furthermore, only verbal reinforcement was used in this study. Therefore, in future studies different reinforcement types (such as symbols, activities or student-elected reinforcements) could be used and the effectiveness of each could be examined. Additionally, future research should focus on replicating the findings of this study and determine whether the intervention results will transfer to other disability populations, other settings and other age groups. Finally, while the results of this study confirmed that there is a positive relationship between teacher and student behaviors, the effects of teacher behaviors on the students is very strong. More research is recommended in terms of specifics.

### Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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