Effect of Peer Delivered Social Stories on the Crossing Skills of Primary School Students with Developmental Disabilities

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Abstract

In this study, it was aimed to examine the effect of a peer education program developed on the acquisitions of knowledge and skill of writing and implementing social stories by students attending primary school, and the effect of social stories delivered by peers who have completed the program (peer tutor) on the acquisition of crossing skills by students with developmental disabilities (peer tutees), maintenance of this skill two weeks after the end of the implementation, and generalization with a different street. In the study, social validity data were collected from peer tutees and peer tutors using a subjective evaluation approach. The study was carried out with a total of six participants consisting of three students aged between 7 and 9 years who attend a primary school in a province in East Anatolian Region, two of whom are diagnosed with autism spectrum disorder and one of whom is diagnosed with a mild intellectual disability, and these students' peers with normal development. Peer tutees were taught how to write and deliver social stories with one-on-one instruction by following the steps of Powerpoint presentation, modeling, experimenting, and providing feedback. In the study, a multiple probe design with probe conditions across dyads (peer tutor - peer tutees), one of the single subject research models, was used to evaluate the effect of social stories written and delivered by peer tutors on peer tutees' learning crossing skills. Research results showed that peer tutors acquired the social story writing and implementation skill accurately by 100%. After the instruction delivered by the peers who acquired the social story writing and implementation skill, it was observed that peer tutees acquired the crossing skill and could generalize it to a different street, and that two peer tutees with the ASD continued to exhibit this skill they acquired accurately by 100% two weeks after the end of the study. Maintenance data were not collected from the third peer tutee due to the closure of schools. Social validity data collected from peer tutees and peer tutors using a subjective evaluation approach showed that both peer tutees and peer tutors had positive opinions on the target skill, social stories, and research results. These results were discussed within the

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context of the literature, and suggestions were made to include peer mediated implementations in teaching different skills with different methods and to make the use of social stories in teaching safety skills by parents, siblings, specialists working in the field and teachers widespread.

Introduction

Safety skills are the skills that require the individual to take precautions and protect himself/herself against dangerous situations that may harm him/her (Dixon, Bergstorm, Smith, & Tarbox, 2010). Studies show that individuals with developmental disabilities are exposed to dangerous situations two or three times more compared to individuals with normal development (Agran & Krupp, 2010; Agran, Krupp, Spooner, & Zakas, 2012; Bonander, Beckman, Janson, & Jernbro, 2016; Lee, Harrington, Chang, & Connors, 2008; Sherrard, Tonge, & Ozanne-Smith, 2001; Şirin & Tekin-İftar, 2016; Zhu et al., 2014). The characteristics that individuals with developmental disabilities have due to their disabilities are shown as one of the reasons why these individuals are more vulnerable to these dangers. Another reason is that individuals with developmental disabilities cannot acquire these skills spontaneously over time as individuals with normal development, and they need systematic instruction to acquire these skills. However, studies show that parents and teachers try to prevent intentional or unintentional dangers that threaten safety by taking various precautions instead of offering systematic instruction for these skills or warn their children using statements like "don't do it, watch out" and that such an approach is inadequate in teaching safety skills (Schwebel & Gaines, 2007; Şirin & Tekin-İftar, 2016; Winterling, Gast, Wolery, & Farmer, 1992). This makes it inevitable to develop and implement an effective curriculum for teaching safety skills to individuals with developmental disabilities (Miltenberger, 2008). In the literature, there are studies showing that different safety skills are taught to individuals with developmental disabilities, such as (a) performing first aid (e.g., Ergenekon, 2012; Kearney, Brady, Hall, & Honsberger, 2017), (b) protection from abduction (e.g., Gunby & Rapp, 2014; Ledbetter-Cho et al. 2016), (c) protection from foreigners (e.g., Kutlu, 2016), protection from sexual abuse (e.g., Süzer, 2015), (d) staying safe in water (e.g., Levy, Ainsleigh, & Hunsinger-Harris, 2017; Tucker, 2016), (e) protection from fire (e.g., Rossi, Vladescu, Reeve, & Gross, 2017), (f) protection from home accidents (e.g., Summers et al., 2011; Winterling et al., 1992, (g) ensuring safety in traffic (e.g., Yeaton & Bailey, 1978) and (h) asking for help when lost (e.g., Hoch, Taylor, & Rodriguez, 2009). One of these skills is the crossing skills under the title of ensuring safety in traffic.

Crossing skills are the skills that individuals with developmental disabilities commonly need in daily life and which enable them to maintain their lives as independent individuals. Crossing skills can be accomplished in different ways, such as using the overpass, using a pedestrian crossing, using traffic light, or crossing the road where there is no warning sign (Batu, Ergenekon, Erbaş, & Akmanoğlu, 2004). In the literature, there is a limited number of studies on teaching crossing skills to individuals with developmental disabilities. In these studies, it is observed that various teaching methods are used in teaching crossing skills to individuals with intellectual disability (Ağrı, 2017; Collins, Stinson, & Land, 1993; Mechling & Seid, 2011), autism spectrum disorder (Goldsmith, 2008; Harriage, Blair, & Miltenberger, 2016; Honsberger, 2015; Kaya & Ergenekon, 2016; Yavuz, 2017) and developmental disability (Bağımsızlığa Yol Verin Projesi, 2013; Batu et al., 2004; Hawkins, 2016). When the studies are examined in terms of the teaching methods used, it is observed that response prompting procedure (Ağrı, 2017; Bağımsızlığa Yol Verin Projesi, 2013; Batu et al., 2004; Harriage et al., 2016), behavioral skills teaching (Goldsmith, 2008; Hawkins, 2016), being a live model (Collins et al., 1993) and video modeling (Honsberger, 2015; Kaya & Ergenekon, 2016; Mechling & Seid, 2011), which are among evidence-based implementations, are used in teaching crossing skills. These implementations are also effective in teaching other safety skills (Ergenekon, 2012; Rossi et al., 2017). Another evidence-based implementation the effectiveness of which in teaching safety skills has been investigated in recent years

is social stories (Değirmenci, 2018; Kutlu, 2016; Süzer, 2015). However, no study examining the effectiveness of social stories in teaching crossing skills has been found.

Social stories were initially developed to make individuals with ASD acquire social skills (Gray, 1998; Scattone, 2002). The studies carried out later showed that social stories could also be used effectively in teaching safety skills, as well as social skills (Değirmenci, 2018; Kutlu, 2016; Süzer, 2015), for individuals with learning disability (Kalyva & Agaliotis, 2009), behavioral problems (Toplis & Hadwin, 2006), and intellectual disability (Olçay-Gül & Tekin-İftar, 2016). In one of these studies examining the effectiveness of social stories on teaching safety skills, Süzer (2015) aimed to teach the skill of protecting from sexual harassment to three participants aged between 10-17 years with ASD, and it was observed that social stories were influential in the acquisition of target skills, in the maintenance of permanence, and generalization to different people and harassment. In another study, Kutlu (2016) examined whether the delivery of social stories alone and in combination with video modeling differed in terms of effectiveness and efficiency in teaching skills of protecting from foreigners' abduction attempts and protecting from foreigners who knock the door to four participants aged between 10-13 years with ASD. Research results showed that three of four participants learned the skills of protecting from foreigners at a level to meet the criteria with both implementations and that the instruction in which social stories were delivered alone was more effective for the fourth participant. In a similar study, Değirmenci (2018) compared the effectiveness and efficiency of video modeling with social story in teaching safe response skills when faced with waste battery, slippery ground and medicine to three students aged between 4-7 years with ASD and found out that both methods were almost equally effective and efficient in teaching target safety skills. It was observed that studies were carried out with individuals with ASD in these studies in which the effectiveness of social stories in teaching safety skills was investigated, and no study examining the effectiveness of social stories in teaching safety skills to individuals with intellectual disability was found.

When the studies in which social stories were used in teaching safety skills were examined in terms of the implementer's characteristics, it was observed that the studies except for the study carried out by Değirmenci (2018) were carried out by researchers and that teachers who received social story writing and implementation training conducted the implementation in the study of Değirmenci (2018). The studies focusing on the effectiveness of social stories in teaching different skills showed that social stories could be implemented by the others around the individual, such as parents (Acar, Tekin-İftar, & Yıkmış, 2017; Ivey, Heflin, & Alberto, 2004; Olçay-Gül & Tekin-İftar, 2016), teachers (Değirmenci, 2018; Scattone, Tingstrom, Wilczynski, & Rabian, 2006) and preservice teachers (Akgün Giray, 2015), with high implementation reliability. Peers, as well as parents and teachers, are the people with whom individuals with developmental disabilities attending inclusive education and special education classes especially in general education schools interact mostly during the day, and studies have shown that the instructions delivered by peers is effective in the acquisition of various target skills by individuals with developmental disabilities. In these studies, peers were made to acquire the knowledge and skills of implementing simultaneous prompting procedure (e.g., Fetko, Collins, Hager, & Spriggs, 2013; Tekin-İftar, 2003), constant-time delay procedure (e.g., Godsey, Schuster, Lingo, Collins, & Kelinert, 2008; Wolery, Werts, Snyder, & Caldwell, 1994), embedded instruction using constant-time delay procedure (e.g., Jameson, Mcdonnell, Polychronis, & Riesen, 2008), self-maintenance (e.g., Gilberts, Agran, Hughes, & Wehmeyer, 2001), pivotal response teaching (e.g., Sams, 2009), natural instruction using milieu teaching strategies (e.g., Bishop & Christensen-Sandfort, 2012) method and techniques, and it was observed that after the instruction delivered by peers, individuals with developmental disabilities acquired the target academic skills (Jameson et al., 2008; Tekin-İftar, 2003; Wolery et al., 1994), daily life skills (Godsey et al., 2008), leisure time skills (Fetko et al., 2013), and social interaction and communication skills (Bishop & Christensen-Sandfort, 2012; Sams, 2009). As a result of the literature review, no study examining the effectiveness of social stories written and delivered by peers in teaching safety skills was found.

In conclusion, in the literature, it has been observed that (a) there is a limited number of studies examining the effectiveness of social stories in teaching safety skills, (b) there is no study examining the effectiveness of social stories in teaching safety skills to individuals with intellectual disability, (c) no study related to the effectiveness of social stories written and delivered by peers was found, (d) there is a limited number of studies on teaching crossing skills to individuals with developmental disabilities, and (e) no study examining the effectiveness of social stories in teaching crossing skills has been found. In this study which was planned by considering the limitations listed, it was aimed to examine the effect of a peer education program developed on the acquisitions of knowledge and skill of writing and implementing social stories by peers, and the effect of social stories delivered by peers who have completed the program on the learning of crossing skills by individuals with developmental disabilities, and to collect social validity data from peers and individuals with developmental disabilities using a subjective evaluation approach. Based on these aims, answers to the following questions were sought:

1. Can peers (peer tutors) be taught to write social stories accurately and to implement them reliably through a peer education program?

2. Are social stories written and delivered by peer tutors effective on the learning of crossing skills by individuals (peer tutees) with developmental disabilities, maintenance of these skills acquired by them after two weeks, and generalization of these skills to a different setting?

3. What are the opinions of peer tutees and peer tutors about the implementation?

Method

Participants

Peer Tutees. The peer tutees of the study consisted of three male students aged between 7 and 9 years who continue their education in a primary school a province in East Anatolian Region, two of whom are diagnosed with ASD and one of whom is diagnosed with intellectual disability. Among the peer tutees, the students with ASD are primary school third-grade students. The student with the intellectual disability (ID) is a first-grade student and is attending a special education class. In this study which was planned upon the request of the families for support from the first author, individual interviews were conducted with the families and students, and the aim of the study, the contributions to be provided by it, the stages of the study, and what to do during this process were explained to them. Written permissions were obtained from the parents and peer tutees based on this information. In the study, the peer tutees were expected to have three prerequisite skills consisting of (a) following the instruction, (b) directing attention to visual and auditory stimuli for at least five minutes, (c) comprehending the text read to them, and the peer tutees were evaluated by observing whether they responded to instructions appropriately, such as "Give me your Turkish book." and "Take the pencil case out of the cabinet." within five seconds, whether they directed their attention to a story read or a video opened for at least five minutes, and whether they responded to "who, what, when, where, why, and how" (5Ws and 1H) questions related to the short story consisting of 11 sentences read to them. All peer tutees were observed to have prerequisite skills. Table 1 includes the information about the participants.

Table 1. Demographic Characteristics of the Participants

Participants with Developmental Disabilities					Peers			
Name**	Gender	Age	Grade Level	Diagnosis	Name**	Gender	Age	Grade Level
Doğukan	Male	9	3	ASD*	Betül	Female	9	3
Ufuk	Male	9	3	ASD*	Berk	Male	9	3
Rıza	Male	7	1	Mild ID *	Seren	Female	7	1

* Participants' diagnoses in the Health Board Reports are included.
** Pseudonym were used.

The peer tutees' levels of being affected by ASD were evaluated using the Gilliam Autism Rating Scale-2-Turkish Version (GARS-2-TV) which was developed by Gilliam (1995) and the standardization study of which was conducted by Diken, Ardıç, and Diken (2011). The GARS-2-TV was implemented in line with the information received from the children's families, and the participants' autistic disorder index scores were determined. The autistic disorder index score was found to be 81 for Doğukan, 90 for Ufuk and 118 for Rıza. The information obtained from the GARS-2-TV shows that Rıza has a higher likelihood of ASD, in addition to his intellectual disability. The intelligence levels of the participants were determined using the revised version of the Wechsler Intelligence Test for Children (WISC-R) the Turkish standardization study of which was conducted by Savaşır and Şahin (1995), and the intelligence quotient was found to be 110 for Doğukan and 120 for Ufuk. The intelligence test was started to be implemented for Rıza, but the process could not be completed due to his behavioral problems.

The first peer tutee Doğukan and the second peer tutee Ufuk are 9 years old. Doğukan and Ufuk, who are primary school third-grade students, are able to read and write and to perform simple addition and subtraction operations, and they exhibit a performance close to their peers in academic skills. Furthermore, Doğukan and Ufuk exhibit behaviors such as frequently standing up in the classroom and walking around the classroom. Rıza, the third peer tutee, is also able to read and write and to perform simple addition operations. Rıza has difficulties in fulfilling behaviors such as following the rules and turn taking. Information obtained from their families and teachers show that all peer tutees have difficulties in distinguishing the situations that are dangerous for themselves and in giving an appropriate response to these situations.

Peer Tutors. Peer tutors were expected to have two prerequisite skills consisting of (a) comprehending the written material prepared within the scope of the peer education program and the verbal information delivered and (b) having reading and writing skills, and the characteristics such as establishing strong social communication, being loved by their peers, being open to cooperation and regular school attendance (Sasso, Mundschenk, Melloy, & Casey, 1998; Strain & Odom, 1986) were required in peer tutors with these prerequisite skills. Three peers who had the prerequisites skills and characteristics listed were determined in accordance with the opinions of peer tutees, their parents, and teachers. Betül and Doğukan, Berk and Ufuk are in the same class. During the interviews on peer interactions conducted with them, Doğukan stated that he got along well with Betül, and Ufuk stated that he got along well with Berk, and the opinions of their families and teachers also supported these statements. Since there was no peer with the specified prerequisite skills and characteristics in the special education class where Rıza receives education, a peer receiving education in the first grade from a different class was selected depending on teachers' opinions. Unlike the other two pairs, opportunities were created for Seren and Rıza, who do not know each other, to communicate and spend time together. After peer tutors were determined, they and their families were informed about the aim and method of the study, and written permission was obtained from them and their families. Table 1 includes information about the peer tutors.

Implementer and Observers. The implementer, who is the first author of the study, has a bachelor's degree in the field of special education and has been working as a special education teacher in the school where the participants are present for about a year. He has an experience of providing instruction to students with developmental disabilities using evidence-based practices such as errorless teaching methods, teaching through video modeling and social stories. In the study, the data collection process from peer education, probe, maintenance, and generalization sessions were performed by the implementer. Intervention and fading sessions were conducted by peers.

Reliability data on dependent and independent variables were collected in the study. The interobserver agreement and treatment integrity data of the study were collected by two primary school teachers and a guidance teacher. The observers were provided with approximately two hours of training on target skills and the intervention process. From among three observers, only one of them was allowed to participate in the session according to availability for the session to be held. In this training, observers were provided with information about the (a) aims of the study, (b) target skill, (c)

peer delivered social story implementation (d) probe sessions, (e) intervention and fading sessions, (f) maintenance sessions, (g) generalization sessions, (h) participants' correct and incorrect responses, (i) responses to participants' correct and incorrect responses. The observers were also asked to evaluate whether the implementer accurately performed the process of educating peers as tutors; for this purpose, they were provided with information about the steps of (a) Powerpoint presentation, (b) modeling for writing a social story, (c) experimenting to write a social story, (d) modeling for social story implementation, (e) experimenting the social story implementation and (f) providing feedback.

Setting

The street which is located in the south of the school on the way return from home to school and where there is no warning sign and traffic flows in both directions was determined as the setting where crossing probe sessions would be conducted for Doğukan and Ufuk, and the street which is located in the north of the school and has the same features with the south street was determined for Rıza. Generalization data were collected from Doğukan and Ufuk using the street determined for Rıza and from Rıza using the street determined for Doğukan and Ufuk. The roads where data collected has infrequenly traffic flow. It is possible to provide 3 km of sight when looking at the right and left sides of the roads. Also, the width of the roads is 5 meters. In addition, roads provide high control ability to the researcher to ensure safety of participants while crossing. The sessions held to teach the knowledge and skill of implementing social stories to peers and the sessions in which the social stories for teaching target skill were delivered by peers, which were the first steps of the study, were conducted at the end of lesson hours in the support education class in the school of children. The support education room was arranged by the implementer when studies would be performed. Except for a desk and two chairs used, other classroom objects were excluded from the field of view of the peer tutees and peer tutors.

Tools and Materials

While the computer was used for the Powerpoint presentation used in teaching sessions held to ensure the acquisition of the skill of writing and implementing social stories by peer tutors, paper, notebook, and pen were used for peer tutors to take notes and to use in social story experiments. In the process of delivering instruction using social stories to peer tutees by peer tutors, the social stories on an A4 paper, which were written by peer tutors in line with the rules determined by Gray (2000) according to the characteristics of each peer tutee, and which included nine or ten sentences and the pictures selected from the internet by the peer tutors, were used.

Dependent and independent variables

The peer tutees' level of learning crossing skills is the dependent variable of the study. The dependent variable was determined as the result of interviews conducted with mothers. During these interviews, mothers indicated that their children had difficulties in distinguishing situations that are dangerous for themselves and in giving an appropriate response to these situations. As a result of the information about what the dangerous situations are received from mothers during the interviews, it was decided that crossing skills should be first studied. During the interviews, mothers mentioned that their children had to cross over while going to school and returning home and during the lunch break, but they were not able to teach this skill to their children since there are no traffic lights, pedestrian crossing and overpasses on the streets, and their children should acquire this skill as soon as possible to gain independence in daily life.

After it was decided to teach crossing skills, the skill analysis of this skill was performed. In this process, adaptations were made in the skill analysis steps included in the study of Batu et al. (2004), and then, two experts, one of whom is a special education teacher and the other one is an academic member in the field of special education, were asked for their opinions about the skill analysis prepared. The skill analysis of the skill of crossing a road where there is no warning sign which was finalized in accordance with the expert opinions is presented in Table 2. The independent variable of this study is the social stories written and delivered by peers.

Table 2. Analysis of the Crossing Skill

1. Stops at the curbside.

2. Controls the road by turning head to the left, to the right and again to the left.

3. If the road is clear, he/she stops when he/she reaches the middle of the road.

4. Controls the road by turning head to the right in the middle of the road.

5. If there is no car, proceeds to the opposite pavement.

Research Model

In this study, a multiple probe design with probe conditions across dyads (peer tutor - peer tutees), one of the single subject research models, was used to evaluate the effect of social stories written and delivered by peer tutors on peer tutees' learning crossing skills. In this study, the acquisition of the target skill by the peer tutee to whom an experimental control social story was delivered was achieved by the fact that there was no change in the performances of peer tutees to whom social story was not delivered yet, similarly, the diachronic acquisition of the target skill by other peer tutees with the delivery of social story.

Process of Educating Peer Tutors

The peer tutors were educated by one-on-one instruction. Just before starting to work with the individual with developmental disability, the process of educating that individual's peer was included. Before delivering the instruction related to social story writing and implementation skill to peers, a pretest was performed to determine the peer tutors' performance levels for these skills. During the pretest session, the peer tutors were asked to choose a skill to teach to the peer tutees and to write a story for this target skill and to deliver instruction. During skill selection, the peers were helped in the form of "What would you like to teach to your friend. Let's think together? Playing games, turn taking, keeping away from foreigners, etc. are possible. You yourself choose one". The education of the peer tutors was initiated after the pretest. During peer education, it was aimed to make the peer tutors acquire two skills including social story writing and implementation skills. During the stage of writing social stories, the peers were made to acquire the knowledge and skills with regard to features of social stories, sentence types, sentence ratios, and the points to take into account while writing. During the stage of implementing social stories, it was aimed to acquire the knowledge and skills with regard to where and how the story would be delivered, and the points to take into account during delivery. Peer education was conducted by following the steps listed in teaching behavioral skills; (a) Powerpoint presentation, (b) modeling for writing a social story, (c) experimenting to write a social story, (d) modeling for social story implementation, (e) experimenting the social story implementation and (f) providing feedback.

(a) Powerpoint presentation: The implementer made Powerpoint presentation including information about social story writing and implementation and made explanations to the peers. After making explanations about the presentation, the implementer asked verbal questions to evaluate whether the information provided in the presentation was learned by the peers, and the stage of modeling for writing social stories was initiated when the peer tutors answered all the questions correctly.

(b) Modeling for writing a social story: The implementer became a model on how to write social stories by explaining descriptive, directive, reflecting and confirming sentence writing expected to be included in a basic social story, their ratios within the story, and the items to take into account in story writing, with examples. Whether the peer tutors learned social story writing was evaluated with their performances in the stage of experimenting to write a social story.

(c) Experimenting to write a social story: In this stage, the peer tutors were asked to write a social story about a target skill determined by them, and they were enabled to do exercises for the writing of social stories. The implementer evaluated the peers' social story writing performances by considering the items included in the "Social Story Writing Checklist" in Table 3 (Olçay-Gül & Tekin-İftar, 2016). By providing corrective feedback to the peers who could not perform all steps accurately by 100%, it was returned to the stage of modeling for writing social stories. This process continued until the peer met the 100% criterion.

Table 3. Social Story Writing Checklist

		Yes	No
1.	Gives a title that reflects the content of the story.		
2.	Includes the introduction, body, conclusion sections.		
3.	Writes in a way to include answers to 5W1H questions.		
4.	Writes from the words and point of view of the child.		
5.	Writes in a way to include descriptive, directive, reflecting and/or confirming sentences.		
6.	Complies with sentence ratios (Total number of descriptive sentences/total number of directive sentences > 2).		
7.	Writes using positive expressions.		
8.	Writes in a way to be understood clearly by his/her peer.		
9.	Writes for a single target behavior.		
10.	Writes in the present tense.		

(d) Modeling for social story implementation: The implementer became a model on how to implement social stories by exhibiting the behaviors included in the "Social Story Implementation Checklist" (Olçay-Gül & Tekin-İftar, 2016) and by including role-playing studies in which "he is a peer tutor, and the peer tutor is a peer tutee. "Whether the peers learned to use the method after the stage of modeling was evaluated by considering their performances in the stage of experimenting with the social story implementation.

(e) Experimenting with the social story implementation: Role-playing studies in which the implementer was a peer tutee and the peer was a tutor were included in this stage. The peer tutor's performance was evaluated using the "Social Story Implementation Checklist" in Table 4, and it was returned to the stage of modeling for social story implementation by providing corrective feedback to the peers who could not perform all the steps accurately by 100%. This process continued until the peer met the 100% criterion.

(f) Providing feedback: In cases when the criterion in social story writing and implementation skills could not be met, it was returned to modeling stages by providing corrective feedback. This process continued until all peers met the 100% criterion in all stages.

Following the instruction delivered to teach social story writing and implementation skills to peer tutors, the posttest implementation was initiated, and the peer tutors were asked to choose a skill to teach to peer tutees and to write a story for this skill and to deliver instruction. The peers' performances in the pretest and posttest sessions were evaluated by taking into account the steps in Table 3 and Table 4.

Table 4. Social Story Implementation Checklist

		Yes	No
1.	Delivers in an appropriate setting (Delivers the story in a setting that is quiet and is not disturbed by others).		
2.	Provides the attention-grabbing clue (Hello ... It's high time to read the story entitled ….. that I wrote for you. Are you ready, shall we start?)		
3.	Shows that the peer is ready and reinforces his/her verbal and non-verbal responses (You're great! Give me a high five, etc.).		
4.	Reads the story.		
5.	Asks five 5W1H questions to evaluate whether the story has been understood (Our story is over. Now let's answer the questions about the story.).		
6.	Reinforces his/her peer verbally when the peer gives correct answers to the questions (Great answer.).		
7.	If the peer cannot answer the questions correctly or never answers the questions, repeats the processes of reading the story and evaluating whether the story has been understood.		
8.	Terminates the process by being a model for correct answers if the peer does not answer 5W1H questions correctly after reading the story 3 times.		
9.	Reinforces his/her peer since he/she has worked cooperatively (We did a great job together. You worked very well with me, etc.).		

During the pretest session, while Betül, Berk, and Seren performed social story writing steps accurately by 40%, 20%, and 20%, respectively, it was observed that Betül, Berk, and Seren performed social story implementation steps accurately by 11.1% (See Figures 1 and 2). During the posttest session, it was observed that all the participants performed the story writing and implementation skill accurately by 100%. Betül, Berk, and Seren were provided with 4 hours of training, 5 hours of training and 6 hours of training, respectively, so that they would be able to perform the social story writing and implementation skill accurately by 100%.
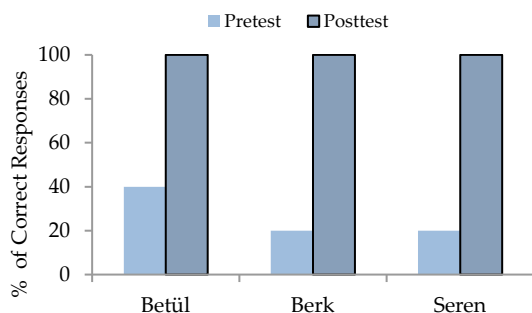

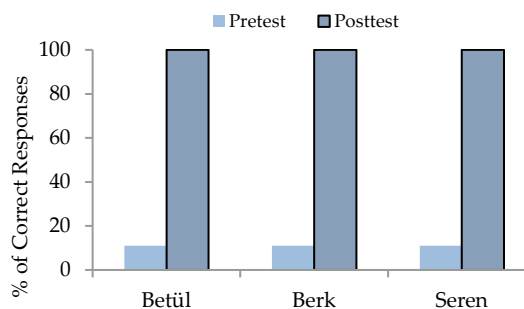**Figure 1.** Peer Tutors' Pretest - Posttest Performances for Social Story Writing Skills

Figure 2. Peer Tutors' Pretest - Posttest Performances for Social Story Implementation Skills

Immediately after the posttest session, the peer tutors were asked to write a social story to teach crossing skills to their peers, and they were given information about the steps of crossing skills. The stories written by the peer tutors were evaluated using the "Social Story Writing Checklist." It was observed that Betül and Seren wrote their stories accurately by 100% and that there were sentences written with negative statements in the story of Berk. Berk was allowed to reorganize his story by providing feedback to him by the implementer. This process continued until all the features listed in the social story writing checklist were met. Then, two experts were asked for their opinions about the skill analysis for the suitability of stories, and the stories were finalized by making the necessary arrangements.

General Process

The testing process was initiated after the social story writing and implementation skill was introduced to the peer tutors. In the testing process, probe, intervention, maintenance, and generalization sessions were organized, and intervention sessions were held in the support education class of the school while probe, maintenance, and generalization sessions were held in situ where the relevant target skill was expected to occur. Two sessions in a day were held every day on weekdays.

Probe sessions. Two separate probe data including a full probe and daily probe were collected in the study. Probe sessions were designed based on the controlled baseline format. The first full probe session was conducted to collect baseline data, and the other full probe sessions were conducted simultaneously in all participants just before the initiation of instruction with a participant and immediately after the criterion in instruction studies was met. Full probe sessions were continued until at least three continuous, stable data were obtained, and one full probe session was held every day. In all sessions of the full probe stage, one trial was conducted for each participant. Daily probe sessions were held immediately after reading a social story every day. Daily probe sessions were also held just as the full probe sessions. In these sessions, the implementer created opportunities to allow the participant to cross over, such as going home at the end of the lesson or during the lunch break. The implementer walked together with the participant until the road the participant would cross and then said: "I will come, you go on." The implementer walked five to six steps behind the participant against any adverse situation and physically responded to the participants when needed. The single opportunity format was used to evaluate the participants' performance during the probe sessions. In these sessions, the fact that the participants crossed within 10 seconds (the time was determined by considering the average performances of two people on the road where the study was carried out) by following the steps listed in Table 2 was accepted as the correct response. The fact that the participants made a mistake in one of the steps listed or crossed within a period longer than 10 seconds or waited for the implementer to cross was accepted as the incorrect response.

Intervention sessions. Intervention sessions were conducted in the support education class in the school just before creating opportunities that would require the peer tutees to cross. The support education class is a setting to which all participants are familiar. During intervention sessions, the peer tutee and peer tutor sat side by side, the peer tutor delivered the attention-getting clue by using statements, such as "I have written a story for you Rıza. I think it is very nice. Would you like to listen? It is high time to read this story", and read the story. After the story was read, the peer tutor asked four 5W1H questions related to the story to evaluate whether the peer tutee understood the story, and the peer tutees were expected to give correct answers to all these questions. In the case that the peer tutee gave correct answers to all the questions, he/she was reinforced verbally using statements such as "Super answer. You're great. Give me a high five", then the process was terminated, and the peer tutee was allowed to go to the setting where he/she would exhibit the target skill. When the peer tutee gave an incorrect answer to one of the questions about whether he/she has understood the story, the processes of reading the story and evaluating whether the story has been understood were repeated. If the peer tutee could not answer 5W1H questions correctly after reading the story 3 times, the process was terminated by being a model for correct answers. It was moved to the setting where the behavior would be exhibited.

Fading sessions. Intervention sessions continued until the peer tutees gave 100% correct responses in three consecutive sessions in daily probe sessions, and the fading sessions were initiated after the criterion was met. During the first fading session, the directive sentence defining the target skill was removed from the social story. During the second fading session, it was only said "Don't forget the story" just before crossing the street. Fading sessions were held in the same way as the intervention sessions, apart from the points mentioned.

Maintenance session. Two weeks after the last intervention session, the maintenance session was conducted to evaluate whether the peer tutees maintained the skill they had acquired. The maintenance session was conducted just as the full probe sessions. One trial was performed in the maintenance session. Maintenance data could not be collected from Rıza since the schools were closed.

Generalization session. The generalization data were collected by evaluating whether the peer tutees were able to generalize the skill they had learned to different settings, with the pretest and posttest measures. The generalization data were collected from the first and second participants on the road determined for the third participant and from the third participant on the road determined for the first and second participants. The generalization pretest sessions were carried out as controlled sessions before starting an intervention in peer tutees and in a similar manner to full probe sessions. The posttest sessions were carried out after the intervention sessions ended and in a similar manner to full probe sessions.

Interobserver Agreement and Treatment Integrity

Two types of reliability data, including interobserver agreement and treatment integrity, were collected in the study. Interobserver agreement data were collected from at least 33.3% of each session. The [Consensus/(Consensus + Dissensus)] x 100 formula was used to calculate the interobserver agreement coefficient (Kırcaali-İftar & Tekin, 1997). Treatment integrity data were collected from 100% of all sessions to evaluate whether the implementer performed the peer education, probe, maintenance, and generalization sessions and the peers performed the social story implementation and the fading process in accordance with the plan. The peer tutors' performances with regard to the first step in the social story implementation checklist were assessed by considering the answers they gave to the question of "When will we deliver the story? What should the setting where we will deliver the story be?". The [Observed implementer behavior / Planned implementer behavior x 100] formula was used to calculate the treatment integrity coefficient (Kırcaali-İftar & Tekin, 1997). It was found out that the implementer performed the peer education, probe, maintenance, and generalization sessions in accordance with the plan by 100%. Treatment integrity data on the peer tutors and interobserver agreement data on the peer tutees are presented in Table 5.

Table 5. Reliability Data

			Interobserver Agreement				
Peer Tutor	**TI (%)**	**Peer Tutee**	**BS (%)**	**IS (%)**	**FS (%)**	**PS (%)**	**GS (%)**
Betül	95.2	Doğukan	86.6	96	100	91.6	100
	83.4-100		80-100	80-100	100	70-100	100
	(100)		(100)	(100)	(100)	(50)	(50)
Berk	91.7	Ufuk	93.3	97.5	100	91.4	100
	75.1-100		80-100	80-100	100	80-100	100
	(100)		(100)	(62.5)	(50)	(58.3)	(66.6)
Seren	89.9	Rıza	100	100	100	95	93.3
	66.8-100		100	100	100	80-100	80-100
	(100)		(100)	(58.3)	(50)	(33.3)	(33.3)

Note. In the table, the first line shows the percentage of average reliability, the second line shows the range, and the third line shows the percentage of sessions from which data were collected.
Abbreviations: BS = Baseline sessions, GS= Generalization sessions, FS = Fading sessions,
TI = Treatment integrity, IS = Intervention sessions, PS = Probe sessions.

Social Validity

In the study, social validity data were collected from both peer tutors and peer tutees using the social validity questionary forms prepared by the researchers. Two experts, who had been previously consulted for the skill analysis and the suitability of social stories, were asked for their opinions about the suitability of social validity forms prepared by the researchers. The form prepared for the peer tutors included both open-end and closed-end questions in the forms of "Do you think the social stories you have learned to deliver instruction to your peers are useful? Are you pleased with the methods I have used to teach social stories to you? How did you feel during the story writing and implementation process, can you tell? Did you like teaching something to your friends? Would you like to participate in

another study like this? What are the aspects of this study that you have appreciated? and What are the aspects of this study that you have not appreciated?". The form prepared for the peer tutees included questions in the forms of "What have you learned in this study? Do you think the skill you have learned is useful? Did you enjoy working with your friend? Did you enjoy learning with stories? Do you think the study is useful to you? What are the aspects of this study that you have appreciated? and What are the aspects of this study that you have not appreciated?". Social validity data were collected through group interviews that were conducted separately with the peer tutees and peer tutors. All interviews were recorded and analyzed with notes taken on the form.

Results

The results related to the effectiveness of social stories were achieved by analyzing the peer tutees' performances in probe, intervention, fading, maintenance, and generalization sessions, and the participants' performances in these sessions are presented in Figure 3. The peer tutees' performances in generalization sessions are presented in Figure 4.

Results of Effectiveness Obtained for Doğukan. As it is seen in Figure 3, while Doğukan exhibited the crossing skill accurately at an average level of 20% in the baseline, he reached 100% at the end of the third intervention session. Fading sessions were initiated when Doğukan exhibited 100% performance in three consecutive sessions. Doğukan continued to exhibit 100% performance in two fading sessions held and in the first, second and third full probe sessions held after these sessions. It was observed that Doğukan maintained the crossing skill by 100% in the maintenance session held two weeks after the intervention. The generalization data showed that Doğukan exhibited the crossing skill at a level of 20% in the pretest session and generalized this skill he had acquired to a different street by reaching 100% performance in the posttest session.

Results of Effectiveness Obtained for Ufuk. As it is seen in Figure 3, Ufuk exhibited the crossing skill at an average level of 20% in the baseline sessions. Ufuk reached the 100% criterion in the sixth intervention session, but instruction was continued until he gave a 100% correct response in three consecutive sessions. After the eighth intervention session, the instruction was terminated,and the fading sessions were initiated. Ufuk exhibited 100% performance in two fading sessions. It was also observed that Ufuk exhibited an average performance of 20% in the first full probe session while he exhibited 100% performance in the second and third full probe sessions. Ufuk maintained the crossing skill by 100% in the maintenance session held two weeks later. The generalization data showed that Ufuk gave a correct response at a level of 20% in the pretest session and generalized the skill he had acquired to a different street by reaching a 100% correct response percentage in the posttest session.

Results of Effectiveness Obtained for Rıza. It was observed that Rıza exhibited the target skill at the average level of 0% in the baseline sessions. Rıza reached 100% performance at the end of the 10th intervention session, but the instruction was continued until he gave a 100% response in three consecutive sessions. It was observed that Rıza exhibited 100% performance during the fading sessions held after the intervention sessions. It was also observed that Rıza exhibited the crossing skill at an average level of 6.66% during the first and second full probe sessions and reached a 100% correct response level during the third full probe session. The maintenance session could not be conducted for Rıza due to the closure of schools. The generalization data showed that Rıza exhibited the target skill at a level of 0% in the pretest session and at a level of 100% in the posttest session.
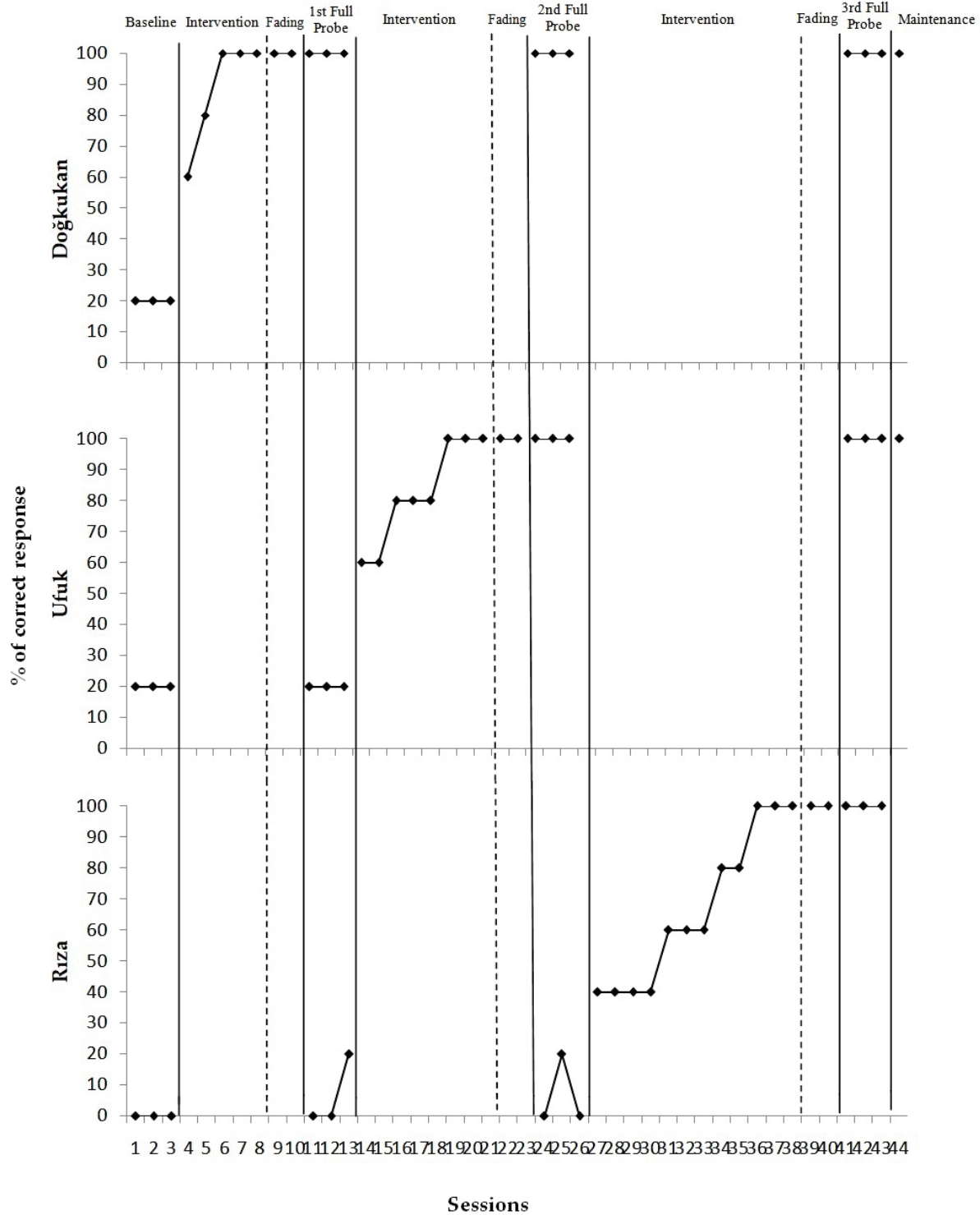
Figure 3. Peer Tutees' Levels of Learning the Target Skill

In the study, an immediate effect was observed in the performances of all peer tutees along with the implementation of social stories written and delivered by peers. As a result of the absolute level analysis which was performed to determine this effect, the immediate effect was determined as 40 for Doğukan, Ufuk, and Rıza. These values have shown that social stories have produced an immediate effect on the target behavior and that there may be hope with respect to making desired behavioral changes (Tekin-İftar, 2012). In the study, the percentage of nonoverlapping data (PND) technique was used to calculate the effect size of the social stories written and delivered by peers. The percentage of

nonoverlapping data of baseline-intervention sessions were found to be highly effective by 100% in all participants.
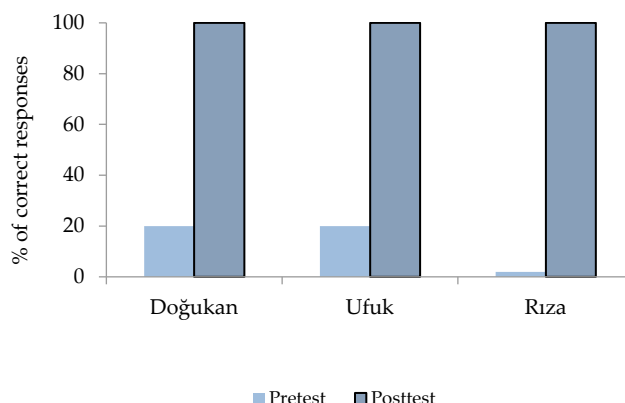

Figure 4. Peer Tutees' Pretest-Posttest Performances in Generalization Sessions

Social Validity Results

In the study, social validity data were collected from both peer tutors and peer tutees using the social validity questionary forms prepared by the researchers, and they were analyzed. All peer tutors stated that they found social story writing and implementation very useful and amusing. After the end of the study, Betül prepared a notebook for herself to write stories to teach different skills and shared the stories she wrote with the researchers. The peer tutors indicated that they were very satisfied with the education delivered for the acquisition of the social story writing and implementation skill and that their most favorite stage was the role-playing studies that they performed with the implementer. Betül expressed her happiness by answering the question "How did you feel during the story writing and implementation process, can you tell?" by stating "I devoted all my skills to cross the street, and hmm... I thought I could do it and I did it". Berk and Seren said that the process made them very happy. The peer tutors stated that they were very pleased to teach something to their friends, that they wanted to participate in a similar study and that the study had no aspect disliked by them. Betül stated that the most favorite aspect of the study was that she learned writing story, and Berk and Seren stated that the most favorite aspect was teaching something to their friends.

The peer tutees gave the answer of crossing to the question "What have you learned in this study?" and they showed how they should exhibit each skill to the implementer. All peer tutees stated that the skill they learned was very important and that they enjoyed studying with their friends and stories. Doğukan expressed his satisfaction with the study by saying that "I am satisfied with the process. Yes, I am satisfied.", and Ufuk said: "Is it possible to study next year?". All peer tutees indicated that the study was very useful for them and that the study had no aspect disliked by them. They also stated that they had a great time by indicating that the most favorite aspect of the study was studying with their friends and stories.

Discussion and Conclusion

In this study, the effect of a peer education program developed on the acquisitions of knowledge and skill of implementing social stories by primary school students aged between 7 and 9 years, and the effect of social stories delivered by peers who have completed the program on the learning of crossing skills by peer tutees with developmental disabilities were examined. Furthermore, social validity data were collected from peer tutors and peer tutees. Research results showed that the peer tutors wrote and implemented social stories accurately by 100%. As a result of the social stories written and delivered by the peer tutors, it was observed that the peer tutees acquired the target skill and could generalize it to a different street and that two of the participants could maintain the skill after 2 weeks. The social validity data collected from the peer tutors and peer tutees revealed that all participants found the process generally positive, amusing and useful.

Within the scope of the peer education program, the behavioral skills instruction including the steps of presentation, modeling, role-playing (experimenting to write and implement a social story) and providing feedback was implemented in the acquisition of social story writing and implementation skills by peer tutors, and it was observed that the behavioral skills instruction was effective on the acquisition of social story writing and implementation skills by peer tutors. In the studies on the effectiveness of peer-mediated implementations in the literature, it was also observed that the process based on behavioral skills instruction was effective on the acquisitions of knowledge and skill of implementing target methods and techniques by peers (Jameson et al., 2008; Sams, 2009; Tekin-İftar, 2003; Wolery et al., 1994). In the study, it was observed that the peers acquired the social story writing skills after the education delivered and implemented them with high treatment integrity. This finding is similar to the findings obtained from the studies in which social stories were written and delivered by adults (Acar et al., 2017; Olçay-Gül & Tekin-İftar, 2016; Quilty, 2007) and the findings obtained from the studies examining the effectiveness of peer-mediated implementations (Fetko et al., 2013; Gilbers et al., 2011; Godsey et al., 2008).Based on this finding, it can be said that peers are as good implementers as adults and that peers can be used as a source of teaching especially in the settings where inclusive studies are performed. With this aspect, it is thought that the study has contributed both to the social story literature and to the implementation literature.

In the study, as a result of the implementation of social stories written and delivered by peers, it was observed that the peer tutees acquired the crossing skills, two of the participants maintained this skill and all the participants generalized the crossing skills to a different street. When the performances of the peer tutees in the study were examined, it was observed that Doğukan acquired the crossing skills in 5 sessions, Ufuk acquired it in 8 sessions and Rıza acquired it in 12 sessions. It was observed that Doğukan was very willing and motivated during the study. This alacrity may have helped to Doğukan to learn the crossing skill more quickly. The diagnosis of Rıza may be the reason why he needed more sessions to acquire the target skill. Unlike the other two participants, Rıza is an individual with an intellectual disability. Furthermore, an immediate effect was observed in the performances of all peer tutees along with the implementation of social stories written and delivered by peers. In the study, the effect size of social stories written and delivered by peers was found to be highly effective by 100% in all participants. These findings can be explained by the facts that the steps of the target skill were very well defined in social stories, that the stories were supported with visual materials and that the peers performed the implementation with fairly high levels of reliability. When it is considered that the most important positive features of social stories include the features such as the fact that they allow for the use of visual stimuli, include clear messages and define the situation in which the skill will be exhibited and the target behavior very well, it can be said that the findings are parallel with the positive features of social stories and the findings obtained from social story studies (Crozier & Tincani, 2007; Özdemir, 2008; Reichow & Sabornie, 2009; Washburn, 2006). The positive change in the peer tutees' performances can also be a result of peer-mediated implementations (Fetko et al., 2013; Gilbers et al., 2011; Godsey et al., 2008; Jameson et al., 2008; Sams, 2009; Tekin-İftar, 2003; Wolery et al., 1994). It is stated in the literature that social stories can be used easily by general and special education specialists, educators and peers in schools and by parents, siblings and care providers in out-of-school settings (Delano & Snell, 2006; Kuoch & Mirenda, 2003; Olçay-Gül & Tekin-İftar, 2016; Quilty, 2007; Swaggart et al., 1995); however, it is observed that there is a limited number of studies examining the effectiveness of social story implementations performed by educators, parents and siblings (Acar et al., 2017; Akgün Giray, 2015; Değirmenci, 2018; Olçay-Gül & Tekin-İftar, 2016; Quilty, 2007). In the study carried out by Quilty (2007), it was aimed to teach the social story writing and implementation skill to experts and to evaluate the effectiveness of social stories delivered by experts on the reduction of problem behaviors of individuals with ASD. The findings of the study showed that two experts acquired the social story writing and implementation skill and that the social stories delivered by experts were effective on the reduction of participants' problem behaviors. In the study carried out by Akgün Giray (2015), whether preservice teachers acquired the skills of implementing social stories accurately and reliably was examined. In the study, it was reported that the students with ASD acquired the target social skills,

maintained them and generalized them along with the social stories prepared and delivered by preservice teachers. In the study carried out by Olçay-Gül & Tekin-İftar (2016),the effect of social stories delivered through mothers and siblings on the acquisition of target social skills of adolescents with ASD was examined, and it was observed that the mother and sibling acquired the social story writing and implementation skill, maintained and generalized it after family education and that the adolescent participants acquired the target social skills, maintained and generalized them after the instruction delivered by the mother and sibling. In a study in which social stories delivered by mothers and video modeling implementations were compared, it was observed that mothers acquired the social story and video model implementation skills and that children with ASD acquired the target social skills as a result of the instruction delivered by mothers (Acar et al., 2017). In a similar study, Değirmenci (2018) concluded that individuals with ASD acquired, maintained and generalized the target safety skills as a result of the instruction delivered by teachers with training on the social story and video modeling implementation. No study aimed at teaching social story writing and implementation skills to people like children's parents, teachers, siblings, etc. was found apart from the studies listed; however, the studies in which the social stories written by researchers were implemented by family member-researcher cooperation were found (Adams, Gouvousis, VanLue, & Waldron, 2004; Dodd, Hupp, Jewell, & Krohn, 2008; Kuoch & Mirenda, 2003). The fact that social stories were written and implemented by peers makes this study different from other social story studies and other studies focusing on teaching safety skills. With this aspect, it can be said that the study has contributed to the literature on social story and safety skills.

In the study, it was aimed to use social stories in teaching safety skills to participants with developmental disabilities. Three studies in which social stories were used in teaching safety skills were found in the literature (Değirmenci, 2018; Kutlu, 2016; Süzer, 2015). Results of these studies yielded that using social stories for teaching safety skills is effective. In this context, results obtained from these studies has a qualification to support the related literature. In this study, unlike the studies mentioned, it was aimed to teach crossing skills to three participants, two of whom are diagnosed with ASD and one of whom diagnosed with intellectual disability. Due to the fact that no study in which social stories were used in teaching crossing skills was found in the literature and the fact that the studies in which social stories were used in teaching safety skills were not carried out with a participant with intellectual disability, it is thought that the skill taught and the characteristics of the participating group are one of the original aspects of the study and it has contributed to the relevant literature. Another original aspect of the study is that interventions were implemented with the participants in situ. In their study, Qi, Barton, Collier, Lin, and Montoya (2018) examined the studies in which social studies were used, and they revealed that a significant part of social story studies were carried out in the school environment. In this study, only the delivery stage of social stories was conducted in the school environment, and the probe, maintenance and generalization sessions for the target skill were conducted in-situ. Moreover, Marchetti, McCartney, Drain, Hooper, and Dix (1983) reported that the instructions performed in urban traffic were more effective than modeling in the acquisition of pedestrian skills, and Dixon et al. (2010) indicated that if the target skill is shaped in the setting- in-situ- where it should be exhibited in teaching a safety skill, the skill is more likely to continue to be exhibited in that setting. The fact that the study was carried out by with all precautions has taken on the streets that have appropriate specifications used by the participants on a daily basis, in other words appropriate in-situ, is thought to be effective in maintaining and generalizing the target behaviors.

In this study, social validity data were collected from the peer tutees and peer tutors using a subjective evaluation approach. The findings obtained from the studies examining the effectiveness of social stories in which social validity data were collected revealed that positive opinions were expressed for social stories (Crozier & Tincani, 2007; Olçay-Gül & Tekin-İftar, 2016; Sansosti & Powell-Smith, 2006). When the studies examining the effectiveness of social stories in teaching safety skills were examined, it was observed that Süzer (2015) collected social validity data from the parents of participants and Değirmenci (2018) collected them from teacher participants and the parents of students. Kutlu (2016) collected social validity data from the participants of the study and their mothers, and the participants

of the study expressed positive opinions on social stories. In this study, social validity data were collected from both the peer tutee and peer tutor participants, and similar findings were obtained. In this study, unlike other social validity studies, it was observed that both peer tutors and peer tutees were satisfied with working with each other. Furthermore, during the study period, the peer tutors and peer tutees often requested study even when there was no study.

In the study, it was observed that the peer-mediated delivery of social stories without systematic data collection on communication between peers strengthened the ties between peers and that this process contributed to the peer tutors and peer tutees in terms of having a fun time. It was observed that this interaction also continued in the settings such as classroom environment and school garden when there was no study. This situation is frequently encountered in peer-mediated implementations (Bene, Banda, & Brown, 2014; Tekin & Kırcaali-İftar, 2002). The fact that no study examining the effectiveness of social stories written and delivered by peers was found does not give an opportunity to make a discussion compared to other studies on positive communication between peer tutors and peer tutees. In a qualitative study carried out by Dev (2014), it was observed that a teacher implementing social stories during lessons stated that the use of social stories in his lessons strengthened the ties between peers. In this study, it can be said that both the delivery of implementation by peers and the presence of social stories are effective in the strengthening of communication and ties between peers.

The original aspects of the study listed have ensured that the findings obtained have contributed to the social story literature, peer-mediated implementations literature and safety skills literature. In addition to these contributions, this study has some limitations that need to be addressed. The fact that the study was carried out only with three participants with developmental disabilities, inability to collect maintenance data from the third participant due to the timelimit and inability to collect maintenance and generalization data from the peers can be listed among these limitations. Based on all these points, in further studies, it can be ensured that peer tutors will acquire the knowledge and skill of using different evidence-based implementations, the effectiveness of the instruction delivered by peers in teaching different skills to participants with different diagnoses can be examined, and maintenance and generalization data on the skills of implementing the methods and techniques taught to peers can be collected. Furthermore, it may be suggested that teachers and school administrators should include peers in general education classes in the process as a source of teaching.

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