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The effectiveness of graduated guidance on teaching leisure skills to children with autism spectrum disorder*

[a]Özcan Karaaslan *

[a] *Marmara University, Istanbul, Turkey*

Abstract

The aim of this study was to investigate the effectiveness of teaching with graduated guidance on teaching the playing backgammon skill, which is one of the leisure skills, to children with *¨Autism Spectrum Disorder (ASD)¨*. Three children with ASD participated in this research. A multiple probe design across the participants was used in order to examine the effectiveness graduated guidance on teaching playing backgammon skill. The research was conducted by using. The dependent variable of this research is the level of acquiring playing backgammon skill. Additionally, the independent variable of this research is graduated guidance. According to the findings of this study, graduated guidance was effective on teaching playing backgammon skill, which is one of the leisure skills. In other words, result of this study revealed that graduated guidance was effective on teaching backgammon playing skill to children with ASD. In addition, it was determined that after finished instruction sessions, children with ASD were able to maintain the playing backgammon skill that they learned and also generalize the acquired skill to different person. In the light of the limitations identified and the findings, recommendations were made for further research.

Keywords: Autism Spectrum Disorder, Graduated Guidance, Leisure Skills, Playing Backgammon Skill

1. Introduction

The Centers for Disease Control and Prevention declared that ¨Autism Spectrum Disorder (ASD)¨ 1 in 44 (%2.3) 8-year-old children have been identified with ASD according to an analysis of 2018 data (Maenner, Shaw, Bakian, Bilder, Durkin, Esler, & Cogswell et al., 2021). Although the prevalence of ASD differs from country to country, it is generally seen that there is an increase in the number of ASD in all countries (Fombonne, 2002, as cited in Karaaslan & Karaaslan, 2016).

* Corresponding author: Özcan Karaaslan . ORCID ID.: https://orcid.org/0000-0002-4672-5678
E-mail address: ozcan.karaaslan@marmara.edu.tr

The Diagnostic and Statistical Manual of Mental Disorders (DSM-5) of the American Psychiatric Association defines ASD as a neurodevelopmental disorder characterized by restriction in interests and repetitive behaviors, as well as persistent difficulties in language and communication and social interaction (as cited in Berenguer, Baixauli, Gómez, Andrés, & De Stasio, 2020). According to some researchers (Caldwell, Finkelstein, & Demers, 2001; Dodd, Zabriskie, Widmer, & Eggett, 2009; Schleien, Wehman, & Kiernan, 1981) assert that children with ASD independently participating in leisure time skills may increase quality of life and social acceptance (Carlile, Reeve, Reeve, & DeBar, 2013). Children with ASD usually spend most of their leisure time doing nothing because of the limitations they experience in social skills and need the support of others (Beland, 2008; Westling & Fox, 2004, as cited in Eyiip, Ergenekon & Çolak, 2018). For example, in the study conducted by Hochhauser and Engel-Yeger (2010), it was found that children with high-functioning ASD had lower involvement in leisure activities expressed in limited range of activities, performed less often, mostly alone and at home.

Most of typically developing children spend their leisure time with relaxing, making friends with others, discovering their interests and learning new skills (Altun & Yücesoy-Özkan, 2018). On the other hand, individuals with ASD or other developmental disabilities spend most of their leisure time doing nothing because of the limitations they experience in accessing different persons and environments, and their need for help from others (Beland, 2008; Westling & Fox, 2004, as cited in Altun & Yücesoy-Özkan, 2018). Therefore, while individuals with normal development can perform leisure time activities on their own, in line with their wishes and preferences, in their work life, at school or outside of daily life; individuals with ASD have difficulty participating in leisure activities and performing these activities (Eyiip, Ergenekon & Çolak, 2018).

In the literature, it has been investigated whether or not to teach leisure time skills by using activity schedules presented on the iPod touch. In the study conducted by Carlile, Reeve, Reeve, & DeBar (2013), it was tried to determine whether the activity schedule on the iPod touch is effective or not to teach independent leisure activities to four children diagnosed with ASD. In addition to prompts, progressive time-delay procedures and reinforcement were used in the study. The prompts were faded systematically by using progressive time-delay procedures. When the activity schedule presented on the iPod touch in instruction sessions all participants learned to perform independent leisure skills independently. In addition, it was observed that they maintained those new skills after the end of the intervention and generalized them to novel settings and schedules. In the study carried out by Eyiip, Ergenekon & Çolak (2018), the mother of an adolescent with ASD prepared and taught the activity schedule including leisure activities as well as teaching of on-schedules. According to the findings, the activity schedule was effective in acquiring the skill of following the schedule based on leisure time activities for the adolescent with ASD.

In the literature, it is seen that Power Point on the computer, activity schedules and video modeling are used to teach leisure skills to children with ASD (Carlile, Reeve, Reeve, & DeBar, 2013). There are also researches on the effectiveness of video prompting. For example;

Altun & Yücesoy-Özkan (2018) compared the effectiveness and efficiency of the video prompting with and without error correction in the acquisition of leisure time skills to a child with ASD. The findings showed that the video prompting, both with and without error correction, is effective in teaching leisure skills for the child with ASD. Additionally, in the study carried out by Kurt (2006), the effectiveness and efficiency of simultaneous prompting procedures and constant time delay within an embedded teaching format were compared in terms of the acquisition of leisure skills by the students with ASD. The findings revealed that children with ASD learned leisure time skills both in simultaneous prompting procedures and constant time delay within an embedded teaching format. In addition, there was no difference in efficiency between these two methods in terms of results. In the literature, it is asserted that graduated guidance is used as an effective teaching technique in children with ASD. For example; in the study conducted by Birkan (2011), it is seen that scripts and script fading procedure with graduated guidance is used in teaching conversation skills to children with ASD. The study conducted by Çattık (2016) indicates that gradual assistance has effective on graduated guidance on digital play and observational learning skills of children with ASD. In the study conducted by Akmanoğlu (2008), it was revealed that graduated guidance with video modeling and community-based instructional arrangements were effective in helping children with ASD learn to protect themselves from the lures of strangers. In summary, there was not a study that has been found on the acquisition of leisure skills by using graduated assistance.

1.1. Aim of the Study

The purpose of this study is to evaluate the effects of graduated guidance on teaching or gaining leisure skills to children with ASD. In accordance with this purpose, answer the following research questions were sought. These;

1. Is the graduated guidance effective in helping ASD children acquire playing backgammon skill, which is one of the leisure skills?
2. If ASD children gain playing backgammon skill with the graduated guidance, can they maintain the skill they have gained after the end of the instruction?
3. If ASD children gain playing backgammon skill with the graduated guidance, can they generalize (to different people) the skill they learn?

2. Method

2.1. Research design

A multiple probe design across the participants, which is the single subject research models was used to determine the effectiveness of graduated guidance on teaching playing backgammon skill to children with ASD. In this research model, experimental control is ensured with the change in the behavior of each participant occurring only when the independent variable is applied, no change in behavior occurring when the independent variable is not applied, and a similar effect being repeated in the behavior of other

participants with the diachronic application of the independent variable (Tekin & Kırcaali-İftar, 2001).

2.2. Participants

Participants included two children with ASD (a female and two male) who were between 11 and 13 age. All three participants had received a diagnosis of ASD. In the research, the real names of the participants were not used. Therefore, code names were used for participants. Four prerequisite features were used for participants for selection in this study. These prerequisite features are; (1) being able to pay attention to the activity for 5 minutes and sitting in place throughout the activity, (2) following verbal instructions (arranging the checkers properly on the backgammon), (3) fine motor skills (for example, putting the checkers in the backgammon, holding the dice, throwing, etc.). and (4) the ability to imitate motor skills.

2.3. Dependent and independent variable

The dependent variable of this research is the level of acquiring playing backgammon skill. Additionally, graduated guidance is the independent variable of the research

2.4. Data collection tools and setting

Backgammon was used for the acquisition of the skill of playing backgammon skill in this study. Additionally, a video camera was used for recording all sessions. The intervention sessions were held one-on-one with each participant in the group training room. The group training room is rectangular in shape with dimensions of 3m x 2m and there is a table and 2 chairs in the room.

2.5. General procedure

In this study; baseline, intervention (instruction) sessions, probe session before intervention sessions, full probe sessions, generalization and maintenance sessions were carried out. In this research, firstly, baseline data were collected from all subjects. When stable data were obtained at the baseline level, the intervention session was started with the first subject. While intervention sessions were carried out with the first subject, no intervention session was conducted for the acquisition of any dependent variable in the other subjects. When the 100% criterion was met in the intervention phase with the first subject, the first full probe sessions were conducted in all subjects. After first full probe session, intervention sessions were started with the second subject. While the intervention session was carried out with the second subject, no instruction regarding the dependent variable was carried out with the other two subjects. In the intervention phase with the second subject, when the 100% criterion was met, the intervention session was concluded and second full probe sessions were held. After second full probe sessions with each subject, intervention sessions were held with third subject. While intervention was conducted with the third subject, no instruction regarding the dependent variable was carried out with the other two subjects. When third subject responded 100% correctly in backgammon playing skill, the instruction was concluded and the third full probe session was held. Thus, a similar effect

was achieved by diachronically applying the independent variable to each subject. In addition, maintenance (follow-up) and generalization sessions were held.

2.5.1. Baseline

Baseline sessions were held to determine the performance of children with ASD in terms of playing backgammon. When the children with ASD performed each skill step correctly, the correct responses of the children were recorded as (+) in the data collection form. The non-responsiveness or false responses of the children with ASD were recorded in the data collection form as (-). When at least three stable data were obtained in the baseline sessions, then the intervention sessions were started.

2.5.2. Intervention Sessions

In the intervention sessions, the practitioner presented the target stimulus after providing information about what will be done in the study by saying "Now we will play backgammon with you." Additionally, while using graduated guidance in teaching, the practitioner used physical and verbal cues and blurred these cues in the intervention process. For example, for the child with ASD to perform the skill step correctly, the practitioner held the child's hand and enabled the child to fulfill the skill step with physical cues. In the process of blurring the physical cue, the hierarchy of full physical cue, partial physical cue, sign cue, and shadow cue was used as described in the literature (for example, Dalgın Eyiip, 2018; Tekin-İftar & Kırcaali-İftar, 2006). When the child with ASD gave the right response, the physical cue was blurred gradually and the verbal cue, which has a lower help level, was implemented. If the child with ASD provided false responses, then the previous clue, the physical cue, was used**.**

2.5.3. Probe Sessions

Probe sessions were held in the study after each intervention session to determine whether each participant acquired backgammon playing skill. Probing sessions were conducted similarly to baseline sessions

2.5.4. Maintenance and generalization sessions

Maintenance sessions were held to see if the participants retained their skills to play backgammon skill, which they learned through graduated guidance, after the end of the intervention. Additionally, generalization sessions were held to see whether the participants could generalize the learned playing backgammon skill to different people.

2.6. Data collection and analysis

Effectiveness data. In the research, data about the baseline, intervention, full probe, maintenance and generalization sessions were collected using the data registration form prepared for the teaching of playing backgammon. The obtained data were analyzed by visual analysis method and plotted.

Reliability data. ¨inter-observer reliability¨ and *¨treatment integrity¨* data were collected in at least 30% of all sessions held throughout the study and analyzed. Treatment integrity

data were analyzed by using the *"observed practitioner behavior/planned practitioner behavior x 100"* formula in line with the data collected (Tekin-İftar & Kırcaali-İftar, 2013). The findings revealed that the practitioner conducted all the sessions at a 100% reliability level. Additionally, inter-observation reliability data were analyzed by using the "*Agreement/(Agreement + Disagreement) x 100"* formula in line with the data collected (Tekin-Iftar & Kırcaali-Iftar, 2013). The findings showed that the inter-observer reliability coefficient is between 90% and 100%.

3. Findings

3.1. Acquisition findings about the participants

The baseline data about all the participants in Figure 4.1 were analyzed by visual analysis and reflected on the graph. When the baseline level performed with each participant regarding backgammon that is one of the leisure skills is examined, Ece (first participant) and Veli (third participant) responded at 0% on average, while Ali (second participant) gave 7% correct response at the baseline level. Therefore, it was observed that Ece and Veli never reacted correctly, and Ali almost never reacted correctly. When we look at the intervention sessions for teaching backgammon by using graduated guidance, it was determined that Ece exhibited an average of 60.1% (range 7%-100%) correct behavior in the teaching sessions. That is, in the intervention sessions, and met the criterion by giving 100% correct response in the last three sessions. When we look at the first collective probe sessions held after the intervention sessions with Ece, it was revealed that Ece responded 100% correctly in the probe sessions, while the other two participants, Ali and Veli, continued to exhibit the same performance at the baseline level. In other words, while Ali responded 7% correctly in the first probe session, Veli responded 0% correctly.

Considering the teaching sessions held with the second participant, Ali, it was found that Ali exhibited correct behavior by an average of 66.7% (range 20%-100%) in the teaching sessions, that is intervention sessions, and met the criterion by responding 100% correctly in the last three sessions. It was determined that Ece and Ali responded 100% correctly in the probe sessions, while Veli responded 0% correctly and continued to exhibit the same performance at the baseline level in the second collective probe sessions held after the intervention sessions with Ali (the second participant). It was seen in the teaching sessions held with Veli, the third participant, that he exhibited correct behavior at an average of 69.4% (range 20%-100%) in the teaching sessions, that is, in the intervention sessions, and met the criterion by responding 100% correctly in the last three sessions. In the third collective probe sessions held after the intervention sessions with Veli (third participant), it is seen that Ece, Ali and Veli responded 100% correctly in the probe sessions. Therefore, it was revealed that teaching with graduated guidance was effective in helping all three participants gain playing backgammon that is leisure skills. Considering the effectiveness findings of Ece, Ali, and Veli in general, a total of 30 intervention sessions were conducted, 11 with the first participant, 9 with the second participant, and 10 with the third participant, using graduated guidance to gain playing backgammon that is leisure skills.

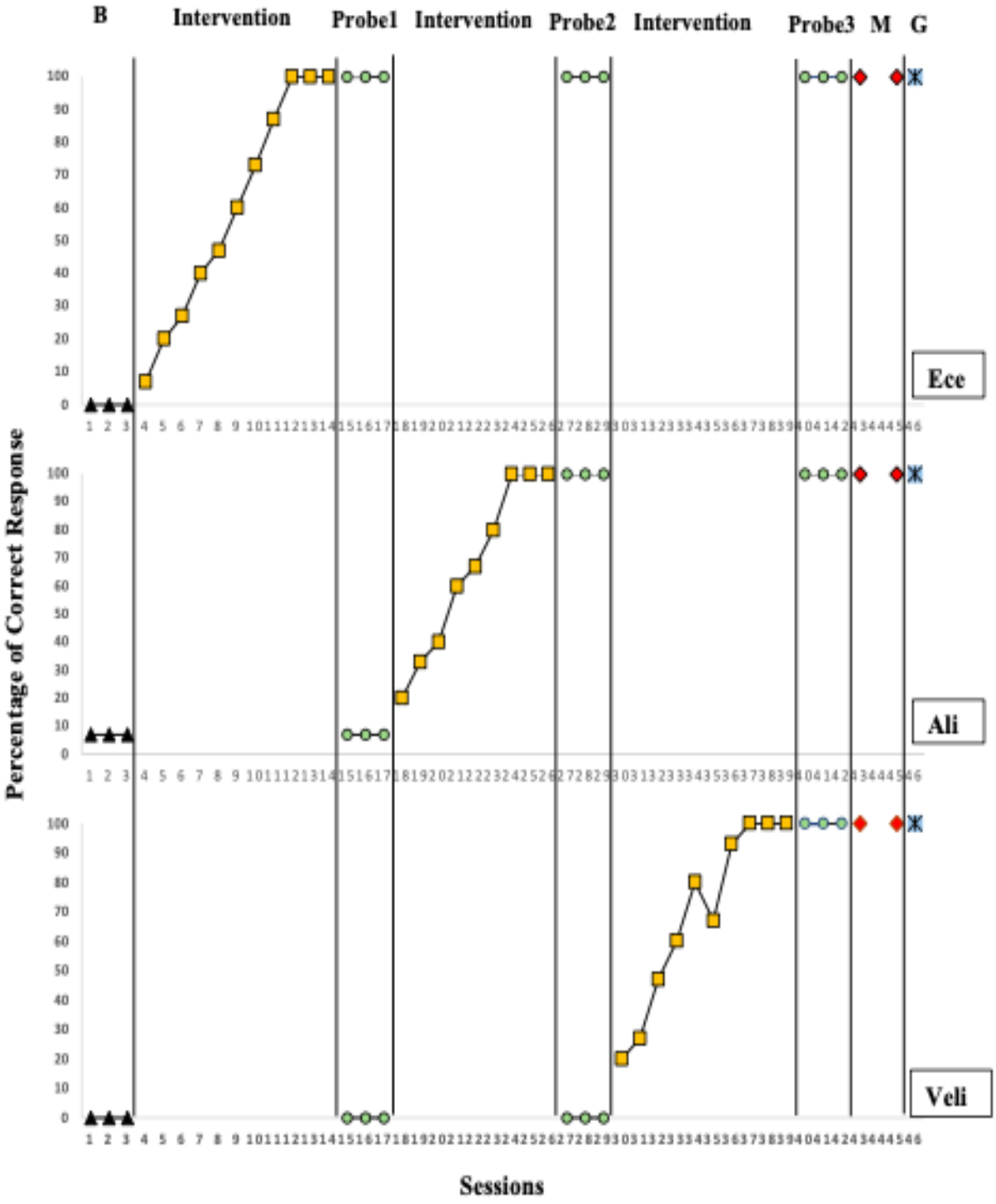

Figure 4. 1. Ece, Ali, and Veli's Correct Response Percentages in the Baseline (B), Intervention, Probe, Maintenance (M) and Generalization (G) Sessions for Leisure Skills When Graduated Guidance is Used

3.2. Monitoring and generalization findings

Monitoring (retention) sessions were held with Ece, Ali and Veli 2 and 4 weeks after the end of the teaching sessions conducted using graduated guidance. The data obtained from the monitoring sessions demonstrated that the participants responded 100% correctly in the monitoring sessions conducted with all participants. In other words, it was observed that Ece, Ali and Veli retained the backgammon playing skill they had gained in the teaching sessions 2 and 4 weeks after the end of the training. Looking at the generalization sessions with Ece, Ali and Veli, it was determined that all three participants responded 100% correctly in the sessions held with a different practitioner. This is to say that, it was determined that Ece, Ali and Veli were able to generalize their backgammon skills to different people.

4. Discussion and Conclusion

In the baseline sessions conducted with each participant on the skills of playing backgammon skill, which is one of the leisure skills, Ali (the second participant) reacted 7% correctly, while Ece and Veli did not react at all correctly. In other words, it was observed that none of the three participants could fulfill their backgammon skills at the baseline level. Using graduated guidance in conducting baseline sessions, it was determined that together, each of the three participants performed their backgammon skills with 100% accuracy. Therefore, it has been revealed that teaching leisure time skills to students with ASD through graduated guidance is effective. It has also been observed that students with ASD maintained the skills they learned after the lessons were completed and generalized what they learned.

In the literature on this field, studies show the effectiveness of using the most to least prompting procedure (Vuran, 2008), video prompting (Armendariz & Hahs, 2019), constant delay procedure(Tekin-İftar, Kırcaali-İftar, Birkan, Uysal, Yıldırım & Kurt, 2001) and simultaneous prompting (Kurt & Tekin-İftar, 2008) to teach leisure time skills to students with ASD. In these studies, it is apparent that leisure skills related to making a basket form from clay, playing pool, pin knocking, playing hotshot basketball, playing golf, playing darts, and playing frisbee, turning on a cd player, taking a picture using a digital camera and attempting to initiate social interaction are attempted to be taught. For example, in the study conducted by Vuran (2008) using a multiple probe design, an attempt is made to determine the effectiveness of using the most-to-least prompting procedure to teach leisure skills to adults with ASD. In the study, making a basket from clay was taught to two adults with ASD receiving support special education in special education and rehabilitation center. It was determined from the results of the study that the most-to-least prompting procedure teaching method was effective in teaching leisure time skills (making baskets from clay) and that after the instructing was completed, the adults with ASD continued to perform the skills they learned, that is, the skills they learned became permanent. However, it is observed that generalization data was not collected in this study. Therefore, even though the data obtained here is similar to the results of this research, it is not known whether adults with ASD generalize the skill they learn.

In the literature of studies conducted in this field, it is claimed that the deficits in leisure skills are not only a factor in the diagnosis but are also influenced by structural constraints such as a lack of resources, support, and opportunity. Therefore, the learning of leisure skills by children with ASD should be supported with evidence- based practices (Armendariz & Hahs, 2019). For example, in the study by Armendariz and Hahs (2019), they determined the effectiveness of using the single-subject research method of multiple probes across participants to teach leisure activities with social initiations through the video prompting method. At the end of the research, it was concluded that the video prompting method was effective in teaching leisure time skills. It is observed that generalization data was not collected in this study. When compared with existing study results, it has been determined that the independent variable is effective in teaching leisure skills and that children with ASD maintained the skills they learned after the instructing was completed.

In the study carried out by Tekin-İftar, Kırcaali-İftar, Birkan, Uysal, Yıldırım and Kurt (2001) using a multiple probe design across behaviors, the effectiveness of the 4-s constant delay procedure method in teaching a total of seven children between the ages of 6 and 13 with developmental disabilities, one with ASD, four with Down's Syndrome, and two with other developmental disabilities, leisure skills (playing pool, pin knocking, playing hotshot basketball, playing golf, playing dart, and playing frisbee) was studied. The results of the study show that using the constant delay procedure in teaching developmentally disabled children leisure skills is effective. It was also determined that the developmentally disabled children maintained the skills they had learned and could generalize them. The results that were achieved in this study are parallel with the results of existing studies.

In the study conducted by Kurt and Tekin-İftar (2008) using an adapted alternating treatments design, the effectiveness and efficiency of presenting constant time delay and simultaneous prompting methods within embedded instruction on teaching leisure skills turning on a cd player, taking a picture using a digital camera to children with ASD were compared. The results achieved in the study revealed that both teaching methods were effective in helping the subjects gain leisure skills, and the children with ASD maintained what they had learned after the lesson was finished. When the efficiency data in terms of number and percentage of errors and total training time are considered, while the constant time delay method presented with embedded instruction was found to be more effective in teaching leisure skills to the two children with ASD compared to the simultaneous prompting method, it was determined that teaching leisure skills to the remaining two children with ASD using the simultaneous prompting method presented with embedded instruction was more effective compared to the constant time delay method.

It is seen in literature that graduated guidance is used together with scripts and script-fading and the activity schedule. In the study conducted by Birkan (2011), it was determined that when script instruction is used with graduated guidance, children with ASD learn initiation of social interaction, the structure of language, and conversation when there are scripts and script-fading. In the study conducted by Elçin and Tunalı (2016), it was revealed that the tablet computer using the graduated guidance technique was effective in the subject

acquisition, maintaining, and generalization of schedule-following skills. When studies in which only graduated guidance is used are considered, it has been observed that graduated guidance is effective in teaching children with ASD the skills to protect themselves from the lure of strangers (Akmanoğlu, 2008) and learning through digital games and observation (Çattık, 2016). It has also been observed that students with ASD maintain these skills and generalize them to different settings and people once the instruction is finished. In these studies, seen in the literature, no matter how many different skills were studied in each, the obtained results are parallel with the existing studies.

In the above studies, it has been determined that graduated guidance has been used together with various teaching methods to teach children with ASD skills in social interaction, conversation with each other, and protecting themselves from the lure of strangers, and that they have maintained these skills and can generalize them after the teaching is over. In this study, it has been determined that graduated guidance is effective in teaching leisure skills to children with ASD, and that children with ASD maintain what they have learned and generalize. However, the fact that social validity findings were not collected in this study is among the limitations of this research. Therefore, future research studies can be conducted by including the collection of social validity findings. Also, studies can be conducted on helping subjects gain leisure skills using technology-supported applications.

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