

LEARNING FROM STORYBOOKS: DOES THE THEME MATTER?

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LEARNING FROM STORYBOOKS: DOES THE THEME MATTER?

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## DECLARATION OF ORIGINALITY

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## ABSTRACT

### Learning from Storybooks: Does the Theme Matter?

Reading storybooks are one of the most preferred pastime activities in childhood. In addition to entertaining feature, storybooks can be used to improve children's social and cognitive skills. However, there is limited research on whether and what kind of information children can learn from storybooks and what kind of storybooks promote this learning process. Study 1 investigated whether story theme (i.e., realistic, anthropomorphic, or fantastical) and the problem context (i.e., physical or social) influence children's learning of analogical problem solutions. In Study 1, 91 preschool children listened to storybooks and were asked to solve problem solution analogies. Results showed that children who listened to realistic stories were more successful while solving physical problem solution analogies. However, this was not the case for the stories which had more social context. In Study 2, we examined whether story theme has an impact on children's learning of pro-social behaviors such as sharing, helping and honesty. Seventy-eighty 6-year-old children were administered pro-social behavioral tasks before and after listening to either realistic, anthropomorphic or fantastical storybooks. It was found that children who listened to realistic storybooks showed an increase in their sharing behavior from pre-test to post-test compared to children in either anthropomorphic or fantastical conditions. Even though we did not find this kind of story theme effect on children's helping or honesty behaviors, children's scores on these behaviors increased from pre to post-tests which suggested that listening to storybooks promoted children's prosocial behaviors.

## ÖZET

### Hikaye Kitaplarından Öğrenme: Tema Fark Eder Mi?

Hikaye Kitaplarından Öğrenme: Tema Fark Eder Mi? Hikaye kitabı okumak, çocukluk döneminde en çok vakit geçirilen aktivitelerden biridir. Hikaye kitaplarıyla eğlendirme amacının yanında, çocukların hem sosyal hem de bilişsel becerilerinin geliştirilmesi hedeflenmektedir. Ancak, çocukların hikaye kitaplarından ne tür bilgiler öğrenebildikleri ve ne tür hikaye kitaplarının bu öğrenme sürecini teşvik ettiği konusunda sınırlı sayıda araştırma bulunmaktadır. Birinci çalışmada, hikaye kitabı türü ile (gerçekçi, antropomorfik veya fantastik) problem bağlamının (sosyal veya fiziksel) çocukların analogik problem çözme öğrenme davranışı üzerindeki etkisi incelenmiştir. Bu doğrultuda 91 okul öncesi dönemdeki çocuk çalışmaya katılmış ve çeşitli hikaye kitaplarını dinledikten sonra çocuklardan farklı problemleri çözmeleri istenmiştir. Birinci çalışmanın sonuçlarına göre, gerçekçi hikayeler dinleyen çocuklar fiziksel içeriğe sahip problemleri antropomorfik veya fantastik hikayeleri dinleyenlere kıyasla daha başarılı bir şekilde çözmüştür. Fakat bu etki sosyal hikayeler için bulunamamıştır. İkinci çalışmada ise hikaye kitabı türünün (gerçekçi, antropomorfik veya fantastik) çocukların paylaşma, yardım etme ve dürüstlük gibi pro-sosyal davranışları üzerinde bir etkisi olup olmadığı incelenmiştir. İkinci çalışmaya 78 altı-yaş çocuğu katılmış ve hikaye kitabı dinleme aşamasının öncesinde ve sonrasında pro-sosyal davranışlarını ölçmek için görevler uygulanmıştır. Sonuçlara göre, gerçekçi hikaye dinleyen çocukların ön test-son test paylaşım skorları arasındaki fark antropomorfik veya fantastik hikaye dinleyen çocuklara göre daha yüksektir. Yardımlaşma ve dürüstlük davranışları için ise,

hikaye kitabı türünün etkisi bulunamamasına rağmen hikaye kitabı türü fark  
etmeksizin çocukların davranışları son testte artış göstermiştir.

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## TABLE OF CONTENTS

CHAPTER 1 .....	1
1.1 Story theme .....	2
CHAPTER 2 .....	8
2.1 Method .....	13
2.2 Results .....	21
2.3 Discussion .....	26
CHAPTER 3 .....	32
3.1 Method .....	40
3.2 Results .....	48
3.3 Discussion .....	59
CHAPTER 4 .....	65
APPENDIX A .....	70
APPENDIX B .....	71
APPENDIX C .....	72
APPENDIX D .....	73
APPENDIX E .....	78
APPENDIX F .....	79
APPENDIX G .....	81
APPENDIX H .....	82
APPENDIX I .....	83

APPENDIX J .....	90
REFERENCES.....	100

## LIST OF TABLES

Table 1. Number of Children in Each Experimental Condition.....	15
Table 2. Number of Children in Each Category of Solution Selection Task.....	24
Table 3. Solution Selection Frequencies among Children Who Could Not Solve the Transfer Stories .....	25
Table 4. Number of Children in Each Experimental Condition.....	40
Table 5. Children’s Pre and Post Scores on Sharing Tasks Across Conditions.....	51
Table 6. Children’s Pre and Post Scores on Helping Tasks Across Conditions .....	55
Table 7. Number of Children’s Behavior in Deception Game by Story Theme Condition.....	56

## LIST OF FIGURES

Figure 1. Introduction of story themes per condition.....	17
Figure 2. Social and physical problem transfer scores across conditions (Collapsed across age groups).....	23
Figure 3. The procedure for whole process (Ws indicate within subject measurement and Bs indicate between subject measurement).....	42
Figure 4. Pre and post sharing scores for all sharing calculations by story theme condition.....	51
Figure 5. Mean differences in sharing tasks across story theme conditions .....	54
Figure 6. Pre and post scores in helping tasks across story theme conditions. ....	55
Figure 7. Percentages in deception game across conditions .....	57
Figure 8. Results of pictures in the fantasy spectrum questionnaire.....	80

## CHAPTER 1

### INTRODUCTION

When you enter a child's room, it is highly probable that you can see so many storybooks (i.e., books that include pictures/illustrations for younger ages) and maybe even a little library. In a survey study carried out with parents in the USA, it was found that pre-school children spend almost an hour reading or listening to storybooks in a day (Rideout et al., 2003). Since these books are part of children's daily life, there is an increasing interest in children's books, and parents and educators intend to buy age-appropriate storybooks for children to improve their social and cognitive skills in addition to keeping them entertained (Hassinger-Das et al., 2020; Larsen et al., 2018). Therefore, researchers try to understand the role of books on children's development and whether they meet the expectations (Hopkin & Weisberg, 2017; Strouse et al., 2018). There is now a good amount of research indicating that storybooks improve children's vocabulary knowledge, causal understanding, and social rule learning (Larsen et al., 2018; Walker et al., 2015; Weisberg et al., 2015). However, what information children can learn and what kind of storybook is better for children's learning processes still need more research.

Two major issues seem to be prominent regarding what children can learn from storybooks: topic of the storybook and story-theme. In other words, children can learn different subjects from storybooks such as physical rules, numeric knowledge, moral lessons, or word learning with respect to different story theme such as realistic or fantastical. A storybook, for example, may aim to teach children how to be kind with illustrations of realistic human characters or fantastical creatures like fairies. On the contrary, it can also aim to teach numbers while using real

pictures of animals or cartoon characters. At this point, it is valuable to ask a set of questions: Can children successfully learn both the numbers and how to be kind from storybooks? Do types of characters and the violation of reality (i.e., using fantastical features) in these books affect children's learning? For these reasons, in this study, I aimed to examine the effect of story theme on children's learning processes by focusing on the learning of physical and social problem solution analogies and social behaviors by conducting two studies. In this chapter, the literature on children's learning from storybooks and some limitations regarding this topic are discussed.

### 1.1 Story theme

In investigations of processes of learning from storybooks, story-theme is one of the main issues that has been studied in the literature (e.g., Kruse et al., 2020; Richert et al., 2009). In this line of research, realistic themed stories (e.g., stories with real characters and daily events) have been compared with fantastical themed stories (e.g., non-real creatures and impossible events). In most of these studies, it was found that preschool children learn more from reality themed books compared to fantasy themed ones (e.g., Larsen et al., 2017; Richert et al., 2009; Walker et al., 2015), and the reason for that has been discussed in relation to several points.

One point that has been brought up is that when children are reading or listening to fantasy content, they may experience the *readers' dilemma*, and that they may get confused about what information should be generalized to real-life (Hopkins & Weisberg, 2017; Oranç, 2019; Richert & Schlesinger, 2017). Since fantasy themed stories have some differences from real world context (e.g., physical violations), it was claimed that transferring from one to another may be impacted negatively due to this dissimilarity (Holyoak et al., 1984). Some researchers also suggested that since

preschoolers have relatively limited cognitive capacity, it may be challenging for them to process both fantasy content and the target information at the same time (Fisch, 2000; Kahneman, 1973; Oranç, 2019). In addition, due to the entertaining features of fantastical elements in storybooks compared to realistic ones, children may pay more attention to fantastical content as opposed to the targeted information (Weisberg et al., 2014). Therefore, the targeted information may be ignored or cannot be given the high level of attention which leads to not being as successful as in the realistic stories.

Walker and colleagues (2015), for instance, read preschool children novel causal relations in stories, and wanted to examine whether the story theme had an effect on children's learning of causal knowledge. Children listened either realistic (e.g., driving car) or fantastical (e.g., fly with magic cape) stories that contain novel causal relations. Supporting previous arguments, they found that preschool children were more successful in generalizing causal relations, if the story had more realistic features rather than fantastical ones. One recent research, similarly, indicated that preschool children were able to learn more factual information about unknown animals, if the book contains factual language with realistic illustrations as opposed to a book that includes anthropomorphic language and images which can be considered as fantastical (Ganea et al., 2014). There are also several studies indicating that reality theme storybooks are better than fantastical ones in terms of learning of problem solution analogies (e.g., Richert & Smith, 2011) and social behaviors such as sharing (Larsen et al., 2018; see Chapter 2 for more information on this). Thus, the studies reviewed here report consistent results suggesting that realistic themed stories were better in terms of teaching/learning of casual relations, word learning and problem solution analogies.

On the other hand, some current studies reported that children can effectively learn new information from books with fantastical content as well (Hopkins & Lillard, 2021; Stahl & Feigenson, 2017; Richert & Schlesinger, 2022; Weisberg et al., 2015; Weisberg & Hopkins, 2020). Since fantastical context is more engaging and motivating for children compared to realistic theme (Parker & Lepper, 1992), children's attention to the information in the book may be affected positively and enhance their learning (Weisberg & Richert, 2022). Besides, considering the great number of fantastical storybooks compared realistic ones in children's literature (Chlebuch et al., 2022; Goldstein & Alperson, 2020; Marriott, 2002), children may be more used to read/listen to these types of books and even prefer them. Due to this familiarity, and engaging context, children may want to read fantasy content books again and again and in turn, this kind of repetition may positively affect children's learning of new information from fantasy themed books. Hopkins and Lillard (2021), for instance, conducted a study by manipulating the levels of fantasy; realistic themed stories were compared with themes of low-level of fantasy (i.e., characters are described as just living in another planet without highlighting any physical violation), surface level of fantasy (i.e., different worlds and highlighting physical differences such as purple sky) and deep level of fantasy (i.e., different worlds, physical differences, and physical violations). After children were read the story which emphasizes how to solve a physical problem, they were given physical analogical problems to solve. According to the results of the study, there were no differences between realistic and any levels of fantasy; children learned almost equally in all conditions. Moreover, they found that children who were read the deep level of fantasy story had higher transfer scores than surface level of fantasy condition. However, they conducted a follow-up study and examined whether the

order of presentation of fantasy features - mentioning about fantasy features immediately before or after the solution itself- affected children's transferring processes. They found that if the fantasy features were highlighted immediately after the solution, there were no differences between children's transfer scores between the realistic and fantasy conditions. However, if fantastical elements are presented early in a story, it may bolster children's learning and transferring process. Researchers discussed these differences regarding priming effect which suggests that the order of showing fantasy features may affect children's learning. However, as they also suggested, due to small sample size, more research is needed to understand the effect of presentation order.

Likewise, Weisberg and colleagues (2015) taught children new words over a two-week intervention by manipulating the representation of words either in realistic or fantastical storybooks. As a result of their study, children's comprehension of new vocabulary did not change across story theme conditions, and they learned almost equal number of new words. However, when children were asked to talk about these new words, children who learned these new words in fantastical stories were likely to produce more information compared to children who learned in the realistic stories which may indicated the positive effect of fantasy features on children's word learning.

There are also some studies which are suggesting that story theme does not necessarily affect children's learning either in a positive or negative way. Ganea et al. (2017), for example, conducted a study whether children can learn about physical concepts from storybooks. They found that regardless of the story theme, preschool children were able to learn about balance, and even transfer this new knowledge into real-world task. Similarly, in terms of learning about new facts, Aydin and

colleagues (2021) reported that even though there are age related differences in learning from storybooks, preschoolers learned about new facts from both realistic and fantastical types of books which may suggest either kind can enhance children's learning. Weisberg and Hopkins (2020) also found in two studies that preschool children do learn and extend novel information about an unknown animal, regardless of the context of the story whether it is either realistic or fantastical.

As it can be seen, there are inconsistent results in the studies focusing on children's learning from storybooks. These discrepancies may be explained by several reasons. Differences in the description of fantasy term across studies seem to be one of the major points. Even though the goal is to compare realistic and fantastical content of the storybooks in all the studies above, they generally do not refer to the same level of fantasy. For instance, in one context, while fantasy was depicted by using talking trees (Walker et al., 2015), in another context, it was depicted by using a giant robot that was fighting with a child and astronauts (Richert & Smith, 2011). Similarly, while Richert et al. (2009) orally told the fantasy stories by referring a non-human creature who was living in another planet like Winnie the Pooh's place without showing pictures of the stories, Hopkins and Lillard (2021) used human character, but they manipulated both the world that protagonist lives in (e.g., the universe that has physical violations) and his/her actions (e.g., walking thorough wall) and all these features were depicted as picture. All of these have been considered under the category of fantasy. Indeed, the term fantasy is more like a spectrum in which we can observe increasing or decreasing levels from one end to another in terms of the amount of fantasy in a given context (e.g., human characters who live in another planet or non-existing creatures who violate physical rules). Moreover, storybooks contain at least one fantastical element (Bonus & Mares, 2018;

Goldstein & Alpers, 2020). Content analysis of children's books indicate that anthropomorphic features are extremely common in storybooks (e.g., Chlebuch et al., 2022). Therefore, children may be more familiar to anthropomorphic content (e.g., talking rabbits) compared to more intense fantasy such as non-human fictional character like Mike Wazowski in Monsters Movie. Due to this familiarity and exposure, children's learning may also be affected. For all these reasons, it is hard to understand and make assumptions how fantasy content affects children's learning processes.

To sum, it is still unclear what information children can learn from storybooks, which kind of stories are better for these processes, whether there is any optimal level of fantastical features to enhance children's learning and extending information from storybooks. Therefore, the current research tried to answer these questions by conducting two studies in which the effect of story-theme on preschool children's both learning of problem solution analogies and social behaviors were examined in detail.

## CHAPTER 2

### STUDY 1

When the issue is children's learning from storybooks, one of the most studied and important topics is the story theme (Strouse et al., 2018). However, as mentioned in the previous chapter, there are conflicting results regarding the effect of story theme (i.e., realistic vs. fantastical) on children's learning processes. Since learning of problem solution analogies is one of the most studied topics in the literature in terms of the effect of story theme on learning process, in this current study, we wanted to investigate whether the story theme affects preschoolers' learning of analogical problem solving.

We first wanted to replicate and extend Richert and colleagues' (2009) study in which they investigated the effect of story theme (i.e., realistic vs. fantastical) on preschool children's analogical transfer processes in different kinds of problem-solving situations such as social (e.g., how to make friends) and physical (e.g., stacking objects). In that study, they first read children source stories which highlighted both the problems and solutions (e.g., a child is trying to make friends and accomplishes the goal by offering help to the children s/he wants to be friends with). After children were read these source stories, they were given transfer stories which had almost the same problem as the source stories (e.g., trying to make friends with a group of children) and asked the transfer questions about what the character in the story should do to solve this problem. To be successful on this task, children should transfer solutions from source stories to target stories (e.g., offering help). According to their results, children who were read reality themed stories had higher scores on transferring problem solution analogies compared to children who were

read fantasy theme stories regardless of the problem type (i.e., either physical or social).

We similarly wanted to examine the effect of story theme on children's learning of both physical and social problem solution analogies by comparing realistic and fantastical themes, but in addition to these themes we also added an anthropomorphic condition as a story theme. Richert et al. (2009) compared realistic and fantastical stories in which fantasy was defined by using nonexistent creatures as story characters without emphasizing any physical violations. This can be considered as 'surface level fantasy' because there were non-human creatures but there was not such an emphasis on these creatures' supernatural features (e.g., similar to Hopkins & Weisberg's (2021) study). However, as discussed earlier, the term fantasy includes various types of fantastical elements from lower to higher levels. Therefore, in addition to Richert et al.'s (2009) surface level fantasy condition, we added an anthropomorphic condition which might be placed in the middle of the fantasy spectrum. Overall, the Study 1 included three story theme conditions which were realistic, anthropomorphic, and fantastical.

It is worth noting that Goldstein and Alperson (2020) reported that that almost 70% of media products (i.e., books and movies) include animals who act like humans which highlight the majority and importance of anthropomorphized characters in children's books. Thus, using animals instead of non-human creatures may make a difference in terms of fantasy levels, and may affect children's learning from storybooks differently. Because of the familiarity of anthropomorphic content, children can learn more compared to surface level fantasy content because fantastical features in the anthropomorphic stories may not have the same distraction level considering the familiarity. On the contrary, children may react similarly to

anthropomorphic stories as they do in these fantasy content because there are physical violations in both types of stories. To the best of our knowledge, no study has compared the anthropomorphic and surface level fantasy in terms of learning of problem-solution analogies from storybooks. Therefore, we added a new condition in which a group of children were given anthropomorphic stories. Considering the most of earlier results (Larsen et al., 2018; Richert et al., 2009; Richert & Smith, 2011), we hypothesized that children in the reality condition will learn solutions better, thus have higher transfer scores, than children in the fantasy condition. However, we did not have a direct hypothesis for anthropomorphic condition.

Another point that we extended Richert and colleagues' (2009) research was that we wanted to understand whether children learned the solution that the way we highlighted or not. Children might give answers that were not highlighted in the source story but still might be a potential solution to the problem. This does not directly indicate that the child did not learn the solution; it is possible that they might have learned the solution highlighted in the source story but preferred other solutions due to various other reasons (e.g., a solution that they have personally experienced might be preferred). In order to control for this concern, we included a solution selection task in which after children gave the answer to transfer stories, they were given three different solutions that can be applied to the given problem and asked what they will do first to solve the problem. This task might be an important for children who could not give the correct answers in transfer stories when asked open-endedly or prompted. If children selected highlighted solution as first or second option to solve the problem, this may be an indicator that they considered highlighted solution as an appropriate solution. However, if they did not prefer to select the solution as first or second step, it may be an indicator of that children thought that

there are better ways to solve the given problem. Therefore, by giving children several options to solve the problem, we had a chance to test whether the highlighted solutions in the stories are appropriate for children and whether there were any differences in terms of story theme conditions.

In addition, we wanted to investigate which factors can be related to children's learning from storybooks and explain the inconsistent results in the literature. Thus, we examined whether children's fantasy orientation (FO) - the extent that children prefer imaginary content (as opposed to reality-based preferences) in their daily lives (Pierucci et al., 2013; Woolley & Gilpin, 2020)- is linked to children's learning and transfer of problem solution analogies from storybooks. It is observed that while some children have more realistic preferences in daily life (e.g., playing ball games), some of them have more fantastical choices such as pretending to be a Batman. Several types of activities can be also reflection of children's FO, such having an imaginary companion and/or pretend identity (Taylor et al., 1993). Studies indicate that children's FO is related to their daily activities and social cognitive development, such as the amount of time spent in pretending (Kamber et al., 2021), sophistication of pretend play (Taylor et al., 1993) and better ability to differentiate reality from fantasy (Sharon & Woolley, 2004). It was also claimed that children's FO can be linked with learning processes as well; children who are more fantasy oriented may also be more familiar to fantasy content books which may help them to overcome plausible negative effects of fantasy on attention (Richert & Smith, 2011). In other words, children who have high level of fantasy-orientation may be more likely to learn the given issue in the fantasy-themed storybooks compared to their peers who have lower levels of fantasy orientation. To test this argument, Richert and Smith (2011) conducted a study in which they

examined the relations between fantasy orientation and learning of analogical problem solution from storybooks. According to their results, there was no such relationship between these two variables. However, their assessment of FO was only based on four questions (e.g., talking by her/himself before sleep) which did not include children's daily preferences and may not exactly reflect children's real fantasy orientation level. Therefore, studies examining the relations between FO and learning processes are still needed.

For these reasons, we decided to assess children's FO and investigate the relations to children's learning of analogical problem solving from story books. We assessed children's FO by using several questions from the Imaginative Play Predisposition Interview (Taylor & Carlson, 1997) which includes questions about children's favorite daily activities, favorite media products and thoughts before sleep (Bunce & Woolley, 2021; Kamber et al., 2021; Sharon & Woolley, 2004). We expected that children who are more fantasy oriented may also have higher transfer scores in fantasy and anthropomorphic conditions. In addition, children who are in the fantastical/anthropomorphic conditions and have higher FO scores will also have higher transfer scores than the ones who were in the fantasy/anthropomorphic condition, but lower level of FO. This may be because children's engagement in fantasy content in daily life may make them more familiar with the fantasy content and eliminate the plausible confounding effect of fantasy on children's learning. For these reasons, we expected that children's FO and transfer scores will be positively correlated in fantasy condition and anthropomorphic conditions.

Last but not least, studies that are focusing on analogical problem solving argued that while some children directly solved the given problem when asked in an open-ended question format, some needed a prompt to successfully solve the analogy

(Richert et al., 2009; Richert and Smith, 2011). It is possible that individual differences in children's general problem-solving skills might also be an important factor in transfer of solutions from storybooks. Therefore, to control for general cognitive abilities, different from Richter et al.'s (2009) study, we included pre-assessment of problem-solving skills. We added a baseline problem solving task which was adapted from Hopkins and Lillard's study (2021). We updated the story they used to assess analogical solving in order to assess whether children have problem-solution ability in basic level. All children ages between 4- to 6-year-old were expected to pass this task and children who were not successful in this task were not included in the analogical problem-solving task because it was assumed that they have difficulties in solving of even easier problems.

Overall, in this current study, we wanted to investigate whether different story themes affect children's learning of problem solution analogies. We also included solution selection task and fantasy orientation interview which may help us to explain individual differences in children's transfer scores.

## 2.1 Method

### 2.1.1 Design

This study had 3 (story theme: realistic/anthropomorphic/fantastical; between subject) X 3 (age group: 4-5-6- year-old-between subject) between subject design.

The physical and social analogical transfer scores of children were the two dependent variables of the study.

### 2.1.2 Pilot testing

In order to test whether children understand the wording and instruction of analogical problem-solving task (Richert et al., 2009), we first ran a pilot study in which 15 children between the ages of 4 and 6 (5 boys,  $M_{age} = 60.3$  months,  $SD = 10.2$  months) participated. According to the results of the pilot study, we updated some parts of the two stories which are discussed in material session below in detail. More importantly, we were able to observe individual variability in children's responses regarding analogical problem-solving task.

### 2.1.3 Participants

One hundred preschool children participated in the study. Nine of them were excluded either because of unwillingness to participate ( $N = 6$ ), parental interference ( $N = 2$ ) or unsuccessful at control (i.e., baseline problem solving task;  $N = 1$ ). Thus, the final sample included 91 children (46 girls and 45 boys;  $M_{age} = 64.4$  months, age range = 48-83 months). Table 1 provides descriptive age and sex information for each condition. According to parents' report of monthly income, 30.8% of them can be considered low income\* (i.e., monthly income 6.000 Turkish Liras (TL) or less), 38.5 % of participants can be considered mainly middle level income (i.e., 6.000 TL to 10.000 TL income), and 30.8% of them are high level income (i.e., 10.000 TL or more income). In addition, majority of parents (69.3%) had college degree or higher. Children were recruited from the social media posts from Boğaziçi University Family and Children Research Laboratory and volunteer private preschools.

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\*Income ranges are based Turkish Statistical Institute's report (2021).

Table 1. Number of Children in Each Experimental Condition

		Realistic	Anthropomorphic	Fantastical	Total
Child's Sex	Girl	15 (32.6%)	14 (30.4%)	17 (37%)	46 (50.5%)
	Boy	16 (35.6%)	15 (33.3%)	14 (31.1%)	45 (49.5%)
Age group	4-year-old	10 ( $M = 53.8^*$ , $SD = 3.4$ )	11 ( $M = 52.3$ , $SD = 3.1$ )	10 ( $M = 53.3$ , $SD = 3.5$ )	31 ( $M = 53.1$ , $SD = 3.3$ )
	5-year-old	11 ( $M = 65.4$ , $SD = 3.9$ )	11 ( $M = 64$ , $SD = 3.1$ )	11 ( $M = 65.3$ , $SD = 3.4$ )	33 ( $M = 64.9$ , $SD = 3.4$ )
	6-year-old	10 ( $M = 75.3$ , $SD = 2.7$ )	7 ( $M = 79.3$ , $SD = 3.5$ )	10 ( $M = 76.1$ , $SD = 3.7$ )	27 ( $M = 76.6$ , $SD = 3.5$ )
Total		31 ( $M = 64.8$ , $SD = 9.3$ )	29 ( $M = 63.2$ , $SD = 11$ )	31 ( $M = 64.9$ , $SD = 9.9$ )	

\* Means ( $M$ ) represent age in months.

#### 2.1.4 Procedure

Children participated in the tasks individually online via Zoom. After obtaining consent from parents and verbal assent from children, the testing session started and was recorded by the experimenter. Children were randomly assigned to one of the three conditions (realistic, anthropomorphic or fantastical). They were administered the fantasy orientation interview, baseline problem solving task, analogical problem-solving task and solution selection task, respectively. There was a 5-minute cartoon break between the block of two-problem-transfer stories. The whole session took approximately 20-minutes.

## 2.1.5 Materials

### 2.1.5.1 Control task- baseline problem solving task

The task was adapted from Hopkins and Lillard's (2021) study to assess children's baseline-problem solving skills as a control of their problem-solving skills. Children were told a story in which a dog barks because it cannot reach the food that is on the other side of the fences because the fence is too high. There is a little space at the bottom of fences through which the dog cannot reach the food but which enables the child character to extend the food to the dog. After children were given the problem, they were asked to solve it, "*What should X (child character) do so that the dog does not bark?*" If they could not give the correct answer (i.e., passing food to the dog through the space at the bottom of fence) in the first time, they were prompted to think about the solution again. Children received a score of "2" for direct answers (e.g., give the food); "1" for prompted correct answers and "0" for wrong answers (i.e., building a door). There was only one child who gave an incorrect answer and was excluded from the analysis. Please see Appendix C for the story and details of the scoring.

### 2.1.5.2 Analogical problem-solving task

This task was adapted from Richert et al.'s (2009) study. In this task, children were given 4 different source stories two of which had more social (group entry and perspective taking) and two of them had more physical problems (wrapping fruits and stacking boxes; Please see Appendix D for all the source and transfer stories). In these source stories, both the problems and the solutions were highlighted. The theme and protagonist in each story differed across conditions which were either

realistic, anthropomorphic or fantastical. Children were firstly introduced to the story theme and the main character itself which was either a human, animal or a fantastical creature (Please see Figure 1 for the depictions and introductions of conditions).

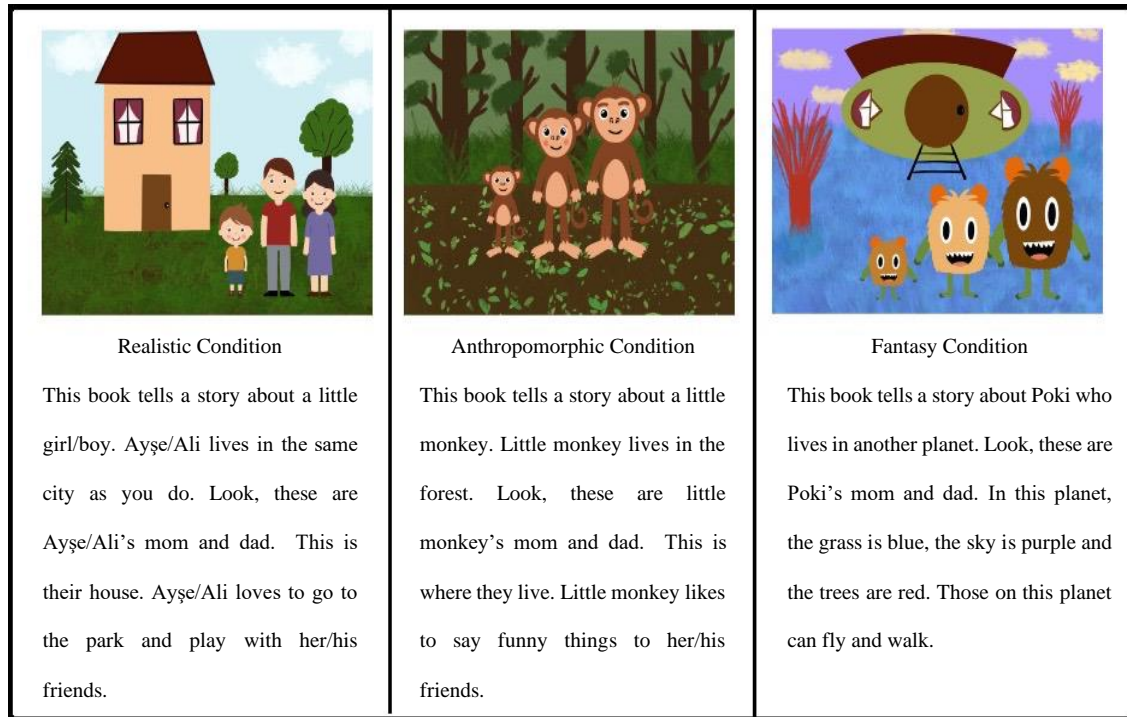


Figure 1. Introduction of story themes per condition

According to our pilot testing, we decided to change some part of the original group entry (social problem) and stacking stories (physical problem) (Richert et al., 2009). In group entry story, the protagonist wanted to play with a group of children/animals/creatures (depending on the story theme condition the participant is assigned to). Then, in order to be accepted into the group, the protagonist helped them, and the children/animals/creatures allowed the protagonist to play with them. However, both in Richert et al.'s (2009) study and our pilot testing, when the participants were given a similar problem and asked what the protagonist should do, instead of offering help to be friends with them, almost all children preferred to say "the child should ask whether s/he can play with them" as their first solution in

transfer story. Therefore, we decided to change the story in order to prevent children saying this dominant response in pilot testing. We thought that if children do not have a chance to offer this solution, they may prefer to use the analogy in source story and prefer the highlighted solution. Thus, we updated the group entry story by adding information that these children/creatures cannot hear the X (main character) because they are listening to music with headphones. Pilot testing indicated that children preferred to use the analogy to solve the group entry problem and we could observe individual variability in children's answers with the help of this change.

Another change was implemented in the stacking story in which the protagonist reached the box on a high shelf by stacking the books. We used the same source story in our study, but we changed the transfer story of Richert et al.'s (2009) in which the protagonist cannot watch the play on the stage because there are taller children in front of him/her and to be able to see the play, the protagonist should stack the boxes and stand up on the boxes. We updated this story to make it more familiar in children's daily life. Therefore, we used the same topic, stacking and boxes, by changing the context in which we updated the protagonist's goal – in our study, the protagonist who was missing his/her balloon tries to reach high by stacking boxes.

After the source stories ended, children were asked three memory questions to check whether they understood and remembered the details of the stories. If the memory scores were lower than three, children's transfer scores were treated as missing (one child's social transfer score and three children's physical transfer scores were missing). There were no differences in children's memory scores for all conditions and sex and age. Then, children were given four short transfer stories which had almost the same problem as previous stories. In these stories, the

protagonist was a realistic child character in all conditions. Each transfer story was told right after the relevant source story. At the end of the stories, children were asked an open-ended question: “What would you do if you were X (name of realistic child character)?”. Children received a score of “2” for direct solutions; “1” point if they gave the correct answer after prompt (experimenter saying ‘think about the previous story that I read’) and “0” for no solution/non-relevant solution. All stories were supported with illustrations. Besides, children who were in the fantasy condition were also asked three fantasy check questions (e.g., Do you think that the Poki’s universe is real?) to check whether they evaluated the fantastical creatures as fantastical. All children correctly answered these fantasy-checking questions.

Social stories and physical stories were always presented in the same block. Children were read stories in a partially randomized order in which they either listened to social story block (i.e., two social stories) or physical story block (i.e., two physical stories) first and then the other one. There were no statistical differences in children’s response regarding the effect of order for conditions or sex, or age.

#### 2.1.5.3 Solution selection task

In this task, we wanted to assess whether children consider the correct solutions (i.e., analogical solutions) as more appropriate than the other ones which were not highlighted in the source stories. Thus, after children gave answers for each transfer story, they were given three different situations in which the protagonist solves the problem with the highlighted way (e.g., helping children in group entry story), with a plausible way (e.g., giving children a gift) and inappropriate way (e.g., saying children “Can I play with you?”). Then, they were asked what they would do first. If they first selected the highlighted solution, they were given a score of 2; if they

secondly selected the highlighted solution, they were given a score of 1; and if they selected the highlighted solution as the last possible solution, they were given a score of 0.

#### 2.1.5.4 Fantasy orientation interview

This interview was adapted from the Imaginative Play Predisposition Interview to assess children's fantasy orientation (Taylor & Carlson, 1997). In this interview, children were asked 12 questions which were about their favorite games, the games they play with parents, favorite toys, storybooks, cartoons, YouTube programs, television shows, tablet applications, computer game, activities they engage in alone, activities they do with friends, and thoughts before sleep (Sharon & Woolley, 2004; Singer & Singer, 1990). Answers were coded in three categories by considering previous studies (e.g., Bunce & Woolley, 2021; Kamber et al., 2020) by two independent coders as "reality-oriented" (scored as 0, e.g., playing basketball); "reality-based fantasy" (scored as 1, e.g., pretending to be a doctor); and "fantasy-oriented" (scored as 2, e.g., pretending to be a Batman). The interrater reliability among the two coders was high (Cohen's Kappa = .84). Disagreements between coders were discussed, and an agreement was reached. Since missing values were higher than 70% in four categories (i.e., favorite television show, YouTube channel, computer game, tablet application), they were not included in the FO related analysis. Children's FO scores were calculated as averages of their scores on 8 items (the possible range is 0 to 2), with low scores indicating more reality orientation and high scores indicating more fantasy orientation (Bunce & Woolley, 2021).

## 2.2 Results

### 2.2.1 Data preparation

Firstly, we checked whether there were any differences between conditions (realistic, anthropomorphic, fantastical) in terms of children's age and sex. As expected, there were no differences in terms of children's age and sex across conditions (Please see Table 1).

Children's performance on the two social ( $r = .22, p = .032$ ), and two physical problem transfer scores ( $r = .28, p = .007$ ) were correlated with each other. Thus, two aggregate scores were created: one for social and another for physical problem transfer scores which were used as the dependent variables. These two variables did not violate normality or homogeneity assumptions. Children's social and physical problem transfer scores also did not differ by child's gender, and so, gender was not included in further analysis.

Since we randomized the order of the stories in which children were read either social block or physical block first, we checked whether there was an order effect, and two independent samples-t test indicated that there was not an order effect in either social ( $p = .72$ ) or physical problem ( $p = .54$ ) transfer scores.

### 2.2.2 Problem transfer task

In order to test whether the story theme and age group affect children's social transfer scores, a 3 (story theme: realistic/anthropomorphic/fantastical) X 3 (age: 4/5/6) univariate ANOVA was conducted, and neither the main effect of story theme ( $M_{\text{realistic}} = 2.06, SD = 1.15; M_{\text{anthropomorphic}} = 1.67, SD = 1.15; M_{\text{fantastical}} = 1.8, SD = 1.10, p = .52$ ) nor age ( $M_{\text{4-year-old}} = 1.5, SD = 1.16; M_{\text{5-year-old}} = 1.9, SD = 1.04; M_{\text{6-year-old}} = 2.18, SD = 1.14, p = .07$ ) nor their interaction were significant ( $p = .88$ ),

suggesting that story theme and age did not have an effect on children's transferring of social problem solution analogies.

However, in terms of physical problem transfer scores, a 3 (story theme: realistic/anthropomorphic/fantastical) X 3 (age: 4/5/6) univariate ANOVA showed that both the main effect of story theme ( $F(2, 88) = 4.47, MSE = 7.18, p = .014, \eta^2_p = .10$ ) and age ( $F(2, 88) = 5.88, MSE = 9.44, p = .004, \eta^2_p = .13$ ) were significant, but the interaction was non-significant ( $p = .21$ ). LSD post hoc analysis indicated that children in reality themed condition ( $M = 2.6, SD = 1.19$ ) had higher transfer scores than children in either anthropomorphic ( $M = 1.89, SD = 1.34; p = .03, CI [.04, 1.3]$ ) or fantastical condition ( $M = 1.63, SD = 1.47; p = .00, CI [.31, 1.61]$ , please see Figure 2). However, children's scores in anthropomorphic condition did not differ from fantasy themed condition. LSD also revealed that 6-year-old ( $M = 2.7, SD = 1.13$ ) children had higher transfer scores than both 4-year-old ( $M = 1.75, SD = 1.4, p = .00, CI [.27, 1.63]$ ) and 5-year-old ones ( $M = 1.75, SD = 1.4, p = .00, CI [.29, 1.6]$ ). However, there were no differences in 4- and 5-year-old children's physical problem transfer scores. These results suggest that story theme and age separately influenced children's transfer of physical problem solution analogies.

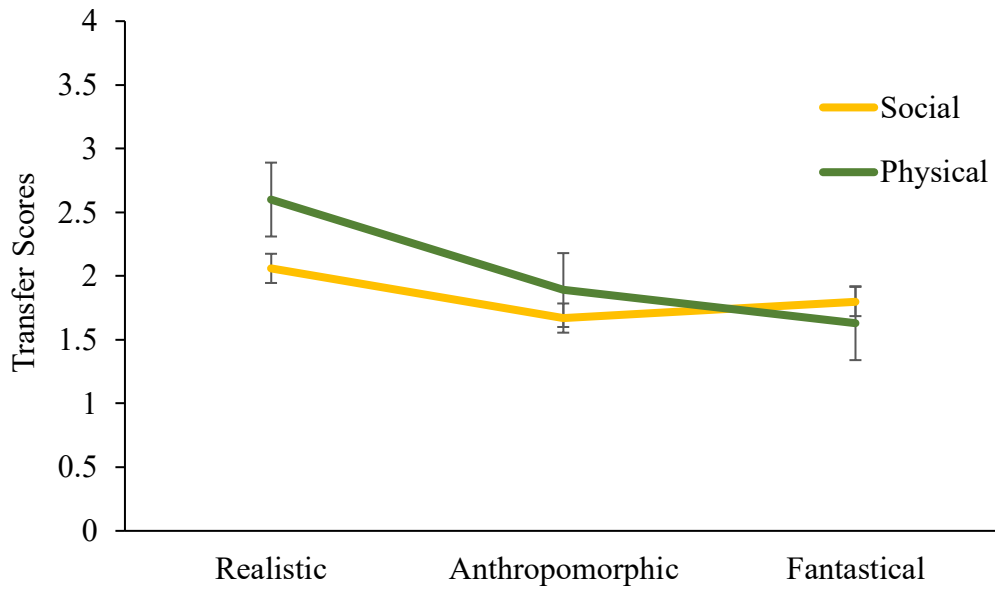


Figure 2. Social and physical problem transfer scores across conditions (Collapsed across age groups). Error bars represent standard errors.

Repeated measure t-test was conducted to test whether children were more successful on social or physical problem transfer stories. There were no differences in children's scores by story type ( $p = .32$ ). Besides, this test was also conducted for each story-theme condition, and similarly repeated measure t-test indicated that there were no differences in children's social and physical problem transfer scores in realistic ( $p = .15$ ), anthropomorphic ( $p = .49$ ) or fantastical conditions ( $p = .68$ ).

### 2.2.3 Solution selection task

We firstly examined whether children selected the highlighted solution as their first choice (Please see Table 2). Overall, children mainly preferred highlighted solutions as first option to solve the problem compared to plausible and inappropriate solutions except for wrapping story. In group entry story, the highlighted solution significantly differed from the inappropriate solution ( $\chi^2(1) = 13.79, p = .000$ ), but did not differ from the plausible solution ( $\chi^2(1) = 3, p = .083$ ). In perspective taking and stacking stories, the highlighted solution significantly differed (i.e., selected more frequently)

from both the plausible solution ( $\chi^2(1) = 13.34, p = .000$ ; ( $\chi^2(1) = 19, p = .000$ ) and the inappropriate solution ( $\chi^2(1) = 4.37, p = .036$ ; ( $\chi^2(1) = 24.5, p = .000$ ). However, in wrapping story, children significantly selected plausible solution (i.e., putting apples into a bag) more than both highlighted solution (i.e., wrapping apples in a coat;  $\chi^2(1) = 18.28, p = .000$ ) and inappropriate solution (i.e., rolling up apples on the floor;  $\chi^2 = 9.39, p = .002$ ). There were no differences between the highlighted and inappropriate solutions selections in wrapping story ( $\chi^2(1) = 1.2, p = .262$ ). Please see Appendix-E for all the options in the solution selection task.

Table 2. Number of Children in Each Category of Solution Selection Task

	Highlighted Solution	Plausible Solution	Inappropriate Solution
Group Entry Story ( $N = 90$ )	44 (48.9%)	30 (33.3%)	16 (17.8%)
Perspective Taking Story ( $N = 91$ )	46 (50.5%)	17 (18.7%)	28 (30.8%)
Stacking Story ( $N = 91$ )	57 (62.6%)	19 (20.9%)	15 (16.5%)
Wrapping Story ( $N = 88$ )	16 (18.2%)	49 (55.7%)	23 (26.1%)

We also wanted to investigate whether children who failed in the transfer stories, given a score of 0 in each story, differed from children who were able to solve the problem with/without prompt while ordering the solutions (Please see Table 3). In group entry story ( $N = 35$ ) and perspective taking story ( $N = 22$ ), children's preferences did not differ in terms of solution selections. However, in stacking story ( $N = 22$ ), although children were not successful while solving the transfer story, they selected the highlighted solution more than plausible ( $\chi^2(1) = 5.57, p = .018$ ) and

inappropriate solutions ( $\chi^2(1) = 5.57, p = .018$ ). On the other hand, in wrapping story ( $N = 50$ ), children significantly preferred plausible solution more than highlighted ( $\chi^2(1) = 12.6, p = .000$ ) and inappropriate ones ( $\chi^2(1) = 3.93, p = .047$ ); there were no differences between highlighted and inappropriate solutions ( $\chi^2(1) = 2.9, p = .088$ ). Thus, in social stories, children who could not solve the transfer stories did also not consider the highlighted solution as first option to solve the problems. However, in terms of stacking, even though children could not transfer the analogical problem solution directly, when they were given the options to select the solutions, they selected the highlighted solution as their first option. In terms of wrapping, children in our study did not consider highlighted solution as first option to solve the wrapping problem. Lastly, there were no differences in children's solution selections based on the story theme condition suggesting story theme did not affect whether children select highlighted solution more than both plausible and inappropriate ones.

Table 3. Solution Selection Frequencies among Children Who Could Not Solve the Transfer Stories

	Highlighted Solution	Plausible Solution	Inappropriate Solution
Group Entry Story ( $N = 35$ )	12 (34.3%)	13 (37.1%)	10 (28.6%)
Perspective Taking Story ( $N = 22$ )	7 (31.8%)	7 (31.8%)	8 (36.4%)
Stacking Story ( $N = 22$ )	14 (63.6%)	4 (18.2%)	4 (18.2%)
Wrapping Story ( $N = 50$ )	7 (14%)	28 (56%)	15 (30%)

#### 2.2.4 Fantasy orientation

Children's responses in fantasy orientation interview were scored in two different ways in which one was continuous that was ranging from 0 to 2 with low scores indicating more reality orientation and high scores indicating more fantasy orientation. The other scoring was categorical in which there were three categories realistic, reality-based fantasy and fantastical by considering previous studies (e.g., Bunce and Woolley, 2021). For the category-based assessment, children were reality oriented in their plays, plays with parents, toys, activities alone, activities with friends and thoughts before sleep. However, in terms of storybooks and cartoons, children were more fantasy oriented;  $\chi^2(2) = 79.14$ ;  $\chi^2(2) = 38.04$ ,  $p$ 's  $<.05$ , respectively. There were no significant relationships between children's overall FO scores and children's gender, age, and social and physical problem transfer scores. Similarly, when we treated FO scores as two categorical variables (realistic vs. fantastical preferences), there was also no difference in those categories in terms of children's social and physical problem transfer scores. When we conducted the same analyses based on each story theme, there were no relations between children's FO and social problem transfer scores in realistic ( $r(29) = .24$ ,  $p = .19$ ), anthropomorphic ( $r(27) = -.23$ ,  $p = .22$ ), or fantastical conditions ( $r(30) = -.05$ ,  $p = .77$ ). Similarly, children's FO and physical problem scores did not significantly correlate in either realistic ( $r(29) = -.04$ ,  $p = .80$ ), anthropomorphic ( $r(27) = .15$ ,  $p = .43$ ), or fantasy conditions ( $r(30) = .21$ ,  $p = .25$ ). Overall, children's FO and their transfer of physical or social problem-solution analogies did not relate to each other.

### 2.3 Discussion

In this study, we examined whether the story theme has an impact on learning of problem-solution analogies in preschool ages. We found that, similar to earlier

findings (e.g., Larsen et al., 2018; Richert et al., 2009; Richert et al., 2011), children were more successful while transferring problem-solutions from realistic themed books rather than fantastical ones. In addition, we also found that children performed better on realistic themed stories than they did on anthropomorphic ones. However, we found these results only for physical problems, not for social problems, a finding we discuss in more detail in the light of literature.

We also explored whether fantasy theme can be considered like a spectrum and whether stories that are on different places on the spectrum might make a difference in children's learning. We diversified fantasy by adding an anthropomorphic condition (in which animals are the main characters) in addition to fantasy condition (in which a non-existing creature living in another planet is the main character). We found no differences between fantastical and anthropomorphic conditions in any problem type. Although most of the children's books contain anthropomorphized elements (Goldstein & Alperson, 2020), children's performance did not differ between fantasy and anthropomorphic story conditions. These results suggested that surface level fantasy and anthropomorphized story books might have similar effects on children's learning process. Therefore, fantasy condition may require deeper level of fantastical features like emphasizing physical violations in the story as in Hopkins and Lillard's (2021) study such as the protagonist is able walk in the walls.

Previous studies suggested that fantastical elements in storybooks may have a distractor effect on children's learning processes (for a review please see Strouse et al., 2018). If children try to learn new information or skills from these kinds of books, it was suggested that this may be challenging for them. Supporting this argument, several studies found that children are more successful while learning new

information from realistic themed stories rather than fantastical ones (Larsen et al., 2018; Richert et al., 2009; Richert & Smith, 2011; Walker et al., 2015). This presented study also reported that children were more successful while transferring problem solutions from reality themed stories rather than from anthropomorphic or fantastical themed ones.

Even though children's success rate did not differ between physical and social stories, they were more successful in transferring solutions if the physical problem had realistic content. One reason for this result –that there was no difference between realistic theme vs. others in social problems- may be that while we were introducing the conditions (i.e., realistic, fantasy or anthropomorphic), we emphasized the physical features of the characters and environment only (Please see Figure 1). For instance, in fantasy condition, we referred to physical features of the fantastical world by describing it as having “purple sky, blue grass and red trees”. However, we did not mention any social features of this fantastical world; for instance, we did not say anything about how this fantastical world might differ in terms of friendship. Thus, while children were solving physical stories, they might think that because the physical features of this world (anthropomorphic/fantastical) are different from their reality, it may be okay to not use the highlighted solution. However, when they were listening to the social stories, they might think that “this world and mine are quite similar, and so I should transfer the solution”. When the story is social and there is no information about social features, children might use their own personal experiences that might be why we did not find any differences between story-theme conditions in social stories. These results are especially meaningful when we consider the effect of similarity in terms of learning. It was claimed that the more similar the two things are the more successful the learning (Holyoak et al., 1984).

Additionally, using illustrations may support this argument suggesting that in our study, in addition to orally describing the created world, children also had a chance to see what these worlds look like- highlighting the differences in the physical world while not giving any clue about how the world might be different in social terms. However, Richert et al. (2009) did not use the illustrations to depict the fantasy planet in which they did not find an effect of problem type. Therefore, emphasizing physical features of stories both orally and visually may have affected how children evaluated the given information and which information they learned from them.

Replicating previous findings (Hopkins & Lillard, 2021; Richert et al., 2009; Richert et al., 2016), we found that 6-year-old children had greater transfer scores in physical problem solutions than both 4- and 5- year- olds. This may be explained by the differences in children's cognitive skills. For instance, it was suggested that executive function skills are quite important in children's learning of analogies (Richeland et al., 2016). Similarly, various studies indicated that children's problem-solving skills differ in this age range (Carlson, 2005). Our baseline problem solving story indicated that children were successful while solving basic physical problems. Yet, since we did not assess the other cognitive abilities such as executive functioning, it is possible that there are individual differences in terms of children's cognitive capacity between the ages of 4-5 and 6. Therefore, we still need additional studies which assess the effect of children's pre-test abilities on children's learning of analogies.

We also tried to examine the relations between children's fantasy orientation and learning from storybooks. However, similar to Richert and Smith's (2011) study, we did not find any relations between these two factors. Although some children were more fantasy oriented in terms of their favorite book and cartoon, this tendency

did not affect their learning of problem solution analogies from storybooks. It was suggested that when the given content is more familiar, there may not be at high level of distraction due to this familiarity which in turn may overcome the suggested negative effect of fantasy content in terms of attentional processes (Fisch 2000; Richert & Smith, 2011). However, due to the fact that there were no such relations between learning analogies from storybooks and fantasy orientation, there may be more dominant factors rather than the familiarity with the fantastical content. In other words, even though children prefer and are exposed to fantasy content in their daily life, this exposure to fantasy might not be directly linked to learning from storybooks either negatively or positively. For instance, how many times they read the book or how much they are exposed to the book can affect their learning information from storybooks.

We were also curious about whether children consider our solutions in source stories as appropriate options. To test this, we used solution selection task and asked them to order highlighted-plausible-inappropriate options to solve the given problem. Results indicated that in terms of physical stacking story, although children could not solve the transfer story, they were aware that our highlighted solution can be an appropriate solution. In terms of physical wrapping story, since there was a dominant response (i.e., putting apples into bag), children did not consider the highlighted solution as the first option because their daily life experiences may have had a great effect. However, children who could not transfer solutions of social stories also did not consider our solutions as the best option. These findings show that children who could not solve the social stories also did not add our solutions to their repertoire. If there is not such a dominant response in physical stories in terms of stacking, even though children cannot solve the transfer task, they might have considered the

highlighted solution as possible way to solve the problem. At this point, we cannot directly say that children cannot learn how to solve the problems in fantasy/anthropomorphic conditions. Due to their prior experiences or more relevant solutions, they may have preferred to use other solutions. Yet, they may be aware that our solutions can also be acceptable. Thus, in future studies, it should be tested whether children really learn the solutions.

Overall, Study 1 showed that, partially replicating Richert and colleagues' study (2009), children can learn more about how to solve problems from realistic storybooks rather than fantastical and anthropomorphic ones, but this was only the case for the problems that include physical issues instead of social ones. Therefore, in study 2, we tried to examine whether the story theme affects children's learning in terms of social behaviors in more detail.

## CHAPTER 3

### STUDY 2

In Study 1, we examined the effect of story theme (realistic, anthropomorphic and fantastical) on children's learning of both physical and social problem solution analogies and explored the relations between fantasy orientation and children's learning processes. According to our results, story theme affected children's learning of physical problem solution analogies such that children had higher transfer scores in reality theme condition compared to both anthropomorphic and fantasy themes. However, we did not find this effect in social stories. Therefore, both considering the results of the Study 1, and limited research regarding the effect of story theme on social behaviors, Study 2 aimed to investigate whether story theme affects children's learning of social behaviors from storybooks.

In their pioneering study, Larsen and colleagues (2018) examined the effect of story theme on preschoolers' learning of sharing behavior which can be considered as social behavior as well. They first gave preschool children (ages 4 to 6) a box with ten stickers and asked them whether they would like to share their stickers with a child who does not have any and put the stickers into the box. Then, they read either realistic or anthropomorphic stories which emphasize the importance of sharing. Immediately after the reading session, they asked children again whether and how many stickers they wanted to share with a child who does not have any stickers and again gave ten stickers with a box. Their results indicated that the difference between pre- and post-sticker-sharing is higher in the reality theme condition compared to anthropomorphic condition which is suggesting that after

children were read a realistic book about the importance of sharing, they shared more stickers compared to their peers who were read an anthropomorphic book.

Russel and Cain (2022) wanted to replicate and extend Larsen et al.'s (2018) study. They extended the original study (Larsen et al., 2018) in several ways: they examined the cultural differences by conducting the study in a U.K. sample whereas original research was conducted with Canadian children. They also broadened the age range which they included 3- and 7- years children extending the 4-to-6-age range. Besides, in addition to effect of story theme, they examined whether the protagonist character (i.e., selfish or not) affects children's sticker donations.

According to their results, as opposed to the results of the original study (Larsen et al., 2018), neither the story theme nor the story character affected children's generosity. In addition, younger age group (3-4 years) increase their sticker donations at the post test compared to older age group (6-7 years). They explained these inconsistent results by emphasizing the cultural differences -- tested children were recruited from U.K.'s rural area with lower SES and that is why they might have a tendency to show less altruistic behaviors due to less wealthiness (Rochat et al., 2009). In other words, due to lower SES, children might tend to save what they have. Therefore, when the issue is social behavior, cultural factors may have great importance and should be considered while interpreting the studies' results.

When we considered both the results of the Study 1 and above-mentioned previous research about social behavior changes, we thought that it is still unclear whether and in which direction the story theme affects children's social behavior. In study 1, also, we did not find any effect of story theme on children's learning of social analogical problem solutions. However, as mentioned previously, Larsen and colleagues (2018) found the effect of story theme on children's social behavior.

When we think about these outputs, we realized that they assessed children's social behavioral changes (e.g., how many stickers they share with a child before/after reading a realistic vs. fantastical story), but we asked children to solve social problems in a verbal level (i.e., in Study 1, children were asked "What will you do if you were X (realistic child character)" in the target stories). Children may know and say the appropriate social behavior should be done (e.g., helping to others in Study 1) but when they need to behave in this way, we can observe individual differences in their acts and the effect of story theme may be only observable at behavioral level. This reasoning is also meaningful when we consider the knowledge-behavior gap paradigm (Blake, 2018; Blake, McAuliffe, & Warneken, 2014; Du & Hao, 2018). Accordingly, people generally know what should be done and can be rational in terms of social issues, when they just need to orally answer. For instance, we all can say that we should not tell lies. However, there may be some inconsistencies regarding what we think and how we behave and that is why we can sometimes tell lies. Therefore, due to methodological differences across studies, inconsistent outputs and lack of studies regarding the learning of social behaviors in the literature, and the substantial role of learning on social behaviors (Warneken & Tomasello, 2009), the effect of story theme on social behaviors needs to be examined further.

In Study 2, since Larsen et al.'s work (2018) can be considered as the first of its kind, we decided to replicate and extend their study. Similar to their methodology, we focused on children's sharing behavior by using the same task (i.e., sticker sharing task) and the same story book called *Little Raccoon Learns to Share* written by Mary Pacard and examined the effect of story theme on learning of preschool children's sharing behavior.

We also tried to extend their study in few ways. Firstly, we increased the number of story theme conditions and picked them in a more controlled way by creating a fantasy spectrum questionnaire. This questionnaire was designed to understand whether the various types of fantastical characters such as fairies, dragons or talking rabbits can be considered as different from each other in terms of how fantastical they are perceived. It helped us to decide the features of both the characters and the highlighting points in the stories and make our inferences more strongly. Based on the results of this questionnaire (Please see Appendix F for the detailed results of this questionnaire), we created realistic (i.e., cartoon children with no physical violation), anthropomorphic (i.e., animals with clothes who behave like humans with no physical violation) and fantastical conditions (e.g., non-human creature which has 5 eyes, 3 legs, feathers with physical violations).

Secondly, while Larsen and colleagues (2018) only examined sharing behavior, we thought that investigating other prosocial behaviors could also help us to understand the role of storybooks on children's learning of these behaviors. Therefore, in addition to sharing behavior, we aimed to test the effect of story theme on children's helping and honesty behavior. To best my knowledge, there is no study on children's helping behavior and learning from storybooks. In terms of honesty, however, there were some studies which examined the effect of story-theme on children's honesty behavior. In a seminal study, Lee and colleagues (2014) conducted a study in which they wanted to explore whether classical moral stories promote honesty in preschool children. They read children storybooks which are highlighting the importance of honesty. Then, they tested children to examine whether they tell lie in a temptation-resistance paradigm (Talwar & Lee, 2008). According to their results, moral stories did not decrease children's lie telling

behavior except from the story that includes the positive consequences of honesty behavior. Similarly, Ding et al., (2023) showed that only the stories that consist of positive encouragement regarding being honest promoted children's honesty compared to the stories which highlighted the negative outcomes of telling lies. Ding and colleagues (2023) also conducted another study that they read children either realistic or anthropomorphic storybooks which highlighted the importance of being honest. Their results indicated that story theme did not affect children's honesty, and they argued that this non-significant result may have originated from the familiarity of anthropomorphic characters in storybooks. They used elephant as protagonist in anthropomorphic storybooks, and it was suggested that elephants are extremely linked to positive attributions in storybooks (Melson, 2001), using uncommon animals in storybooks in terms of social behaviors such racoons (as in Larsen et al.'s (2018) study) may be better to differentiate story theme conditions and enable to observe plausible differences across storybooks. Therefore, even though there are some studies which tried to understand the role of storybooks on how to promote honesty in preschool ages, there is still a need for more research considering the discrepancies in the literature.

We also wanted to test previously mentioned possible knowledge-behavior gap and we assessed children's knowledge regarding sharing, helping and honesty behaviors at verbal level in addition to behavioral assessments. This assessment is important in terms of the non-significant results of story theme effect in learning of problem solution analogies in Study 1. After children listened to vignettes, they were asked questions whether the protagonist in the story should share, should help, and should be honest. Children were asked "What do you think X should do?". Due to the nature of the social issues, children are expected to answer in a socially

acceptable manner (e.g., she should share her stickers) for all the social behaviors. However, when the issue is performing, we expected to observe individual differences in these social behaviors. That is why after the assessment of social behaviors in verbal level, children were behaviorally tested. There were two sessions of behavioral measurements in which sticker sharing task, helping task and deception game were conducted. Firstly, children's pre-sharing, pre-helping and pre-honesty behaviors were measured. After one week period, based on the story theme conditions, children listened to storybooks which emphasize the importance of these social behaviors either in realistic, anthropomorphic, or fantastical themes, and these behaviors were again tested at post-assessment.

Instead of assessing post-tests immediately after the pre-tests, we decided to conduct post-measurement after one week period. This is because we tried to prevent the plausible effect of immediately after post assessment on children's behavior such as they may tend to share less in the post test because of thinking like they already shared their stickers just 10 minutes before in the pre-test. However, to be able to exactly replicate Larsen and colleagues' (2018) study, we thought that half of the children's post sharing behavior should be assessed in the first session and half of them should be assessed in the second session. In other words, all children's post-tests of helping and honesty behaviors were measured in the second session, but for sharing, half of the children were measured in the first session as well (Please see Figure 3 for the details of the procedure).

Moreover, the age range of the original study was 4 to 6 years. However, we decided to only include 6-year-olds because there was no age difference in Larsen et al.'s (2018) study and it was mentioned that by the age 6 there is a developmental difference in children's moral reasoning (Killen & Smetana, 2005; Lagattuta, 2005).

Some studies, for example, that contain the sharing task indicated that younger ages (3 and 4 years) tend to keep all the resources that they have in both pre and post-test (e.g., Samek et al., 2020) and they are willing to share with age (Blake, 2018).

Therefore, to avoid the plausible confounding effect of age on children's behaviors, we decided to focus on only one age group.

Additionally, children's book preference and its relation to learning from storybooks were examined as well. As we mentioned before, if children prefer to read/listen more fantasy featured books compared to realistic ones, they may read/listen them more than once. Therefore, because of this repetition, children may learn more/equally from fantastical books. In this Study 2, children were given book preference task in which they were given some book covers that differ in terms of fantasy level and asked, "Which book would you like to listen to before going to bed?". The relations between children's preferences of the storybooks and their learning from storybooks were examined.

Last but not least, parents were also given a questionnaire in which some questions regarding their children's reading habits such as which theme their child enjoys most were asked. Besides, they also were asked to fill the Parent Ratings Scale that includes 19 items about children's prosocial behaviors including helping, sharing, comforting, and cooperating behaviors (Yagmurlu & Sanson, 2009). It was tested whether there are any connections between parents' answers regarding these questions and children's scores on post-tests.

Considering both high amount of frequency of social issues in children's literature (Kruse et al., 2021, Yao & Enright, 2020) to promote children's pro-social behaviors (e.g., being honest) or prevent them from anti-social behaviors (e.g., telling lies) and major developmental changes in these preschool years (Smith et al., 2013),

it is valuable to examine how storybook and story theme have an impact on these processes. However, there are very limited research on the relations between learning from storybook and children's pro-social behaviors (Strouse et al., 2018). Therefore, it gains more importance to investigate these relations in terms of lack of studies in this topic.

Overall, the current study aimed to assess the effect of story theme on children's social behaviors by replicating and extending the study by Larsen et al. (2018). We replicated their study in terms of the assessment of sharing behavior. Differently, we added fantasy condition in addition to realistic and anthropomorphic ones. Besides, we included other prosocial behaviors (i.e., helping and honesty) which enabled us to compare different type of social behaviors. We also had chance to test afore-mentioned plausible knowledge-behavior gap in terms of prosocial behaviors. It was expected that all children would answer the verbal questions about social issues correctly. However, in terms of behavioral tasks, we hypothesized that based on previous research (e.g., Larsen et al., 2018) the differences between pre- and post- scores of sharing, helping and honesty behavior would be higher for the children who listened realistic stories compared to anthropomorphic and fantastical ones. We did not have specific direction for the comparison of anthropomorphic and fantastical conditions. Additionally, possible links between children's learning from storybooks and their reading and moral habits in daily life were also explored.

### 3.1 Method

#### 3.1.1 Design

This study had 3 (story theme: realistic/anthropomorphic/fantastical; between subject) X 3 (social behavior: sharing, helping and honesty; within subject) mixed design. The differences between pre- and post-test scores on each social behavior were the dependent variables of the study.

#### 3.1.2 Participants

Seventy-eight Turkish speaking 6-year-old ( $M_{\text{age}} = 76$  months,  $SD = 3.28$  months, age range = 72 to 84.6 months) children and their participated in the study. A post-hoc power analysis was conducted using G\*Power3 (Faul et al., 2009) to check the power of the Study 2, and it yielded 82% power with medium to high effect size (i.e.,  $\eta^2_p = .18$ ) with an alpha of .05. Demographic information about the children across conditions are presented in Table 4. Only 27 parents of the children filled out the parents' questionnaires. To recruit children, we contacted the volunteer preschools and snowballing method was used. Ethical approval was obtained from Boğaziçi University's Institutional Review Board.

Table 4. Number of Children in Each Experimental Condition

		Realistic	Anthropomorphic	Fantastical	Total
Child's Sex	Girl	13	15	14	42
	Boy	14	10	12	36
Total		27 ( $M = 76.4$ months, $SD = 3.74$ )	25 ( $M = 75.9$ months, $SD = 3.3$ )	26 ( $M = 75.7$ months, $SD = 2.81$ )	78 ( $M = 76$ months, $SD = 3.28$ )

### 3.1.3 Procedure

Children participated in the tasks individually in a quiet room at their preschools. After obtaining consent from parents and verbal assent from children, the testing session started and it was video recorded. There were two separate sessions which were pre- and post- tests and there were 7-days differences between these two time points. In the pre-test session, children were firstly given verbal tasks with a fixed order in which verbal sharing, verbal helping and verbal honesty tasks were administered, respectively. Following that, the book preference task was applied. Then, pre- behavioral tests were administered in a fixed order in which pre-sticker sharing task, helping task and deception game were applied, respectively. This whole pre-test session took approximately 15 minutes. After one week period, the same children participated in the study again. Children were randomly assigned to one of the three conditions that were either realistic, anthropomorphic or fantastical theme before the storybook session. They first listened the sharing storybook and were given the post-sticker sharing task. Following that, they listened the helping storybook and were given the post-helping task. Lastly, they listened the honesty storybook and were given the post- honesty (deception) game. To be able to directly replicate the original study (Larsen et al., 2018), half of the children listened the sharing storybook immediately after the pre-sticker sharing task and then post-sticker sharing was applied in the same session. Children who listened the fantasy themed stories also asked fantasy checking questions at the end of the all the tasks. This post-test session took approximately 20 minutes. Please see Figure 3 for the procedure.

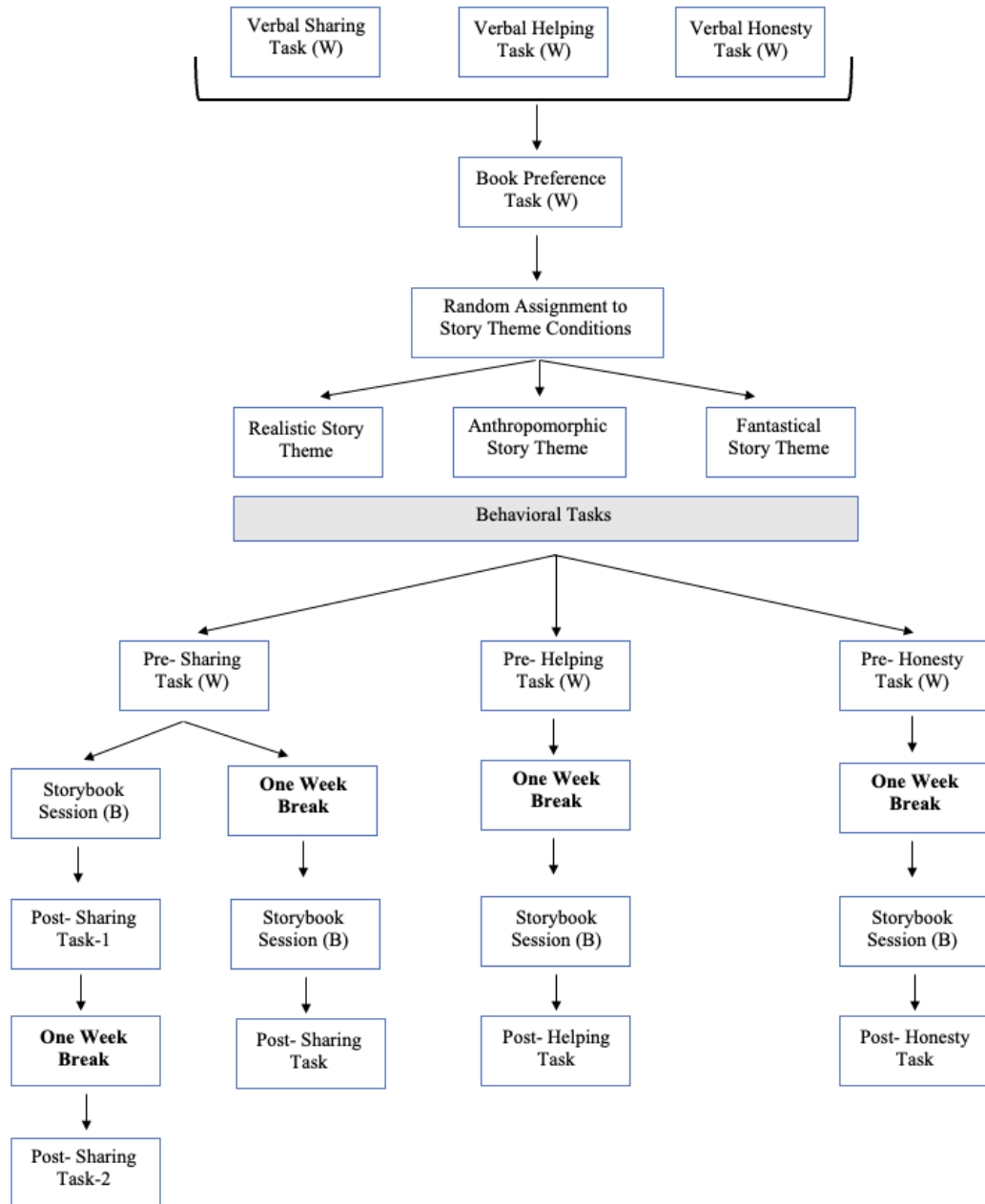


Figure 3. The procedure for whole process (Ws indicate within subject measurement and Bs indicate between subject measurement).

### 3.1.4 Materials

#### 3.1.4.1 Verbal sharing task

In this task, children’s attitude regarding sharing behavior was assessed at verbal level. Children were given a short story in which the protagonist plays a game and earns some stickers. However, due to the limited time, the other child in the story is

not able to play the game and so does not have stickers. At the end of the story, children were asked “What should X (the name of protagonist) do?”. Children who directly answered “X (the name of protagonist) should share his/her stickers” were given a score of 2; children who answered the question after being prompted “Do you think that X (the name of protagonist) should share his/her stickers?” were given a score of 1 and children who gave unrelated answers were given a score of 0.

#### 3.1.4.2 Verbal helping task

In this task, children’s attitude regarding helping behavior was assessed at verbal level. Children were given a short story in which the protagonist is doing homework and his/her friend is drawing. The friend dropped the pencils and could not reach them. At this point, children were asked “What should X’s (the name of protagonist) friend do?”. Children’s answers were recorded. Children who directly answered “X (the name of protagonist) should help his/her friend” were given a score of 2; children who answered the question after being prompted “Do you think that X (the name of protagonist) should help his/her friend?” were given a score of 1 and children who gave unrelated answers were given a score of 0.

#### 3.1.4.3 Verbal honesty task

In this task, children’s attitude regarding honesty behavior was assessed at a verbal level. Children were given a short story in which the protagonist plays a computer game and if s/he wins the game, s/he earns the prize. While s/he is playing the game, her/his teacher’s phone rings so that s/he leaves the room. While the teacher is outside of the room, the protagonist loses the game and the computer turns off immediately. When the teacher enters the room again, s/he asks to the protagonist

whether s/he won. At this point, children were asked “What should X (the name of protagonist) do?”. Children who directly answered “X (the name of protagonist) should tell the truth that s/he lost” were given a score of 2; children who answered the question after being prompted “Do you think that X (the name of protagonist) should say that s/he lost?” were given a score of 1 and children who gave unrelated answers were given a score of 0.

#### 3.1.4.4 Storybooks

There were three different storybooks. For the sharing storybook, we used the same book as Larsen and colleagues’ (2018) study which is *Little Raccoon Learns to Share* written by Mary Pacard (2013). For the helping and honesty, we created stories by considering the original sharing story and tried to be consistent with the same number of pages and number of words. Since we manipulated the story themes, all the stories were illustrated with three versions which are realistic, anthropomorphic and fantastical. There were human protagonist and a depiction of real world in realistic condition, anthropomorphized animals and real world in anthropomorphic condition and fantastical creatures and non-real world in fantastical condition. The protagonists were different for all the story topics. In other words, there were different characters in sharing, helping and honesty stories in in all conditions (for one of the examples of the stories and depictions please see Appendix G). At the end of each storybook session, children were asked four memory questions to assess whether they remember the details of the story well. Almost all children correctly answered all the memory questions. There were only six children who did not respond correctly to one question out of four. These children’s post-test scores, sex and conditions did not differ. Therefore, they were not excluded from analysis.

Besides, children who listened to fantasy theme stories were also asked three fantasy checking questions whether they consider fantastical features as fantastical such as “Do you think that you and X (the name of the fantastical creature) can be friends?” Almost all children answered fantasy questions correctly except that some of them ( $N = 4$ ) mentioned that “We can be friends.”. However, their responses did not correlate to their scores on post tasks and also those children’s sex and conditions did not differ. Therefore, they were not excluded from analysis.

#### 3.1.4.5 Sticker sharing task

This task was adapted from Larsen et al.’s (2018) study and was administered to measure children’s sharing behavior. The task included pre and post assessments. In the pre-test, children firstly played an easy game and received ten stickers. Then, they were told that there is a child who is not able to play the game and does not have any stickers, and that they can share some of their stickers with this child. If they want, they can add it to a box. After they are given time to add stickers to the box, half of the children were immediately read a story which highlights the importance of sharing and half of them listened the story in the second session (after a one-week period). The storybook that they listened to was either realistic, anthropomorphic or fantastical (depending on the condition the child was assigned to). Following the reading session, children participated in the same sharing task by playing a different game, earned different stickers, and they were asked the same question whether they want to share her/his stickers. The differences between the number of shared stickers in pre- and post-tests were calculated. The ones who listened the story immediately after the pre-test were also tested after one week period but they were not reminded

of the story. Their third time of sticker sharing scores were also recorded and analyzed separately.

#### 3.1.4.6 Helping task

This task was adapted from Iannotti et al.'s (1985) study and was administered to measure children's helping behavior. This task also included pre-and post-test. In this adapted version, the experimenter pretends to accidentally drop the pencils on the table while dealing with the papers. After the pencils fall, the experimenter deals with the papers for 20 more seconds and then starts to pick up the pencils slowly. Children who collected the pencils before the movement of experimenter were given a score of 2; children who collected the pencils after the experimenter's movement were given a score of 1; and the ones who did not help were given a score of 0. After a one-week period, before post-test assessment, children were read a story which highlights the importance of helping. At the end of the reading session, children were administered the same task. The differences between the pre- and post-tests were calculated.

#### 3.1.4.7 Deception Game

This task was adapted from Sierksma et al.'s (2019) study with the original name 'quiz outcome task' and was administered to measure children's honesty behavior. In this adapted version, children played a computer game in which they were given six questions two of which were easy to solve and four of them were quite hard. Children were told that if they answered three questions correctly, they would receive a prize which was a balloon. While children were playing the game, the experimenter left the room. When the game ended, the computer program said, "You

have been disconnected, please call the experimenter”. Experimenter came back to the room and pretended to restart the program. While the program started again, the experimenter said “Unfortunately the program crashed. But the computer saves all the necessary information. Let me check. Hmmm, it says you scored three points and earned the prize. Is that correct?” Children who said “yes” were considered lying and were given a score of 0; children who said “no” were considered to be honest and were given a score of 1. After a one-week period, before post-test assessment, children were read a story which highlights the importance of honesty. At the end of the reading session, children played this game again with different questions but same difficulty level. The same procedure was applied and their responses in the post- test were recorded. The changes from pre-test to post test- were analyzed.

#### 3.1.8 Book preference task

This task was used to assess children’s book preferences. Children were shown three book covers that highlighted either realistic (e.g., realistic rabbit), anthropomorphic (e.g., cartoon rabbit wearing clothes) or fantastical (e.g., rabbit with a cloak and wand) features. The titles of the books were also in parallel with the book covers and children were asked “Which book would you like to listen to/read before sleep?”. 3 trials (total of 9 different book covers) were administered and children who selected two or more realistic books were coded as reality oriented; the ones who selected two or more anthropomorphic books were coded as fantasy-based reality oriented and those selecting two or more fantastical books were coded as fantasy oriented. Children who selected one realistic, one anthropomorphic and one fantastical book were coded as no preference. For all the book covers please see the Appendix H.

### 3.1.9 Parent Measures

Parents were asked to answer the demographic questions (e.g., social economic status, number of siblings etc.) and question about their child-parent dyad reading habits which includes their children's top five favorite books. These reported book preferences might be reflection of children's fantasy orientation (FO). In addition, they were also given The Parent Ratings Scale that includes 19 items about children's prosocial behaviors such as "Shares a toy or other object that he/she is playing with at the time" and asked to rate these items on a 7-point rating scale (1 = Never, 7 = Always). There were four different subscales of this scale which are helping, sharing, comforting, and cooperating (Yagmurlu & Sanson, 2009). Overall score (Cronbach's alpha = .85) and two subscales of this scale including helping (Cronbach's alpha = .77) and sharing (Cronbach's alpha = .79) were calculated . Please see Appendix I for all the parent questions (for Turkish version please see Appendix J).

## 3.2 Results

### 3.2.1 Data preparation

We firstly checked whether there were any differences between conditions (realistic, anthropomorphic, fantastical), regarding children's sex and age and there were no differences between conditions in terms of these variables ( $ps > .05$ ).

We first needed to calculate the dependent variables of the study by taking the difference between children's pre and post scores. For behavioral sharing task, as it was mentioned in the method section, after children were given pre-behavioral sharing task, some of them were read the storybook immediately after the pre-test and were given the post-test; some of them listened the storybook one week later and

were assessed on the post sharing task in this second session (Please see Figure 3 for the procedure chart). Forty-two children ( $M_{age} = 76.2$  months,  $SD = 3.28$ , 24 girls) were given post-test one week later whereas thirty-six children ( $M_{age} = 75.8$  months,  $SD = 3.31$ , 18 girls) were given the post-test in the first session immediately after the pretest. There were three different sharing calculation: The first one was the one week-sharing dependent variable of the study by taking the difference between children's pre (i.e., the number of stickers shared in the pre-test) and post scores (i.e., the number of stickers shared in the post-test) for the children who listened the storybook one week later. The second one was the same session sharing dependent variable of the study by taking the difference between children's pre (i.e., the number of stickers shared in the pre-test) and post task scores (i.e., the number of stickers shared in the post-test) for the children who listened the storybook immediately after the pre assessment. These children were also asked to share their stickers (i.e., post-test-2 )without listening the story book again one week later. Thus, we calculated third sharing variable which we called long-term sharing variable in which children's pre-test scores were subtracted from one-week later post task scores (i.e., (post-test-2) – (pretest)) . By doing this, we had a chance to observe the effect of story theme in the long run. Overall, one-week sharing, same session sharing and long-term sharing were the calculations of children's behavioral sharing scores. Please see Table 5 for pre and post test scores by condition and Figure 4 for the visual representation. There were no differences between children's sex, age and condition in children's pre-sharing scores ( $ps > .05$ ).

For the calculation of helping variable, since 8 children ( $M_{age} = 74.6$  months,  $SD = 2.02$ , 5 girls) helped directly to the experimenter in the pre-assessment of the helping task (i.e., immediately started to collect the pencils), these children were

excluded from further analysis which did not differ in terms of sex, age and condition (3 of them were in realistic, 3 of them in anthropomorphic and 2 of them in fantasy condition). Then, similarly, helping dependent variable was created by subtracting the pre- task scores (i.e., helped the experimenter after 10 seconds or did not help) from post task scores (i.e., helped directly, after 10 seconds or did not help). The scores were ranging from 0 to 2. There were no differences between children's sex, age and condition in children's pre-helping scores ( $ps > .05$ ).

Due to the dichotomous nature of the behavioral honesty measure, we examined how many children did not tell a lie in the pre-assessment of honesty task. Seven children ( $M_{age} = 74.8$  months,  $SD = 1.78$ , 4 girls) were honest in the pre-honesty task which they were excluded from further honesty related analysis because we wanted to investigate whether storybook positively affected children's responses regarding being honest. These children did not differ from each other in terms of sex, age and condition (2 of them were in realistic, 3 of them in anthropomorphic and 2 of them in fantasy condition).

There were no violations in terms of normality and homogeneity assumptions in these calculated dependent variables (i.e., one-week sharing, same session sharing, long-term sharing and helping), and so that parametric tests were conducted. Instead of conducting repeated measure tests, both considering the methodology in previous studies (e.g., Russel and Cain, 2022; Larsen et al., 2018) and making hard to interpret the interactions in the repeated measure tests, we preferred to take differences from post to pre scores. Therefore, we conducted several one-way ANOVAs to investigate the effect of story-theme on children's pro-social scores, and several one sample t-tests whether the increases or decreases were significant in each condition.

Table 5. Children’s Pre and Post Scores on Sharing Tasks Across Conditions

		Realistic	Anthropomorphic	Fantastical
One week sharing ( <i>N</i> = 42)	Pre scores	<i>M</i> = 3.40 ( <i>SD</i> = 3.09)	<i>M</i> = 2.31 ( <i>SD</i> = 1.18)	<i>M</i> = 2 ( <i>SD</i> = 1.62)
	Post scores	<i>M</i> = 5.53 ( <i>SD</i> = 2.53)	<i>M</i> = 2.69 ( <i>SD</i> = 1.11)	<i>M</i> = 1.93 ( <i>SD</i> = 1.44)
Same session sharing ( <i>N</i> = 36)	Pre scores	<i>M</i> = 1.83 ( <i>SD</i> = 1.85)	<i>M</i> = 2.08, ( <i>SD</i> = 1.24)	<i>M</i> = 2.08 ( <i>SD</i> = 1.68)
	Post 1 scores	<i>M</i> = 2.67 ( <i>SD</i> = 1.07)	<i>M</i> = 2 ( <i>SD</i> = 1.54)	<i>M</i> = 1.83 ( <i>SD</i> = 1.75)
Long-term sharing ( <i>N</i> = 36)	Post 2 scores	<i>M</i> = 4, ( <i>SD</i> = 1.08)	<i>M</i> = 2.7, ( <i>SD</i> = 1.83)	<i>M</i> = 2.58, ( <i>SD</i> = 1.16)

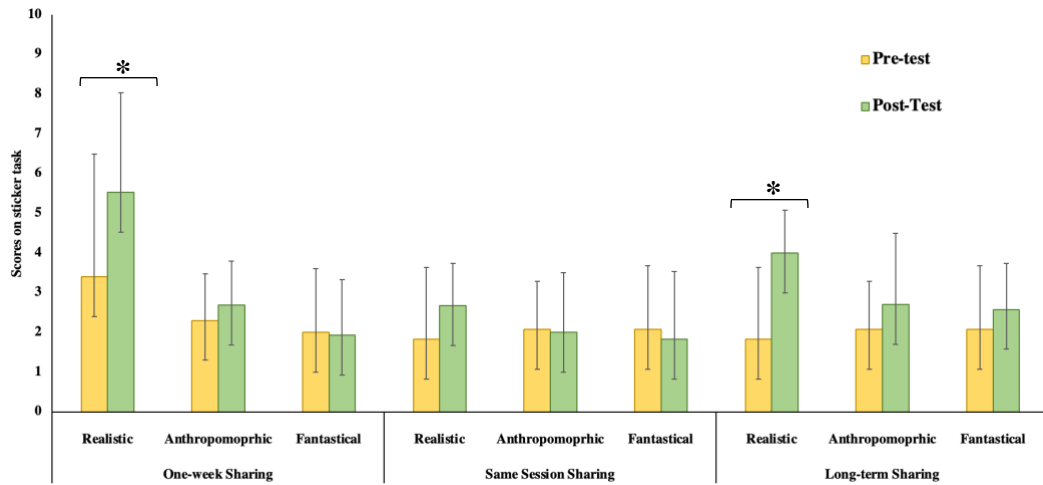


Figure 4. Pre and post sharing scores for all sharing calculations by story theme condition. Error bars represent standard errors.

\*  $ps < .05$ .

### 3.2.2 Children’s responses in verbal tasks

We firstly checked children’s responses in verbal tasks, and as expected almost all children answered the questions about prosocial behaviors in socially acceptable

manner (i.e., The protagonist should share/help/be honest). Eight children in verbal sharing task, 6 children in verbal helping task and 2 children in verbal honesty task gave the correct response after being prompted. These children's age and sex did not differ and there were no correlations between these variables and children's scores on behavioral tasks.

### 3.2.3 Effect of story-theme on children's sharing behavior

Firstly, children's sex and age did not differ in all the sharing calculations (i.e., one week sharing, same session sharing and long-term sharing) and so they were not included in the further analysis.

In order to test whether the story theme (realistic/anthropomorphic/fantastical) affected children's one-week sharing behavior (i.e., children administered pre-test and then listened the storybook one week later and were given post-test) a one-way ANOVA test was conducted. The effect of story theme on children's one-week sharing behavior was significant,  $F(2, 39) = 4.32$ ,  $MSE = 4.56$ ,  $p = .020$ ,  $\eta^2_p = .18$ . LSD post hoc analysis showed that children who listened realistic books significantly increased their donations after one week period compared to both children who listened anthropomorphic ( $t(39) = 2.16$ ,  $p = 0.037$ , Cohen's  $d = .82$ , CI [0.03, 1.61]) and fantastical stories ( $t(39) = 2.78$ ,  $p = 0.008$ , Cohen's  $d = 1.03$ , CI [0.24, 1.82]). There were no differences between anthropomorphic and fantasy conditions. Besides, one sample t-test was conducted to examine whether children's sticker donations pre to posttest were increased in one-week sharing calculation regardless of the story-theme. The only significant result was for the children in the realistic condition with one week sharing ( $t(11) = 3.1$ ,  $p = 0.008$ , Cohen's  $d = 0.8$ , CI [0.2, 1.37]) suggesting that those children

increased their sticker donations after one week period when listening to realistic storybook.

The other one-way ANOVA test was conducted to test the effect of story theme on children's same session-sharing scores, but it yielded non-significant results ( $p = .18$ ). Similarly, all the one sample t-tests were non-significant for each condition ( $ps > .05$ ).

It was also tested the effect of story theme on children's long-term sharing calculation. In other words, whether sticker donations pre- to post- tests were increased for the children who were tested in the same session and asked to share one week later without listening again sharing-storybook (i.e., (post-test-2) – (pretest)). A one-way ANOVA test indicated that the effect of story theme on children's one-week sharing behavior was significant,  $F(2, 33) = 3.37$ ,  $MSE = 2.83$ ,  $p = .047$ ,  $\eta^2_p = .17$ . LSD post hoc analysis showed that children who listened realistic books significantly increased their donations after one week period compared to both children who listened anthropomorphic ( $t(33) = 2.3$ ,  $p = 0.27$ , Cohen's  $d = 0.94$ , CI [0.07, 1.8]) and fantastical stories ( $t(33) = 2.18$ ,  $p = 0.036$ , Cohen's  $d = 0.89$ , CI [0.03, 1.71]) There were no differences between anthropomorphic and fantasy conditions. The only significant one sample t-test result was for the realistic condition in which children's sticker donations significant increased from pre-test to second post-test only for the ones who listened the realistic storybook in the first session ( $t(11) = 4.73$ ,  $p < 0.001$ , Cohen's  $d = 1.37$ , CI [0.55, 2.15]). Please see Figure 5 for the visual representation of mean differences in sharing calculations across story theme conditions.

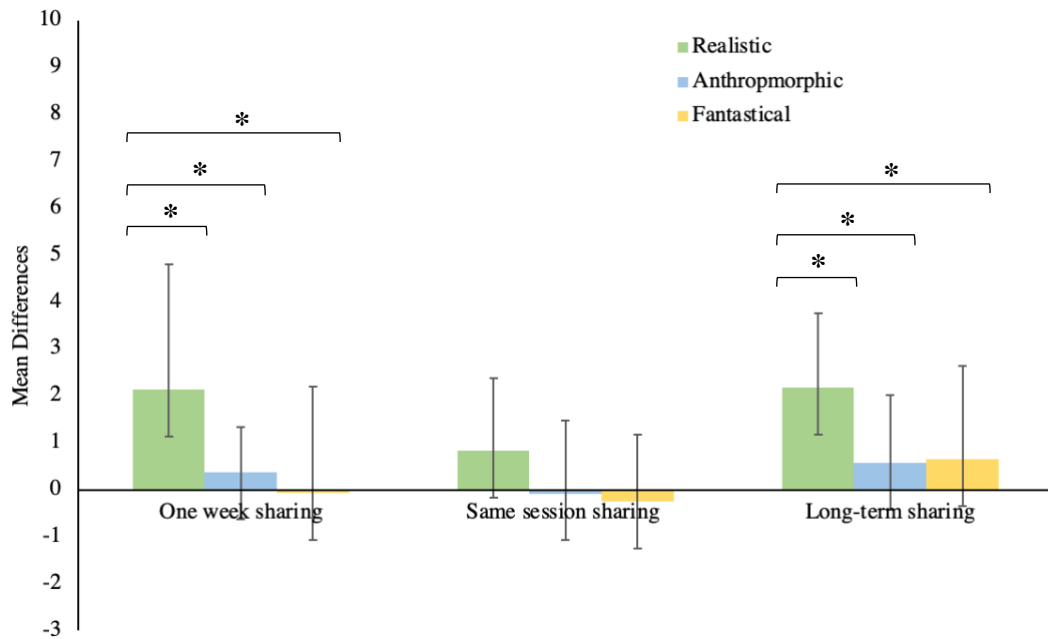


Figure 5. Mean differences in sharing tasks across story theme conditions. Error bars represent standard errors.

\*  $ps < .05$ .

### 3.2.4 Effect of story-theme on children's helping behavior

As mentioned previously, 8 children were excluded from the analysis since they directly helped the experimenter in the pre-helping task scores ranging from 0 to 2. Helping score was created by subtracting pre- helping score from post helping score. A one-way ANOVA test was conducted to examine whether story-theme affected children's helping behavior and the result was non-significant ( $p = .31$ , Please see Table 6). One sample-t tests were conducted for each condition to test whether children's helping behavior increased after the storybook reading session. All of them yielded significant results which suggested that children in realistic ( $t(23) = 6.78, p < 0.001$ , Cohen's  $d = 1.38$ , CI [0.81, 1.94]), anthropomorphic ( $t(21) = 4.46, p < 0.001$ , Cohen's  $d = 0.95$ , CI [0.44, 1.45]) and fantastical ( $t(23) = 4.29, p < 0.001$ , Cohen's  $d = 0.88$ , CI [0.39, 1.34]) conditions helped more after they listened to a storybook which emphasizes the importance of helping (Please see Figure 6).

Table 6. Children's Pre and Post Scores on Helping Tasks Across Conditions

	Realistic	Anthropomorphic	Fantastical
Helping ( <i>N</i> = 70) Pre-scores	<i>M</i> = 0.37 ( <i>SD</i> = 0.49)	<i>M</i> = 0.5 ( <i>SD</i> = 0.51)	<i>M</i> = 0.54 ( <i>SD</i> = 0.5)
Post-scores	<i>M</i> = 1.38 ( <i>SD</i> = 1.08)	<i>M</i> = 1.27 ( <i>SD</i> = 1.83)	<i>M</i> = 1.21 ( <i>SD</i> = 1.16)

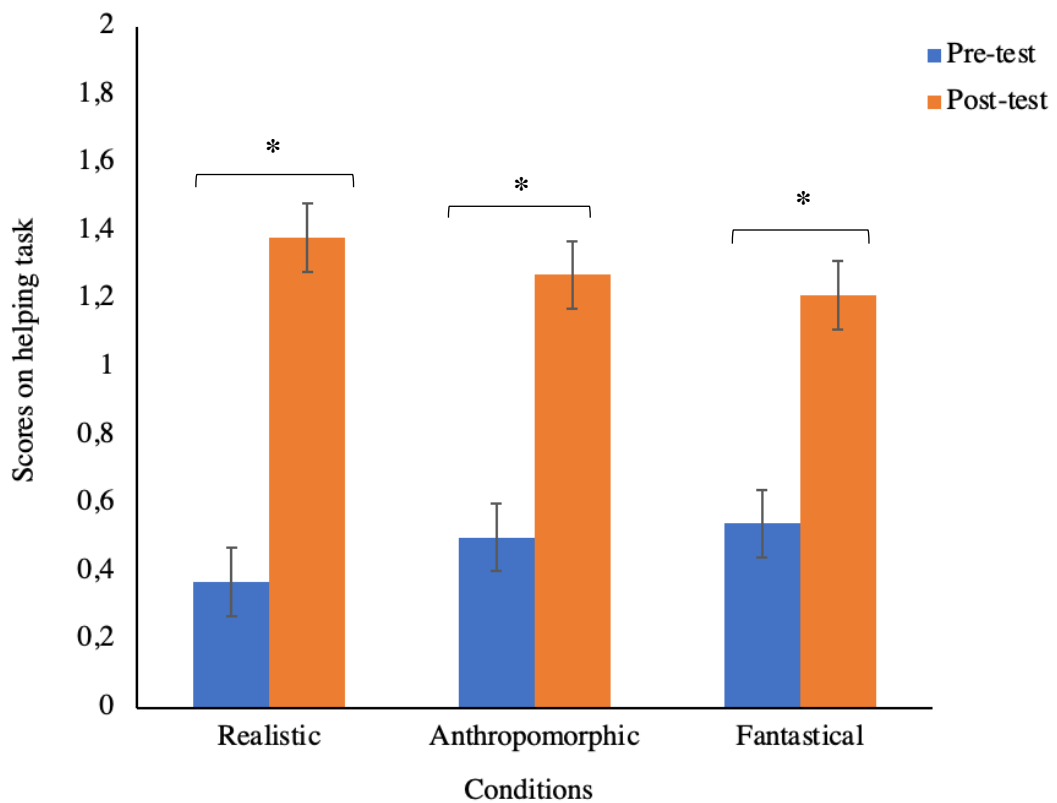


Figure 6. Pre and post scores in helping tasks across story theme conditions. Error bars represent standard errors.

\*  $ps < .05$ .

### 3.2.5 Effect of story-theme on children's honesty behavior

Seven children were excluded from the analysis since they did not tell lie in the deception game pre-test which did not allow us to examine whether story theme increased children's honesty. Since honesty measurement was dichotomous by

nature, a Chi-Square test was conducted to examine whether story-theme affected children’s honesty behavior and it showed non-significant result ( $p = .99$ , Please see Table 6 for the contingency table). Four different one-sample binomial proportion tests were conducted to examine whether children’s honesty behavior increased after storybook session (three of them for story theme conditions and one of them was for total proportion). In total, children’s honesty behavior slightly increased but it was non-significant ( $p = .057$ , Please see Figure 7). Since non-parametric tests are sample size sensitive (Field, 2009; Kaur & Kumar, 2015), p-values in these tests should be interpreted by considering this issue.

Table 7. Number of Children’s Behavior in Deception Game by Story Theme Condition

		Realistic	Anthropomorphic	Fantastical	Total
Post Honesty Behaviors	Did not lie	17	15	12	44 (62%)
	Lie	8	9	10	27 (38%)

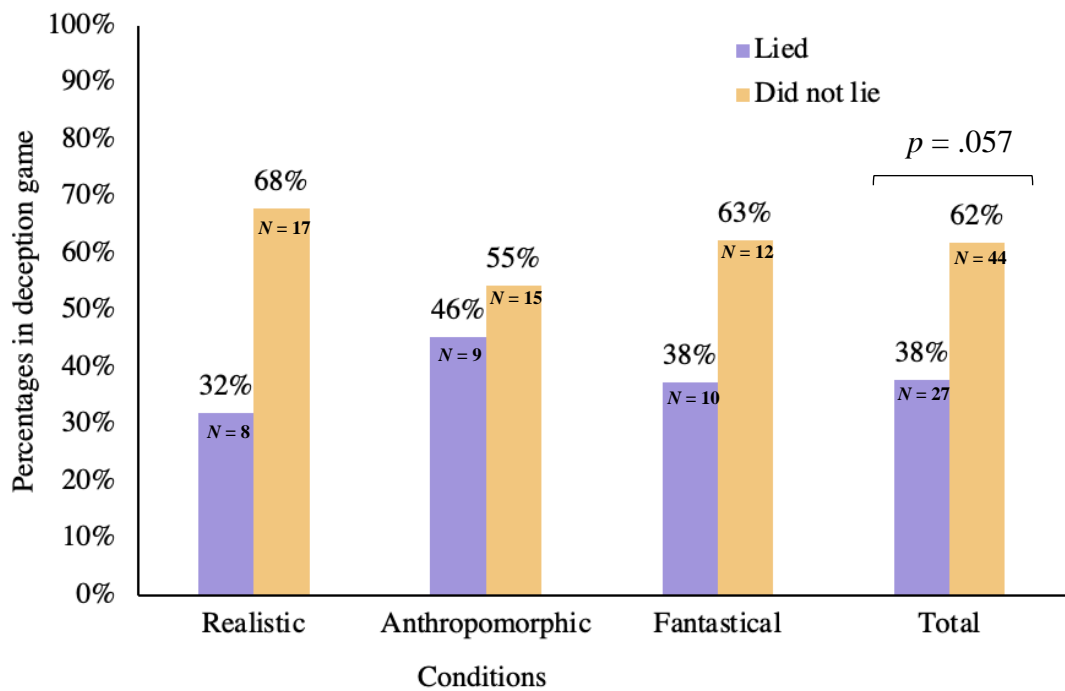


Figure 7. Percentages in deception game across conditions.

### 3.2.6 Relations between children’s storybook preferences and scores on behavioral tasks

Children were given book preference task in which they were given total of nine book covers asked to select three of them that they would like to listen before going to bed. Chi-Square tests were performed to test whether children’s storybook preferences differed from each other. According to the results, children selected realistic and fantastical books more frequently than anthropomorphic ones,  $\chi^2(3) = 13.2, p = .004$ . Children’s storybook preferences were not related to their sex, age and story-theme conditions. Several one-way ANOVAs were conducted to test whether children’s storybook preference affected their sharing and helping behavior, and all the results were statistically non-significant. Similarly, there were also no relations between children’s preferences and their honesty behavior.

### 3.2.7 Relations between parents' responses and children's scores on behavioral tasks

Parents were asked to write their children's top five favorite books and they were also given The Parent Rating scale in which they rated their children's prosocial behaviors including helping, sharing, comforting, and cooperating behaviors (Yagmurlu & Sanson, 2009). Only 27 parents filled out the parents form and there were no differences between children's sex, age and conditions who answered and did not answer the parent questions.

Parents wrote their children's top five favorite books and their answers were coded by two independent coders based on three categories which were reality oriented, reality-based fantasy oriented and fantasy oriented as in the fantasy orientation coding in study 1 (Please see Methodology Section of Study 1). The interrater reliability among the two coders was high (Cohen's Kappa = .81). Then, composite FO scores were calculated as averages of their scores on 5 answers (the possible range is 0 to 2), with low scores indicating more reality orientation and high scores indicating more fantasy orientation. There were no differences between children's sex, story theme condition and their parent reported FO scores ( $p = .42$ ,  $p = .86$ , respectively). There were also no correlations between children's FO and one-week sharing, immediately after sharing, long-term sharing and helping scores. Similarly, children's honesty behavior in posttests also did not differ in terms of their FO ( $ps > .05$ ).

In terms of ratings of parents in the Parent Rating scale, overall score was calculated by taking average of all 19 items, with higher scores indicating more prosociality of children. Sharing subscale score was computed by taking average of 6 items and similarly helping subscale score was computed by taking average of the 6 relevant items. There were no relations between children's sex, age and conditions

regarding both sharing- and helping- subscales and overall scores. Correlation analysis indicated that there were no relations between children's behavioral sharing, helping and honesty scores, and both overall scores and sharing and helping subscales of the parent rating scale. These results also did not change across story theme conditions.

### 3.3 Discussion

Study 2 attempted to assess whether story theme affected preschoolers' pro-social behavior changes which were sharing, helping and honesty. By partially replicating previous findings (i.e., Larsen et al., 2018), our results also revealed that children shared more after listening to a realistic book rather than either anthropomorphic or fantastical stories. We also observed effect of storybook theme on children's sharing after one-week which suggested that children's sticker donations increased in realistic condition rather than both anthropomorphic and fantastical ones even if the book was read one week ago. However, we found this effect only for one week period assessment. In other words, unlike Larsen et al.,'s (2018) study, we did not find story theme effect on children's sticker donations for the assessment that was done immediately after reading the book. Additionally, we found that regardless of the story theme, children helped the experimenter more and were more honest in the deception game at post-tests. All these findings are discussed in the light of literature.

It was found that children's second sticker donations increased one week later, if they listened the realistic storybook. However, if they listened the storybook immediately after the first donation and asked to share again in the same session, this positive impact of realistic books on their sharing behavior was not observed.

Nevertheless, when these children were asked to share again one week later without

listening the storybooks again, we similarly observed the positive impact of realistic books compared to both anthropomorphic and fantastical ones. As we assumed by building the methodology, so many children in the same session condition explained their sharing behavior by referring to their sharing just a few minutes ago (e.g., children told the experimenter ‘I have already shared my stickers’). That might be why they did not increase their donations in immediately post assessment. Similar to our findings, Russel and Cain (2022) also mentioned that they did not find immediate influence of story-theme on preschool children’s sticker sharings. Besides, in our study, children who shared immediately after their first donations, in the same session, were also asked to share again one week later. The ones who listened to realistic storybooks increased their donations from pre-test to one week post test. However, we did not observe an increase in children’s donations who listened to anthropomorphic or fantasy themed stories. Therefore, asking to share directly might have suppressed the story-theme effect on children’s sharing behavior because the children’s first donation was still fresh in their minds. However, contrary to these arguments, Larsen and colleagues (2018) found the effect of story-theme on children’s sharing behavior in immediately after assessment and reported that children who listened to realistic stories shared more compared to their peers who listened anthropomorphic stories. These contradictory findings might have originated from several factors. Russel and Cain (2022), for example, argued that since Russel and Cain’s (2022) sample have lower social economic status (SES) profile, children might tend to share less compared to children who have higher SES profile as in the Larsen et al.’s (2018) study. There might be similar case in the current Study 2 as well. since most of the parents did not fill out the parent questionnaire, we do not have specific knowledge about children’s SES profile. Besides, in our particular

sample, we realized that using stickers in the sharing task might not be sensitive enough to assess children's sharing behavior. In most of the kindergartens that the assessments took place, stickers are used as rewards, if the children are successful in the given task. Stickers are itself so valuable for children in this study and that might have affected their donations in the sharing task. Therefore, the features of the sample may be directly linked to children's sharing behaviors and should be considered to assess in the future studies.

In addition to children's sharing behavior, we also examined whether story-theme had an impact on children's honesty behaviors. We did not find any effect of story-theme on children's honesty behaviors. However, listening to a storybook about honesty itself marginally increased children's pro-social behaviors which suggested that regardless of the story theme children were more honest after listening the storybooks which emphasize the importance of these behaviors. However, this finding was statistically non-significant. This may be because of the sample size sensitivity of non-parametric tests (Field, 2009; Kaur & Kumar, 2015). Due to the dichotomous nature of honesty assessment, we had to use non-parametric tests. Even though our sample size was sufficient to find medium to high effect size in parametric tests, we needed more participants regarding non-parametric test. In terms of honesty, the results were consistent with the previous literature in which emphasizing the importance of positive consequences of being honest can promote children's honesty (e.g., Ding et al., 2023; Lee et al., 2014). In other words, instead of highlighting the punishments of telling lies, promoting children about telling truth increases their honesty behaviors. Similarly, in our study, children's honesty behavior increased, after listened the storybook which emphasize the importance of honesty. However, in parallel with Ding and colleagues' (2023) findings, we did not

find story theme effect on children's honesty behavior. They compared realistic and anthropomorphic books in terms of the efficiency while highlighting the importance of honesty, and they found no differences between conditions. They argued that using uncommon animals such as raccoons instead of bears (like in Study 2) may be better to examine the effect of story theme because children tend to have more positive attributions to these extremely common characters in children's books. However, we also did not find any effect for fantastical condition in which the protagonist was novel and created for this study. Therefore, for honesty behavior, emphasizing the positive consequences of being honest may be more important factor rather than story-theme. In addition, since we assessed honesty in categorical level, larger sample size was needed to use parametric tests. Therefore, more sensitive assessments of honesty behavior such as the time it takes for children to answer the lying question can be examined.

Similar to the results of honesty, we did not find the effect of story theme on children's helping behavior either. However, regardless of story-theme conditions, children helped more in the post test after listening a storybook which highlights importance of helping to others. To best my knowledge, there is no previous study on children's helping behavior and learning from storybooks. Previous research on the relationships between children's sharing and helping behaviors revealed that it is vital who the children are expected to help or share with (Dunar & Fidanci, 2016). In this Study 2, while children were expected to help an adult experimenter, they were asked to share with a child. Therefore, it is better to assess whether children's helping behavior are affected from story-theme, if they are expected to help their peers. Besides, children's helping behavior should be assessed more sensitively in the future which enables to detect the differences from pre-test to post-test between

conditions like in Knafo et al.,'s (2011) study in which the experimenter pretended to lose the keys and children's helping behavior such as after how much time children start to help and when they stop to help were coded. Therefore, using more sensitive helping task by controlling to whom children help may be a better way to evaluate the effect of story theme on children's helping behavior.

We also wanted to test knowledge-behavior gap paradigm whether children's verbal responses to the questions which were about their actions regarding pro-social issues consistent with their behaviors in the tasks. As we expected, they all answered the questions in socially acceptable manner, but we observed individual variability in their behaviors which these findings were discussed in more detail by combining two studies in general discussion.

In addition, we wanted to explore whether children's storybook preferences are linked with their learning from storybooks. We used book preference task in which we showed children several book covers that highlighted either realistic (e.g., realistic rabbit), anthropomorphic (e.g., cartoon rabbit wearing clothes) or fantastical (e.g., rabbit with a cloak and wand) features, and they were asked to select which one of them they want to listen before sleep. We thought that children who selected fantastical books more than realistic books may tend to learn from fantasy books compared to children who preferred realistic book more. However, we did not find any relations between children's storybook preferences and their scores on behavioral tasks. Although most of the storybooks contain at least one anthropomorphic feature such as talking animals (Goldstein & Alperson, 2020), children in our study selected realistic and fantastical storybooks more frequently than anthropomorphic books. Both realistic and fantastical book covers might be more interesting to children and so that they preferred to read them due to their

rareness. Therefore, the task itself may not be a true reflection of children's storybook preference. This is why it needs to be assessed in more detail such as showing them real-life popular book covers.

Moreover, we wanted to investigate the relations between children's daily life practices in terms of prosocial behaviors and their learning from storybooks. We gave parents The Parent Rating Scale (Yagmurlu & Sanson, 2009.) to rate their children's prosocial behaviors, but only few parents filled out the parents' questionnaire. The results of the analysis revealed non-significant correlations but the small sample size ( $N = 27$ ) makes it hard to interpret these non-significant results.

Overall, the study showed that although there were differences across story theme conditions in children's sharing behavior, reading a storybook itself which emphasize the positive consequences of pro-social behaviors promotes children's real life prosocial behaviors regardless of the theme.

## CHAPTER 4

### GENERAL DISCUSSION

Across two studies, we examined the effect of story theme on children's learning behavior. While Study 1 was about children's learning of physical and social problem solution analogies, Study 2 focused on children's learning of pro-social behaviors which were sharing, helping and honesty. In both studies, consistent with the previous literature (e.g., Lee et al., 2014; Weisberg and Hopkins, 2020, for review please see Strouse et al., 2018), we found that listening to storybooks could affect children's learning and that story theme might have an effect on these processes.

One of the fundamental findings of these two studies was that by partially replicating previous studies (Larsen et al., 2018; Richert et al., 2009), we found that reality theme storybooks were more effective than both anthropomorphic and fantastical books in terms of children's learning. As it was mentioned in Chapter 1, while children were listening to fantasy themed storybooks, it might be challenging for them to process both targeted information and fantastical features in the book at the same time. Similarly, when children watched fantastical cartoons, their scores on cognitive tasks (e.g., executive function (EF) assessments) decreased (Lillard and Peterson, 2011). There might be a similar process for storybooks, and due to this cognitive load (e.g., decreased performance in EF tasks), children might not learn as much from fantastical books compared to realistic ones.

Study 1 revealed that preschool children learned better how to solve physical problems from reality theme stories rather than anthropomorphic and fantastical ones. However, we did not find this effect for social problem solution analogies. The

pioneering study (Larsen et al., 2018) in terms of the effect of story theme on children's social behavior changes (i.e., sharing) reported that after children listened to realistic storybook, they increased their sticker donations compared to the ones who listened to fantastical storybooks. We then thought about the plausible reasons of these two outputs in terms of social behaviors and realized that the results might have originated from children's knowledge-behavior gap (e.g., Blake, 2018). Children may know what should be done and can be rational, even if they listened to fantasy stories; however, when they need to behave in this way, there may be individual differences in children's behavior and the effect of story theme may be observable. Study 2 tried to test this hypothesis and as we expected, almost all children in Study 2 answered the verbal questions in a socially acceptable manner. In other words, they told us that the protagonist should share her/his stickers, should help, be honest. However, when they needed to perform in this way, we observed individual differences in their behaviors. For instance, while children said that the protagonist should share the stickers with a child who does not have any, the average number of shared stickers out of 10 stickers was 2 in Study 2. At this point, we observed the story theme effect on children's sharing behavior in which children in the reality theme condition shared more stickers than children in both anthropomorphic and fantastical conditions. Overall, as we argued, when the issue is social behaviors, instead of verbal assessment, behavioral assessment may be a better choice to observe individual differences in terms of learning from storybooks.

As we discussed in the previous section, even though we found the effect of story theme on children's sharing behavior, we did not find any effect for children's helping and honesty behaviors. Our tasks for helping and honesty might not have been sensitive enough to observe children's behavioral changes and so that more

sensitive measurement should be included in the future studies such as when children start to help the experimenter or how long after the children tell lies or the truth.

In both of the studies, we wanted to explore the relations between children's fantasy orientation and their learning from storybooks. While children's FO was assessed with interview technique (e.g., asking their favorite storybooks) in Study 1, parents were asked to write their children's top five favorite books and their average score was calculated in Study 2 as part of FO assessment. Besides, children were asked to select several book covers which also might be a reflection of their fantasy orientation. However, consistent with the Richter and Smith's (2011) study, we did not find any associations between children's FO, storybook preferences and their learning scores in either Study 1 or Study 2. Although we tried to assess children's FO in several ways, since they are more reality oriented in their preferences, it was hard to compare children's scores on learning tasks between children who were fantasy oriented and listened to fantasy books, and children who were reality oriented and listened to fantasy books. Besides, the storybook preference task in Study 2 only included the animals and their realistic, anthropomorphic and fantastical versions (Please see Appendix H for the book covers). In the future it would be better to include more versions of reality and fantasy such as real humans or fantastical creatures. This may help in assessment of children's fantasy orientation in more detail and may enable researchers to find possible relations between fantasy orientation and learning from storybooks.

These two studies have some limitations: Firstly, children's familiarity to the characters in the stories may have great impact on their learning processes. When the characters are familiar to reader/listener, the plausible distractor effect of fantasy may be eliminated. As we reported in the fantasy spectrum questionnaire (Please see

Appendix F), fantasy level and familiarity differed across different characters. For example, while non-human creatures (e.g., Poki in Study 1) were rated as more fantastical than monkeys, monkeys were rated as more familiar than Poki. At this point, it is valuable to ask which one is better for children's learning or is it possible to find optimal familiarity and fantasy level which enhance children's learning. However, while we were deciding the features of the story-theme conditions, we only considered the fantasy level. Therefore, examining the effect of familiarity on learning from storybooks should be examined further.

As we mentioned previously, in Study 1 we used Richert et al.'s (2009) stories to replicate and extend their study. However, as can be seen in the solution selection task, there were some dominant responses in stories which may have restrained children from transferring the highlighted solutions. Therefore, in future studies, it should be considered whether the problem posed in the story has a solution that is more common (e.g., carrying things with a bag instead of packing them in fabric) or whether children might have experienced the problem in their daily life because it may be difficult to teach children new ways for something that they are already familiar with. Additionally, it was claimed that there were several factors which affect children's analogical understanding such as causal understanding (Walker et al., 2015) and executive functioning (Richeland et al., 2016). Thus, future studies should examine the analogical learning processes and plausible individual differences that might be related to it.

In addition, fantasy content may be more enjoyable than realistic content for children. For instance, children's daily life preferences in terms of storybooks and cartoons are found to be more fantasy oriented rather than reality in our two studies. It is possible that children may actually like these types of fantasy themed books

more and want to read/listen to them again again. they might also give more attention to the book or repetition of the story might positively affect their learning. Thus, future studies should examine whether there are any differences in children's liking of different themed storybooks and whether repetition might eliminate the plausible negative effect of fantasy content on children's learning.

Additionally, as we mentioned in the previous section, more sensitive assessment of helping and honesty behaviors may help us to see the effect of story theme on children's pro-social behaviors. Besides, since cultural differences has great importance on pro-social behaviors (e.g., Rochat et al., 2009), it should be examined in more detail and included in the future studies to understand the changes in children's prosocial behaviors better.

In conclusion, the current studies investigated the effect of story theme on children's learning of analogical problem solutions and pro-social behaviors. Reality theme story books may be better option to teach these issues to preschoolers. However, considering children's fantastical preferences and the growing body of research which are also showing the positive impact of fantasy in certain cases (for review please see Strouse et al., 2018; Weisberg and Richert, 2022), it seems that we need more research to understand the direction and understand the optimal level of fantastical features in children's storybooks.

## APPENDIX A

### ETHICS COMMITTEE APPROVAL OF STUDY 1

Evrak Tarih ve Sayısı: 12/12/2020-258

T.C.  
BOĞAZIÇI ÜNİVERSİTESİ  
SOSYAL VE BEŞERİ BİLİMLER YÜKSEK LİSANS VE DOKTORA TEZLERİ ETİK İNCELEME  
KOMİSYONU  
TOPLANTI TUTANAĞI

Toplantı Sayısı : 10  
Toplantı Tarihi : 10/12/2020  
Toplantı Saati : 13:00  
Toplantı Yeri : Zoom Sanal Toplantı  
Bulunanlar : Prof. Ebru Kaya, Prof. Dr. Fatma Nevra Seggie, Dr. Öğr. Üyesi Yasemin Sohtorik İlkmen  
Bulunmayanlar : Prof. Dr. Özlem Hesapçı Karaca

Hatice Şeyma Kara  
Psikoloji

Sayın Araştırmacı,  
"Can children learn how to solve problems from storybooks?" başlıklı projeniz ile ilgili olarak yaptığımız SBB-EAK 2020/56 sayılı başvuru komisyonumuz tarafından 10 Aralık 2020 tarihli toplantıda incelenmiş ve uygun bulunmuştur.

Bu karar tüm üyelerin toplantıya çevrimiçi olarak katılımı ve oybirliği ile alınmıştır. COVID-19 önlemleri kapsamında kurul üyelerinden ıslak imza alınmadığı için bu onam mektubu üye ve raportör olarak Yasemin Sohtorik İlkmen tarafından bütün üyeler adına e-imzalanmıştır.

Saygılarımızla, bilgilerinizi rica ederiz.

Dr. Öğr. Üyesi Yasemin  
SOHTORİK İLKMEN  
ÜYE

e-imzalıdır  
Dr. Öğr. Üyesi Yasemin Sohtorik  
İlkmen  
Öğretim Üyesi  
Raportör

SOBETİK 10 10/12/2020

Bu belge 5070 sayılı Elektronik İmza Kanununun 5. Maddesi gereğince güvenli elektronik imza ile imzalanmıştır.

## APPENDIX B

### ETHICS COMMITTEE APPROVAL OF STUDY 2

Evrak Tarih ve Sayısı: 29.04.2022-64224

T.C.  
BOĞAZIÇI ÜNİVERSİTESİ  
SOSYAL VE BEŞERİ BİLİMLER YÜKSEK LİSANS VE DOKTORA TEZLERİ ETİK İNCELEME  
KOMİSYONU  
TOPLANTI KARAR TUTANAĞI

Toplantı Sayısı : 31  
Toplantı Tarihi : 28.04.2022  
Toplantı Saati : 10:00  
Toplantı Yeri : Zoom Sanal Toplantı  
Bulunanlar : Prof. Dr. Ebru Kaya, Dr. Öğr. Üyesi Yasemin Sohtorik İlkmen  
Bulunmayanlar :

Hatice Şeyma Kara  
Psikoloji

Sayın Araştırmacı,  
"Hikaye kitaplarının olumlu sosyal davranışlar üzerindeki etkisi" başlıklı projeniz ile ilgili olarak yaptığımız SBB-EAK 2022/35 sayılı başvuru komisyonumuz tarafından 28 Nisan 2022 tarihli toplantıda incelenmiş ve projenizin ilk kısmı uygun bulunmuştur.

Bu karar tüm üyelerin toplantıya çevrimiçi olarak katılımı ve oybirliği ile alınmıştır. COVID-19 önlemleri kapsamında kurul üyelerinden ıslak imza alınmadığı için bu onay mektubu üye ve raportör olarak Yasemin Sohtorik İlkmen tarafından bütün üyeler adına e-imzalanmıştır.

Saygılarımızla, bilgilerinizi rica ederiz.

Dr. Öğr. Üyesi Yasemin  
SOHTORİK İLKMEN  
ÜYE

e-imzalıdır  
Dr. Öğr. Üyesi Yasemin Sohtorik  
İlkmen  
Öğretim Üyesi  
Raportör

SOBETİK 31 28.04.2022

**Bu belge, güvenli elektronik imza ile imzalanmıştır.**

APPENDIX C

BASELINE PROBLEM SOLVING TASK



*“This is X. X woke up and heard a dog barking from outside.*



*X went downstairs and saw that a dog was constantly barking behind the fences.*



*The dog was hungry and so that could not reach the food in X’s garden because the fences were too high. What should X do so that the dog does not bark?”*

- 2 points: X should give the food from space under the fences.
- 1 point: Correct response after being prompted “Look at the space under the fences”.
- 0 point: Unrelated answers such as X should build a door.

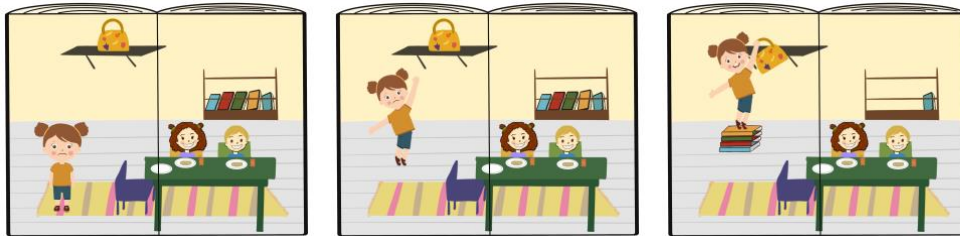
## APPENDIX D

### ANALOGICAL PROBLEM-SOLVING TASKS

Physical stories:

1a. Stacking Source Story: *“One day X was going to have dinner with his/her friends, but X’s lunchbox was on a shelf far above. X wanted to take the lunchbox down but X could not reach. Then, he stacked books and stepped on them. X could now reach the lunchbox. X was very happy because X could have dinner with his/her friends.”*

Example pictures of the stacking source story for realistic girl condition:



1b. Stacking Transfer Story: *“Selin, a child like you, had a balloon but she missed the balloon. The balloon flew and rose up to the ceiling and Selin could not reach the balloon. Selin did not know how to get the balloon. What would you do if you were Selin?”*

Pictures of the stacking transfer story for all conditions for girls:



2 points: stacking the boxes.

1 point: Correct response after being prompted “Do you remember the story that I read just before this one. It may help”.

0 point: Unrelated answers such as calling mother.

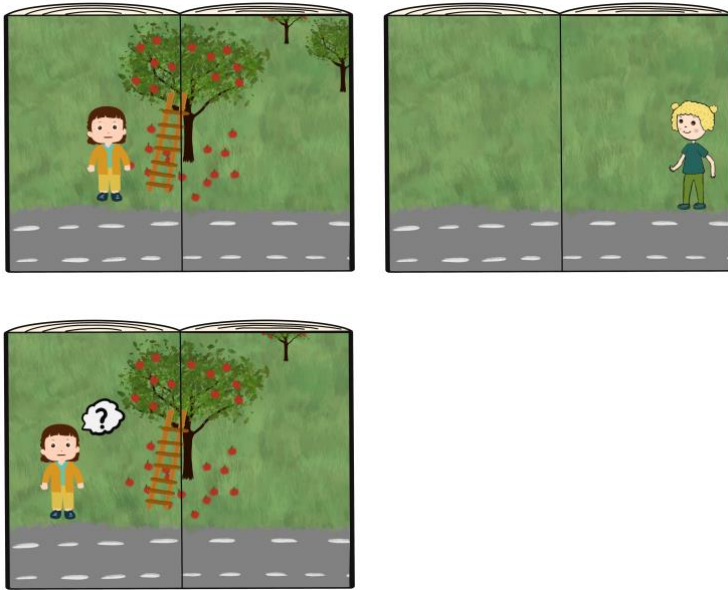
2a. Wrapping Source Story: *“One day X wanted to buy oranges for her friend who lives in the same street. X wanted to take the oranges to his/her friends in one time. So that X took off his/her scarf, put the oranges in it and then held it by the end like a bag. X was able to carry all the oranges in one time without dropping them. X was verry happy because X was able to take oranges to his/her friend.”*

Example pictures of the wrapping source story for anthropomorphic condition:



2b. Wrapping Transfer Story: *“Selin, a child like you, picked apples from the tree for her friend. Selin and her friend are living in the same street. Selin wanted to carry all the apples in one time but she did not know how to do. What would you do if you were Selin?”*

Pictures of the wrapping transfer story for all conditions for girls:



2 points: wrapping the apples into coat.

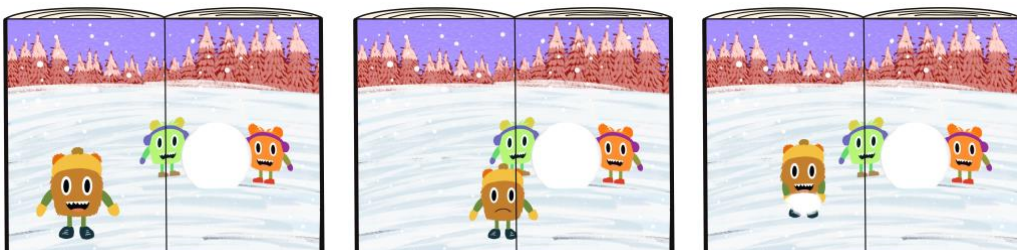
1 point: Correct response after being prompted “Do you remember the story that I read just before this one. It may help”.

0 point: Unrelated answers such as finding bag.

Social Stories:

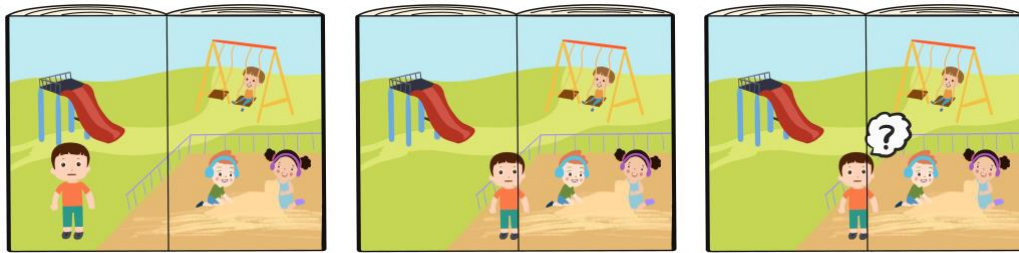
1a. Group-entry Source Story: *“One day a lot of snow fell. Children/Little Monkeys/ Little creatures started to do a snowman in the outside. X went to the children and said, ‘Can I play with you?’. Bu they could not hear X because they were wearing headphones. Then, X started to carry some snow to the children and helped them to do a snowman. They smiled to the X and said, ‘Thank you for your helping, you can do snowman with us, too.’ X was very happy because X was able to do snowman with them.”*

Example pictures of the group-entry source story for fantastical condition:



1b. Group-entry Transfer Story: “*Selim, a child like you, went to the park. In the park, other children were building sandcastles while listening to music with headphones. Selim also wanted to play with them but he did not know how to do. What would you do if you were Selim?*”

Pictures of the group-entry transfer story for all conditions for boys:



2 points: helping to children by carrying sand.

1 point: Correct response after being prompted “Do you remember the story that I read just before this one. It may help”.

0 point: Unrelated answers such as playing alone.

2a. Perspective Taking Source Story: “*One day, it was X’s aunt’s birthday. X wanted to buy a gift that his/her aunt would like. X taught that his/her aunt looked very much like his/her mother. The mother likes flowers that why X taught his/her aunt would like flowers, too. So that X bought a flower for his aunt and gave it to her. The aunt was so happy and said, ‘Thank you very much, I like flowers.’ X was very happy because X gave her aunt a gift that she liked.*”

Example pictures of the perspective taking source story for realistic boy condition:



2b. Perspective Taking Transfer Story: “*Selim, a child like you, has a teacher who likes to his father. Selim wanted to buy a gift to his teacher that he would like. But he did not know what to buy. What would you do if you were Selim?*”

Pictures of the perspective taking transfer story for all conditions for boys:



2 points: buying a gift that father likes.

1 point: Correct response after being prompted “Do you remember the story that I read just before this one. It may help”.

0 point: Unrelated answers such as buying a toy.

## APPENDIX E

### SOLUTION SELECTION TASK

#### 1) Physical Stories:

##### a. Stacking Story:

- i. Highlighted Solution: stacking boxes
- ii. Plausible Solution: calling parents
- iii. Inappropriate Solution: bouncing

##### b. Wrapping Story:

- i. Highlighted Solution: wrapping apples
- ii. Plausible Solution: putting apples into a bag
- iii. Inappropriate Solution: rolling up apples on the floor

#### 2) Social Stories:

##### a. Group Entry Story:

- i. Highlighted Solution: helping children
- ii. Plausible Solution: giving gift
- iii. Inappropriate Solution: saying be friend

##### b. Perspective Taking Story:

- i. Highlighted Solution: buying a gift that father likes.
- ii. Plausible Solution: giving food
- iii. Inappropriate Solution: buying a gift that himself/herself likes.

## APPENDIX F

### FANTASY SPECTRUM QUESTIONNAIRE

This questionnaire was designed to differentiate the various types of fantasy. In this questionnaire, participants were asked to rate several pictures and vignettes that include different levels of fantasy. Each picture/vignette was designed to reflect realistic, anthropomorphic or fantastical content. Participants firstly rated 23 different pictures in terms of the level of fantasy (from 1-low fantasy to 5-high fantasy) and familiarity (1-definitely unfamiliar to 5-very familiar). Then, they read 8 different vignettes in which they were similarly asked how much each vignette includes fantastical elements and how much they are familiar with the given content.

232 adults ages between the ages of 18 and 54 (204 females; 28 males;  $M_{age}=27.1$ ,  $SD = 7.4$  years) participated in the study. Participants filled out the questionnaire via Qualtrics. They were firstly given demographic questions and then fantasy spectrum questionnaire. In the questionnaire, they first rated pictures, and then vignettes. However, pictures and vignettes were given in random order. To compare participants' ratings regarding both fantasy level and familiarity, Repeated Measures Anova tests were conducted. Results of them can be seen in Figure 6 at below. Each vertical line in the scale represents that those pictures' fantasy ratings are significantly different from each other such that while realistic picture 1 has significantly higher ratings in terms of reality than realistic picture 3, it did not differ from realistic picture 2. Based on this schema, we decided to use "Realistic 3" as a realistic protagonist, "Anthropomorphic 6" as an anthropomorphic protagonist and "Fantasy 12" as a fantastical protagonist. Besides, considering ratings of vignettes, we decided the main points that should be highlighted in the stories; for instance, in

fantasy condition there will be both physical violation and different universe (i.e., the protagonist lives in different planet where it can fly and can be invisible).

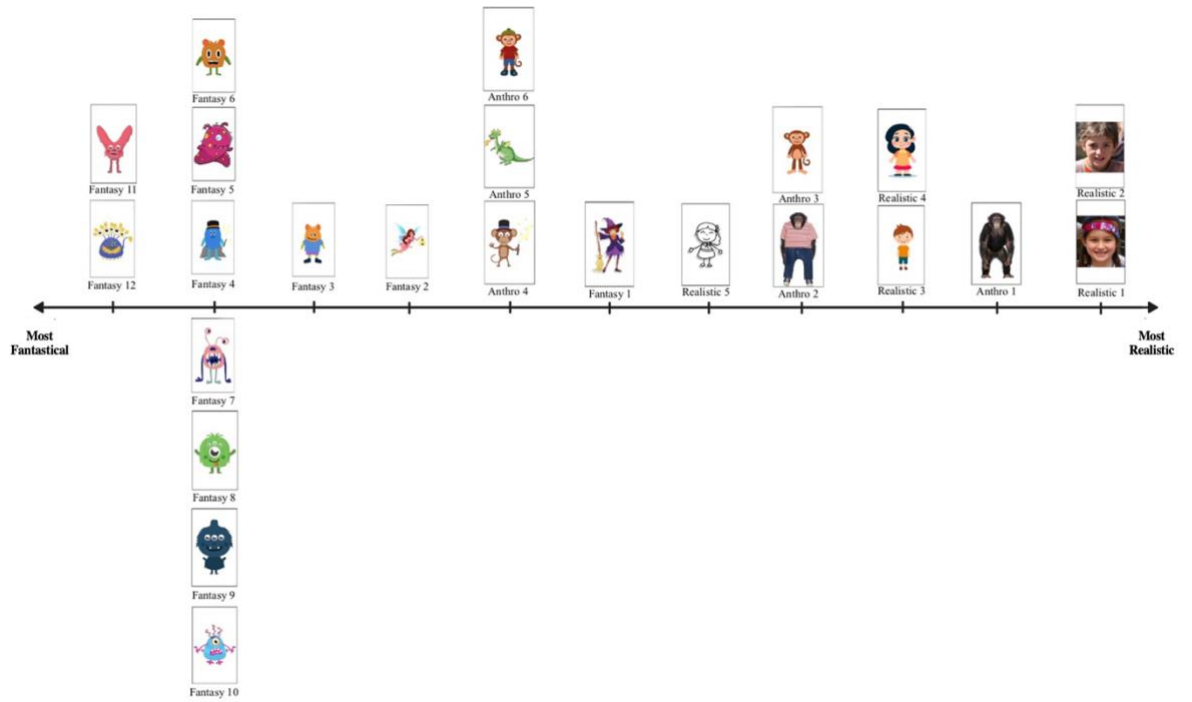


Figure 8. Results of pictures in the fantasy spectrum questionnaire

## APPENDIX G

### SHARING STORY ACROSS CONDITIONS

Realistic Condition:



Anthropomorphic Condition:



Fantasy Condition:



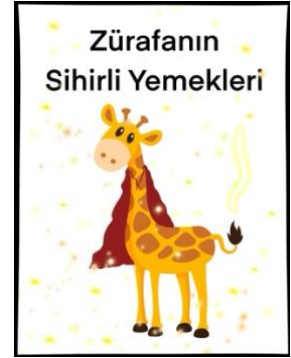
APPENDIX H

BOOK COVERS in BOOK PREFERENCE TASK

1<sup>st</sup> group:



2<sup>nd</sup> Group:



3<sup>rd</sup> Group:



APPENDIX I

PARENT QUESTIONNAIRE

Section 1.1: Child Demographics

- 1) Full name of your child: \_\_\_\_\_
- 2) Sex:  Girl  Boy
- 3) Child's date of birth: \_\_ / \_\_ / \_\_ (DD/MM/YY)
- 4) Number of siblings:  0  1  2  3 or more  
    Sibling 1: Date of birth: \_\_\_\_\_ Sex: \_\_\_\_\_  
    Sibling 2: Date of birth: \_\_\_\_\_ Sex: \_\_\_\_\_
- 5) Does your child have a diagnosed developmental problem (e.g., autism spectrum disorder, down syndrome, attention deficit disorder, learning disability, or hyperactivity)?  
 Yes (please explain: \_\_\_\_\_)  No

Section 1.2: Parent Demographics

- 1) Date of birth: \_\_ / \_\_ / \_\_ (DD/MM/YY)
- 2) Gender:  Female  Male  Other
- 3) Relationship to your child:  Mother  Father  Other (please specify: \_\_\_\_\_)
- 4) Education level:  
 Illiterate (0)  Did not finish high school (5)  
 Literate, or did not finish elementary school (1)  Graduated from high school (6)  
 Graduated from elementary school (2)  Graduated from a two-year school (e.g., a higher education institution) (7)  
 Did not finish secondary school (3)  Did not finish college (8)  
 Graduated from secondary school (4)  Graduated from college (9)  
 Completed an Advanced Professional degree (e.g., M.A., Ph.D., or or expertise in medicine) (10)

5) Are you currently employed?

Full-time, 40 hours a week  Half-time, 20 hours a week  Unemployed

Occupation: \_\_\_\_\_

6) Parent 2's relationship to the child:  Mother  Father  Other (\_\_\_\_\_)

7) Parent 2's date of birth: \_\_\_ / \_\_\_ / \_\_\_\_ (DD/MM/YYYY)

8) Parent 2's education level:

Illiterate (0)  Did not finish high school (5)

Literate, or did not finish elementary school (1)  Graduated from high school (6)

elementary school

Graduated from elementary school (2)  Graduated from a two-year (7)

school (e.g., a higher education institution)

Did not finish secondary school (3)  Did not finish college (8)

Graduated from secondary school (4)  Graduated from college (9)

Completed an Advanced Professional degree (e.g., M.A., Ph.D., or or expertise in medicine) (10)

9) Is Parent 2 currently employed?

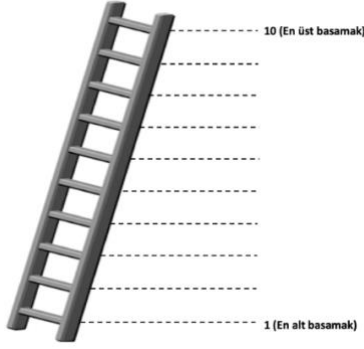
Full-time, 40 hours a week  Half-time, 20 hours a week  Unemployed

Occupation: \_\_\_\_\_

### Section 1.3: Income Section

1) Think of this ladder as representing where people stand in your city. At the top of the ladder, people who have the highest income, the most education, and the most respected jobs stand. The bottom of the ladder stands for the people who have the least income, the worst education, and the least respected jobs. Moving higher up on this ladder, you get closer to the people at the top of the ladder, and moving down on the ladder, you get closer to the people at the bottom of the ladder. Where would you consider yourself on the

ladder? Please put an X mark on the step (10 is the highest) where you stand in the current stage of your life, considering other people in your city.



2) Monthly total income of households (including the income of other households):

- Less than 5000 TL per month
- Between 5001 –7000 TL per month
- Between 7001 – 10000 TL per month
- Between 10001 – 12000 TL per month
- Between 12001 – 15000 TL per month
- Between 15001 – 20000 TL per month
- More than 20000 TL per month

## Section 2: Reading Habits

In this section, we would like you to answer some questions regarding your child's reading habits.

1) Do you read books to your child during the day?

- Yes  No

If yes, how many minutes on average do you read to your child per day?

\_\_\_\_\_

2) How does your child interact with books? (You can select multiple options)

- The mother is reading the books.  The father is reading the books.  The caretaker/nanny is reading the books.  The grandmother/grandfather is reading the books.

- Other (Please explain): \_\_\_\_\_

- 3) On average, how many times do you reread a book that you have bought for your child? \_\_\_\_\_
- 4) What characteristics do you consider when choosing a book for your child? (You can select all that apply).  
 Content  Price  Genre  Print quality  Pictures/images  Endurance   
 Texture  Size  Author
- 5) What kind of books does your child enjoy the most? You can select all that apply.  
 Realistic  Fantastic  Fable (the type that animals talk)  Other (please explain): \_\_\_\_\_
- 6) Please rank the following themes from your child's favorite to least favorite (you can assign 1 to the favorite, 2 to the next, and 3 to the least favorite).  
 \_\_\_ Realistic      \_\_\_ Fantastic      \_\_\_ Fable (the type that animals talk)
- 7) Which theme does your child enjoy the most in books? (You can select multiple options)  
 Adventure  Space  Nature  School  Educational  Coloring   
 Biography  History  Culture  Art  Activity  Science-fiction  Sports   
 Humor  Riddle

### Section 3: Favorite Book

In this section, we would like you to write five of your child's favorite books and indicate how often you read them.

1<sup>st</sup> Book \_\_\_\_\_

(Frequency \_\_\_\_\_)

2<sup>nd</sup> Book \_\_\_\_\_

(Frequency \_\_\_\_\_)

3<sup>rd</sup> Book \_\_\_\_\_

(Frequency \_\_\_\_\_)

4<sup>th</sup> Book \_\_\_\_\_

(Frequency \_\_\_\_\_)

5<sup>th</sup> Book \_\_\_\_\_

(Frequency \_\_\_\_\_)

#### Section 4: Book Preference

In this section, we would like you to pick a book cover to get your child and indicate why you would prefer it.

1<sup>st</sup> Group

1<sup>st</sup> Book



2<sup>nd</sup> Book



3<sup>rd</sup> Book



1) Which of these three books would you choose to get your child?

---

---

2) Could you briefly explain the reason for this choice?

---

---

2<sup>nd</sup> Group

1<sup>st</sup> Book



2<sup>nd</sup> Book



3<sup>rd</sup> Book



1) Which of these three books would you choose to get your child?

---

---

2) Could you briefly explain the reason for this choice?

---

---

3<sup>rd</sup> Group

1<sup>st</sup> Book



2<sup>nd</sup> Book



3<sup>rd</sup> Book



1) Which of these three books would you choose to get your child?

---

---

2) Could you briefly explain the reason for this choice?

---

---

Section 5: The Parents Rating Scale.

APPENDIX J

PARENT QUESTIONNAIRE ORIGINAL TURKISH VERSION

Bölüm 1: Demografik Bilgiler

Çocuğunuzun Tam İsmi: \_\_\_\_\_

Çocuğunuzun cinsiyeti: Kız - Erkek

Çocuğunuzun doğum tarihi: \_\_\_\_\_

Kardeş sayısı: \_\_\_\_\_

Kardeş 1: Doğum tarihi: \_\_\_\_\_ Cinsiyet: \_\_\_\_\_

Kardeş 2: Doğum tarihi: \_\_\_\_\_ Cinsiyet: \_\_\_\_\_

----

Çocuğunuzda tanısı konmuş herhangi bir gelişimsel farklılık var mı (Ör. Otizm, Down sendromu-mongolizm, dikkat eksikliği, öğrenme güçlüğü, hiperaktivite)?

Evet  Hayır

Evet ise lütfen açıklayınız:

\_\_\_\_\_

Doğum Tarihiniz: \_\_ / \_\_ / \_\_ (GG/AA/YY)

Cinsiyetiniz:  Kadın  Erkek  Diğer

Çocuk ile yakınlığınız :  Anne  Baba  Diğer

Eğitim seviyeniz (uygun olan seçeneği işaretleyiniz) :

Okuma yazma bilmiyor	0	Liseden terk	5
İlkokuldan terk veya okuma yazma biliyor	1	Lise mezunu	6
İlkokul mezunu	2	Yüksek okul mezunu (2 yıllık)	7
Ortaokuldan terk	3	Üniversiteden terk	8
Ortaokul mezunu	4	Üniversite mezunu (4 yıllık)	9
Uzmanlık derecesi var (yüksek lisans, doktora veya tıpta uzmanlık gibi)			10

Şu anda çalışıyor musunuz? (uygun olan seçeneği işaretleyiniz)

Mesleği: \_\_\_\_\_

Evet (Tam zamanlı, haftada 40 saat)	Evet (Yarı-zamanlı, haftada 20-25 saat )	Hayır (Çalışmıyor)
-------------------------------------	--	--------------------

Ebeveyn 2'nin yakınlığı:  Anne  Baba  Diğer (açıklayınız: \_\_)

Ebeveyn 2'nin doğum Tarihi: \_\_\_\_\_

Ebeveyn 2 eğitimi (uygun olan seçeneği işaretleyiniz) :

Okuma yazma bilmiyor	0	Liseden terk	5
İlkokuldan terk veya okuma yazma biliyor	1	Lise mezunu	6
İlkokul mezunu	2	Yüksek okul mezunu (2 yıllık)	7
Ortaokuldan terk	3	Üniversiteden terk	8
Ortaokul mezunu	4	Üniversite mezunu (4 yıllık)	9
Uzmanlık derecesi var (yüksek lisans, doktora veya tıpta uzmanlık gibi)			10

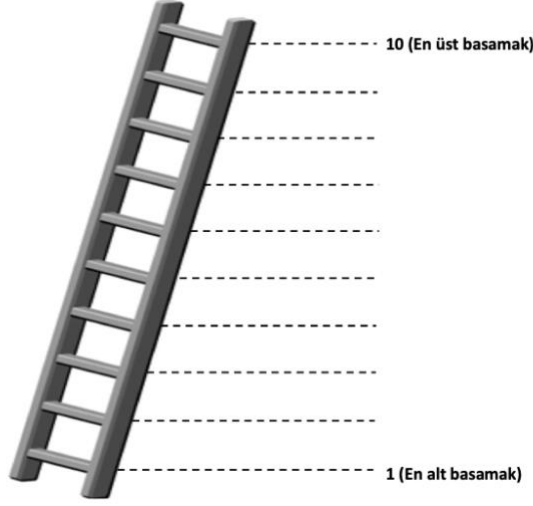
Ebeveyn 2 şu anda çalışıyor mu? (uygun olan seçeneği işaretleyiniz)

Mesleği: \_\_\_\_\_

Evet (Tam zamanlı, haftada 40 saat)	Evet (Yarı-zamanlı, haftada 20-25 saat )	Hayır (Çalışmıyor)
-------------------------------------	--	--------------------

Lütfen şekilde gördüğünüz merdivenin sizin şehrinizde yaşayan insanların sosyo-ekonomik seviyesini yansıttığını hayal edin. Merdivenin en üst basamağında en zengin, en eğitilmiş ve en prestijli işlere sahip insanların, en altında ise en az paraya sahip, en eğitimsiz ve en az prestijli işlere sahip insanların bulunduğunu varsayın. Yukarı doğru çıktıkça en tepedeki insanlara daha çok yaklaştığınızı ve aşağıya doğru indikçe en alttaki insanlara daha çok yaklaştığınızı düşünün. Bunları göz önüne

aldığınıza sizce siz bu merdivenin neresindesiniz? Lütfen hayatınızın şu andaki evresinde şehrinizde yaşayan diğer insanlara kıyasla nerede olduğunuzu gösteren basamağın (“10” en yüksek olmak üzere) yanına “X” işareti koyunuz.



Evin toplam gelir düzeyi (evde sürekli yaşayan tüm bireylerin toplam kazancı):

Ayda 5000 TL'nin altında		Ayda 12.001 – 15.000 TL	
Ayda 5001 – 7000 TL		Ayda 15.001 – 20.000 TL	
Ayda 7001 – 10.000 TL		Ayda 20.000 TL'nin üzerinde	
Ayda 10.001 – 12.000 TL			

Bölüm 2: Bu bölümde sizden çocuğunuzun kitap okuma alışkanlığına yönelik birtakım soruyu cevaplamanızı istiyoruz.

1) Çocuğunuza gün içinde kitap okuyor musunuz? :  Evet  Hayır

a. Evet ise, günlük ortalama kaç dakika?

2) Çocuğunuz kitaplarla nasıl etkileşime geçiyor? (Birden fazla işaretleyebilirsiniz)

Kitapları anne okuyor  Kitapları baba okuyor  Kitapları bakıcı okuyor

Kitapları anneanne/babaanne-dede okuyor  Diğer (açıklayınız)

3) Çocuğunuza aldığınız bir kitabı ortalama kaç defa tekrar okuyorsunuz?

.....

4) Çocuğunuza kitap seçerken ne gibi özellik/özellikleri göz önünde bulunduruyorsunuz? (Uygun olan hepsini işaretleyiniz)

İçerik  Fiyat  Tür  Baskı kalitesi  Resimler/görseller  Dayanıklılık  Doku

Büyüklük  Yazar

5) Çocuğunuz hangi içerikteki kitapları daha çok seviyor? Uygun olan hepsini işaretleyiniz

Gerçekçi  Fantastik  Fabl (hayvanların konuştuğu tür)  Diğer (açıklayınız)

6) Lütfen aşağıdaki temaları çocuğunuzun en sevdiğinden en sevmediğine doğru sıralayınız (En sevdiğine 1, diğerine 2 ve sonrakine 3 yazabilirsiniz)

.....Gerçekçi ..... Fantastik ..... Fabl (hayvanların konuştuğu tür)

7) Çocuğunuz hangi temada kitapları daha çok seviyor? (Birden çok işaretleyebilirsiniz)

Macera  Uzay  Doğa  Okul  Eğitici  Boyama  Biyografi  Tarih  Kültür  Sanat  Aktivite  Bilim Kurgu  Spor  Mizah  Bilmece

Bölüm 3: Bu bölümde sizden çocuğunuzun en çok sevdiği beş kitabı yazmanızı ve bu kitapları ne sıklıkla okuduğunuzu belirtmenizi istiyoruz.

1. Kitap.....(Sıklık  
.....)

2. Kitap.....(Sıklık  
.....)

3. Kitap.....(Sıklık  
.....)

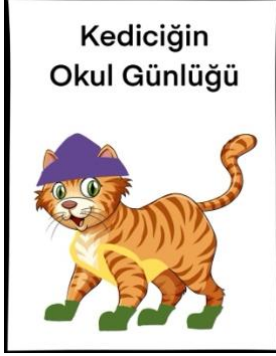
4. Kitap.....(Sıklık  
.....)

5. Kitap.....(Sıklık  
.....)

Bölüm 4: Bu bölümde sizden verilmiş olan kitap kapaklarından hangisini ve niçin çocuğunuzun için almayı tercih ederdiniz sorularını yanıtlamanızı istiyoruz.

1. Grup

1. Kitap



2. Kitap



3. Kitap



Bu üç kitaptan çocuğunuza almak için hangisini seçerdiniz?

Bu seçiminizin nedenini kısaca belirtir misiniz?

2. Grup

1.Kitap



2. Kitap



3. Kitap



Bu üç kitaptan çocuğunuza almak için hangisini seçerdiniz?

Bu seçiminizin nedenini kısaca belirtir misiniz?

3. Grup

1.Kitap

2. Kitap

3. Kitap



Bu üç kitaptan çocuğunuza almak için hangisini seçerdiniz?

Bu seçiminizin nedenini kısaca belirtir misiniz?

Bölüm 5: Bu bölümde sizden aşağıdaki ifadelerin, bu çalışmaya katılan çocuğunuza ne kadar uyduğunu lütfen göstermenizi istiyoruz. Çocuğunuzun bu davranışları ne sıklıkla yaptığını göstermek için, 1'den 7'ye kadar olan sayıları kullanınız ve (X) işareti koyunuz. Lütfen sorulara doğru cevaplar veriniz ve her soruyu cevaplayınız.

	1- Hiçbir zaman	2- Seyrek	3- Çok sık değil	4- Yarı yarıya	5- Sıkça	6- Çok sık	7- Her zaman
Ortalığı toplar.							
Başka bir çocuğa, bir şeyin nasıl yapılacağını gösterir.							
Bir iş üzerinde çalışırken (bulmaca parçası tamamlamak gibi), başka bir							

çocukla iş birliği yapar.							
Başka bir çocuk kendi kendini yaralarsa, onu teselli eder.							
Gergin ve endişeli olan başka bir çocuğa oyuncuğımı veya sevdiğini başka bir şeyi vermeyi kabul eder.							
O an oynamakta olduğu şeyi başka bir çocuğa verir.							
Oynamakta olduğu oyuncuğı ya da başka bir şeyi paylaşmayı kabul eder.							
	1- Hiçbir zaman	2- Seyrek	3- Çok sık değil	4- Yarı yarıya	5- Sıkça	6- Çok sık	7- Her zaman
Başka bir çocuğa yapamadığı ya da fazladan yardım gerektiren bir şey için yardım eder.							
Endişeli ya da yardıma ihtiyacı olan bir çocuğa yardım etmek için sizi veya başka bir çocuğı çağırır.							

Pek çok oyuncacı ya da birden fazla çocuğun oynayabileceği kadar oyuncacı varsa, başka çocukların da onlarla oynamasına izin verir.							
İstedığı oyuncak başka bir çocukta varsa, kendi oyuncasını onunkiyle değiş tokuş eder.							
Başka bir çocukla veya sizle iş birliği yapar.							
Başka bir çocukla oyun veya oyuncasını paylaşır.							
Başka bir çocuk üzgün, mutsuz veya korkmuş ise, onu teselli eder.							
	1- Hiçbir zaman	2- Seyrek	3- Çok sık değil	4- Yarı yarıya	5- Sıkça	6- Çok sık	7- Her zaman
Size etrafı toplamada yardım eder.							
Üzüntülü bir çocuğu ya da							

yetişkinine sarılır veya onu öper.							
Yiyeceğini paylaşır.							
Üzüntülü bir çocuğu ya da yetişkinini teselli etmek için bir şeyler söyler.							
Dökülmüş bir içeceği veya düşen bir şeyi temizlemek için başka bir çocuğa ya da yetişkinine yardım eder.							

-Son-

Çocukların hikaye kitaplarından neler öğrenebileceğini incelediğimiz çalışmamıza katıldığınız için teşekkür ederiz. Çalışmayla alakalı sorularınız için çalışmayı yürüten Boğaziçi Üniversitesi Psikoloji Bölümü Yüksek Lisans öğrencisi Hatice Şeyma Kara ile iletişime geçebilirsiniz.

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