THE EFFECTS OF ROLE-PLAYING ON CHILDREN'S ATTENTION AND INHIBITORY CONTROL SKILLS

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2023

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Thesis submitted to the

Institute for Graduate Studies in Social Sciences

in partial fulfillment of the requirements for the degree of

Master of Arts

in

Early Childhood Education

by

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Boğaziçi University

2023

DECLARATION OF ORIGINALITY

I, Beyza Şirvan Ayaz, certify that

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ABSTRACT

The Effects of Role-Playing on Children's Attention and Inhibitory Control Skills

The aim of this study was to investigate the effects of role-playing on children's inhibitory control and attention. To achieve this goal, a posttest-only experimental group design was used. The study included five and six-year-old children who were randomly assigned to one of three study conditions; Story-Only Condition, Role-Playing Condition, or Control Condition (N = 90). Children in the Story-Only Group were exposed to a story with a high-skilled character. Children in the Role-Playing Group were given the same story with a high-skilled character but also were given a cloak of the character to take on. Finally, the control group was exposed to a story without high-skilled characters or role-playing manipulations yet including similar items and the same characters with a descriptive story of children playing in the same setting. In each group, children were given the Frankfurter Attention Test (Raarz & Mihling, 1971) and the Day and Night Stroop Task (Gerstadt, Hong, & Diamond, 1994) to examine their attention and inhibitory control. Results of the study showed that children in the Role-Playing condition demonstrated higher inhibitory control scores than those who were in Story-Only condition or control condition. When children's attention scores were analyzed, the role-playing condition had the highest mean score, as expected, for attention; however, the results did not reach the conventional levels of significance.

ÖZET

Rol Yapmanın Çocukların Dikkat ve Ketleyici Kontrol Becerileri Üzerindeki Etkisi

Bu çalışmanın amacı, rol yapmanın erken çocukluk dönemindeki çocukların ketleyici kontrol ve dikkat becerileri üzerindeki etkisini incelemektir. Bu amaca ulaşmak için kontrol gruplu sontest deneysel desen kullanılmıştır. Araştırmada beş ve altı yaşlarındaki 90 çocuk sadece hikâye manipülasyonu, rol yapma manipülasyonu ve kontrol gruplarından birine rastlantısal olarak atanmıştır. Sadece hikâye manipülasyonu grubundaki çocuklar üstün bilişsel becerilere sahip bir karakterin hikayesini dinlerken, rol yapma manipülasyonu grubundaki çocuklara aynı hikâyeyi dinledikten sonra hikayedeki karaktere ait kırmızı bir pelerini üstlerine giymeleri için verilmiştir. Son olarak, kontrol grubundaki çocuklara ise benzer ögelerin yer aldığı ancak başkahramanın yüksek bilişsel becerilere sahip olmadığı, aynı ortamdaki çocukların parkta oynamaları konu edinen ve ağırlıklı olarak betimlemelerin bulunduğu bir hikâye sunuldu. Tüm gruplarda çocukların dikkat becerilerini değerlendirmek için Frankfurter Dikkat Testi (Raarz ve Mihling, 1971) ve ketleyici kontrol becerilerini değerlendirmek için Gece Gündüz Görevi (Gerstadt, Hong ve Diamond, 1994) sırasıyla uygulanmıştır. Yapılan araştırmanın sonuçları rol yapma manipülasyonuna maruz kalan çocukların performansa dayalı ketleyici kontrol puanlarının sadece bu hikâyeyi dinleyen veya kontrol grubunda olan çocukların ketleyici kontrol puanlarından anlamlı bir şekilde daha yüksek olduğunu göstermektedir. Dikkat testi sonuçları incelendiğinde ise beklendiği gibi gruplar arasında en yüksek ortalamaya rol yapma grubunun sahip olduğu ancak istatistiksel olarak anlamlı bir fark olmadığı görülmüştür.

ACKNOWLEDGEMENTS

First and foremost, I am profoundly grateful to my advisor, Assist. Prof Ayşegül Metindoğan, for her unwavering support and invaluable guidance throughout this research journey. I extend my heartfelt thanks to my thesis committee members, Assoc. Prof. Ersoy Erdemir, and Assoc. Prof. Özkan Özgün, for their valuable time, and insightful suggestions. I would like to thank Assoc. Prof. Serkan Arıkan, for his precious guidance and expertise. I also want to thank Assoc. Prof. Mine Göl Güven, and Assoc. Prof. Zeynep B. Erdiller Yatmaz for their continuous support.

I would like to extend my greatest gratitude to my amazing mom, Nurgül Ayaz, and my wonderful dad, Aydın Ayaz, for always believing in and encouraging me through hard times. I would not be able to complete this thesis without your support. One of the best things that ever happened to me was to be your daughter. I want to thank my dear brothers, Cihat and Azad, for encouraging me and watching anime with me, dattebayo! I am deeply indebted to you all for providing me with an environment filled with love, warmth, and endless encouragement.

I would like to thank my dearest partner in crime, Betül Sarı, for being with me from beginning to end and bringing unicorns into my life. We have stood side by side, facing the towering walls of academia. May our adventures continue. Shinzou wo Sasageyo, my friend! I am also very grateful to my dear colleagues, Beyhan Ataş and Zeynep Aydin, for all the motivational talks and encouragement.

I would like to thank a very special person, my most precious friend, Umut Can Kılıç, for always being there for me. Your presence in my life has been a constant source of inspiration and motivation throughout this journey. Thank you for naming Çiçi so cutely and making me smile when I needed it the most. Your contributions to this thesis are priceless.

Last but not least, I owe sincere gratitude to my first teacher, İklima Karataş, and my dear grandmother, Saniye Çabuk, whose unwavering belief in me during my childhood has shaped the person I am today.

During this thesis, I have been awarded a scholarship by TÜBİTAK 2210 - A National M.A. Scholarship Program, which I really appreciate. I would like to express my gratitude to all the individuals who participated in this study and all of my friends for their support in making this research journey a reality.

Thank you all from the bottom of my heart for being a part of this incredible journey.

Beyza Şirvan Ayaz

This thesis is dedicated to my beloved mom and dad,

Nurgül and Aydın Ayaz.

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CHAPTER 1

INTRODUCTION

Decades of research have shown that play is a significant component of children's lives. It is not possible to think of early childhood education without play. However, its direct effects on child development are not studied by using experimental designs sufficiently to provide evidence explaining its direct effect on a range of developmental and educational outcomes in children's lives. Vygotsky, one of the early advocates of play and its value, states, "A child's greatest self-control occurs in play" (1933/1978, p. 99). As inspired by Vygotsky and others who emphasize the value of play on a range of developmental outcomes of children, the goal of the present study was to explore the immediate and direct effects of role-playing on children's inhibitory control and attention skills.

Vygotsky (1978) argued that the need to act against impulses emerges during play. Therefore, play context creates a demand for children to demonstrate their highest self-control. Considering that there is a great emphasis placed on the role of play in children's lives, investigating the dynamics of its effects would be beneficial to better support and utilize play in children's development. Role-playing, with its cognitive and emotional complexity, is unique to humans and our closest relatives, such as chimpanzees (Jensvold & Fouts, 1993). In fact, it distinguishes the play of humans from the play of animals (Rogers & Evans, 2008). In this respect, play and its relation to children's development have been studied by several studies (e.g., Kelly, Hammond, Dissanayake, & Ihsen, 2011; Lillard et al., 2013), yet empirical studies are still sparse (Carlson, White & Davis-Unger, 2014; White & Carlson, 2016; White, Thibodeau-Nielsenb, Palermo & Mikulski, 2021). Therefore, additional

studies are needed to help clarify the extent to which role-playing is related to inhibitory control and attention skills in early childhood.

Recent studies that emerged out of a need to explore how the dynamics of play drive children for potential outcomes proposed a term called "the Batman Effect", arguing that role-play can boost children's executive functions (White et al., 2017, p.1563). This idea encouraged some researchers to investigate Batman Effect through several experiments (e.g., Grenell et al., 2019; Veraksa et al., 2021; White & Carlson, 2021). In addition to correlational studies, such experimental studies paved the way to shed light on the possible effects of role-playing on children's development. Thus, inhibitory control, a subdomain of executive functions, could be a significant construct to investigate the so-called Batman effect in young children since previous studies also emphasized its relation with inhibitory control.

Inhibitory control refers to being able to control one's attention, behavior, thoughts, and emotions in order to do what is more appropriate or needed despite impulses (Diamond, 2013). Previous studies found evidence for a correlation between children's ability to engage in symbolic play and their inhibitory control skills. (Kelly et al., 2011). However, there is still a need to build on previous knowledge using more controlled study designs so that we are more confident to argue children can demonstrate higher levels of inhibitory control during play as Vygotsky (1978) suggested. Studies propose that inhibitory control in early childhood could have a significant relationship with many outcomes throughout life, such as academic achievement (Allan, Hume, Allan, Farrington & Lonigan, 2014; Gashaj, Oberer, Mast, & Roebers, 2019), income levels (Moffitt et al., 2011) and better quality of life (Brown & Landgraf, 2010). Children with better executive function skills can benefit more from theory-of-mind training (Benson, Sabbagh,

Carlson & Zelazo, 2013), pay attention more easily, remember classroom rules, and adopt new perspectives (Meuwissen & Zelazo, 2014). EF skills allow children to sustain attention, inhibit responding immediately without thinking, evaluate possible consequences of different behaviors, and make future plans (Zelazo, Blair, & Willoughby, 2016). Although lacking, empirical studies provided evidence for the reciprocal relation between pretend actions and performance on EF (Carlson, White & Davis-Unger, 2014). Of those executive function skills, inhibitory control is argued to be a crucial aspect of representation in pretense (Carlson, White & Davis-Unger, 2014).

Attention, similar to inhibitory control, is one of the most important components of cognitive abilities (Vygotsky, 1978). It is associated with many outcomes throughout life (e.g., Colombo & Cheatham, 2006; Köhler, 1927; Ristic & Enns, 2015). Likewise, inhibitory control was considered a critical component in the ability to sustain attention voluntarily (Colombo & Cheatham, 2006). Considering the effects of role-playing on children's inhibitory control and the relationship between inhibitory control and attention, it is possible to question whether or not such an effect of role-playing could exist for children's attention skills too. In other words, it is important to investigate the effects of role-playing on children's attention skills as well as inhibitory control skills.

Taken together, research to date suggests that role-playing manipulations might have an effect on children's executive function. However, there is still a need to investigate this effect in different contexts. Studying this effect in the Turkish context could contribute to the literature since it demonstrates different cultural characteristics than the contexts of previous studies, such as Europe or the USA. On the other hand, prior research provides no evidence for the effect of role-playing on

children's attention. Furthermore, previous studies used a well-known superhero to create role-playing manipulations. However, it is crucial to examine whether or not role-playing a novel character could have an influence on children's inhibitory control and attention skills. To achieve this goal, "Çiçi," a novel character unlike Batman, was created with high attention and inhibition skills in a children's picture book. Unlike well-known heroes like Batman, the story of Çiçi included children's activities like playing hide and seek or picking up pears among apples in a children's park. Çiçi, initially a neutral character for children, was depicted in the story as having sharper attention skills, being more focused, careful, not distracted, faster, and precise. Therefore, the current study offers a new perspective on the concept of the "Batman Effect" by providing evidence for the effectiveness of role-playing using a previously unknown character on children's cognitive skills. Finally, by introducing the novel character in a story that is designed as a children's picture book, we attempt to understand whether children's literature can be used in exploring executive function skills and role-playing.

CHAPTER 2

LITERATURE REVIEW

2.1 Theoretical background

Several theories focus on the relationship between pretend play, attention, and inhibitory control. In this section, the theoretical background of this relationship is discussed. In this regard, studies of Piaget, Vygotsky, and psychological distancing theories are briefly introduced.

First, studies by Jean Piaget showed that children's imagination emerges in pretend play (Taylor, 2013). Following Piaget's claims, the relationship between imagination and play has been examined by many studies. Jean Piaget (1962) argued that engaging in play can be seen as a process of assimilation in which children would imagine things even if the initial stimuli are no longer present, whereas imitation is a form of accommodation in which children would alter their own behavior to match that of another (Taylor, 2013). Through the mechanisms of assimilation, children demonstrate a tendency to combine novel events or objects into already existing ways of thinking (Piaget, 1962). In this regard, through play, children incorporate old skills into new ones as required by their needs or desires. Piaget (1962) also emphasized that the gradual decline of egocentrism can be brought about by the processes of assimilation and accommodation, which can also be apparent in pretense. As children pass through Piaget's preoperational stage, taking place on average between ages two to six years, symbolic play emerges as a significant assimilative act (Rogers & Evans, 2008) and entails a child's ability to manipulate objects and events in their mind internally. Thus, considering that symbolic play is manifested in a child and demonstrate a set of skills to manipulate

objects and events mentally, we can argue that executive function, as it also requires a child to mentally work through a behavior before acting, Piaget's theory is rather consistent with the claim that pretense and executive function are related.

Secondly, Vygotsky (1967) believed that "a child's greatest self-control occurs in play" (1933/1978, p. 99). He argued that social pretend play could promote self-regulation since it requires rule-based behaviors (Vygotsky, 1967). Therefore, to be able to stay in pretend play, children need to suppress their impulses and follow the rules of pretense. Such representational plays lead children to exercise the suppression of impulses rather than presenting themselves in spontaneous acts. As a result, children do not really eat the pretend cookies during make-believe play but only pretend that they are real cookies as symbolic thinking develops.

The second idea that Vygotsky offered in this regard focuses on cognitive flexibility, which can be defined as an ability to consider and selectively focus on multiple facets or dimensions of a situation or problem (Carlson & Zelazo, 2008). Vygotsky (1967) argued that pretense could support children to break free from the external stimulus while leading them to consider objects and events that are not visible at the moment. He claimed pretense could offer an "emancipation from situational constraints" (1933/1978, p.99) since such internalized representations could let children break free from their external context, not be distracted, and focus on distant things or events. In the play, children can develop the ability to mentally distance themselves from constant attacks of external stimuli, they can act independently so that flexibly both be flexible and control their behavior by implementing external mediators and internal mental tools (Vygotsky & Luria, 1994).

Psychological distancing is the third concept that should be mentioned within this context. The term "psychological distancing" was originally coined by Werner and Kaplan (1963) and used to describe the gradual decontextualization of symbols from their original references. The term was later adopted by Sigel (1970) in order to describe the behaviors or events that create cognitive distance between the child and their immediate behavioral environment. Sigel (2002) argued that the reason for calling this "distancing" is that children are asked to stand back mentally, which leads to a cognitive distinction or separation of events or instances in time or space. The meaning of this distancing is metaphoric. It can be caused by external factors, such as external demands generated from social and cultural sources. Three levels of distancing have been identified based on the level of distancing demand upon the child: high-level distancing, medium-level distancing, and low-level distancing (Sigel, 2002).

In low-level distancing, the child is required to separate the self from the ongoing events while involving minimal representations, such as requesting descriptions of events (Sigel, 2002). In medium-level distancing, mental demands create an increase in the distance from the stimulus, while some abstractions require some mental extensions to make inferences from what is observable to what is non-observable, as well as to use propositional and hypothetical thinking. On the other hand, in a high-level distancing, inquiry without any preset props or a declarative statement is demanded (Sigel, 2002). Similar to Vygotsky's hypothesis that symbolic thought could lead children to detach themselves from literal contexts, psychological distancing theories argue that children could mentally transcend the present moment by utilizing representation and reflection (Carlson & Zelazo, 2008). In this regard, psychological distancing emerges as a tool for human beings to take a step back from

the real world and reevaluate things based on a symbolic version which could lead to more regulated behaviors (Carlson & White, 2013).

To conclude, as a starting point, it is possible to reference three main theories to support the idea that role-play may affect children's inhibitory control and attention; Theories of Piaget, Theories of Vygotsky, and Theories of Psychological Distancing. In the following sections, studies that illustrate the relationship between executive function and role-playing are discussed in more detail to demonstrate the foundation for the current study.

2.2 Symbolic play, pretense, and role-playing

Vygotsky (1978) argued that defining play as an activity that would give children pleasure would be inaccurate for two main reasons. First, he claims that sucking a pacifier could give children more pleasure than play. Second, many games do not give pleasure unless the child finds the result interesting such as games that can be won or lost. In this regard, Vygotsky (1978) offers criteria for distinguishing a child's play from other types of activities, which is creating an imaginary situation. For example, even playing chess creates an imaginary situation since each piece has rules of movement.

Krasnor and Pepler (1980) proposed four criteria for defining play: flexibility, positive affect, nonliterality, and intrinsic motivation. Within this definition, flexibility implies that play behaviors may vary from actual behaviors in terms of exaggerations or content. Positive affect implies that people may look like they are having fun while playing. Nonliterality implies that behaviors usually lack their real meaning. Intrinsic motivation implies that individuals engage in play for their own sake.

Vygotsky (1978) argues that play creates a demand for children to act against their impulses since they face a conflict between the rules of the game and the way they want to act spontaneously. That is why pretense has a crucial developmental role in a child's life (Vygotsky, 1978). Children can develop abstract thought through pretend play (Vygotsky, 1967). In addition, this is also leading children to develop self-regulation skills since they must inhibit reality in order to stay in play (Bodrova & Leong, 2007). Thus, Vygotsky (1978, p.102) argues that children can take themselves to the upper end of their "zone of proximal development" (p.86) through play. In a review of neo-Vygotskian approaches, it is also supported that children can regulate their own behavior in play, which plays a significant role in the development of self-regulation (Karpov, 2005). Children can modify symbolic events that arouse emotions and learn how to regulate their emotions through such symbolic experiences (Bretherton, 1989).

On the other hand, Piaget (1962) argues that pretend play emerges around 18 months as toddlers begin to treat objects as if they were something else in a symbolic way. Likewise, children around two years of age can infer make-believe object substitutions initiated by adults, such as treating wooden blocks as bananas (Harris, Kavanaugh, Wellman, & Hickling, 1993). By the age of three, children can pay attention to the rules of a joint pretense scenario in pretend play and act accordingly (Wyman, Rakoczy, & Tomasello, 2009). Studies show that 3-year-olds can protest against a character who joins in pretend play but treats make-believe objects according to their real function or mixes up their pretend identities between two separate pretend games (Wyman, Rakoczy, & Tomasello, 2009).

2.2.1 Pretense and Role-Playing in Early Childhood

When the focus is on role-playing, it is important to discuss the distinction between role-play and object substitution. The development of role-play demonstrates individual differences that are driven by children's interests and personalities (Sachet & Mottweiler, 2013). Role-playing even influences adult activities. On the contrary, object substitution in pretend play demonstrates a relatively shorter developmental progression that is significantly correlated with other cognitive abilities, such as executive function or verbal ability (Sachet & Mottweiler, 2013). Harris (2000, p.30) defines role-play as a form of pretend play in which "the child temporarily acts out the part of someone other than the self-using pretend actions and utterances". This definition covers three prominent cases of role-play (Harris, 2000). The first role-play case is to have a personified object, which means that children create and enact a role projected onto a specific object, such as a doll or toy. The second case of role play is to have a pretend identity, which implies that children act out a make-believe character, like being a mother or a soldier. The third case of role play is to have an invisible friend, which implies that children invent an invisible creature or human without any tangible props.

Roger and Evans (2008) emphasized that the ability to engage in role-play separates the play of human beings from the play of young animals since it is observed only in humans. Likewise, they argued that humans are not born with this ability but only have the potential for it (Rogers & Evans, 2008). They described role-play as "encompassing a communication imperative," which involves the ability to see and appreciate the viewpoint of another (Rogers & Evans, 2008, p.23).

The debate over the psychological mechanisms underlying pretense has been discussed over the years by many researchers. Piaget (1962) claimed that pretend

play was related to the development of the semiotic function, which could also lead to deferred imitation and language. The role of pretense in language development has been emphasized by many studies (Whitebread et al., 2017). Leslie (1987) proposed that pretense could be an early manifestation of the theory of mind. In contrast, Stich and Tarzia (2015) argued that children did not need to have a theory of mind in order to engage in joint pretense.

In an experimental design study conducted by Sawyer (2017), children were assigned to the playful context condition and the non-playful context condition in order to examine their effect on children's mastery motivation and private speech. Results demonstrated that children in the playful condition were more likely to show higher levels of composite mastery motivation than those in the non-playful condition (d= .83, large effect size, Sawyer, 2017). In the study, a task that required children to catch fish, which had put children in situations in which catching fish was both possible and impossible. In the study, children in the playful condition caught more fish overall and spent more time attempting to catch fish that was not possible to catch than those in the non-playful condition (Sawyer, 2017). Similarly, children in the playful condition demonstrated similar levels of private speech with the non-playful condition while trying to catch possible fish. However, they had more frequent private speech during their trials of catching impossible fish than those children in non-playful conditions (Sawyer, 2017).

A review of studies supported the notion that it is possible to suggest that pretend play demonstrates significant relationships with executive function and social skills (Lillard et al., 2013). However, the existing evidence cannot support a crucial casual position for pretend play (Lillard et al., 2013). Thus, there is a need for

more experimental studies to investigate the role of pretend play in the development of cognitive and social abilities.

In the studies done in the Turkish context, it is possible to see the evidence that there can be significant relations between children's play behaviors, emotion regulation, and executive function (Hamamcı & Balaban Dagal, 2022). In a study, the combined effect of emotion regulation and executive function on children's play behaviors has been investigated. It was found that children's emotion regulation and executive function were negatively related to children's reticence behavior and solitary play, whereas they contributed positively to social play (Hamamcı & Balaban Dagal, 2022).

Pretending emerges as a coping strategy to deal with difficult situations in several studies (e.g., Lazarus & Abramovitz, 1962; Robin, Schneider & Dolnick, 1976; Rubin, 2007). It is possible to see that superheroes can be used in counseling and play therapy. For instance, Nelson (2007) asked children to imagine how Superman would deal with problem situations and guided them to adopt similar strategies to deal with their own problems. It was found that children could benefit from this technique to deal with challenging situations. In another study done with chronically ill school children, Clark (2003) found that these children often prefer to cognitively transform aversive medical contexts into playful, pretend games, which is called "imaginal coping". As an example of this imaginal coping strategy, children claim that they pretend to have imaginary dragon friends who replace their breathing machines. Thus, it is possible to argue that pretending can be an effective way of dealing with difficult situations for young children.

Studies of children's play focused on children's preferences in the way they receive instructions. In one study, children were exposed to either literal, such as

squeezing their fists, or metaphoric instructions, such as squeezing a pretend lemon, as a part of relaxation training (Heffner, Greco & Etfert, 2003). Findings demonstrated that there was no significant difference in compliance to either set of instructions (Heffner, Greco & Etfert, 2003). Researchers argued that a very high rate of overall compliance in both conditions could have produced a ceiling effect, which might have restricted the ability to reveal an effect on compliance to instructions. On the other hand, they found that children prefer metaphoric instructions more than literal instructions. Similarly, in the study, all children chose a metaphorical game as their favorite. Such findings could also provide evidence for the need for metaphoric contexts in children's lives.

The relationship between engaging in social pretend play and gains in executive function across school years was examined by White et al. (2021). For this purpose, 132 Spanish-speaking preschoolers from 10 Head Start classrooms in the southwest United States, whose main age was 53 months, were included in the study. Children were observed multiple times in free play contexts in terms of their interactions and activities (e.g., social pretense, solitary pretense, non-pretense social play). Among observed play behaviors, results showed that social pretense was the only predictor of inhibitory control growth among preschoolers. Therefore, the predictive role of pretense on children's inhibitory control emphasizes the need to investigate its direct effects on children's inhibitory control.

2.3 Executive functions in early childhood

One of the central aims of this study was to examine how role-playing could affect young children's inhibitory control. However, it is also important to mention an umbrella term that covers inhibitory control and more, that is, executive functions.

Executive functions have three core domains: inhibitory control, working memory, and cognitive flexibility (Diamond, 2013). It also refers to a set of skills that include inhibitory control, planning, and attention flexibility (Carlson, 2005). Studies indicated that the brain areas related to executive functions also reciprocally interact with the areas that underlie the control of attention, emotion, and stress (Blair & Ursache, 2011).

Despite a traditional model of executive function with three subdomains (Diamond, 2013), executive functions can be categorized differently at different ages by some other researchers. Studies indicated that working memory and cognitive flexibility/inhibitory control emerge as two main executive functions by middle childhood, whereas cognitive flexibility and inhibitory control become two distinct sub-skills by adolescence, which shapes its traditional three sub-skill versions, namely working memory, cognitive flexibility, and inhibitory control (Bardikoff & Sabbagh, 2017; Huizinga, Dolan & van der Molen, 2006; Lee, Bull & Ho, 2013).

2.3.1 Working memory

Working memory can be defined as the ability to hold information in mind and manipulate it (Diamond, 2013). Working memory is different from short-term memory since short-term memory involves holding information but not manipulating it (Diamond, 2013). This aspect of executive function demonstrates a steady change over the course of childhood (Chevalier & Clark, 2017). In early childhood, working memory tasks focus on simple maintenance of the information, whereas in adulthood working memory tasks, simultaneous manipulation of the maintained information is required through several ways of updating, inhibiting, or transforming (Chevalier & Clark, 2017). Evidence suggests that the first signs of the ability to hold a

representation over a delay exist before six months of age, whereas the ability to keep more items in mind is continued development throughout the preschool years (Gathercole, 1998; Pelphrey & Reznick, 2003).

3.3.2 Cognitive flexibility

Cognitive flexibility, which develops much later in life, requires and builds on working memory and inhibitory control (Diamond, 2013). This term involves several concepts, such as the ability to change perspectives spatially or interpersonally, changing the way we think about something, and being flexible enough to adjust to changed demands (Diamond, 2013). There is much overlap between cognitive flexibility, task switching, and set-shifting.

Set-shifting tasks require children to shift from one mental set to another (Garon, Bryson & Smith, 2008). These tasks generally involve two main phases. In the first phase, participants should focus on relevant stimuli by holding the rule in mind while avoiding any distractors (Garon, Bryson & Smith, 2008). This part requires children to focus on a single rule at a time. In the second phase, shifting to a new mental set (rule) that conflicts with the first one is required. For this phase, children should learn one rule first and then switch to a new rule that is in conflict with the previous one (Garon, Bryson & Smith, 2008).

2.3.3 Inhibitory control

Inhibitory control refers to being able to control one's attention, behavior, thoughts, and emotions in order to do what is more appropriate or needed despite impulses (Diamond, 2013). In the literature, it is possible to see several sub-categorizations for

inhibitory control. Inhibitory control can be studied within two subdomains, which are response inhibition and attentional inhibition.

Inhibitory control of attention can be defined as selectively attending and focusing on what one chooses based on one's goal or intention while suppressing attention to any other stimulus (Diamond, 2013). This term can also be called selective or focused attention, attentional control, attentional inhibition, top-down and bottom-up control of visual selection (e.g., Diamond, 2013; Theeuwes, 2010).

On the other hand, response inhibition implies withholding or restraining motor responses (Garon, Bryson & Smith, 2008). Complex response inhibition tasks involve keeping an arbitrary rule in mind and responding accordingly while inhibiting a dominant response (Garon, Bryson & Smith, 2008). Carlson's (2005) study demonstrated that this ability develops rapidly at three years of age. While the rate of passing complex response inhibition tasks is only 51% for younger three-year-olds, the rate jumps to 76% for older three-year-olds. On the other hand, several cross-sectional studies demonstrated similar age-related differences in Stroop-like tasks, too (Carlson, 2005).

Although attentional inhibition and response inhibition have been found to be highly correlated in previous studies, recent studies argue that they are empirically independent constructs (Tiego, Testa, Bellgrove, Pantelis, & Whittle, 2018). Similarly, inhibitory control demonstrated a partial statistical dependence on the Working Memory Capacity factor (Tiego et al., 2018).

In the literature, it is possible to see "hot" and "cool" aspects of EFs, in which Cool EF implies tasks that focus on cognition, such as working memory, whereas Hot EF implies tasks that are motivational in nature, such as rewarded delay tasks (Garon, Bryson & Smith, 2008; Zelazo et al., 2013). On the other hand, complex

response inhibition tasks, such as the Stroop, require both working memory and inhibition of a prepotent response, which highlights both hot and cool EFs (Marsh et al., 2006). Additionally, higher-order executive function domains could be listed as reasoning, problem-solving, and planning (Diamond, 2013). Some researchers can use these subdomains as a synonym for fluid intelligence since they demonstrate a high correlation between them (Diamond, 2013; Ferrer et al., 2009).

The relationship between age and children's inhibitory control has been examined by several studies. In their study, Carlson (2005) demonstrated cross-sectional data on 602 preschool children via some battery of tasks for executive function and analyzed age-related differences as well as difficulty differences across tasks. They found that EF scores increased significantly from 3 to 5 years, even after controlling verbal ability (Carlson, 2005). Thus, age can significantly affect executive function abilities in early childhood. Similarly, studies indicated that processes considered under the umbrella of executive function skills might develop at different times. Studies provided evidence that children between the ages of 3 and 6 years can demonstrate rapid gains in response inhibition (Wiebe, Sheffield & Espy, 2012). Thus, early childhood emerges as a significant period of time for the development of inhibitory control.

Gender differences in inhibitory control also have been examined by several studies. A study done with adults showed that there was no significant difference between males and females in terms of their mean values of attentional abilities (Solianik, Brazaitis & Skurvdays, 2016). On the contrary, another study done with undergraduate students reported a significant sex difference in benefiting from practice in the stop-signal test (Mansouri, Fehring, Gaillard, Jaberzadeh, & Parkington, 2016).

On the other hand, Stroop like paradigm was used by numerous studies to investigate children's ability to inhibit a prepotent verbal response (Cuevas et al., 2016; Gunzenhauser, Saalbach, & von Suchodoletz, 2017; Yamamoto & Imai-Matsumura, 2019; Yücel et al., 2012). There was no sex difference in inhibitory control in school-aged children (O'Brien, Dowell, Mostofsky, Denckla, & Mahone, 2010; Wodka et al., 2008). Yet, it was found that increasing the level of the cognitive load was related to lower performance in girls (Seymour, Mostofsky, & Rosch, 2016). Despite higher impulsivity and hyperactivity in boys than girls, some studies argued a greeted inhibitory deficit in females (Gershon, 2002). Another study that benefited from the Stroop Tasks also revealed some gender differences in the early school years, in which boys had better inhibitory performance than girls from 5 to 8 years when the speed of processing was controlled (Macdonald, Beauchamp, Crigan, & Anderson, 2014).

In the literature, executive function skills, such as working memory, inhibitory control, cognitive flexibility, mental shifting, and planning, can be associated with the both cognitive self-regulation or self-regulation (e.g., Pauen, 2016; Murray, Rosanbalm, Christopoulos, & Hamoudi, 2015). However, self-regulation implies temporally extended goal-directed behaviors, which would include attempts to decrease the discrepancy between values, goals, standards, and the actual state of affairs (Hofmann, Schmeichel, & Baddeley, 2012). It could be defined as an umbrella term for the ability to adapt to the cognitive and social requirements of a situation to achieve a specific goal (Berger, 2011). In this regard, self-regulation could be seen as a broader construct than EF since EF does not focus on values or standards as much. Nevertheless, it is significant to emphasize that they demonstrate a tremendous conceptual and empirical overlap between self-regulation and EF

(Müller & Kerns, 2015). Executive functions play a significant role in regulating both cognitive activities and emotions (Blair & Ursache, 2011).

The capacity for self-regulation starts with life itself and remains essential to human nature throughout life (Bronson, 2000). Children's behavioral regulation is found to be strongly linked to academic achievement (Day, Connor, & McClelland, 2015; McClelland et al., 2015; Morrison, Ponitz & McClelland, 2010), children's behavior problems (Lonigan et al., 2017), and even later mental health throughout life (Woodward, Lu, Morris, & Healey, 2017).

The construct of executive function overlaps with other similar constructs, such as self-control, and effortful control (Müller & Kerns, 2015). However, effortful control refers to a temperamental trait that involves both response inhibition and attentional control (Liew, 2011). Although similar tasks are used to assess both concepts, the main difference could be described as that they originated in different research traditions (Müller & Kerns, 2015).

Studies show that inhibitory control in early childhood can be predictive of many outcomes throughout life. A longitudinal study done with approximately 1000 children for 32 years demonstrated that those children who had better inhibitory control at the age of 3 to 11 were less likely to drop out of school, make risky choices, or take drugs, whereas they were more likely to earn more and be happier in their adulthood (Moffitt et al., 2011). Likewise, having better EF have found to be associated with academic achievement (Gashaj, Oberer, Mast, & Roebers, 2019) and better quality of life (Brown & Landgraf, 2010).

In a study to explore the relationship between symbolic play and executive function in young children, it was found that the ability to inhibit prepotent responses had a significant relationship with children's symbolic play skills, which suggests

that greater inhibitory control is associated with greater ability to engage in symbolic play (Kelly et al., 2011). Although this finding does not provide evidence for a cause-effect relationship, it reveals the need for experimental studies to investigate the effects of play on executive function in young children.

In this regard, improving children's inhibitory control is another significant issue that is focused on by researchers. Diamond, Kirkham & Amso (2002) found that during a Stroop-like Day-Night Task, inserting a delay between the presentation of cards and the response improved preschool children's responses despite that delay having a distraction in the form of song. Thibodeau, Gilpin, Brown and Meyer (2016) designed an experimental study to see the effects of pretend play on children's EF skills. In this study, children were randomly assigned to either a fantastical pretend play intervention, a non-imaginative play intervention, or a business-as-usual control condition for five weeks. Results showed that children who attended in fantastical pretend play intervention for five weeks demonstrated improvements in their executive function skills, whereas children in the other two conditions did not show a significant improvement in their executive function skills (Thibodeau et al., 2016).

In another experimental study to explore the effects of various styles of pretense in diverse populations, 179 children were assigned to one of four conditions; Fantastical Pretense, Realistic Pretense, Non-Imaginative Play, or Business-as-Usual Control (Thibodeau-Nielsen et al., 2020). 38% of these children were low-income in the Headstart program, whereas the rest of the children came from middle-class families. Results indicated that after 5 weeks of daily intervention, children who were in Fantastical Pretense Condition significantly improved in terms of their executive function scores, whereas there was no significant difference for other groups of the

study (Thibodeau-Nielsen et al., 2020). On the other hand, children who were low-income and in Head-start did not demonstrate any significant EF improvement after any type of intervention, which may be due to lower initial levels of EF and propensities towards pretense (Thibodeau-Nielsen et al., 2020).

On the other hand, it is possible to see that there are some studies done to explore how to train children's inhibitory control skills specifically. In one of these studies, thirty preschool children were randomly assigned to control and intervention groups in which children would receive a program for attentive rehabilitation of inhibition and selective attention, which is called PARISA (Ghodrati, Askari Nejad, Sharifian, & Nejati, 2021). This intervention program included six computerized tasks that aimed to improve different types of inhibitory control and were given to children in ten sessions, in which the level of difficulty gradually increased during these ten sessions. The results showed that it is possible to improve preschoolers' inhibitory control skills, whereas PARISA seemed to be an effective program for this purpose. Another example that targets children's executive function skills can be Tools of the Mind (Bodrova & Leong, 2007). Yet, this program specifically aims to improve children's self-regulation in a specific classroom context. Thus, it is not a special program designed for inhibitory control but for self-regulation overall. However, it is still significant to mention as an intervention for its effectiveness.

Overall, it is possible to argue that previous studies provide evidence for a relationship between role-playing and inhibitory control in young children. Likewise, there are several intervention studies that benefit from role-playing to support children's executive function skills. Thus, it is significant to emphasize that inhibitory control could be improved via several interventions and manipulations which benefit from play.

2.4 Attention in early childhood

Attention is a complex and multifaceted construct (Ruff & Rothbart, 2001, p.4). It can be described as directing the eyes toward a source of information while keeping a visual focus on that source as long as it is enough to learn information or solve a problem (Ruff & Rothbart, 2001, p.4). Thus, it is possible to argue that attention plays an essential role in the process of perception and learning about selective events. It is also related to motivation, which means that some events could be intrinsically so attractive that they could trigger involvement. Likewise, attention can be determined by external factors such as novelty (Garon, Bryson & Smith, 2008). Mesulam (1981) claims that "The effective execution of attention requires a flexible interplay among intense concentration, inhibition of distractibility, and the ability to shift the center of awareness from one focus to another according to inner needs, past experience, and external reality" (pp. 321-322). In this regard, attention can be examined in three parts, which are the selection of a target, the engagement of attention, and the controls which are necessary to sustain and shift attention accordingly based on the needs of the current situation (Ruff & Rothbart, 2001, p.4).

Theoretically, it is also possible to discuss three main views on conceptualizing attention. First, the "attention-for-perception" view gives attention a selective role in managing the immense sensory input that is available in the environment (Ristic & Enns, 2015, p. 158). Second, the "attention-for-action" focuses on actions rather than mental capacities, such as standing still, moving, or reaching toward an object (Ristic & Enns, 2015, p. 159). Thirdly, the "attention-for-planning" view emphasizes the need for some steps to be completed before others (Ristic & Enns, 2015, p. 159).

2.4.1 Early models of selective attention

Broadbent's and Treisman's Models of Attention can be given as an example of the well-known theories of selective attention. Broadbent (1958) argued that human beings have a limited capacity to process information, which requires a filter to prevent overloading the information-processing system. Thus, the inputs that were not initially selected by the filter would decay rapidly.

According to Treisman's (1964) framework, both the information that we focus on and the information we do not focus on can pass through the filter called "Attenuator", which later leads into the "Dictionary Unit" in order to reach working memory. In this framework, attention works as an attenuator, which allows individuals to volume down or up other stimuli in order to attend to a single source of information, whereas in a dictionary unit, every word has a different threshold for being activated. Thus, unlike the model of Broadbent (1958), Treisman (1964) argued that unattended messages could also be identified by individuals since they are just volumed down instead of being filtered. These frameworks are discussed specifically within the concept of selective listening studies.

2.4.2 Top-down and bottom-up controls of attention

Recent studies on attentional control generally focus on two main approaches (Van der Stigchel et al., 2009). First argues that spatial selection is under top-down control, which means that the observer selects the information according to his or her goals, beliefs, or intentions (Bacon & Egeth, 1994; Van der Stigchel, et al., 2009). Thus, this view is also called goal-driven attentional control (Vecera, Cosman, Vatterott & Roper, 2014). Within this approach, a stimulus could capture attention

only if it matches the properties of the target (Vecera, Cosman, Vatterott & Roper, 2014).

The second view suggests that spatial selection is under bottom-up control, which implies that attention is controlled by the physical properties of the scene regardless of the intentions or goals of the observer (Van der Stigchel et al., 2009; Theeuwes, 2004). This view emphasizes the role of stimulus-driven or stimulus-based factors in directing attention (Vecera, Cosman, Vatterott & Roper, 2014). According to the bottom-up control approach, visual attention is not selective enough to avoid attention being captured by irrelevant stimuli (Vecera, Cosman, Vatterott & Roper, 2014). Many studies found evidence that attention could be captured in a stimulus-driven way (e.g., Pratt, Radulescu, Guo, & Abrams, 2010; Theeuwes, 2010)

In order to examine the extent of bottom-up and top-down control of visual selection, the "attentional capture" paradigm could be used to discuss to what extent the observer is distracted by "bottom-up" signals (Van der Stigchel et al., 2009). In this regard, attentional capture could be defined as an interruption of a goal-directed behavior by irrelevant bottom-up information (Van der Stigchel et al., 2009). Studies proposed that stimulus-driven attention capture could be modulated by perceptual load or capture (Vecera, Cosman, Vatterott & Roper, 2014).

Jo, Kim, and Han (2021) argued that top-down control of attention and bottom-up control of attention could be differently involved across the low-load and high-load conditions. That is, in the low load conditions, the target stimulus could capture attention in a bottom-up manner since it is the only stimulus in task-relevant locations. However, in the high load conditions, bottom-up control of attention was not observed since the target stimulus was surrendered by competing stimuli. That's why, when performing a high-load task, a strong degree of top-down control was

required to focus on the target with the exclusion of the nontargets (Jo, Kim & Han, 2021).

According to the Attention Control Theory (Eysenck, Derakshan, Santos, & Calvo, 2007), the activation of the goal-directed attentional system decreases as the levels of anxiety increase. In other words, anxiety may increase the activation of the stimulus-driven attentional systems. Thus, this theory proposes the tendency of individuals to get distracted by anxiety-related distractors that are prioritized by stimulus-driven attention systems (Eysenck et al., 2007).

Thus, given all the evidence for both accounts, it is possible to argue that a dichotomous view of attentional control which focuses on both top-down and bottom-up controls, could be beneficial to investigate the mechanisms underlying attentional control (Vecera, Cosman, Vatterott & Roper, 2014). With this alternative modal, stimulus-driven control and goal-driven control could be discussed in the continuum form instead of separate processing modes (Vecera, Cosman, Vatterott & Roper, 2014).

2.4.3 Divided attention versus focused attention

There are two different procedures to examine the role of attention in perception, which are called divided attention and focused attention (Treisman, 1969). Divided attention implies the ability to divide attention between two or more sensory inputs and use two or more dimensions to analyze or test two or more targets that are defined by specific features (Treisman, 1969).

On the other hand, focused attention implies selecting or focusing on a single sensory input, analyzing a single dimension, or testing a single target while rejecting others (Treisman, 1969). Treisman (1969) argued that attention is a word that covers

a wide variety of selective processing rather than offering a single definition. With years of further experiments, the issue of capacity limitations of "divided attention" and "focused attention" came to be discussed within the problem of top-down control (Duncan, 2012, p. 15).

2.4.4 Focused attention in early childhood

Ruff and Rothbart (2001) argued that there are two distinct systems that subserve selective sustained attention, which are called the orienting system and the executive control system. Over the life of human beings, these two systems demonstrate different maturation schedules and involve different anatomical regions, as well as distinct chemical modulators. That is to say, dopamine is related to the executive system, whereas acetylcholine is linked to the orienting system (Fisher & Kloos, 2016, p. 219). These two attention subsystems can support the development of focused attention in early childhood (Posner, Rothbart, Sheese, & Voelker, 2014).

The ability to focus attention is already present early in infancy and demonstrates many similarities with the more mature selective attention of older preschoolers (Garon, Bryson & Smith, 2008). Early in infancy, focus attention is subserved by the orienting response system, which is at its maximum as long as the object retains some novelty (Ruff & Rothbart, 2001). In other words, the focus of attention in the first year of life is often characterized as stimulus-driven rather than participant-driven (Ruff & Rothbart, 2001). By the end of the first year of life, attention becomes more voluntary and less influenced by environmental factors (Garon, Bryson & Smith, 2008; Ruff & Rothbart, 2001). Within this period, selective sustained attention gradually becomes under the control of both orienting and executive control systems (Ruff & Rothbart, 2001). Some significant developments

in the ability to sustain attention focus for longer periods and structured tasks occur during the preschool years (Garon, Bryson & Smith, 2008). Likewise, the most extensive development occurs in the ability of conflict resolution during the preschool years, which is a significant aspect of executive function development (Garon, Bryson & Smith, 2008).

Overall, selective attention can be defined as an ability to focus on relevant information while ignoring irrelevant information (Van der Stigchel et al., 2009). Visual selective attention implies searching particular visual objects in the presence of competing distractors (Treisman & Gelade, 1980). It is often evaluated by visual searching tasks, in which a target that is defined by visual features and distractors that share a common feature but differ in different dimensions are given to participants, whereas participants are asked to identify targets among these distractors (e.g., Treisman & Gelade, 1980; Hommel, Li, & Li, 2004).

Studies demonstrated that social and emotional content often challenges children's and adults' attention (e.g., Calvo, Avero & Lundqvist, 2006). When the distractors to flank a task-defined target are given in the form of faces, both children and adults demonstrate more difficulty in ignoring them (Calvo et al., 2006). Moreover, findings suggest that faces that display negative emotions such as anger or fear take an attentional priority starting from infancy to adulthood (e.g., Calvo et al., 2006; Hoehl, Palumbo, Heinisch, & Striano, 2008).

Vygotsky (1978) argues that attention could take the first place among the significant functions in the psychological structure underlying the use of tools. Referring to former studies of Köhler (e.g., Köhler, 1927), Vygotsky (1978) also emphasizes that the ability to direct one's attention could play a significant role in the success or failure of any practical operation. Thus, attention has been seen as

important by many researchers throughout the years in the course of human development.

Attention has a significant role in the development of EF components (Garon, Bryson & Smith, 2008). Likewise, EF components, specifically inhibition and working memory, are considered to be critical components in the ability to sustain attention voluntarily (Colombo & Cheatham, 2006). It is also argued that there can be a bidirectional relationship between sustained attention and memory (Colombo & Cheatham, 2006). It is proposed that attention could be a mediator of self-regulation since it is developed through the interactions between individual temperament traits and environmental demands (Ristic & Enns, 2015).

2.5 The relationship between role-playing, inhibitory control, and attention

A handful of findings suggest that there might be a significant relationship between role-playing, inhibitory control, and attention in early childhood. Vygotsky (2004) argued that playing some imaginary situations or characters could enable children to enact some of these characteristics in real life too. Through pretend play, children can control their actions based on the role that they take while they must inhibit their real-world desires and follow the rules associated with an imaginary situation (Whitebread et al., 2017).

Previous studies have demonstrated that role-play can boost children's executive functions, which is called the Batman effect (White et al., 2017). On the other hand, some other studies focused on whether it was the role-playing of another's perspective or specifically the characteristics of the role itself which was responsible for this Batman effect (Veraksa et al., 2021). They investigated the effects of role-playing in relation to several roles, such as protagonist, villain, and

sage, which would indicate the characteristics of benevolence, malevolence, and skill on young children's executive function performances. Results demonstrated that children in the condition of the Sage and Control groups were significantly improved in terms of cold executive function scores, whereas this difference did not exist for hot executive function scores. On the other hand, children who played protagonists and villains did not demonstrate any significant improvement in cognitive flexibility.

In this study, children with benevolent or malevolent roles did not demonstrate any connection to the executive function task fulfillment, whereas others with a wise role might have built such a connection to their executive function roles (Veraksa et al., 2021). Thus, these findings support the idea that pretending to be someone with higher executive function skills can improve young children's cold executive function scores. An explanation for the control group scoring higher on the second test can be explained by the practice effect, which implies that children who take the same assessments the same way might have learned the tests better than the other groups. In this study, The Dimensional Change Card Sort (DCCS) task (Zelazo, 2006), Statue (NEPSY-II), and Inhibition (NEPSY-II (Korkman, Kirk, & Kemp, 2007) were used. They aimed to evaluate inhibition, motor persistence, and cognitive flexibility of executive function skills in young children. This study argues that not all self-distancing roles could have the same effectiveness in executive function tasks.

In another experimental study, the influence of graded levels of self-distancing was examined (White & Carlson, 2016). In this study, four manipulations of distance from the self were used, namely from proximal to distal: self-immersed, control, third person, and exemplar others through role-play, such as pretending to be Batman. Results showed that increased distance from the self was significantly

related to improvements in executive function in 5-year-old children. However, three-year-olds did not benefit from taking a self-distanced perspective through third-person self-talk or taking the perspective of an exemplar other through role-play. In the study, this difference was explained by the developmental differences in the theory of mind across this age range. A computerized version of the Flanker task (Zelazo et al., 2013) and was used to evaluate children's executive function.

Additionally, the benefits of self-distancing have been investigated in terms of children's perseverance (White et al., 2017). In the study, four- and six-year-old children were assigned to work on a repetitive task for 10 min while having the opportunity to take breaks by playing some attractive video game. Study results showed that six-year-old children could persevere longer than four-year-olds, whereas children who were pretending to be an exemplar other, such as Batman, worked longer on the task across both ages. Likewise, similar results were shown respectively by children with a third-person perspective on the self, and, finally, a first-person perspective. This study benefited from the Theory-of-Mind Scale (Wellman & Lie, 2004), several executive function tasks such as Forward and backward digit span, Dimensional Change Card Sort, Flanker, and finally, the Peabody Picture Vocabulary Test to evaluate receptive vocabulary in young children.

Study results demonstrated that children who took a self-immersed perspective were more likely to focus on immediate gratification and less likely to focus on a relatively long-term goal than those who were asked to reflect on the task as if they were another person (White et al., 2017). This finding supports the idea that taking on the perspective of another person could allow children to disengage from immediate pleasures and focus on their main goals. Another explanation for such an increase in perseverance could be that children identified themselves with the

powerful features of the characters they chose to impersonate, which was supported by dress-up props since the options children could choose were all competent in such tasks. Children in the exemplar condition worked the longest, which was followed by children in the third-person and self-immersed conditions. This finding is consistent with previous experiments, which indicated significant increases in self-control as a result of self-distancing in young children (White & Carlson, 2016). In this study, the theory of mind or receptive vocabulary did not moderate the potential correlates of perseverance and role-playing (White et al., 2017). Yet, previous research (White & Carlson, 2016) found that children with a relatively advanced theory of mind benefited more from role-playing and third-person self-talk than those with a lower theory of mind skills. However, unlike this recent study, White and Carlson (2016) included 3-year-olds in their study. Such an age difference could be an explanation for the difference in these findings too.

In another experimental study, 66 preschooler children were assigned to the Superman-caped conditions, half with instructions regarding Superman's delay-relevant qualities or a control group with the un-caped condition. Results demonstrated that those who were in the caped group were able to delay longer than those in the uncapped control group, especially when they were exposed to instructions regarding Superman's delay-related abilities (Karniol et al., 2011). In the second part of the study, 48 preschool children were assigned to two conditions; in the Superman Cap condition, children were told about Superman as a superhero who is very patient and can wait really well, whereas, in the Dash Cap condition, children were told about a superhero who is very impulsive and never waits for anything (Karniol et al., 2011). Results demonstrated that children with Superman caps could wait longer than children with Dash caps (Karniol et al., 2011).

In another study, 97 4-year-old children from a federally funded Head Start pre-kindergarten program were randomly assigned to receive one of three types of guided play intervention (Goldstein & Lerner, 2018). Children in the experimental group received an 8-week guided dramatic pretend play intervention which consisted of a set of dramatic pretend and role-play games. On the other hand, two control groups were formed; children in the first control group received a guided block-building activity, whereas children in the second control group were given a guided storytime. Results demonstrated that attending 24 sessions of guided dramatic pretend play intervention could lower children's live distress responses and child-reported emotion matching during descriptions of others' distress as compared to engaging in either guided block play or story time (Goldstein & Lerner, 2018).

Grenell et al. (2019) examined age-related differences in the effectiveness of self-distancing were examined. For this purpose, typically developing 72 4-year-old children and 67 6-year-old children were randomly assigned to one of four self-distancing experimental groups, in which they were asked to think about themselves from the perspectives of self-immersed, control, third-person, or competent media character. In each group, children were given a frustrating task for 10 minutes, and overt expressions of frustration were coded by researchers. Results demonstrated that younger children and children with lower EF or lover effortful control (regardless of age) benefited the most from self-distancing manipulations. In this regard, researchers suggested that using third-person speech or pretending to be a media character could improve children's self-regulation, whereas self-distancing could be especially effective for vulnerable individuals (Grenell et al., 2019).

White and Carlson (2021) examined the facilitator role of pretending with realistic and fantastical stories in executive function in 3-year-old children. In their

experiment, children were told a fantastical or realistic story and then were asked to engage in pretense or non-pretense activities. After that, children were asked to complete the Less is More task of inhibitory control. Results demonstrated that children who were told a fantastical or realistic story performed equally well, whereas children who took place in story-related pretend play performed better inhibitory control than those children who engaged in a non-pretense activity. Nevertheless, they found no significant relationship between story content and play engagement type. These findings supported that mode of play engagement with a story could be more significant in promoting young children's inhibitory control skills than the level of realism in the stories.

To sum up, previous studies provided evidence for a relationship between children's engagement in role-play and inhibitory control skills. However, there was no study to specifically focus on the effects of role-playing on children's attention skills. Likewise, none of these relationships have been investigated through experimental design studies in the Turkish context. Thus, there is a gap in the literature regarding the effects of role-playing on children's inhibitory control and attention skills.

2.6 Aim of the study

The aim of the study was to investigate the effects of role-playing on five and six-year-old children's attention and inhibitory control skills. To reach this aim, a posttest-only experimental design was used with three condition groups; Story-Only Condition in which children were exposed to a story that had a main character with high cognitive abilities. Role-Playing Condition, in which children were exposed to a story that had a main character with cognitive abilities but also offered to wear the

cloak of that character to pretend, and Control Condition, in which children listened to a story with a main character who had no high cognitive abilities. The study aimed to contribute to the literature by proposing the effects of role-play on children's inhibitory control and attention skills.

2.7 Importance of the study

In light of the literature, it is possible to conclude that role-playing involves inhibitory control as it requires children to inhibit their actions and responses (Zelazo et al., 2008). However, especially in the Turkish context, there is not enough study to investigate the effects of role-play on children's inhibitory control. Similarly, in current studies, the need for additional research to test the generalizability of the effect of self-distancing in young children is mentioned (e.g., White & Carlson, 2016).

On the other hand, the benefits of self-distancing have been investigated in terms of children's perseverance by some other studies (e.g., White et al., 2017). Such studies could make a connection to the effects of self-distancing on children's attention span too. However, in the literature, there is no study that specifically focused on the effects of role-playing on children's attention. Thus, it is possible to claim that the current study makes a unique contribution to the literature. Likewise, since the literature emphasizes the relationship between attention control and inhibitory control (e.g., Colombo & Cheatham, 2006; Garon, Bryson & Smith, 2008), it could be significant to examine the effects of role-playing on these two constructs together.

The current study can encourage the use of role-playing games in early childhood education programs and sheds light on the preparation of more effective

intervention programs by supporting the effect of role-playing and symbolic games on children's attention and inhibitory control skills in early childhood with experimental findings. Likewise, it may guide educators to prepare lesson plans that include role-playing to boost children's inhibitory control as well as attention in class.

2.8 Research questions and hypotheses of the study

In light of the literature, in this study, the aim was to focus on the effect of role-playing on children's inhibitory control and attention skills. This thesis research seeks answers to the following research questions:

R1: Is there a significant difference between the groups of children who were exposed to role-taking manipulation and those who were not exposed to role-taking manipulations on attention skills?

R2: Is there a significant difference between the groups of children who were exposed to role-taking manipulation and those who were not exposed to role-taking manipulations on inhibitory control?

Additionally, the current study seeks answers to the following sub-questions:

R3: Do age and gender have effects on children's performances between the children who were exposed to role-taking manipulation and those who were not exposed to role-taking manipulations on attention skills?

R4: Do age and gender have effects on children's performances between the children who were exposed to role-taking manipulation and those who were not exposed to role-taking manipulations on inhibitory control?

In line with the research questions, the hypotheses of this study can be found below:

H1: Those children who were exposed to a story that had a main character with high cognitive skills and were offered to wear the cloak of that character to pretend would demonstrate significantly different inhibitory control scores than those who listened to the same story but were not exposed to any role-taking manipulation and those who listened to a story with a main character who had no high cognitive skills.

H2: Those children who were exposed to a story that had a main character with high cognitive skills and were offered to wear the cloak of that character to pretend would demonstrate significantly different attention scores than those who listened to the same story but were not exposed to any role-taking manipulation and those who listened to a story with a main character who had no high cognitive skills.

CHAPTER 3

METHOD

3.1 Research design

Quantitative research methods were used to investigate the effects of role-playing on children's attention and inhibitory control. Quantitative research can be defined as the collection and analysis of numerical data in order to describe a situation, investigate relations, study cause-effects, and explain or predict phenomena (Mills & Gay, 2016). There are several forms of quantitative research methods. Survey research design is used to describe a current condition, whereas correlation designs are designed to investigate the relationship between two or more variables. On the other hand, experimental and causal-comparative studies are used to examine cause-effect outcomes (Mills & Gay, 2016)

In this study, an experimental research design was used in order to investigate the effects of role-playing on children's attention and inhibitory control. In experimental research, at least one independent variable should be manipulated by the researcher in order to observe its influence on one or more dependent variables (Mills & Gay, 2016, p.285). In the current study, the posttest-only control group design was preferred. The posttest-only control group design requires participants to be randomly assigned to at least two groups without any pretest (Mills & Gay, 2016, p.305). Since the current study aims to evaluate children's attention and inhibitory control skills in 3 different groups, which are to be assigned randomly, this design fits the best.

In the study, there were one control group and two experimental groups. The reason for the two experimental groups was to explore the effects of introducing a

novel character with high executive skills and role-playing. The combination of random assignment as well as the existence of a control group enables researchers to control for all threats to internal validity except mortality (Mills & Gay, 2016, p.285). The reason for this case is that there was no pretest in this design which could lead to mortality. Random assignment was preferred to increase the generalizability of the findings.

3.2 Population and sample

The current study included 90 typically developing children ranging in age from 55 to 76 months (M = 65.8 months, SD = 5.9) who live in İstanbul and attend a public kindergarten in İstanbul. In the current study, a convenience sampling method was used to access the pool of children to be randomly assigned to one of the study conditions. Convenience sampling can be defined as selecting volunteering participants who are available at the time just because of their availability (Mills & Gay, 2016). In this respect, the researcher visited five public schools which were available for the researcher. One preschool with seven classes in Küçükçekmece and one preschool with five classes in Beşiktaş volunteered to be a part of the study. Twelve preschool teachers of these schools also agreed to take part in the study. Finally, the early childhood education unit of a public university participated in the study with their three classes. Overall, 210 parental permission forms were sent out to the parents of these children (Appendix A & B). In the end, 90 parents gave permission for their children to participate in the study. These 90 children whose parents gave permission became the participants of the study.

Table 1. Descriptive of Participating Children

Variables	Research Groups	Mean	SD	Minimum	Maximum
Age in Months	Story-Only Condition	65.9	6.3	55.0	76.0
	Role-Playing Condition	66.2	5.7	55.0	76.0
	Control Condition	65.7	6.2	55.0	76.0

N= 90

All in all, in the current study, there were 90 children. These children were randomly assigned to one of the three study groups, and the age and gender of these children were aimed to be similar in each group. Thus, children's sex was evenly split overall, with 48 boys and 42 girls. In each group, there were 16 boys and 14 girls. Thus, each group consisted of 30 children (16 boys and 14 girls). Story-Only Condition has a mean age of 65.9 months (SD=6.3), Role-Playing Condition has a mean age of 66.2 months (SD=5.7), and the Control Condition has a mean age of 65.7 months (SD=6.2).

In a similar experimental design study, 48 three-year-old and 48 five-year-old children were chosen as participants to be assigned one of the four manipulation groups of distance from the self (e.g., White & Carlson, 2016). Another similar experimental design study included 80 typically developing five to six-year-old children, assigning 20 children to each of the four groups (Veraska et al., 2021). Another experimental study to explore the effect of playful and non-playful contexts on children's mastery motivation and private speed had a total of 38 children, assigning 19 children in each condition (Sawyer, 2017). The current study was limited to five and six-year-old children.

For true experimental design studies, a minimum of 30 participants for each study group (e.g., experimental and control groups) is recommended as a guideline (Mills & Gay, 2016). In this regard, it is possible to say that the sample size of the current study was adequate (N=90), considering similar studies done in the literature as well as the guideline offered by researchers.

As parents gave consent for their children to attend the study, an invitation form and a demographic information form were sent to these parents. In the invitation form, the requested information was related to being able to reach parents to invite them to a webinar in which the results of the study would be presented (Appendix C & D). Additionally, in this form, those who shared contact information became eligible for the lottery regarding a gift coupon that can be used for book and stationery shopping. In the demographic information form, the requested information was related to socioeconomic status of parents, their ages and total number of children (Appendix E & F). Nevertheless, only 63.3 % of the parent returned these forms (N=57). Therefore, only these answers could be utilized to describe the participants.

Table 2. Demographic Information of Children's Families

Demographics	Descriptions	N	Percentage
Income Level	Low	2	3.5%
	Below Medium	5	8.8%
	Medium	41	71.9%
	Higher than Medium	8	14.0%
	Upper	1	1.8%
Education Level of Mothers	Primary School	1	1.8%
	Secondary School	-	-
	High School	2	3.5%
	Associate Degree	14	24.6%
	Bachelor's Degree	32	56.1%
	Master's or PhD	8	14%
Education Level of Fathers	Primary School	-	-
	Secondary School	-	-
	High School	6	10.5%
	Associate Degree	10	17.5%
	Bachelor's Degree	34	59.6%
	Master's or PhD	7	12.3
The Total Number Of Children	One	24	42.1%
	Two	28	49.1%
	Three	5	8.8%
The Age of Mothers	29-34	12	21.1%
	35-40	32	56.2%
	41-48	13	22.9%
The Age of Fathers	31-34	6	10.6%
	35-40	26	45.6%
	41-50	25	44%

N= 57

To be able to describe the socio-economic characteristics of the participants, one of the questions asked in the demographic information form was to describe their income level when they consider the city they live in. 12.3% of parents claimed that their income levels were low or below medium (N = 7). 71.9% of parents reported

having a medium income level (N = 41). 15.8% of parents reported having higher than medium or upper-income levels (N = 9).

72% of the mothers reported that they worked in a full-time or part-time job whereas the rest of the mothers claimed that they did not work. All of the fathers reported working in a full-time job. 5.3% of mothers graduated from Primary School, Secondary School, or High School (N = 3), and 24.6% of these mothers held an associate degree (N = 14). 56.1% of mothers graduated from university (N = 32), whereas 14% of these mothers had either a master's or Ph.D. degree (N = 8).

Considering the reports of fathers, 10.5% of these fathers had a diploma from high school (N=6), while 17.5% of them had an associate degree (N = 10). 59.6% of these fathers graduated from university (N = 34), and 12.3% of them had either a master's or Ph.D. degree (N = 7).

How many children these parents have was another demographic information gathered. 42.1% of these parents had 1 child in total (N=24), 49.1% had 2 children (N=28), and 8.8% had 3 children (N=5). None of the parents reported their children having a need for mental or psychological support. All of these children were living with both their biological mothers and fathers.

Additionally, the ages of the parents were asked in demographic information forms. 21.2% of mothers were ranging in age from 29 to 34 years old (N = 12). 56.2% of the mothers were 35 to 40 years old (N = 32). 22.9% of mothers were 41 to 48 years old (N = 13). 10.6% of fathers were ranging in age from 31 to 34 years old (N = 6). 45.6% of fathers were 35 to 40 years old (N = 26). 44% of parents were 41 to 50 years old (N = 25).

3.3 Data collection tools

3.3.1 Inhibitory control (The Day/Night Task)

Children's inhibition control was measured via the Day and Night Task (Carlson & Moses, 2001; Gerstadt, Hong, & Diamond, 1994). The Day-Night Stroop Task (DNST; Gerstadt et al., 1994) requires individuals to inhibit a verbal response to a given stimulus. Therefore, it is considered to be a measure of response inhibition (Nassuer & Halperin, 2003). Based on the recommendation of Prof. Adele Diamond, who is one of the developers of the Stroop-like Day and Night Task, the task was administered in two blocks (Appendix G). For the first block, the researcher applied the congruent condition first (saying what the cards really represent). The reason for this condition was to make sure that children were able to adopt the prepotent response (Berwid et al., 2005). Then, for the second block, the researcher applied the actual incongruent condition (saying the opposite of what the card really presents). All the children gave correct answers in the first congruent version, so it was not included in the analysis as a variable.

In this task, there were two cards which included a day card where there was a sun on a white background and a night card where there was a moon and stars on a black background (Figure 1). Each card was printed on a same-sized coated paper (9 x 9 cm).

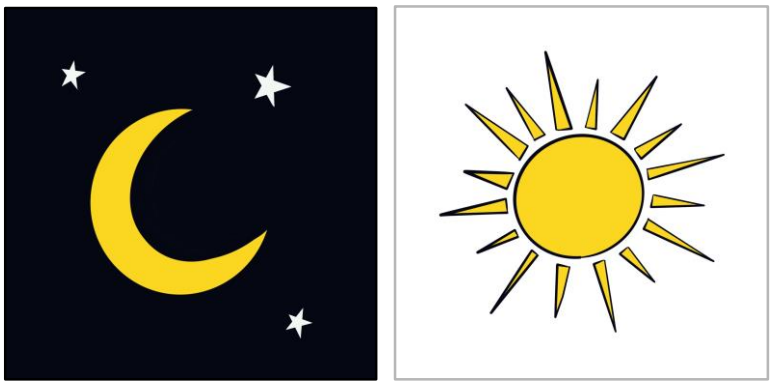


Figure 1. Day and Night Task Cards

Children were asked to say “day” if they were shown a card with the moon and stars, whereas they were asked to say “night” if they saw a card with the sun. There were two practice trials before the experiment began, one for the day card and one for the night card. If the child could not give correct answers for the practice trial, the experimenter reminded the rule of the task and gave the correct answer. After all these, there were 16 test cards in which no feedback was given to the child. The cards were shown in the order of “night, day, day, night, day, night, night, day, day, night, day, night, night, day, night, day.” Children’s performance in each test was scored as “1” if they gave the correct answer, whereas the wrong answers were scored as “0”. The first responses of children were scored so that even if children self-corrected themselves after giving the wrong answer, it was scored as 0. The total scores of each test were calculated, ranging between 0 and 16. There were no rule reminders or breaks.

3.3.2 Attention (FTF-K Concentration Test for 5-6 Year-Old-Children)

To measure children’s attention, the Frankfurter Test für Fünfjährige — Konzentration [Frankfurt Test for Five-Year-Olds — Concentration] Frankfurter

Attention Test (Raatz & Möhling, 1971; Gözüm & Kandır, 2018) was used (Appendix H). The task was developed by Raatz and Möhling in 1971 in Germany. The task was applied to 100 five to six-year-old children, the test-retest reliability was found to be r=. 85 (Raatz & Möhling, 1971). In this task, children were given some paper that included pictures of apples and pears in a disorganized way. The experimenter asked children to cross out all the pears that they could detect in 90 seconds. The total number of crossed-out pears became the raw score of the child. There were a total of 42 pears among apples, and children got 1 point for each pear they crossed out. The possible range for this task was between 0 and 42. Mistakenly crossed-out apples were not included in the score. Children's raw scores can be adjusted to evaluate their scores in regard to norms based on their gender and age too. However, in the current study, since individual evaluations were not preferred, group comparisons were made based on raw scores.

The first study of the Frankfurter Attention Test for the Turkish context was conducted by Ankara University. It was applied to children individually (Kaymak, 1995). Similarly, the Frankfurter Attention Task has been studied in terms of reliability and validity in the Turkish context, too (Gözüm & Kandır, 2018). Results of the study show that this task can be used with Turkish children too. In their study, Gözüm and Kandır (2018) reported a retest reliability coefficient of .74 for an interval of three weeks, which means that the Frankfurter Attention Test can be a reliable tool for children in the Turkish context too.

3.3.3 Demographic information form

The Demographic Information form consisted of two main areas of information Appendix E & F). In the first part, the information requested about the children was

the gender of the individuals and their birth dates. In the second part, the information requested was about the parents, such as parents' ages, education levels, working status, and how they evaluate their income level compared to the city they live. Additionally, whether or not their children had any diagnosed disorder was asked via this form. These questions were prepared to have a better picture of the participants to interpret findings and define the population. However, the response rate of the second part was not high enough to include in the analysis.

3.3.4 The manipulation of the story of Çiçi

In this study, two stories were developed to introduce a new character to children, Çiçi (Appendix I & Appendix K). The name Çiçi was chosen for being a unisex name so that in each story, the name Çiçi was used as the main character. However, the character was drawn as a boy and girl separately for male and female participants, respectively. The reason for this was to make sure that children would be exposed to a character with the same gender as theirs.

Children demonstrate an awareness of gender stereotypes by the age of three (Martin & Ruble, 2009). Thus, the gender presentation of a human protagonist could be significant for children to relate to the story. Studies showed that although children knew that boys could have long hair, they claimed that it was usual for girls to have longer hair than boys in general (Hill & Bartow Jacobs, 2020). In this regard, the male version of Çiçi had short brown hair and brown eyes. The female version of Çiçi also had brown hair and brown eyes, but she also had longer hair than the male version and had some hair-clip on her hair. The reason for this was to make sure that children interpret the sex of the character to better relate. Also, hair-clip and longer

eyelashes were added to illustrations to support a more feminine look. These characters are given below. See Figure 2.

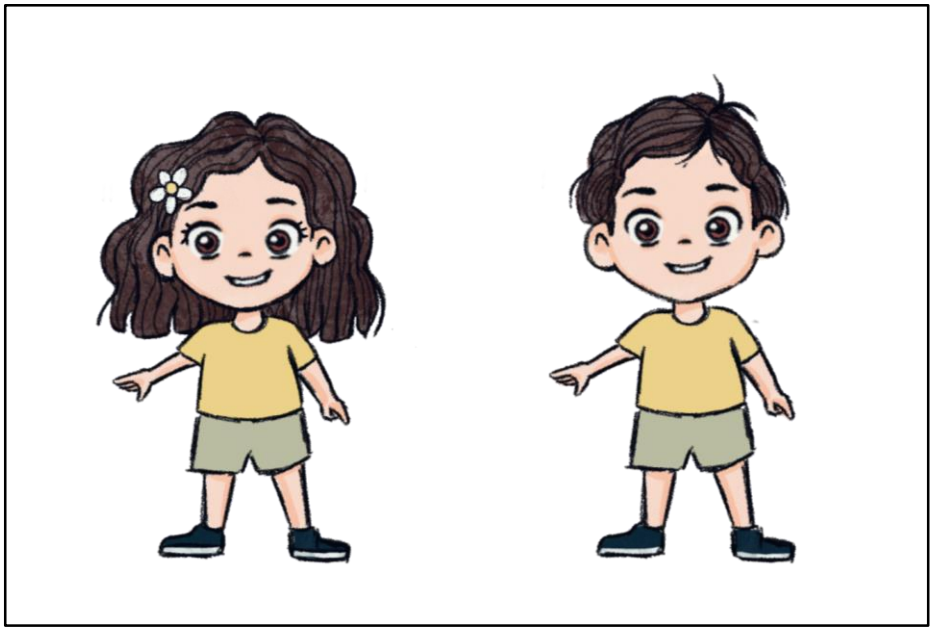


Figure 2. Illustration of Çiçi the girl and boy versions

In Turkey, previous studies have shown that 74% of the Turkish population had either brown or black hair, whereas 90.8% had brown eye color (Ertenü, Altunay & Köşlü, 1995). Therefore, it was aimed to have a general look at the Turkish population for the main character, Çiçi, too. Also, to reduce the effect of character clothes on children's attention, neutral colors were chosen, and they were dressed up the same way. The whole story was written and illustrated the same way for both genders.

In the experimental version of the story, Çiçi finds a magical cloak in the playground (Appendix I & J). After wearing that cloak, Çiçi becomes more attentive and can find his or her friends very quickly by paying attention to details during the hide-and-seek game. Then, after an accident, some apples and pears on a vendor's

counter fall to the ground and get mixed up. However, Çiçi can quickly pick up all the pears very quickly among apples, thanks to the magic cloak. Then, Çiçi realizes the power of the cloak, but the cloak whispers to Çiçi, saying, “I made you very careful and fast. Now let us make other children more careful and faster.” An example of Çiçi with the cloak is given below, Figure 3.

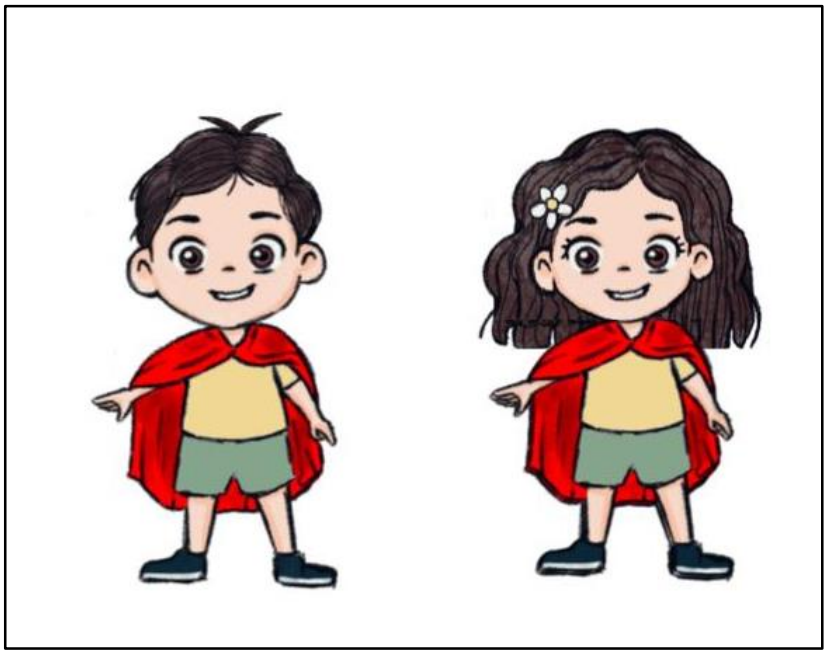


Figure 3. Example illustrations of Çiçi with the red cloak

In the control version of the story, Çiçi goes to the playground to play with other children (Appendix K & L). However, she or he does not find any cloak. When Çiçi plays hide-and-seek, she or he has lots of trouble finding others and finding himself or herself a good play to hide. During play, Çiçi accidentally hits a vendor's counter and causes apples and pears to fall on the ground. Then she or he cannot help pick up pears or apples because it looks too confusing. In the end, Çiçi feels bored and wants to go home.

The reason for the difference in storylines was to demonstrate the effects of role-playing a character with high skills while controlling the effects of reading a story with a high-skilled character alone. Not reading any story to children in the control group could also influence the results of the study. Therefore, it was aimed to design two separate stories which could demonstrate the effect of role-playing a high-skilled character in more detail. Thus, in Story-Only Condition, children were exposed to the experimental version of Çiçi, whereas in Role-Play Condition, children were exposed to the same experimental version of the story but were also offered to wear the red cloak of Çiçi during tasks. Additionally, to control the effects of the context given in the story, children in the control condition were exposed to the control version of Çiçi. All of these stories were evaluated by two different experts in early childhood education and Turkish literature for their developmental appropriateness as well as the usage of language. The red cloak was made specifically for five and six-year-old children and did not have any symbols on it. The stories were horizontally printed on spiralized A4 sheets. Each story had a similar length and total page number. The story was read by the experimenter to each child individually.

3.4 Procedure

First of all, approval from The Ethics Committee for Master and Ph.D. Theses in Social Sciences and Humanities (SOBETİK) of Boğaziçi University was obtained in order to conduct the study (Appendix M). Then, the İstanbul City Administration Department of the Ministry of National Education was conducted to get the required permissions to study with children who attend public preschools and kindergartens in İstanbul (Appendix N).

Then schools were visited by the researcher in order to inform them about the study and see who would volunteer. In this respect, the researcher visited five public schools which were available for the researcher. Two of them agreed to take part in the study. The first public school was located in Küçükçekme and had seven classes in which children attended school full-day. The second public school was located in Beşiktaş. This school also had five classes and offered full-day education. Finally, the early childhood education unit of public university participated in the study with their three classes. Overall, 210 parental permission forms were sent out to the parents of these children via class teachers. At the end of two weeks, 90 parents gave permission for their children to participate in the study.

After parental permission, participating children were assigned to control and experimental groups randomly. For this process, random assignment was preferred in order to increase the generalizability of the study. Also, the gender and age of the children in each group were checked out to make sure that the groups were similar. Each participant was given a participant number to make sure of confidentiality.

To begin the data collection process, the researcher introduced herself to the children with the support of the class teacher. She claimed that she had some games to play with, and she got permission from their parents to play these games with them already. Only if they want to, they go to a silent room to play these games together. The experimenter said that these games would take about 15 minutes, and they would come back to class anytime the child wanted. The right to withdraw was ensured for each child. When the children agreed to join in the experiment, the experimenter told the teacher that they would be going to the experiment room and coming back in 15 minutes together. The rooms where experiments were held were silent and had a child-sized table and two chairs, whereas the chairs faced an empty

wall. The experimenter closed the door of the experiment room and put a sign on it to avoid any interruptions.

As a warm-up activity, the researcher played a simple tag-like game with each participating child before starting the experiment. In this game, the researcher and the child played tag on paper by drawing lines. This game took approximately two minutes. After this game, the experimenter said that "Today I have a very short story with me. Would you like to read it together? Let us see what happens in the story". Then the researcher read the matching story based on children's experiment groups and gender. "Çiçi" was the name of the character in each story, and girls were exposed to a female character look, whereas boys were exposed to a male character look with the same name. The reason for picking the name "Çiçi" was to provide a novel name to avoid any irrelevant associations. Then, the experimenter read the story to each child based on their gender and research group.

In the control group, children were read a story about a child who went to play at a playground. In the story, the main character, Çiçi, was not showing any great attention or executive function control skills. On the contrary, this character was rather not able to focus on details and made some simple mistakes. Then Frankfurter Attention Task and Day and Night Task were given to children.

In Story-Only Manipulation, children were read a story about a child who went to a playground and found a red cloak that made the character super attentive and skillful. In the story, the main character, Çiçi, was able to find their friends fast in the hide-and-seek game while finding pears among apples very fast after an accident. Then Frankfurter Attention Task and Day and Night Task were given to children.

In Role-Playing manipulation, children were read the same story as the Story-Only manipulation group, however, in this group, children were given a red cloak

after the story. To introduce the red cloak, the experimenter said, “Today, I also have a red clock like the one from the story Çiçi. Would you like to wear it too? Let’s see what you will do with this red cloak.”.

In each study group, the rest of the procedure was the same. First, participating children were given Frankfurter Attention Task. The experimenter said, “Here, a seller mixed up apples and pearls. Could you help this seller to find pearls? Look, there is a big peal here, and it is struck through (The experimenter shows the pear that is struck through). Now I will give you this page. Here there are many apples and pears mixed up. Now you know what you are going to do. You will find the pears and strike them out. Now take your pen and strike pears out as fast as you can. Continue until I tell you to stop. Now you can start” (90 seconds begin). After 90 seconds, the experimenter said, “Okay, that is enough. Now let us play another game.”

The Stroop-like Day and Night Task was administered in two blocks. For the 1st Block, the researcher applied the congruent condition first and said, “This time, we will play a game with cards. When you see this card (the experimenter shows the card with the sun), I want you to say ‘day’. Could you repeat it? When you see this card (the experimenter shows the card with the moon), I want you to say ‘night’. Could you repeat it?” . Then,16 cards were shown in the same order for each participating child.

Then, for the 2nd block, the researcher applied the actual incongruent condition. In this part, the researcher said, “Now we will play another game. When you see this card (the experimenter shows the card with the ‘sun’), I want you to say ‘night’. Could you repeat it? When you see this card (the experimenter shows the

card with the ‘moon’), I want you to say ‘day’. Could you repeat it? Okay, let us try. (Two trial cards are used)”

Then, 16 cards were shown in the same order for each participating child. The experimenter scored the children’s answers. Only the first answers of the children were scored, and they got 1 point for their correct answers, whereas 0 points for their incorrect answers even if they corrected themselves afterward. There were no rule reminders or breaks during the experiment.

When all of these were done, those children who were not given any cloak were told, “Today, I have a cloak with me. Would you like to try it on?”. Most children agreed to try it on, and the researcher waited for them to wear the cloak and talked about the games they played together. Then, they were asked to take it off and return to their classes with the experimenter. The reason for this was to avoid children feeling bad about not getting a chance to wear a cloak if they learned about their friends who were in the experiment group with the cloak manipulation. The experimenter thanked each child for their participation and claimed that she enjoyed playing games together.

3.5 Data analysis

First of all, descriptive analyses were conducted to see the demographic characteristics of the sample. In this respect, the demographic characteristics of the sample, such as age and gender, were demonstrated as frequencies, mean, SD, maximum and minimum levels.

Then, the values of skewness and kurtosis for each study group were examined for both attention and inhibitory scores in order to check whether or not there was a normal distribution. Results showed that the skewness and kurtosis values ranged

between +2 and -2, which could be accepted as a normal distribution (Georgy & Mallery, 2019).

Then, to find answers to research questions, a series of One-Way Analyses of Variance (ANOVA) was performed on SPSS. In this regard, ANOVA was used to see whether or not there was a significant mean difference in children's attention and inhibitory control scores between the three research groups. The significance level was set to .05 for statistical analyses. Post-Hoc Analyses were done to examine which groups were different accordingly.

Intercorrelation among variables was examined to see whether or not age could have an effect on results. As results demonstrated that age had a significant relationship with both attention and inhibitory control task scores, to control for the effects of age on findings, ANCOVA was performed for both inhibitory control and attention scores separately. Finally, Two-Way ANOVA with bootstrapping was performed to investigate the interaction between gender and inhibitory control as well as attention, respectively. The bootstrap enables researchers to approximate the shape of the sampling distribution by creating many simulated experiments on the basis of a single data set (Kulesa, Krzywinski, Blainey & Altman, 2015). The reason for preferring this method was to investigate gender effects and possible interactions despite the small sample size.

CHAPTER 4

RESULTS

In this section, the findings of the study are presented. A series of descriptive analyses, correlational analyses, One Way Analysis of Variance, ANCOVA, and Two-way Analysis of Variance were conducted to investigate research questions and to test the hypotheses of the study.

4.1 Normality analysis

First of all, normality analysis for study variables has been run for each group. The criterion for a kurtosis value between +/- 1.0 is considered excellent, whereas a value between +/- 2.0 is acceptable (George & Mallery, 2019). As with kurtosis, a skewness value between +/- 1.0 can be considered excellent, whereas a value between +/- 2.0 can be acceptable (George & Mallery, 2019). In Table 3, normality analysis of dependent variables is given.

Table 3. Normality Analyses of Dependent Variables

Dependent Variables	Study Conditions	Skewness	Kurtosis
Attention Task	Story-Only	-0.533	-0.339
	Role-Playing	-0.472	-0.546
	Control	-0.208	-0.391
Day and Night Task	Story-Only	-1.346	1.632
	Role-Playing	-1.423	1.883
	Control	-0.865	-0.246

As shown in Table 3, the values of kurtosis for the attention task in the Story-Only Condition, Role-Playing Condition, and Control Condition are listed as -0.339, -0.546, and -0.391, respectively. The values of skewness for attention task in the Story-Only Condition, Role-Playing Condition, and Control Condition are listed as -0.533, -0.472, and -0.208, respectively. None of these values violate the guidelines (George & Mallery, 2019).

Likewise, as shown in Table 3, the values of kurtosis for the Day and Night Task in the Story-Only Condition, Role-Playing Condition, and Control Condition are listed as 1.632, 1.883, and -0.246, respectively. The values of skewness for attention task in the Story-Only Condition, Role-Playing Condition, and Control Condition are listed as -1.346, -1.423, and -0.865, respectively. None of these values violate the guidelines (George & Mallery, 2019).

Thus, overall, it is possible to conclude that for both attention and inhibitory control task scores in each group, the normality assumption is met. Therefore, no data were excluded from the data set.

4.2 Preliminary analyses

In the current study, a series of correlational analyses were conducted to see the relationship among the variables to examine whether or not age in months could be a covariate. The relationship between children's inhibitory control, attention scores, and age in months was examined in each study group separately.

For correlational design studies, a minimum of 30 participants is recommended as a guideline in order to establish the existence or nonexistence of a relationship (Mills & Gay, 2016). In the current study, there were 30 participants in each research group, which provides an adequate sample size to run a correlational analysis.

4.2.1 Correlations among age, attention and inhibitory control in Story-Only condition

Bivariate correlation analysis demonstrated that there was no significant relationship between attention scores and inhibitory control of children in the Story-Only condition Group ($p = .80 > .05$). Likewise, there was no significant relationship between the age of children and their Day/Night scores ($p = .057 > .05$). However, a significant positive linear relationship was found between the age of children and their attention scores in experiment group A ($r = .51$, $p = .00 < .05$). The strength of this relationship is medium (see Table 4).

Table 4. Correlation Matrix of Variables in Story-Only Condition

		Attention Task	Age in Months	Day/Night Task
Attention Task	Pearson's r	—		
	df	—		
	p-value	—		
Age in Months	Pearson's r	0.512 **	—	
	df	28	—	
	p-value	0.004	—	
Day/Night Task	Pearson's r	0.048	0.351	—
	df	28	28	—
	p-value	0.800	0.057	—

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

4.2.2 Correlations among age, attention and inhibitory control in Role-Playing condition

The bivariate correlation analysis demonstrated that there was a significant linear relationship between attention scores and inhibitory control of children in the Role-Playing Condition ($r = .40$, $p = .02 < .05$). This means that children who had higher scores on inhibitory control task were more likely to have higher scores on attention task in Role-Playing Condition. The strength of this relationship is medium. This relationship does not mean any casual relationship.

It was also found that there was a significant positive relationship between children's age in months and their attention scores ($r = .64$, $p = .00 < .05$). This means that older children were more likely to have higher scores in the attention task in Role-Playing Condition. The strength of this relationship is medium.

Similarly, there was a significant positive relationship between children's age in months and their inhibitory control scores ($r = 37$, $p = .04 < .05$). This means that older children were more likely to have higher scores in the inhibitory control task in Role-Playing Condition. The strength of this relationship is medium (see Table 5).

Table 5. Correlation Matrix of Variables in Role-Playing Condition

		Attention Task	Age in Months	Day/Night Task
Attention Task	Pearson's r	—		
	df	—		
	p-value	—		
Age in Months	Pearson's r	0.644 ***	—	
	df	28	—	
	p-value	< .001	—	
Day/Night Task	Pearson's r	0.403 *	0.372 *	—
	df	28	28	—
	p-value	0.027	0.043	—

Note. * p < .05, ** p < .01, *** p < .001

4.2.3 Correlations among age, attention and inhibitory control in control group

Bivariate correlation analysis demonstrated that there was no significant relationship between attention scores and inhibitory control of children in the Control Group (p =. 60 > .05). Likewise, There was no significant relationship between the age of children and their Day/Night Task scores (p = .80 > .05). However, a significant positive linear relationship was found between the age of children and their attention scores in experiment group A (r = .44, p = .01 < .05). The strength of this relationship is medium (see Table 6).

Table 6. Correlation Matrix of Variables in Control Group

		Attention Task	Age in Months	Day/Night Task
Attention Task	Pearson's r	—		
	df	—		
	p-value	—		
Age in Months	Pearson's r	0.441 *	—	
	df	28	—	
	p-value	0.015	—	
Day/Night Task	Pearson's r	0.098	0.048	—
	df	28	28	—
	p-value	0.607	0.800	—

Note. * p < .05, ** p < .01, *** p < .001

4.3 One-way analysis of variance (ANOVA) results

A One-Way Analysis of Variance (ANOVA) was performed to compare the differences between the three study groups in terms of their attention scores and Day/Night Task scores. One-Way ANOVA is a statistical technique for comparing the means of two or more independent groups on a dependent variable (Morgan, Leech, Gloeckner & Barrett, 2011). There are some assumptions for ANOVA. First, observations could be independent (Morgan et al., 2011). The current study aims to compare the scores of three independent groups so that it is appropriate. Secondly, equal variance on the dependent variable is needed (Morgan et al., 2011). Finally, the normal distribution of the dependent variable is examined. Since ANOVA is

considered robust, even if second and third assumptions are violated, it is still possible to use ANOVA with different post hoc analysis preferences (Morgan et al., 2011).

4.3.1 One-way analysis of variance (ANOVA) for children's inhibitory control scores across study groups

One Way ANOVA was applied to investigate whether there was a significant difference among these three groups with respect to their inhibitory control scores. For this purpose, group descriptive of Day/Night Task are given below, Table 7.

Table 7. Group Descriptive of One Way ANOVA for Inhibitory Control Task

Variable	Study Condition	N	Mean	SD	SE
Day/Night Task	Story-Only	30	12.83	2.99	0.54
	Role-Playing	30	14.63	1.56	0.28
	Control	30	12.73	2.49	0.45

As seen in Table 7, the mean Day/Night Task score of children who were in the Story-Only condition is 12.83 (SD = 2.99), the mean score of those who were in the Role-Playing is 14.63 (SD = 1.56) and the mean score of those who were in the Control condition is 12.73 (SD = 2.49). These descriptive analyses demonstrated that children in Role-Playing Condition had higher Day/Night Task scores than other two conditions. However, it is important to analyze whether or not this difference is statistically significant. To interpret One-Way ANOVA results, Levene's Test of

homogeneity of variances provides significant information regarding how the data was distributed, Table 8.

Table 8. Homogeneity of Variances Test (Levene's) for Inhibitory Control Task

Variable	F	df1	df2	p
Day/Night Task	4.09	2	87	0.020*

Note. * p < .05, ** p < .01, *** p < .001

The Levene test of homogeneity of variance test showed that variances were not equal (p = .020 < .05). When the variances are not equal, it is recommended to report Welch's F score to interpret the results (Welch, 1951; Zimmerman, 2004). Table 9 shows the results of One-Way ANOVA.

Table 9. One-Way ANOVA for Inhibitory Control

Variable		F	df1	df2	p
Day/Night Task	Welch's	8.39	2	53.6	< .001***
	Fisher's	5.84	2	87	0.004**

Note. * p < .05, ** p < .01, *** p < .001

Based on One Way ANOVA results, it was found that at least one group has a significantly different mean on Day/Night Task between The Story-Only, Role-Playing and Control groups (F (2, 53.6) = 8.39, p = < .001). Thus, the study supported its hypothesis.

To investigate which groups are different, Post-Hoc Analysis was conducted. The Games-Howell post hoc test is considered appropriate when the assumption of equal variance is violated (Morgan et al., 2011). Since the Levene test of homogeneity of variance test showed that variances are not equal ($p = .020 < .05$), Games-Howell Post Hoc Test was conducted, Table 10.

Table 10. Games-Howell Post Hoc Analysis for Day/Night Task

Study Conditions		1 (Story-Only)	2 (Role-Playing)	3 (Control)
1 (Story-Only)	Mean difference	—	-1.800 *	0.100
	p-value	—	0.015	0.989
			CI[.30, 3.30]	CI[-1.61, 1.81]
2 (Role-Playing)	Mean difference		—	1.900 **
	p-value		—	0.003
				CI[.30, 3.30]
3 (Control)	Mean difference			—
	p-value			—

Note. * $p < .05$, ** $p < .01$, *** $p < .001$
1: Story-Only Condition, 2: Role-Playing Condition, 3: Control Condition

According to Games-Howell Post Hoc Test, there is not a significant mean difference between The Story-Only and the Control groups ($p = .989$, CI [-1.61, 1.81]). However, in accordance with the hypothesis of the study, there was a significant mean difference between the Day/Night Task scores of The Role-Playing and Control Condition ($p = .003$, CI [.60, 3.20]), as well as The Role-Playing Condition and The Story-Only Condition ($p = .015$, CI [.30, 3.30]), indicating a

significant difference in favor of Role-Playing Condition. These findings were obtained with a 95% confidence interval for the difference in means.

These findings suggest that the Role-Playing Condition exhibited significantly higher performance on Day/Night Task compared to both Story-Only Condition and Control Condition, while there was no significant difference in Day/Night Task scores between Story-Only Condition and Control Condition. Table 11 shows the effect size for Day/Night Task scores.

Table 11. Effect Size for One-Way Anova Day/Night Task

	Sum of Squares	df	Mean Square	F	p	η^2
Research Group	68.6	2	34.30	5.84	0.004**	0.118
Residuals	511.0	87	5.87			

Note. * p < .05, ** p < .01, *** p < .001

For ANOVA, the common effect size measure is Eta squared (η2), which explains the percentage of variance in the dependent variable accounted for by the independent variable (George & Mallery, 2019). The current findings show that Eta square is .118, which is around .13, this means that the effect size is medium (Cohen, 1988).

4.3.2 One-way analysis of variance (ANOVA) for children's attention scores across study groups

To investigate the effect of role-playing on children's attention scores, One Way ANOVA was conducted. First of all, group descriptive of attention task were examined, Table 12.

Table 12. Group Descriptive of One Way ANOVA for Attention Task

Dependent Variable	Study Condition	N	Mean	SD	SE
FTF-K Attention Task	Story-Only	30	27.5	9.48	1.73
	Role-Playing	30	31.5	7.66	1.40
	Control	30	27.7	7.21	1.32

As seen in Table 12, the mean attention score of children who were in the Story-Only condition is 27.53, the mean score of those who were in the Role-Playing condition is 31.47, and the mean score of those who were in the Control condition is 27.73. Based on the mean attention scores across groups, it is possible to see that children in Role-Playing Condition had higher attention scores than those in Story-Only Condition or Control Condition. However, it is important to examine whether or not this difference is statistically significant via ANOVA results.

Firstly, to interpret one-way ANOVA results, Levene's Test of Homogeneity of Variances provides significant information, Table 13.

Table 13. Homogeneity of Variances Test (Levene's) for Attention Task

Variable	F	df1	df2	p
FTF-K Attention Task	1.71	2	87	0.186

As shown in Table 13, the Levene test of homogeneity of variance test showed that variances were equal ($p = .186 > .05$). When the variances are equal, it is recommended to report F value to interpret results, Table 14.

Table 14. One-way ANOVA for Attention Task (Fisher's)

Variable	F	df1	df2	p
FTF-K Attention Task	2.20	2	87	0.117

In ANOVA, it was concluded that there was no statistically significant difference between the mean attention scores of children in the Story-Only, the Role-Playing, and the Control groups ($F (2,87) = [2.204]$. $p = .117 > .05$). Therefore, no post hoc analysis was required for the scores of attention task. In this regard, the null hypothesis was accepted that there was no significant difference in children's attention scores across study conditions. In other words, role-playing manipulation did not have a significant effect on children's attention task scores.

4.4 Age and gender effects on children's performances between the experimental and the control groups

Examining group differences using ANOVA showed that while there were differences in children's performances in the study groups for inhibitory control, none was found for attention. The next step in the analysis involved whether age or gender influenced children's inhibitory control and attention scores in the study groups. Since the sample size was small, to explore age effects, an analysis of covariance, by including age as a covariate; and two-way analysis of ANOVA to explore age effects within the three study groups were performed separately.

4.4.1 Analysis of covariance (ANCOVA) for controlling the age of children

In order to increase the power of the significance tests, ANCOVA could be used to equate groups in terms of a covariate variable statistically. Although groups were randomly assigned, it is still possible that age differences played a role in the relationship between children's study conditions and their attention or inhibitory control scores. In the current study, intercorrelation analyses demonstrated that age was significantly related to both Day/Night Task and Attention Task scores across study groups. Thus, age emerges as a covariate variable to examine the effect of role-playing on children's attention and inhibitory control. Conducting ANCOVA in addition to ANOVA enables researchers to compare the effect sizes with and without controlling the covariate variable to demonstrate the relationships better.

4.4.1.1 Analysis of covariance results for inhibitory control task after for controlling the age of children

In order to investigate the effect of age on the effect of role-playing on children's inhibitory control scores, ANCOVA was performed. The dependent variable was the inhibitory control score, the covariate was children's age in months, and the fixed factor was research conditions, see Table 15.

Table 15. Analysis of Covariance Results for Inhibitory Control Controlling Age

	Sum of Squares	df	Mean Square	F	p	η^2
Research Condition	65.9	2	32.96	5.89	0.004	0.114
Age in Months	29.9	1	29.86	5.34	0.023	0.052
Residuals	481.1	86	5.59			

After controlling for age in months, there was still a significant difference in children's inhibitory control scores across study groups ($F(2,86) = 5.89$, $p = .00 < .05$). This shows that, even after controlling for age in months, there was still a significant effect of role-playing on children's inhibitory control scores. The common effect size measure is Eta squared ($\eta 2$), which explains the percentage of variance in the dependent variable accounted for by the independent variable (George & Mallery, 2019). The current findings show that Eta square was .114, which is around .13. This means that the effect size is medium (Cohen, 1988). Previous ANOVA results had shown that the Eta Square was .118. Thus, it is significant to emphasize that statistically significant differences among study groups

remained despite age being controlled, whereas the effect size did not really decrease much.

4.4.1.2 Analysis of covariance results for attention task after for controlling the age of children

To investigate the effect of age on the effects of role-playing on children's attention task scores, ANCOVA was performed. The dependent variable was attention score, the covariate was children's age in months, and the fixed factor was research conditions, Table 16.

Table 16. Analysis of Covariance Results for Attention Task Controlling Age

	Sum of Squares	df	Mean Square	F	p	η^2
Research Condition	257	2	128.6	2.63	0.078	0.042
Age in Months	1607	1	1607.3	32.87	< .001	0.265
Residuals	4206	86	48.9			

Results showed that after controlling for age, there was no significant difference in children's Attention Scores across study groups ($p = .07 > .05$), indicating a trend toward significance. Although the result did not reach conventional levels of statistical significance ($p < .05$), it is worth noting that the observed effect approached significance. Further research with a larger sample size may be needed to ascertain the true significance of the effect.

4.4.2 Two-way analysis of variance (ANOVA) for gender interactions

A two-way ANOVA was performed to analyze the effect of study conditions and gender on inhibitory control and attention, respectively. The main reason for this was to reveal any possible interaction between gender and study condition. Since the sample size was smaller than 30 for each group, bootstrapping was performed. The bootstrap enables researchers to approximate the shape of the sampling distribution by creating many simulated experiments on the basis of a single data set (Kulesa, Krzywinski, Blainey & Altman, 2015). The detailed results are given below.

4.4.2.1 Two-way anova to investigate gender differences in Day/Night Task

It was hypothesized that there would be a significant difference in children's Day/Night Task scores between girls and boys when they were in different conditions. To test this hypothesis, two-way ANOVA was performed. At first, an interaction plot of the Day/Night Task between gender and study manipulations was created (see Figure 4).

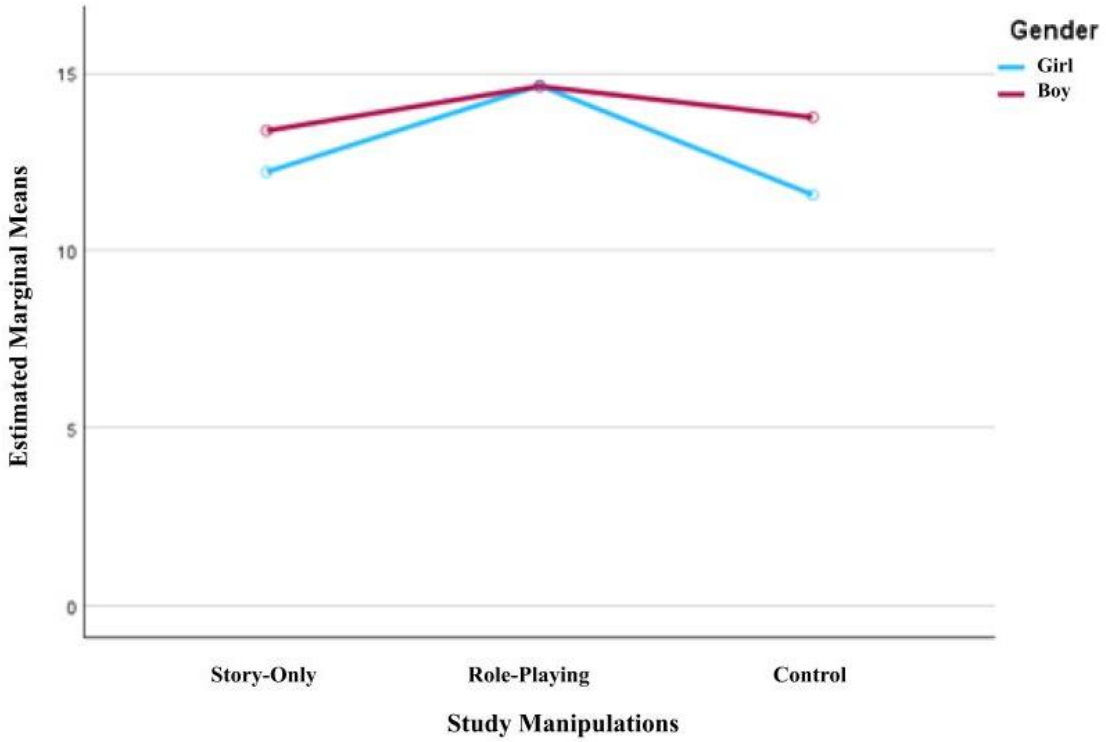


Figure 4. Interaction plot of Day/Night Task between gender and study manipulations

It was seen that there was no interaction between gender and study manipulations for Day/Night Task scores. However, further analysis was performed anyway via bootstrapping, Table 17.

Table 17. Tests of Between-Subjects Effects: Two-Way ANOVA for Gender x Study Condition for Day/Night Task

Dependent Variable: Day and Night Task						
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	114.100[a]	5	22.820	4.118	.002	.197
Intercept	16000.079	1	16000.079	2887.232	<.001	.972
Study Condition	72.621	2	36.310	6.552	.002	.135
Gender	27.457	1	27.457	4.955	.029	.056
Study Condition * Gender	18.043	2	9.021	1.628	.202	.037
Error	465.500	84	5.542			
Total	16740.000	90				
Corrected Total	579.600	89				

a. R Squared = .197 (Adjusted R Squared = .149)
* p < .05, ** p < .01, *** p < .001

A two-way ANOVA was performed to examine the effect of gender and role-playing on children's inhibitory control scores. Bootstrapping with 1,000 resamples was employed to correct for non-normality and non-homogeneity of variances. The results revealed that there was not a statistically significant interaction between the effects of gender and study condition on Day/Night Task scores, F (2,84) = 1.628, p = .202. Since the interaction was not significant, it is possible to argue that the effect of study manipulation on children's Day/Night Task scores was about the same for both genders.

On the other hand, as it was already expected, there was a statistically significant effect of study manipulations on Day/Night Task scores F (2,84) = 6.552, (p = .002). Additionally, in this table, it is possible to see that gender had a statistically significant effect on children's Day/Night Task scores F (1,84) = 4.955, (p = .029). Eta squared demonstrates an index of the effect size for each dependent variable (Morgan et al., 2011). As shown in Table 9, about 13% of the variance in

Day/Night Task scores can be predicted by study conditions, whereas 5% of the variance in Day/Night Task can be predicted by gender. Finally, Adjusted R Squared demonstrated the percent of the variance in Day/Night Task scores predictable from both study conditions, gender, and the interaction (r = .149). Further analysis was conducted to see gender differences in children's Day/Night Task scores.

Table 18. Estimated Marginal Means for Gender and Day/Night Task

Dependent Variable: Day and Night Task

			95% Confidence Interval		Bootstrap for Mean[a]			
							95% Confidence Interval	
Gender	Mean	Std. Error	Lower Bound	Upper Bound	Bias	Std. Error	Lower	Upper
Female	12.810	.363	12.087	13.532	.017	.447	11.901	13.702
Male	13.917	.340	13.241	14.592	.001	.258	13.402	14.427

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

In Table 18, it is possible to see estimated marginal means for gender and Day/Night task. As it is given, the mean score of girls was 12.810, and the mean score of boys was 13.917. This shows that the mean score of girls was lower than the mean score of boys. However, it is important to analyze further to see whether or not this difference was statistically significant. For this reason, pairwise comparison was done in Table 19.

Table 19. Bootstrap for Pairwise Comparison for Gender and Day/Night Task

Dependent Variable: Day and Night Task

			Bootstrap[a]				
						95% Confidence Interval	
Gender	Gender	Mean Difference	Bias	Std. Error	Sig. (2-tailed)	Lower	Upper
Female	Male	-1.107	.016	.515	.047	-2.137	-.056
Male	Female	1.107	-.016	.515	.047	.056	2.137

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

As mentioned before, since the sample size was small, Bootstrapping was performed to analyze gender differences. When the sample is too small, confidence intervals can be reported to investigate significant differences (Morgan et al., 2011). In the current study, the findings showed that there was a significant gender difference in children's Day/Night Task scores CI [-2.137; -.056] (see Table 19).

4.4.2.2 Two-Way ANOVA to investigate gender differences in attention

In this section, possible gender interactions with study conditions were examined. As stated earlier, since the sample size was smaller than 30 for each group, bootstrapping was performed. The bootstrap can be used to approximate the shape of the sampling distribution by creating many simulated experiments on the basis of a single data set (Kulesa, Krzywinski, Blainey & Altman, 2015). The detailed results are given below. At first, an interaction plot of Attention Task between gender and study manipulations was created (see Figure 5).

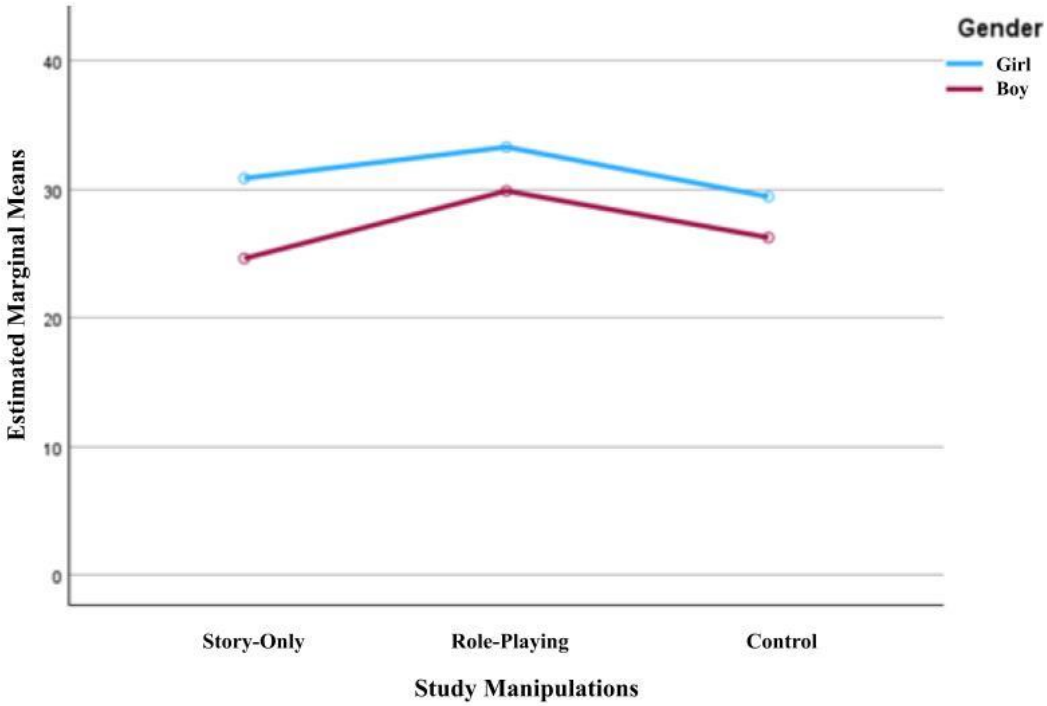


Figure 5. Interaction plot of attention task between gender and study manipulations

As seen in Figure 5, there was no interaction between gender and study manipulations. However, interaction plots may be misleading. Thus, further analysis was conducted with bootstrapping anyway to have a better insight into the possible interactions between gender and study manipulations.

Table 20. Tests of Between-Subjects Effects Two Way ANOVA for Gender x Study Condition in Attention

Dependent Variable:
Attention Task

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	746.789[a]	5	149.358	2.340	.049	.122
Intercept	75632.257	1	75632.257	1185.171	<.001	.934
Study Condition	286.176	2	143.088	2.242	.113	.051
Gender	409.146	1	409.146	6.411	.013	.071
Study Condition*Gender	43.154	2	21.577	.338	.714	.008
Error	5360.500	84	63.815			
Total	81334.000	90				
Corrected Total	6107.289	89				

a. R Squared = .122 (Adjusted R Squared = .070)

The results of the Two-Way ANOVA were consistent with previous findings of the study. It was found that there was no significant interaction between gender and study conditions F (2,84) = .338, (p = .714). Likewise, no significant difference was found for study conditions alone F (2,84) = 2.242, (p = . 113). Yet, as shown in Table 20, there was a significant gender effect on children's attention scores F (2,84) = 6.411, (p = .013).

Table 21. Two Way ANOVA Descriptives for Gender Differences in Attention

Estimates

Dependent Variable: Attention Task

			95% Confidence Interval		Bootstrap for Mean[a]		BCa 95% Confidence Interval	
Gender	Mean	Std. Error	Lower Bound	Upper Bound	Bias	Std. Error	Lower	Upper
Female	31.190	1.233	28.739	33.642	-.029	1.159	28.974	33.448
Male	26.917	1.153	24.624	29.210	.043	1.214	24.387	29.451

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

In Table 21, descriptive for gender differences in attention is given. The mean attention score of girls was 31.190, and the mean attention score of boys was 29.917. This shows that the mean score of girls was higher than the mean score of boys. However, it is important to analyze further to see whether or not this difference was statistically significant, see Table 22.

Table 22 Bootstrap Pairwise Comparisons for Gender Differences in Attention

Bootstrap for Pairwise Comparisons

Dependent Variable: Attention Task

			Bootstrap[a]			BCa 95% Confidence Interval	
Gender	Gender	Mean Difference	Bias	Std. Error	Sig. (2-tailed)	Lower	Upper
Female	Male	4.274	-.072	1.685	.017	1.139	7.394
Male	Female	-4.274	.072	1.685	.017	-7.674	-.866

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

To investigate gender differences in children's attention scores with such a small sample size, Bootstrapping with 1,000 resamples was employed to correct for non-normality and non-homogeneity of variances. When the sample is too small, confidence intervals can be reported to investigate significant differences. In the current study, the findings showed that there was a significant gender difference in children's Attention Task scores CI [1.139; 7.394], $p = .017$. Partial Eta Squared of Gender is .07, which means that the effect size is medium (Cohen, 1988).

CHAPTER 5

CONCLUSION AND DISCUSSION

5.1 Discussion

A number of studies provide essential information on the mechanisms underlying the associations between role-play and executive function. Although there are studies examining the effects of role-playing on children's inhibitory control, the review of the literature in the present study did not find any studies that examined the effects of role-playing on children's attention. Thus, the goal of the current study was to analyze the effects of role-play on children's attention and inhibitory control.

Firstly, this study proposed that role-playing could have an effect on children's inhibitory control. Although the majority of studies have focused on the relationship between dramatic play and executive function, only a few studies have shown that there might be an effect of role-play on children's inhibitory control (e.g., Karniol et al., 2011; Veraksa et al., 2021; White et al., 2017; White & Carlson, 2016). The findings of the current study supported this hypothesis. In the current study, children who were exposed to a story that had a main character with high attention and inhibition skills and were offered to wear the cloak of that character to pretend demonstrated higher inhibitory control scores than those who listened to the same story but were not exposed to any role-taking manipulation and those who listened to a story with a main character who had no high attention or inhibition skills. In a similar study, White and Carlson (2021) investigated the facilitator role of pretending with realistic or fantastical stories in executive function in 3-year-old children. In this experiment, it was also found that children who were told a fantastical or realistic story performed equally well. However, children who took part in story-related

pretend play performed better inhibitory control than those children who engaged in a non-pretense activity. Consistent with the related literature, this finding showed that there was an effect of role-playing on children's inhibitory control, whereas the context of the story did not seem to have a significant effect on children's inhibitory control (White & Carlson, 2021). The findings of the current study also supported this hypothesis. In the current study, children were also exposed to two different types of stories, but there was no significant difference among these conditions until children were given a cloak to pretend.

A study that aimed to investigate the effects of different pretend roles on children's executive function skills demonstrated that pretending to be a skillful character could improve children's executive function (Veraksa et al., 2021). In this study, some children were given either benevolent or malevolent roles which were not directly related to executive function tasks, whereas only one group of children was given a wise role that could be associated with executive function tasks too. Results showed that children with a wise role could perform better than the other two roles (Veraksa et al., 2021). This finding is also similar to the findings of the current study. In the current study, experimental groups were given the story of Çiçi, who found a cloak that made him or her more skillful and attentive. Thus, those children who were given this cloak after the story could perform better than those children who were not given any cloak. This finding could emphasize the effects of role-playing a skillful character on children's inhibitory control.

Also, the current study shed light on an important question which was whether such effects could be observed in children's inhibitory control with a novel hero that is introduced to children through a short storybook instead of a well-known superhero. To investigate this issue, the current study introduced a novel character

Çiçi, unlike other studies that used well-known characters like Batman (e.g. Veraska et al., 2021; White et al., 2017). Results showed that wearing the cloak of a novel character like Çiçi could still have an effect on children's inhibitory control. Children who were exposed to the story of Çiçi and offered to wear the cloak of Çiçi could outperform those who listened to the same story without any cloak or those who listened to the control story. This finding suggests that children can quickly identify with a character that is introduced to them in a story when they are put in a role-playing context prepared to manipulate for such an effect. Thus, it is possible to claim that such effects could exist through a character that is designed for educational purposes instead of popular superheroes. This is an important finding with great implications for early childhood education. In other words, it shows that introducing a novel character via children's picture books and related role-playing items in a classroom context could be used as a vehicle to meet certain curriculum objectives regarding children's inhibitory control.

It is important to emphasize that the current study made use of a children's picture book to introduce a novel hero to children rather than a video. Thus, it could highlight the effects of role-playing a novel hero from a children's picture book specifically. Previous studies demonstrated that it was possible to see the effectiveness of pretend roles on children's executive functions through reading a story (White & Carlson, 2021). Nevertheless, they focused on role-playing the whole storyline, whereas the focus of the current study was to pretend to wear a magical cloak that could make everyone more skillful. In this regard, the current study offers a new approach that allows children to pretend in a less structured way than previous studies, which request children to pretend as they read a story (e.g., White & Carlson, 2021). So, in the current study, after giving the pretend material, we did not provide

any external instruction regarding role-playing. Instead, it was the children's choice to engage in role-playing or not, depending on the children's imagination and possibly intrinsic motivation. Furthermore, initially, in the story, the novel character was presented to be an ordinary child who, after finding and wearing the cloak, became more attentive, focused, sharp, and overall skillful. Although in the study, children were given no further direction to act like the story character Çiçi and were only offered to wear the cloak Çiçi wore, they were better at completing the tasks to assess their executive function. Besides, these children had no previous knowledge of the character Çiçi to recall the character's skills except a short exposure via a picture book read to them. This shows the power pretending and role play can have on children's behaviors and how children can be quick at transferring the insight that they develop in one context into another one by role-playing.

In a study that focuses on whether or not it is possible to train preschoolers' executive function skills via computerized training, researchers found that working memory could be improved via training, whereas inhibition could not be improved via training (Thorell et al., 2009). In the study, the inhibitory control training program had five tasks, which were based on the inhibition of motor response, stopping of a continuing response, and interference control (Thorell et al., 2009). In that study, one of the eight different pre and post-test tasks was also an adapted version of the Day-Night Stroop Task (Gerstadt, Hong & Diamond, 1994), which was used to measure interference control (Thorell et al., 2009). However, the findings of the current study demonstrated that children's inhibitory control could be improved through role-playing manipulations. Thus, it could be possible to argue that there is a need to investigate the effectiveness of an inhibitory control training program that benefits from role-playing activities.

The current findings showed that listening to a story with a character with high attention and executive function skills or a story with a character who did not have such skills did not make a significant difference in children's inhibitory control scores. Only the group of children who were offered to wear the cloak of that character with high skills to pretend demonstrated higher inhibitory control scores than the other two groups. To elaborate on this point further, in a similar experimental study done with preschoolers, 48 children were included in a study. One group of children was given a delayed gratification task after being instructed to pretend to be Superman. Another group was asked to pretend to be a child with the same qualities of high patience and another group was tested after watching a video of Supermen, with or without pretend instructions (Karniol et al., 2011). Results showed that children who were exposed to instructions regarding Superman's delay-relevant qualities and asked to imagine being Superman tended to delay longer than children who watched the Superman video with or without pretend instructions (Karniol et al., 2011). The findings of the current study were also consistent, as listening to a story of a high-skilled character did not make a significant difference in children's inhibitory control unless they were given a cloak of that character to pretend.

To our knowledge, the effects of role-play on children's attention were not directly studied in the literature. Thus, although the current study did not find a significant difference in children's attention scores after role-playing manipulations, the findings were still important to discuss. One possible explanation for this nonsignificant result could be the novelty effect. The novelty effect can be defined as the increased interest and motivation participants demonstrate for doing something new (Mills & Gay, 2016). Likewise, studies show that attention can be influenced by

external factors such as novelty (Garon, Bryson & Smith, 2008). In the present study, attention task was introduced to children prior to inhibitory control task, therefore attention task being possibly influenced by novelty effect. Considering the importance of novelty in attention control, it could be possible to argue that the effects of role-playing on children's attention scores were not observed due to the novelty effect of a given task, that is the attention task. Given that the study included a novel hero could have created a novelty effect on children. It is possible to suggest that using a hero or character that children already knew could decrease the novelty effect and provide a more accurate picture of the effects of role-playing on children's attention skills. Future studies can include both novel and familiar characters to further examine whether children's attention scores would be different in the experimental and the control conditions. Another approach to explore whether novelty effect is a factor explaining why children's attention scores were not different among groups would be to introduce inhibitory control task first and the attention task last.

Even though we expected that attention scores would be improved in the role-playing group, the results showed no significant difference among the study groups. However, although the results regarding the effects of study conditions on children's attention task scores did not reach conventional levels of statistical significance, it is worth noting that the observed effect approached significance. A p-value of .07 was larger than the conventional significance level of .05 but still relatively close. Thus, further research with a larger sample, using different attention tasks, attention tasks that are longer, and novelty effect being controlled could be valuable to explore whether role playing makes a difference in children's attention or not.

White et al. (2017) found that children who were pretending to be an exemplar other, such as Batman, could work longer on a repetitive task despite having the opportunity to take breaks by playing some attractive video game than children with a third-person perspective on the self, and finally a first-person perspective. However, since the current study gave children 90 seconds to complete the attention task, each child worked on the attention task until the experimenter asked the children to stop. Thus, it is possible to claim that role-playing does not make a significant difference in children's attention scores for tasks in 90 seconds. However, its possible effect on perseverance could guide future studies to focus on longer attention tasks that aim for attention span. Similarly, children were given an attention task first and then an inhibitory control task. It is possible to argue that such task order could have an influence on the results.

The current study preferred a post-test-only control group design to investigate the effects of role-playing on children's inhibitory control and attention. In similar studies done with the pretest-posttest control-group design, the control group demonstrated significant improvements in inhibitory control scores between the pretest and post-test (e.g., Veraska et al., 2021). This situation was explained by possible practice effects that could occur as children take the same assessment the same way (Veraska et al., 2021). Thus, in the current study, a post-test-only control group design could eliminate the risk of practice effect between control and experimental groups.

Additionally, previous studies argued that it would be interesting to explore the association between attention and response inhibition (Garon, Bryson & Smith, 2008). In the current study, correlational analysis among variables has shown that there was a significant positive relationship between inhibitory control and attention

scores in the Role-Playing Condition group, but this relationship was not significant for the other two research groups. Previous studies also found that there was a positive relationship between children's ability to inhibit distractors and their parent-reported inhibitory control scores (Beattie, Schutte & Cortesa, 2018). The relationship between attention control and inhibitory control was shown in several studies (e.g., Colombo & Cheatham, 2006; Garon, Bryson & Smith, 2008; Reck & Hund, 2011). In this respect, the current study raises a new question regarding this relationship, so it could be significant to examine why such a relationship was found only in the role-playing condition of the study, but not for the other two study groups. One possible explanation for this could be that being in a role-play condition led children to improve and demonstrate better attention and inhibitory control skills by providing children with a better-defined context. It can be argued that role-playing combined with a story allows children to focus on a given task better. As a result, it is possible that in the control and story-only groups, their task performances were separately affected by other factors such as motivation or interest. Furthermore, although inhibition, attention, cognitive flexibility, and working memory are often studied as separate skills within the domain of execution functions, improvement in one can help the task performance of the other. Since the present study presents a significant improvement in inhibitory control skills in the experimental group, children's attention skills may be improved as a result of improvements in inhibitory control skills.

The current study was limited to five and six-year-old children. In their study, Carlson (2005) did not find a significant difference in Day/Night Task (Gerstadt et al., 1994) scores between three, four, and five-year-old children, however considering the limitations of their study, they argued that it is still possible to see the

effect of age on children's inhibitory control scores if Day/Night Task (Gerstadt et al., 1994) were used for both younger and older children. Therefore, the current study aimed to have only five and six-year-old children to avoid the effect of age on children's inhibitory control. The correlational analysis between age and dependent variables (inhibitory control and attention) showed that there could be a significant relationship between the age of children and their attention scores in each study group whereas there was a significant relationship between the age of children and their inhibitory control scores in Role-Playing Condition. This finding supported the idea that age in months may affect the results of the study. Therefore, additionally, the age in months was used as a covariate in the analysis to control it to see the effect of role-playing. However, it was found that the effectiveness of research manipulation remains on children's inhibitory control even if controlled for age in months.

In previous studies, age-related differences were observed in the response inhibition task (go/no-go task) and reaction time in the attentional inhibition task (flanker task), whereas they found that children's accuracy in response inhibition task significantly increased until the age of eight (Sadeghi, Shalani & Nejati, 2022). However, the difference from age eight to eleven was not significant. These age-related differences may be explained by the maturation pattern of the frontal cortex. Studies showed that the frontal lobe goes through a long-term maturation than any other parts of the brain (Kolb et al., 2012). The developmental pattern of inhibitory control function at an early age is also consistent with this process. Some studies argued that such executive function tasks might reflect different constructs at different ages (Petersen, Hoyniak, McQuillan, Bates, & Staples, 2016). Thus, a task should be considered in terms of being developmentally appropriate or construct-

relevant at a given age. Therefore, a comparison of inhibitory control tasks across ages should be done carefully.

In a study, three pictorial versions of the Stroop Task were used to investigate inhibitory control in 80 children aged 5 to 8 years (Macdonald et al., 2014). Results showed that The Big-Small Stroop task demonstrated an age-related increase in inhibition from five to seven years, while the other Fruit Stroop and Boy-Girl Stroop revealed clear but nonsignificant age differences. The study also showed that older children had fewer errors than younger children. These findings could be considered consistent with the findings of the current study since there was a significant relationship between children's inhibitory control scores and their age in months in Role-Playing condition. Although age has a significant relationship with inhibitory control, even after controlling age, the Role-Playing Condition still had a significant effect on children's inhibitory control scores. It shows the impact of role-playing for different age groups in early years.

The possible interaction between sex and study manipulations was another sub-research question of the current study. The current study did not find a significant interaction between gender and study conditions. However, analyzing the interaction plot, it was visible that the scores of girls and boys got closer in Role-Playing Condition. Previous studies showed contradictory findings related to the idea that inhibitory control was not related to sex. In the studies done to explore the effect of role-playing on children's delayed gratification task, sex did not seem to be a significant main effect or any significant influence in interaction with the group (Karniol et al., 2011).

In the current study, boys had significantly higher inhibitory control scores than girls in the control conditions, similar to related literature offering similar

evidence. A study done with children found that there was no significant difference between boys and girls in their accuracy and neutral reaction time in attentional inhibition and response inhibition tasks (Sadeghi, Shalani & Nejati, 2022). Yet, boys had better accuracy in response inhibition task (go/no-go task) (Sadeghi, Shalani & Nejati, 2022). The Go/No Go Task is a well-known task to examine the ability of both adults and children to inhibit a prepotent response (Verbruggen & Logan, 2008). In several studies, it was found that girls had better accuracy than boys in adolescence (Hooper et al., 2004). Similar sex differences were found for preschoolers too, as girls were less impulsive than boys (e.g., Cornblath et al., 2019; Mileva-Seitz et al., 2015). However, many other studies reported no sex differences for school-aged children and adolescents (e.g., Brocki & Bohlin, 2004; Cheie et al., 2015; Chung et al., 2020; Malagoli & Usai, 2018). Our findings suggested that, although boys had better inhibitory control than girls in the control conditions, boys and girls performed similarly in the study condition where they pretended. In fact, both boys and girls performed better, and girls improved their scores. Children are often exposed to superheroes with extraordinary skills that are male and designed to attract boys, yet superheroes that girls pretend to be are rather few. Pretending, however, given an object, in our case a cloak, could allow girls to better relate and pretend and rather be like the character. Besides, the power of pretending in our study led children to present skills that they already had by performing on executive function tasks.

A longitudinal study investigating the development of response inhibition found that go/no-go task scores were examined in terms of go trials and no-go trials (Wiebe, Sheffield & Espy, 2012). Findings showed that boys responded faster and more accurately on go trials than girls at the ages of 3 and 5.25 (Wiebe, Sheffield &

Espy, 2012). However, girls demonstrated a higher ability to withhold responding on no-go trials (Wiebe, Sheffield & Espy, 2012). This difference might reflect that boys can have more difficulty in withholding a motor response, which contributed to less accurate no-go trials, but they were also responding more quickly, which may have explained better accuracy on go trials. These explanations could be supported by the findings of the current study, too, as girls had better attention task scores than boys, whereas boys had better inhibitory scores than girls.

A recent review study that focused on the literature from 1990 to 2020 demonstrated that the levels of cognitive demand and age are important when investigating the effects of sex differences (Usai, 2023). Studies done with children with ADHD showed no evidence of a significant sex difference in response inhibition tasks (Usai, 2023). Studies done with typically developing preschool children indicated that girls may demonstrate early acquisition of inhibitory control than boys (Montroy, Bowles, Skibbe, McClelland, & Morrison, 2016). Thus, it might be a good idea to focus on both sex and age at the same time to investigate such differences in the effectiveness of role-playing on children's inhibitory control and attention skills. Similarly, it is possible to expect that with a larger sample size, it could be possible to examine gender and age effects on inhibitory control and attention in early childhood in more detail. However, the current study still offers insight into possible relationships between sex, age, and inhibitory control as well as attention. Thus, further studies could focus on these more by including larger samples. Likewise, it could be beneficial to investigate the effectiveness of role-playing a character without high attention or inhibition skills since the current study could not focus on this aspect. Also, using an attention task that is longer than 90 seconds could be beneficial to deal with novelty effects.

The current study gave children the attention task first and then the inhibitory control task later without a break. This could be a reason for finding nonsignificant differences in the attention task, which was given first, whereas finding significant differences in the inhibitory control task, which was given second. It is possible that children could focus on the attention task in a similar way with or without role-playing manipulations. However, when it came to inhibitory control, children in the role-play condition could perform better, unlike other groups. This explanation could be consistent with the evidence of role-playing on children's perseverance levels (e.g., White et al., 2017). Therefore, in future studies, attention tasks and inhibitory control tasks could be given to children with different orders to eliminate such limitations. Likewise, having a free play session with the role-playing material before the start of tasks

Finally, it is important to emphasize that findings of the current study is in line with the claims of Piaget (1962) that pretense and children's executive function skills were significantly related. Furthermore, as Vygotsky (1967) argued, children demonstrated better inhibitory control during a role-play activity in the current study suggesting that there is a significant immediate effect of role-playing on children's inhibitory control. Likewise, role-playing provides children an opportunity to exercise self-distancing as they can take a step back from their impulses and have more focus on what is more appropriate for the moment (Sigel, 2002). In this regard, the current study provided evidence for the effects of self-distancing on children's inhibitory control. Although the current study did not find a significant difference in children's attention scores, this finding also showed that the ability to inhibit distractors and the ability to inhibit responses were not influenced by role-playing

activities in the same way. Thus, there is a need to investigate the effects of role-playing on different aspects of children's cognitive abilities.

5.2 Conclusion

Over the course of early childhood, play is found to be essential for child development. Nevertheless, the significance of role-play in children's lives can be overlooked by researchers since it is one of the most common activities in early childhood. However, focusing on the effects of role-playing could guide educators and policymakers to promote specific learning outcomes in early childhood settings with the help of role-play activities. Yet, literature to date has shown that only very few studies have examined the effect of role-play on children's executive function skills. Previous studies have shown that there might be a significant relationship between role-play and inhibitory control. Yet, very few studies focused on the effect of role-play on children's attention, so there is a gap in the effects of role-play on children's attention in the literature. Thus, the main goal of this study was to investigate the effects of role-playing on children's inhibitory control and attention.

The current study found a significant mean difference in inhibitory control scores between children who were given role-play manipulation and those who were not. Children who were given a cloak to pretend outperformed others on the inhibitory control task. These findings are consistent with the previous studies (e.g. Sparks, 2017; Veraksa et al., 2021; White, & Carlson, 2016; White et al., 2017). However, children's attention scores were not significantly different from each other between groups in the current study. Since the literature related to the effects of role-playing on children's attention skills, it is possible to argue that there is still a need to

investigate the effects of role-playing on children's attention with different types of attention tasks to reach better conclusions.

5.3 Limitations and recommendations for future research and the field of education

The current study has several limitations. In the current study, convenience sampling was used as a method of sampling. One of the disadvantages of this sampling method is that it decreases the possibility of knowing to whom the results could be generalized (Mills & Gay, 2016). Thus, it is difficult to define the population of the current study. Therefore, in future research, it could be recommended to apply different sampling methods to increase the generalizability of the findings. Likewise, demographic information forms were not completed by all parents, which might lead to sampling bias.

In the current study, inhibitory control was measured via the Day and Night Stroop Task (Gerstadt et al., 1994). Nevertheless, as Doebel (2020) argues, such tasks may fail to offer ecologically valid ways to measure children's real executive function skills in a real-world context. Therefore, in future studies, it could be beneficial to evaluate children's executive function skills through natural observations in children's plays.

In the current study, children were exposed to attention task and inhibitory control, respectively. However, it was not possible to examine whether or not this task order could have an effect on children's scores. Thus, this case could be emphasized as a limitation of the study. In future studies, tasks could be given with different orders to control such possibilities with a larger sample size.

The current study benefited from random assignment to reduce the possibility of children having significantly different executive function levels across study

groups. However, in future studies, children's executive function skills can be evaluated via a teacher or parent-reported measures to make sure that children's executive function levels are not significantly different from each other across groups. Likewise, previous studies argued that it would be interesting to explore the association between attention and response inhibition (Garon, Bryson & Smith, 2008). The current study found such a relationship only in Role-Playing Condition. Thus, this finding raises another question regarding the relationship between inhibitory control attention in early childhood so that future studies may focus on this issue.

Veraksa et al. (2021) argued that not all-self-distancing roles could have an effect on children's executive function (Veraksa et al., 2021). The current study had two different stories with and without a high-skilled character. However, only one group was given material to pretend high-skilled character. Thus, it was not possible to investigate the effect of role-playing a low-skilled character. In future studies, it could be beneficial to include such low-skilled role-playing characters to see their effect on children's executive function and attention.

The current study did not find a significant difference in children's attention scores across study groups. However, it is important to emphasize that the current study utilized only one measure of attention, which may not fully capture the multidimensional nature of attention. Thus, in future studies, different types of attention tasks may be used to have a better picture of the effectiveness of role-play on children's attention skills. Likewise, additional research focused on the interactions between sex and role-playing manipulations is necessary to confirm that sex makes a significant difference in children's inhibitory control and attention. More

research with multiple measures is also needed to capture different dimensions of inhibitory control as well as role-playing.

The findings of the study have several implications. First, given the effects of role-playing on children's inhibitory control between the ages of five and six years, this study argues the importance of role-playing in the early childhood education context. Thus, it guides educators to benefit from role-playing manipulations to encourage children's ability to demonstrate inhibitory control. In this respect, unlike previous studies which benefited from superheroes like Batman, the current study offers a developmentally appropriate story character for children in early childhood education. Thus, making use of the developed story and adapting such story and cloak to the daily routine in an early childhood education setting could be effective. Similarly, teachers could take this study as a guideline to develop their own stories and materials to support children's inhibitory control in the school context. Thus, developing an intervention program to support children's inhibitory control could be possible by benefiting from the findings of the current study.

It was seen that reading a story of a high-skilled character was not effective enough to boost children's inhibitory control unless role-playing manipulation was added. Thus, in early childhood education settings, the current study offers evidence for the idea that role-playing materials could be enhanced to support children's development. Emphasizing the importance of recognizing children's agency and active involvement in curriculum development, these findings also suggest that role-playing activities could be co-constructed between children and adults in early childhood settings. Utilizing role-play in relation to better cognitive skills could be effective.

This study demonstrated that widely used story-reading sessions might not be effective enough to support children's inhibitory control abilities alone unless role-playing activities are involved. The current findings show that when children are actively engaged in role-playing activities, they can demonstrate their inhibitory control skills better. Thus, in educational contexts, it is important to make sure that children are exposed to engaging activities along with story reading. Likewise, since children can demonstrate better inhibitory control skills during role-play, role-playing activities could be used to guide children to deal with situations that would require them to exercise executive function skills. In other words, activities used to improve children's knowledge and overall competence in a range of developmental domains that require children to use inhibitory control skills, role-playing could be beneficial to make it easier for children.

Related literature provides important background knowledge while depicting the effects of popular cartoon characters and heroes in children's role-playing practices and their reflections on different development areas. However, it is essential to note that such characters are not directly a product of children's culture. Instead, such heroes and cartoon characters are products of adult culture that are advertised with economic concerns in the marketplace. Therefore, since Developmentally Appropriate Practices (DAP) and educational concerns are not at the center of creating such well-known superheroes, it is essential to reflect on not only the positive but also the negative reflections of such characters. For instance, such well-known popular media characters have the potential to convey various stereotypic and biased messages in popular culture. In this sense, as proposed in Developmentally Appropriate Practices (DAP) (Bredecamp & Copple, 1997), while integrating role-playing in education contexts, it is essential to take into account three

areas of knowledge that are introduced as critical components of decision-making processes for children, which are child development appropriateness, individual appropriateness, social and cultural appropriateness. When these areas of knowledge are addressed effectively, children can benefit the most from role-playing experiences. Educators may take this study as a guide to develop their own developmentally appropriate stories to use in educational contexts. Likewise, instead of creating new stories, already existing developmentally appropriate stories could be used as a tool to employ role-playing activities in classrooms.

Children can produce and participate in a series of peer cultures in society, which are innovative and creative collective productions, whereas each generation creates its own culture while being affected by interactions with the adult world (Corsaro, 2005). In this regard, although heroes that are produced in adult culture are consumed by young children too, it is significant to emphasize that children also have their own culture that they create with their peers. In this regard, instead of introducing a novel character to children, it could be beneficial to create a novel character with children to make sure that the novel character belongs to the children's own culture. Likewise, listening to children's experiences with their role-play activities could be helpful in understanding the nature of role-play and why children demonstrate better inhibitory control in pretense. Unfortunately, the current study failed to have such a qualitative aspect of research. Nevertheless, it would be possible for educators and future studies to interact with children in a classroom context to talk about their experiences of role-play and how they feel in detail.

APPENDIX A

PARENTAL CONSENT FORM (TURKISH)

Araştırmayı destekleyen kurum: Boğaziçi Üniversitesi
Araştırmanın adı: Erken Çocukluk Döneminde Rol Yapmanın Çocukların Ketleyici Kontrol ve Dikkat Becerileri Üzerindeki Etkisi
Proje yürütücüsünün adı-soyadı: Dr. Öğr. Üyesi Ayşegül Metindoğan
E-mail adresi: *******
Ofis telefonu: ******
Proje araştırmacısının adı-soyadı: Beyza Şirvan Ayaz
E-mail adresi: ****
Telefonu: +90 **********

Sayın Veli,

Ben Beyza Şirvan Ayaz. Boğaziçi Üniversitesi, Sosyal Bilimler Enstitüsü, Erken Çocukluk Eğitimi Yüksek Lisans Programında öğrenciyim. Sizi, Rol Yapmanın Çocukların Ketleyici Kontrol ve Dikkat Becerileri Üstündeki Etkisini incelemeyi hedeflediğim yüksek lisans tez çalışmama davet ediyorum.

Araştırmaya çocuğunuzun katılmasını isterseniz, çocuğunuzla birlikte yaklaşık 10-15 dakika sürecek ve tamamı çocuğunuzun gelişimine uygun olan bir hikaye okuyacak birlikte etkinlikler yaptığımız oyunlar oynuyor olacağız. Bu çalışma için etik ve Milli Eğitim Bakanlığından izinler aldık. Ayrıca çocuğunuzun okul müdürü ile öğretmenin bilgisi dahilinde gerçekleştirdiğimiz bu çalışmayı çocuğunuzun okulunda gerçekleştireceğiz. Araştırmada ben, Beyza Şirvan Ayaz, aynı zamanda bir okul öncesi öğretmeniyim, oyunlar oynayacağım ve çocuklarınızla öğretmen yanında tanıştıktan ve çocuğunuzun katılmak istediğine dair sözlü onay alıp görüşmeleri gerçekleştireceğim. Bu etkinlikler kapsamında sizden herhangi bir ön hazırlık beklenmemektedir. Çocuklarınızın verileri bireysel değerlendirme aracı olarak kullanılmayacak, tüm çocuklardan alınan veriler toplu olarak değerlendirilecek ve isimler gizli kalacaktır.

Uygulama öncesinde çocuğunuzdan sözel olarak izni alınacak ve sadece çalışmaya katılmak isteyen çocuklarla çalışılacaktır. Ayrıca baştan onay vermesine rağmen uygulama sırasında çocuğunuz devam etmek istemediğini belirtirse, ya da sıkılırsa çalışmaya derhal son verilecektir.

Araştırma boyunca paylaştığınız kişisel bilgiler gizli tutulacak ve şifreli bir bulut sisteminde saklanacaktır. Süreç içinde sorunuz olursa, proje yürütücüsü Dr. Öğr. Üyesi Ayşegül Metindoğan'a ve proje araştırmacısına ulaşabilirsiniz. Araştırmanın yapılabilmesi için Boğaziçi Üniversitesi Sosyal ve Beşerî Bilimler Yüksek Lisans ve Doktora Tezleri Etik İnceleme Komisyonu'ndan (SOBETİK) onay alınmıştır. Araştırmayla ilgili haklarınız ve olası şikayetleriniz konusunda SOBETİK'e danışabilirsiniz. Araştırmaya katılmanız için onayınız gerekmektedir.
Katkınız ve iş birliğiniz için teşekkürler.

Proje Konusu: Bu araştırmanın amacı erken çocukluk dönemi (5-6 yaş) çocuklarda sembolik oyunun ketleyici kontrol ve dikkat becerilerine etkisini incelemektir. Sembolik oyunun çocukların gelişimindeki önemi bilinmektedir. Bu çalışma, çocukların sembolik oyun içinde ketleyici kontrol ve dikkat becerilerinin nasıl olduğu sorusuna cevap bularak literatüre katkı sunmayı hedeflemektedir.

Gizlilik: Araştırma boyunca paylaştığınız tüm bilgiler gizli tutulacaktır ve kimlik bilgileriniz istenmeyecektir. Araştırma boyunca elde edilecek bulgular toplu olarak değerlendirilecek, bu tez çalışmasına ek olarak diğer bilimsel yayınlarda ve konferanslarda kullanılabilecektir.

Olası Riskler: Araştırma sürecinde araştırmacı çocuğunuzla kitap okuma etkinlikleri yapacaktır. Yeni biriyle tanışmak çocuğunuzda kaygı yaratabilir. Bu durumu en aza indirmek için araştırmacı çocukların ilgi ve ihtiyaçlarına göre çocuklarla iletişime geçecek ve öğretmen desteği alınacaktır. Hem sizin hem de çocuğunuzun araştırma ile ilgili detaylı bilgi alma ve istediğiniz zaman araştırmadan çekilme hakkınız vardır.

Olası Yararlar: Araştırma sürecinde düzenlenen kitap okuma etkinlikleri ile çocuğunuz farklı eğlenceli ve eğitsel bir deneyim edinebilir. Bu çalışmayla çocuğunuz, bireysel görüşmelerdeki oyunlarla kendi ilgi alanlarını keşfedebilir, güzel ve eğitici bir vakit geçirebilir; sembolik oyunlar ve dikkat oyunlarına ilgisi artabilir.
Ayrıca ebeveyn olarak sizlerin online bir alışveriş platformunda kullanabileceğiniz bir hediye çeki kazanma şansı elde edebileceğiniz bir kur'a çekilecek, kazanan 3 ebeveyne 200 TL değerinde bir hediye çeki verilecektir. Arzu etmeniz halinde, araştırma tamamlandıktan sonra, hem araştırma sonuçlarının paylaşıldığı, hem de çocuklarda sembolik oyun ve yürütücü işlev becerileri arasında ilişkiyi anlatan bir seminere katılmak üzere davet gönderilecektir. Bu davetin gönderilebilmesi için, size verilen ölçeğin sonunda tercih ettiğiniz iletişim (email ya da telefon) yöntemi ve bilgisi sorulacaktır.

Çalışmadan Çekilme: Araştırmaya katılmaya onay vermiş olsanız dahi araştırma sürecinde çalışmadan çekilme hakkınız bulunmaktadır. Çalışmadan çekildiğiniz için olumsuz herhangi bir sonuçla karşılaşmayacaksınız.

Sorularınız için: Bu formu sözlü bir şekilde onaylamadan önce ya da elektronik bir şekilde imzalamadan önce, çalışmayla ilgili sorularınız varsa sorabilirsiniz. Süreç içinde sorunuz olursa, proje yürütücüsü Dr. Öğr. Üyesi Ayşegül Metindoğan'a ve proje araştırmacısı Beyza Şirvan Ayaz'a ulaşabilirsiniz.

Araştırmayla ilgili haklarınız ve olası şikayetleriniz konusunda Boğaziçi Üniversitesi Sosyal ve Beşerî Bilimler Yüksek Lisans ve Doktora Tezleri Etik İnceleme Komisyonu'ndan (SOBETİK) onay alınmıştır. Araştırmayla ilgili haklarınız ve olası şikayetleriniz konusunda SOBETİK'e danışabilirsiniz.

Lütfen bu formu doldurup imzaladıktan sonra sınıf öğretmenine ya da araştırmacıya ulaştırınız. Desteğiniz için şimdiden teşekkürler.

Bana anlatılanları dinledim ve formda yazılanları anladım. Bu formun bir örneğini aldım / almak istemiyorum. (Katılımcı formun örneğini almak istemesi durumunda örnek form mail yoluyla katılımcıya ulaştırılacaktır.)

□ Evet, ben ve çocuğumun araştırmaya katılmasını kabul ediyorum.

□ Hayır, ben ve çocuğumun araştırmaya katılmasını kabul etmiyorum.

Katılımcı Velinin Adı-Soyadı:
İmzası: .....
Tarih (gün/ay/yıl): ...../...../.....
Katılımcı çocuğunuzun Adı-Soyadı:
Katılımcı çocuğunuzun Doğum Tarihi:

APPENDIX B

PARENTAL CONSENT FORM (ENGLISH)

Institution supporting the research: Boğaziçi University
Name of the Study: The Effects of Role-Playing on Children's Inhibitory Control and Attention Skills in Early Childhood
Name-surname of the project coordinator: Assoc. Prof. Ayşegül Metindoğan
E-mail address: *******
Office phone: ********
Project researcher's name-surname: Beyza Şirvan Ayaz
E-mail address: *********
Phone: +90 *********

Dear Parent,

I'm Beyza Sirvan Ayaz. I am a student at Boğaziçi University, Institute of Social Sciences, Early Childhood Education Master's Program. I invite you to my master's thesis, in which I aim to examine the Effect of Role Playing on Children's Inhibitory Control and Attention Skills.

If you want your child to participate in the research, we will be playing games with your child, which will take about 10-15 minutes, read a story that is entirely appropriate for your child's development, and play activities together. We obtained permissions from the Ministry of Ethics and the Ministry of National Education for this study. In addition, we will carry out this work, which we have done with the knowledge of your child's school principal and teacher, in your child's school. In the research, I, Beyza Şirvan Ayaz, am also a pre-school teacher, will play games and interview your children after meeting with the teacher and receiving verbal confirmation that your child wants to participate. No preliminary preparation is expected from you within the scope of these activities. The data of your children will not be used as an individual assessment tool, the data from all children will be evaluated collectively and the names will be kept confidential.

Verbal consent will be obtained from your child before the application and only children who want to participate in the study will be studied. In addition, if your child indicates that he does not want to continue during the application despite giving his/her consent from the beginning, or if he/she gets bored, the study will be terminated immediately.

The personal information you share throughout the research will be kept confidential and stored in an encrypted cloud system. If you have any questions during the process, project manager Dr. Instructor Member Ayşegül Metindoğan and project researcher can be reached. Approval was received from Boğaziçi University Social and Human Sciences Master's and Doctoral Thesis Ethics Review Committee (SOBETIC) to conduct the research . You can consult SOBETİK about your rights and possible complaints regarding the research . Your consent is required to participate in the study. Thanks for your contribution and cooperation.

Project Subject: The aim of this research is to examine the effect of symbolic play on inhibitory control and attention skills in early childhood (5-6 years old) children. The importance of symbolic play in the development of children is known. This study aims to contribute to the literature by finding an answer to the question of how children's inhibitory control and attention skills are in symbolic play.

Confidentiality: All the information you share during the research will be kept confidential and you will not be asked for your identity information. The findings to be obtained during the research will be evaluated collectively and can be used in other scientific publications and conferences in addition to this thesis.

Possible Risks: During the research process, the researcher will do book reading activities with your child. Meeting someone new can cause anxiety in your child. In order to minimize this situation, the researcher will contact the children according to the interests and needs of the children and teacher support will be received. Both you and your child have the right to receive detailed information about the research and to withdraw from the research at any time.

Possible Benefits: With the book reading activities organized during the research process, your child can have a different fun and educational experience. With this study, your child can discover his/her own interests with the games in individual meetings and have a nice and educational time; may increase his interest in symbolic games and attention games.

In addition, a lot will be drawn where you, as a parent, will have the chance to win a gift certificate that you can use on an online shopping platform, and a gift certificate worth 200 TL will be given to the 3 winning parents. If you wish, after the research is completed, an invitation will be sent to attend a seminar where both the research results are shared and the relationship between symbolic play and executive function skills in children. In order to send this invitation, you will be asked for your preferred communication (email or phone) method and information at the end of the scale given to you.

Withdrawal from the Study: Even if you have given consent to participate in the study, you have the right to withdraw from the study during the research process. You will not face any negative consequences for withdrawing from the study.

For your questions: Before you approve this form orally or sign it electronically, you can ask any questions about the study. If you have any questions during the process, project manager Dr. Instructor Member Ayşegül Metindoğan and project researcher Beyza Şirvan Ayaz.

Approval has been obtained from Boğaziçi University Social and Human Sciences Master's and Doctoral Thesis Ethics Review Committee (SOBETIC) regarding your rights and possible complaints regarding the research . You can consult SOBETİK about your rights and possible complaints regarding the research ----------

Please fill in and sign this form and send it to the classroom teacher or researcher. Thank you in advance for your support.

I listened to what was told to me and understood what was written on the form. I have / do not want to receive a sample of this form. (If the participant wishes to receive a sample of the form, the sample form will be sent to the participant via e-mail.)

☐ Yes, I and my child agree to participate in the study.

☐ No, I do not accept my child's participation in the study.

Name-Surname of Participating Parent :
Signature: ....
Date (day/month/year): ...../...../.....
Name-Surname of your participant child :
Date of Birth of your participating child:

APPENDIX C

INVITATION LETTER (TURKISH)

Çekiliş ve Seminer Daveti için Gerekli Bilgiler

Sayın Veli,

Boğaziçi Üniversitesi, Sosyal Bilimler Enstitüsü, Erken Çocukluk Eğitimi Yüksek Lisans Programında yürütmekte olduğumuz Rol Yapmanın Çocukların Ketleyici Kontrol ve Dikkat Becerileri Üstündeki Etkisini incelemeyi hedeflediğimiz yüksek lisans tez çalışmamıza katılımınız için teşekkür ederiz.

Çocuklarınızla yapılan çalışmalardan elde edilen verilerle birlikte çocuklarınız hakkında bazı kısa soruları cevaplamanız değerlendirme sürecine büyük katkıda bulunacaktır. Bu nedenle sizden bu formu doldurmanızı ve öğretmeninize iletmenizi rica ediyoruz. Formu dolduran ebeveynlerimize teşekkür etmek amacıyla ufak bir çekiliş yapacağız ve üç ebeveynimize kitap ve kırtasiye alışverişlerinde kullanılabilecek 200 TL değerinde bir kupon hediye edeceğiz.

Arzu etmeniz halinde araştırma tamamlandıktan sonra hem araştırma sonuçlarının paylaşıldığı hem de çocuklarda sembolik oyun ve yürütücü işlev becerileri arasında ilişkiyi anlatan bir seminere katılmak üzere davet gönderilecektir. Bu davetin gönderilebilmesi için bu ölçeğin sonunda tercih ettiğiniz iletişim (e-posta ya da telefon) yöntemi ve bilgisini bizimle paylaşabilirsiniz. *Bilgileriniz belirtilen amaçların dışında kullanılmayacak ve kimseyle paylaşılmayacaktır.*

E-posta: _____(zorunlu değil)

Telefon: _____(zorunlu değil)

Sorularınız için ulaşabilirsiniz: …….

APPENDIX D

INVITATION LETTER (ENGLISH)

Required Information for the Draw and Seminar Invitation

Dear Parent,

Thank you for your participation in our master's thesis, which we aimed to examine the Effect of Role Playing on Children's Inhibitory Control and Attention Skills, which we are conducting at Boğaziçi University, Institute of Social Sciences, Early Childhood Education Master's Program.

Answering some short questions about your children, along with data from studies with your children, will greatly contribute to the evaluation process. Therefore, we ask you to fill out this form and forward it to your teacher. In order to thank our parents who filled out the form, we will hold a small raffle and give our three parents

If you wish, after the research is completed, an invitation will be sent to attend a seminar where the research results are shared and the relationship between symbolic play and executive function skills in children. In order for this invitation to be sent, you can share your preferred communication (e-mail or telephone) method and information with us at the end of this scale. *Your information will not be used or shared with anyone other than the stated purposes.*

Email: _____(not required)

Phone: _____(not required)

For your questions, you can reach: …….

APPENDIX E

DEMOGRAPHIC INFORMATION FORM (TURKISH)

VELİ KATILIMCI DEMOGRAFİK BİLGİ FORMU

Aşağıda araştırmaya katılan çocuk ve ailesi hakkında bazı soruları yanıtlamanız beklenmektedir. Tüm soruları cevaplamanızın yaklaşık 5 dakika sürmesi öngörülmektedir.

1. Yakınlık Dereceniz ( ) Annesi ( ) Babası ( ) Diğer ……..
2. Çocuğunuzun Adı Soyadı:
3. Çocuğunuzun Cinsiyeti:
4. Çocuğunuzun Doğum Tarihi (gün/ay/yıl):

Aşağıdaki soruları lütfen kendiniz için doldurunuz.

1. Doğum Tarihiniz : _____

2. Cinsiyetiniz: _____

3. En son mezun olduğunuz okul türü hangisidir?

( ) İlkokul ( ) Ortaokul ( ) Lise ( ) Önlisans
( )Lisans ( ) Yüksek Lisans/Doktora

4. Çalışıyor musunuz?
( ) Evet, tam zamanlı
( ) Evet, yarı zamanlı
( ) Hayır, çalışmıyorum.
( ) Diğer,_____

Aşağıdaki sorular çocuğunuzun diğer ebeveyni (annesi/babası) hakkındaki bilgileri doldurmanız için ayrılmıştır.

1 . Diğer ebeveynin doğum tarihi: _____

2. Diğer ebeveynin en son mezun olduğu okul (diploma alarak) hangisidir?
( ) İlkokul ( ) Ortaokul ( ) Lise ( ) Önlisans
( )Lisans ( ) Yüksek Lisans/Doktora

3. Diğer ebeveyn çalışıyor mu?
( ) Evet, tam zamanlı çalışıyor.
( ) Evet, yarı zamanlı çalışıyor.
( ) Hayır, çalışmıyor.
( ) Diğer_____

5. Çocuğun biyolojik annesi ve babasının birliktelik durumu?

( ) Birlikte
( ) Ayrı

6. Yaşadığınız şehri göz önüne aldığınızda gelir düzeyinizi nasıl tanımlarsınız?

( ) Düşük ( ) Orta altı ( ) Orta ( ) Orta üstü ( ) Üst

11. Çocuğun tanılanmış bir özel gereksinimi bulunmakta mıdır?

( ) Evet (Bu yanıtı seçtiyseniz lütfen tanıyı belirtiniz _____)

( ) Hayır

12. Çocuğunuzun zihinsel veya ruhsal destek ihtiyacı olduğunu düşünüyor musunuz?

( ) Evet (Bu yanıtı seçtiyseniz lütfen belirtiniz _____)

( ) Hayır

APPENDIX F

DEMOGRAPHIC INFORMATION FORM (ENGLISH)

PARENT PARTICIPANT DEMOGRAPHIC INFORMATION FORM

Below, you are expected to answer some questions about the child and his/her family participating in the research. It is anticipated that it will take you approximately 5 minutes to answer all questions.

1. Your Relationship Level ( ) Mother ( ) Father ( ) Other ……..
2. Your Child's Name and Surname:
3. Your Child's Gender:
4. Your Child's Date of Birth (day/month/year):

Please fill in the questions below for yourself.

1. Your Date of Birth: _____

2. Your Gender: _____

3. What type of school did you graduate from last?

( ) Primary School ( ) Secondary School ( ) High School ( ) Associate Degree ( ) Bachelor ( ) Master/PhD

5. Are you working?

( ) Yes, full time

( ) Yes, part time

( ) No I'm not working.

( ) Other,_____

The following questions are reserved for you to fill in information about your child's other parent (mother/father).

1. Other parent's date of birth: _____
2. Which school did the other parent graduate from most recently (by obtaining a diploma)?

( ) Primary School ( ) Secondary School ( ) High School ( ) Associate Degree ( ) Bachelor ( ) Master/PhD

3. Is the other parent working?

( ) Yes, he works full time.

( ) Yes, he works part time.

( ) No, it doesn't work.

( ) Other_____

4. The status of the child's biological mother and father together?

( ) Together

( ) Separate

5. How would you describe your income level when you consider the city you live in?

( ) Low ( ) Below medium ( ) Medium ( ) Above medium ( ) Upper

6. Does the child have any identified special needs?

( ) Yes (If you chose this answer, please indicate the diagnosis

_____)

( ) No

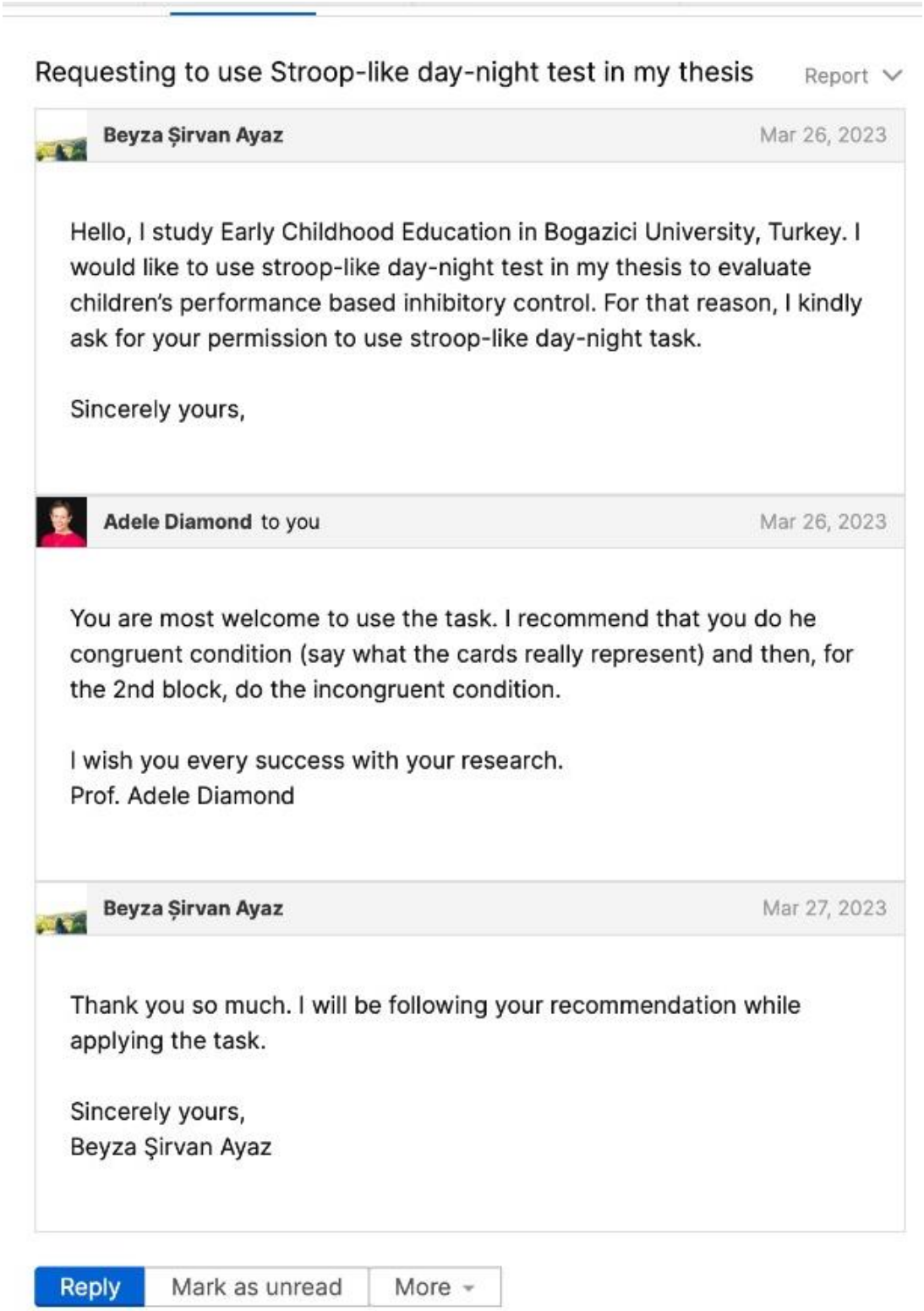
7. Do you think your child needs mental or psychological support?

( ) Yes (Please indicate if you chose this answer _____)

( ) No

APPENDIX G

PERMISSON OF DAY AND NIGHT STROOP-LIKE TASK CARDS



Requesting to use Stroop-like day-night test in my thesis Report

Beyza Şirvan Ayaz Mar 26, 2023

Hello, I study Early Childhood Education in Bogazici University, Turkey. I would like to use stroop-like day-night test in my thesis to evaluate children's performance based inhibitory control. For that reason, I kindly ask for your permission to use stroop-like day-night task.

Sincerely yours,

Adele Diamond to you Mar 26, 2023

You are most welcome to use the task. I recommend that you do he congruent condition (say what the cards really represent) and then, for the 2nd block, do the incongruent condition.

I wish you every success with your research.
Prof. Adele Diamond

Beyza Şirvan Ayaz Mar 27, 2023

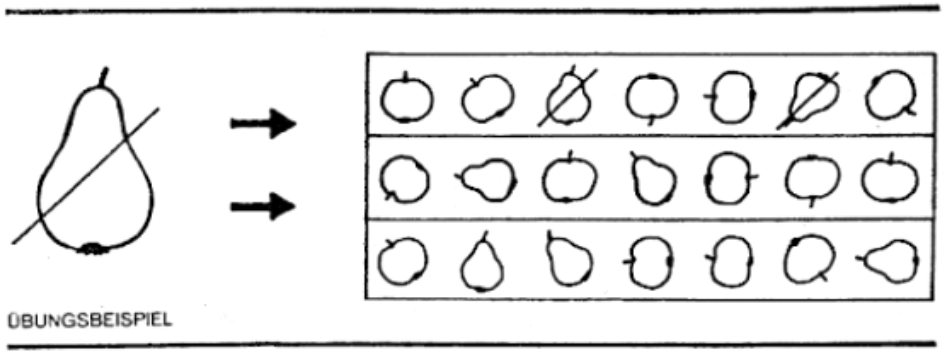
Thank you so much. I will be following your recommendation while applying the task.

Sincerely yours,
Beyza Şirvan Ayaz

Reply Mark as unread More

APPENDIX H

THE EXAMPLE OF FRANKFURTER ATTENTION TASK



APPENDIX I

STORY FOR EXPERIMENT GROUPS (TURKISH)

Çiçi The Boy
Experimental Group

Beyza Şirvan AYAZ

Çiçi arkadaşlarıyla parkta oynamayı çok seven bir çocuktu. Sık sık okulun yanındaki parkta arkadaşlarıyla saklambaç oynar, kaydıraktan kayar, salıncakta sallanırdı. Park okulun yanında olduğu için öğretmenleri parkta oynamalarına izin verirdi.

1

Yine öyle bir günde Çiçi ve arkadaşları parka çıkmışlardı. Parka gider gitmez kaydıraklara, salıncaklara koşan Çiçi bu sefer parkı merakla inceliyordu. Çünkü parkın etrafındaki çalıların arasında bir şey dikkatini çekmişti.

2

Heyecanla çalılara doğru ilerleyen Çiçi dalları kaldırdığında çok şaşırmıştı. Çalıların arasında parlayan kırmızı bir pelerin vardı. Şaşkınlığını üzerinden atamadan bu pelerinin nereden gelmiş olabileceğini düşünmeye başladı. Tam o sırada parktaki çocuklardan biri yanına gelip "Bu pelerin senin mi? Üstüne giysene." dedi.

3

Çiçi pelerini giyer giymez kendisini biraz daha farklı hissetmeye başladı. Bir anda gözlerinin daha iyi gördüğünü, kulaklarının daha iyi duyduğunu fark etmişti. Renkleri daha iyi görmeye ve sesleri daha iyi duymaya başlamıştı. Öyle ki bir şeye dikkat ettiğinde etraftan gelen sesler ya da görüntüler dikkatini hiç dağıtmıyordu. Çiçi sadece görmek istediği şeyi görüyor, duymak istediği şeyi duyuyor, tüm dikkatini istediği şey üzerinde toplayabiliyordu.

4

Çiçi ve arkadaşları birlikte saklambaç oynamaya karar verdi. Saklambaç oynarken Çiçi tüm ayrıntılara dikkat ederek, herkesin nerede olabileceğine dair ipuçlarını takip ediyor, herkesi doğru bir şekilde ve hızla sobeliyordu.

5

Saklambaç oyunu devam ederken çocuklardan biri yanlışlıkla parktaki satıcının tezgahını devirdi. Satıcı özenle tezgahına dizdiği meyvelerin birbirine karışmasından dolayı üzgün görünüyordu.

Çocuklar şaşkınlık içinde ne yapacağını bilemezken Çiçi önce tüm armutları elmaların arasından hızlıca seçip yerlerine dizdi. Ardından da yerde kalan elmaları yerlerine yerleştirirken tüm çocuklar ona katıldı.

6

Çiçi hiçbir yanlış yapmadan armutları ve elmaları hızlı ve doğru bir şekilde yerlerine yerleştirmişti. Çiçi'nin yetenekleri herkesi şaşırtıyordu. Çiçi'nin pelerini onu adeta bir süper kahraman yapıyordu, hem daha dikkatli hem de daha hızlı olmuştu. Çiçi böylesi sihirli bir pelerini bulduğu için çok mutlu oldu ve bu pelerini giyen herkesin bir süper kahramana dönüşebileceğini düşünürken, pelerin Çiçi'ye fısıldadı:

"Çiçi, seninle birlikte çok eğlendim ve beraberken senin yeteneklerini çok iyi kullandığını gördüm. Hadi şimdi başka çocukları daha dikkatli ve hızlı yapalım. Hazır mısın?"

Çiçi gülümsedi ve başıyla onayladı. *"Evet sihirli pelerin, hazırım. Beni daha dikkatli ve hızlı yaptığın için teşekkür ederim"* dedi.

7

SON

APPENDIX J

STORY FOR EXPERIMENT GROUPS (ENGLISH)

Çiçi The Boy
Experimental Group

Beyza Şirvan AYAZ

Çiçi was a child who loved to play in the park with his friends. He would often play hide-and-seek with his friends in the park next to the school, slide down the slide, and swing on the swing. Because the park was next to the school, their teacher would let them play in the park.

1

On such a day, Çiçi and his friends were out in the park. Çiçi, who ran to the slides and swings as soon as he went to the park, was examining the park with curiosity this time. Because something caught his attention in the bushes around the park.

2

Excitingly moving towards the bushes, Çiçi was very surprised when he lifted the branches. There was a glowing red cloak among the bushes. Before he could get over his amazement, he began to wonder where this cloak might have come from. Just then, one of the children in the park came up to him and said, "Is this your cloak? Put it on." said.

3

As soon as he put on the cloak, he began to feel a little different. He suddenly realized that his eyes could see better and his ears could hear better. He began to see colors better and hear sounds better. So much so that when he paid attention to something, the sounds or images from around did not distract him at all. Çiçi saw only what he wanted to see, heard what he wanted to hear, and could concentrate all his attention on what he wanted.

4

Çiçi and his friends decided to play hide and seek together. While playing hide-and-seek, Çiçi was paying attention to all the details, following clues to where everyone might be, and scouring everyone accurately and quickly.

5

While the game of hide and seek was in progress, one of the children accidentally knocked over the vendor's counter in the park. The seller looked upset that the fruits he had carefully arranged on his counter were mixed together.

While the children did not know what to do in amazement, Çiçi quickly picked all the pears from the apples and arranged them in their places. Then all the children joined him as he placed the remaining apples on the ground.

6

Çiçi had placed the pears and apples quickly and accurately, without making any mistakes. Çiçi's abilities surprised everyone. Çiçi's cloak made him a superhero, he was both more careful and faster. Çiçi was very happy to find such a magic cloak, and as he thought that anyone wearing this cloak could turn into a superhero, the cloak whispered to Çiçi:

"Çiçi, I had a lot of fun with you and I saw that you used your talents very well when we were together. Now let's make other kids more careful and faster. Are you ready?"

Çiçi smiled and nodded. "Yes, magic cloak, I'm ready. Thank you for making me more careful and faster."

7

THE END

APPENDIX K

STORY FOR CONTROL GROUPS (TURKISH)

Çiçi The Boy
Control Group

Beyza Şirvan AYAZ

Çiçi arkadaşlarıyla parkta oynamayı çok severdi. Sık sık okulun yanındaki parkta arkadaşlarıyla saklambaç oynar, kaydıraktan kayar, salıncakta sallanırdı. Park okulun hemen yanında olduğu için öğretmenleri onların bu parkta oynamasına izin verirdi.

1

Günlerden birinde Çiçi ve arkadaşları parkta oynamaya çıkmışlardı. Parkta vakit geçiriyorlardı.. Çiçi bazen kaydıraklara koşuyor ve kayıyor, bazen ise salıncakta sallanıyordu. Parkta bir sürü ağaç ve böcek vardı.

2

O sırada Çiçi'nin arkadaşları saklambaç oynamaya başladı. Çiçi de oyunlarına katıldı. Ebe saymaya başlayınca Çiçi ağaçların arasına doğru koşarak saklanacak bir yer aradı. Nereye saklanacağına bir türlü karar veremedi. Bu sırada gördüğü ilk ağacın arkasına saklandı ancak çok geçmeden ebe onu yakaladı.

3

Artık ebe olma sırası Çiçi'deydi. Çiçi gözlerini kapattı ve saymaya başladı bu arada arkadaşları da saklanmak için etrafta koşmaya başladılar.

4

Çiçi gözlerini açtığında nereye gideceğine ve önce nereye bakacağına tam emin olamadı. Bu sırada saklambaç oynayan çocuklar birer birer gelip sobelemeye başlamışlardı bile.

5

Bu arada çocuklardan biri sobelemek için gelirken Çiçi bir an ne yapacağını şaşırdı, ve panikleyerek yakınında bulunan satıcının meyve tezgahını devirdi. Çiçi ne yapacağını şaşırmış bir halde dururken çocuklar satıcıya yardım etmeye başladılar. Çiçi de onlara katılarak yardım etmeyi denedi ama hangi meyveyi nereye koyacağına karar vermekte zorlandı.

6

Yine de sonunda dökülen meyveler toplandı ve diğer çocuklar oyunlarına devam ettiler. Çiçi ise artık saklambaç oynamak istemiyordu ve sıkılmıştı. Bu yüzden etrafına bakıyor ve ne yapacağına karar veremiyordu. Artık burdan girmek istiyordu. Diğer çocuklar oynuyor, Çiçi öylece duruyordu.

7

SON

APPENDIX L

STORY FOR CONTROL GROUPS (ENGLISH)

Çiçi The Boy
Control Group

Beyza Şirvan AYAZ

Çiçi loved to play in the park with his friends. He would often play hide-and-seek with his friends in the park next to the school, slide down the slide, and swing on the swing. Since the park is right next to the school, their teachers would let them play in this park.

1

One day, Çiçi and his friends were out to play in the park. They were spending time in the park. Çiçi would sometimes run and slide on the slides, and sometimes swing on the swing. There were a lot of trees and insects in the park.

2

At that time, Çiçi's friends started playing hide and seek. Çiçi also participated in their games. When the seeker started counting, Çiçi ran towards the trees, looking for a place to hide. He couldn't decide where to hide. Meanwhile, he hid behind the first tree he saw, but soon the seeker caught him.

3

Now it was Çiçi's turn to be a seeker. Çiçi closed his eyes and started counting while his friends started running around to hide.

4

When Çiçi opened his eyes, he wasn't quite sure where to go and where to look first. Meanwhile, the children playing hide and seek had already started to come one by one.

5

In the meantime, while one of the children was coming to tag seeker Çiçi was confused for a moment, and panicked and knocked over the fruit counter of the seller nearby. While the Çiçi stood at a loss as to what to do, the children began to help the seller. Çiçi also tried to help by joining them, but he had a hard time deciding which fruit to put where.

6

However, in the end, the spilled fruit was collected and the other children continued their games. Çiçi did not want to play hide and seek anymore and was bored. So he was looking around and couldn't decide what to do. He wanted to get in from here now. Other children were playing, Çiçi just stood there.

7

THE END

APPENDIX M

ETHICS COMMITTEE APPROVAL

Evrak Tarih ve Sayısı: 26.01.2023-110483

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

Toplantı Sayısı	:	39
Toplantı Tarihi	:	18.01.2023
Toplantı Saati	:	16:00
Toplantı Yeri	:	Zoom Sanal Toplantı
Bulunanlar	:	Prof. Dr. Feyza Çorapçı, Dr. Öğr. Üyesi Yasemin Sohtorik İlkmen, Dr. Öğr. Üyesi Ayşegül Metindoğan
Bulunmayanlar	:	Dr. Öğr. Üyesi Harun Muratoğulları, Doç. Dr. Arhan S. Ertan, Doç. Dr. Senem Yıldız

Beyza Şirvan Ayaz
Erken Çocukluk Eğitimi

Sayın Araştırmacı,

"Rol Yapmanın Çocukların Dikkat ve Ketleyici Kontrol Becerileri Üstündeki Etkisi" başlıklı projeniz ile ilgili olarak yaptığınız SBB-EAK 2023/13 sayılı başvuru komisyonumuz tarafından 18 Ocak 2023 tarihli toplantıda incelenmiş ve uygun bulunmuştur.

Bu karar üyelerin toplantıya çevrimiçi olarak katılımı ve oy birliği ile alınmıştır. Onay mektubu üye ve raportör olarak Yasemin Sohtorik İlkmen tarafından toplantıya katılan bütün üyeler adına e-imzalanmıştır.

Saygılarımızla, bilgilerinizi rica ederiz.

Dr. Öğr. Üyesi Yasemin
SOHTORİK İLKMEN
Öğretim Üyesi

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

SOBETİK 39 18.01.2023

Bu belge, güvenli elektronik imza ile imzalanmıştır.

APPENDIX N

APPROVAL OF THE MINISTRY OF NATIONAL EDUCATION

T.C.
İSTANBUL VALİLİĞİ
İl Millî Eğitim Müdürlüğü

Sayı : E-59090411-44-74424280 14.04.2023
Konu : Anket ve Araştırma İzni (Beyza Şirvan AYAZ)

KÜÇÜKÇEKMECE İLÇE MİLLİ EĞİTİM MÜDÜRLÜĞÜNE

İlgi : a) Yenilik ve Eğitim Teknolojileri Genel Müdürlüğünün 21.01.2020 tarihli ve 2020/2 sayılı genelgesi.
b) Valilik Makamının 11.04.2023 tarihli ve E-59090411-20-74135320 sayılı oluru.

Valilik Makamının Anket ve Araştırma İzni konulu ilgi (b) oluru ve kullanılması uygun görülen ölçme araçlarının Müdürlüğümüzce mühürlenen örnekleri ekte gönderilmiştir.

İlgi (a) genelgenin 28. maddesinde; "Araştırma uygulama izni alan kamu kurum ve kuruluşları, uluslararası kuruluşlar, üniversiteler, sivil toplum kuruluşları ve araştırmacılar tamamladıkları bilimsel araştırma ile ilgili sonuç raporlarını, izni aldıkları ilgili birime çalışma bitiminden itibaren 30 gün içerisinde göndereceklerdir." ifadesi yer almaktadır.

Olur gereğince işlem yapılması ve araştırma sonuç raporunun ekte sunulan örneğe göre Müdürlüğümüz Strateji Geliştirme Şubesine gönderilmesi hususlarında gereğini rica ederim.

Dilek MADEN
İl Millî Eğitim Müdürü a.
Şube Müdürü

Ek:
1- Valilik Oluru (1 Sayfa)
2- Rapor Örneği
3- Ölçekler

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T.C.
İSTANBUL VALİLİĞİ
İl Millî Eğitim Müdürlüğü

Sayı : E-59090411-20-74135320 11/04/2023
Konu : Anket ve Araştırma İzni (Beyza Şirvan AYAZ)

VALİLİK MAKAMINA

İlgi : a) Yenilik ve Eğitim Teknolojileri Genel Müdürlüğünün 21.01.2020 tarihli ve 2020/2 sayılı genelgesi.
b) Küçükçekmece İlçe Milli Eğitim Müdürlüğünün 24.03.2023 tarihli ve E-96054738-604.01.01-73046866 sayılı yazısı.
c) Müdürlüğümüz Araştırma ve Anket Komisyonunun 27.03.2023 tarihli tutanağı.

Araştırma Konusu	: Rol Yapmanın Çocukların Dikkat ve Ketleyici Kontrol Becerileri Üstündeki Etkisi
Araştırma Türü	: Anket
Araştırma Yeri	: Küçükçekmece Belediye Anaokulu, Milli Savunma Üniversitesi Anaokulu
Araştırma Kişiler	: Anaokulu, Anasınıfı, İlkokul Öğrencileri, Öğrenci Velileri, Öğretmenleri
Araştırmanın Süresi	: 2022 - 2023 Eğitim - Öğretim Yılı

Yukarıda bilgileri verilen araştırmanın; 6698 sayılı Kişisel Verilerin Korunması Kanununa aykırı olarak kişisel veri istenmemesi, öğrenci velilerinden açık rıza onayı alınması, bir örneği Müdürlüğümüzde muhafaza edilen mühürlü ve imzalı veri toplama araçlarının kurumlarımıza araştırmacı tarafından ulaştırılarak uygulanması, katılımcıların gönüllülük esasına göre seçilmesi, araştırma sonuç raporunun kamuoyuyla paylaşılmaması ve araştırma bittikten sonra 2 (iki) hafta içerisinde Müdürlüğümüze gönderilmesi, okul idarelerinin denetim, gözetim ve sorumluluğunda, eğitim ve öğretimi aksatmayacak şekilde, ilgi (a) genelge esasları dâhilinde uygulanması kaydıyla Müdürlüğümüzce uygun görülmektedir.

Makamınızca da uygun görüldüğü takdirde olurlarınıza arz ederim.

Levent YAZICI
İl Millî Eğitim Müdürü

OLUR
Dr. Hasan Hüseyin CAN
Vali a.
Vali Yardımcısı

Ek:
1- İlgi (b) Yazı ve Ekleri (20 Sayfa)
2- İlgi (c) Tutanak (1 Sayfa)

REFERENCES

Allan, N. P., Hume, L. E., Allan, D. M., Farrington, A. L., & Lonigan, C. J. (2014). Relations between inhibitory control and the development of academic skills in preschool and kindergarten: A meta-analysis. *Developmental Psychology*, *50*(10), 2368-2379. https://doi.org/10.1037/a0037493

Bacon, W. F., & Egeth, H. E. (1994). Overriding stimulus-driven attentional capture. *Perception & Psychophysics*, *55*(5), 485-496. https://doi.org/10.3758/BF03205306

Bardikoff, N., & Sabbagh, M. (2017). The differentiation of executive functioning across development: Insights from developmental cognitive neuroscience. In N. Budwig, E. Turiel, & P. Zelazo (Eds.), *New perspectives on human development* (pp. 27– 46). Cambridge, UK: Cambridge University Press. http://dx.doi.org/10.1017/CBO9781316282755.005

Beattie, H. L., Schutte, A. R., & Cortesa, C. S. (2018). The relationship between spatial working memory precision and attention and inhibitory control in young children. *Cognitive Development, 47*, 32-45. https://doi.org/10.1016/j.cogdev.2018.02.002

Benson, J. E., Sabbagh, M. A., Carlson, S. M., & Zelazo, P. D. (2013). Individual differences in executive functioning predict preschoolers' improvement from theory-of-mind training. *Developmental Psychology, 49*(9), 1615-1627. https://doi.org/10.1037/a0031056

Berger, A. (2011). *Human brain development series. Self-regulation: Brain, cognition, and development.* American Psychological Association. https://doi.org/10.1037/12327-000

Berwid, O. G., Curko Kera, E. A., Marks, D. J., Santra, A., Bender, H. A., & Halperin, J. M. (2005). Sustained attention and response inhibition in young children at risk for attention Deficit/Hyperactivity disorder. *Journal of Child Psychology and Psychiatry, 46*(11), 1219-1229. https://doi.org/10.1111/j.1469-7610.2005.00417.x

Blair, C., & Ursache, A. (2011). A bidirectional theory of executive functions and self-regulation. In K. Vohs, & R. Baumeister (Eds.), *Handbook of self-regulation* (2nd edition., pp. 300-320). Guilford Press.

Bredekamp, S., & Copple, C. (1997). *Developmentally Appropriate Practice in Early Childhood Programs* (Revised Edition). Washington, DC: NAEYC.

Bodrova, E., & Leong, D. (2007). *Tools of the mind: The Vygotskian approach to early childhood education* (2nd ed.). Pearson/Merrill Prentice Hall.

Bretherton, I. (1989). Pretense: The form and function of make-believe play. *Developmental Review, 9*(4), 383-401. https://doi.org/10.1016/0273-2297(89)90036-

Broadbent, D. (1958). *Perception and Communication.* London: Pergamon Press.

Brocki, K. C., & Bohlin, G. (2004). Executive functions in children aged 6 to 13: A dimensional and developmental study. *Developmental Neuropsychology*, 26, 571– 593. https://doi.org/10.1207/s15326942dn2602_3

Bronson, M. (2000). *Self-regulation in early childhood: Nature and nurture*. Guilford Press.

Brown, T. E., & Landgraf, J. M. (2010). Improvements in executive function correlate with enhanced performance and functioning and health-related quality of life: Evidence from 2 large, double-blind, randomized, placebo-controlled trials in ADHD. *Postgraduate Medicine, 122*(5), 42-51. https://doi.org/10.3810/pgm.2010.09.2200

Calvo, M. G., Avero, P., & Lundqvist, D. (2006). Facilitated detection of angry faces: Initial orienting and processing efficiency. *Cognition and Emotion*, 20(6), 785–811.

Carlson, S. M., & White, R. E. (2013). Executive Function, Pretend Play, and Imagination In M. Taylor (Ed),. *The Oxford handbook of the development of imagination* (pp. 161-173). Oxford University Press.

Carlson, S. M. , & Zelazo, P. D. (2008). Symbolic thought. In M. M. Haith, & J. B. Benson (Eds.), Encyclopedia of infant and early childhood development, Vol. 3 , pp. 288–297 . London : Elsevier .

Carlson, S. M. (2005). Developmentally sensitive measures of executive function in preschool children. *Developmental Neuropsychology, 28*(2), 595-616. https://doi.org/10.1207/s15326942dn2802_3

Carlson, S. M., & Moses, L. J. (2001). Individual differences in inhibitory control and children's theory of mind. *Child Development, 72*(4), 1032-1053. https://doi.org/10.1111/1467-8624.00333

Carlson, S. M., White, R. E., & Davis-Unger, A. C. (2014). Evidence for a relation between executive function and pretense representation in preschool children. *Cognitive Development, 29*(1), 1-16. https://doi.org/10.1016/j.cogdev.2013.09.001

Cheie, L., Veraksa, A., Zinchenko, Y., Gorovaya, A., & Visu-Petra, L. (2015). A cross-cultural investigation of inhibitory control, generative fluency, and anxiety symptoms in Romanian and Russian preschoolers. *Child Neuropsychology*, 21, 121– 149. https://doi.org/10.1080/09297049.2013.87911

Chevalier, N., & Clark, C. A. C. (2017). Executive function in early and middle childhood. *Executive function: Development across the life span* (pp. 29-43) https://doi.org/10.4324/9781315160719

Chung, Y. S., Calhoun, V., & Stevens, M. C. (2020). Adolescent sex differences in cortico-subcortical functional connectivity during response inhibition. *Cognitive, Affective, & Behavioral Neuroscience, 20*(1), 1– 18. https://doi.org/10.3758/s13415-019-00718-y

Clark, C. D. (2003). *In sickness and in play: Children coping with chronic illness*. New Brunswick, NJ: Rutgers University Press.

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*.(2nd ed.). New York: Academic Press.

Colombo, J., & Cheatham, C. L. (2006). The emergence and basis of endogenous attention in infancy and early childhood. In R. V. Kail (Ed.), *Advances in child development and behavior* (pp. 283–322). Elsevier Academic Press.

Cornblath, E. J., Tang, E., Baum, G. L., Moore, T. M., Adebimpe, A., Roalf, D. R., Gur, R. C., Gur, R. E., Pasqualetti, F., Satterthwaite, T. D., & Bassett, D. S. (2019). Sex differences in network controllability as a predictor of executive function in youth. *Neuroimage*, 188, 122– 134. https://doi.org/10.1016/j.neuroimage.2018.11.048

Corsaro, W. (2005). *The sociology of childhood*. Thousand Oaks, California: Pine Forge Press.

Cuevas, K., Calkins, S. D., & Bell, M. A. (2016). To Stroop or not to Stroop: Sex-related differences in brain-behavior associations during early childhood. *Psychophysiology*, *53*(1), 30– 40. https://doi.org/10.1111/psyp.12464

Day, S. L., Connor, C. M., McClelland, M. M. (2015). Children's behavioral regulation and literacy: The impact of the first grade classroom environment. *Journal of School Psychology*, 53, 409–428. doi:10.1016/j.jsp.2015.07.004

Diamond, A. (2013). Executive functions. *Annual Review of Psychology*, *64*, 135-168. https://doi.org/10.1146/annurev-psych-113011-143750

Diamond, A., Kirkham, N., & Amso, D. (2002). Conditions under which young children can hold two rules in mind and inhibit a prepotent response. *Developmental Psychology, 38*(3), 352-362. https://doi.org/10.1037/0012-1649.38.3.352

Doebel, S. (2020). Rethinking executive function and its development. *Perspectives on Psychological Science, 15*(4), 942-956. https://doi.org/10.1177/1745691620904771

Duncan, J. (2012). A research Agenda for 40 Years and Counting: Strategies and Models of Selective Attention, In Wolfe, J. & Robertson, L. (Eds.), *From Perception to Consciousness: Searching with Anne Treisman*, Oxford Series in Visual Cognition (pp. 1-19). New York: Oxford Academic. https://doi.org/10.1093/acprof:osobl/9780199734337.003.0002,

Ertenü, L., Altunay, I., Köşlü, A. (1995) Colors of Skin, Eye and Hair and Undulation of Hair in Turkish People. *Med Bull Sisli Etfal Hosp, 29*(3), 14-19.

Eysenck, M. W., Derakshan, N., Santos, R., & Calvo, M. G. (2007). Anxiety and cognitive performance: Attentional control theory. *Emotion, 7*(2), 336–353. https://doi.org/10.1037/1528-3542.7.2.336

Ferrer, E., Shaywitz, B. A., Holahan, J. M., Marchione, K., & Shaywitz, S. E. (2010). Uncoupling of reading and IQ over time: Empirical evidence for a definition of dyslexia. *Psychological Science, 21*(1), 93-101. https://doi.org/10.1177/0956797609354084

Fisher, A., & Kloos, H. (2016). Development of selective sustained attention: The role of executive functions. In J. A. Griffin, P. McCardle, & L. S. Freund (Eds.), *Executive function in preschool-age children: Integrating measurement, neurodevelopment, and translational research* (pp. 215–237). American Psychological Association. https://doi.org/10.1037/14797-010

Garon, N., Bryson, S. E., & Smith, I. M. (2008). Executive function in preschoolers: A review using an integrative framework. *Psychological Bulletin, 134*(1), 31–60. https://doi.org/10.1037/0033-2909.134.1.31

Gashaj, V., Oberer, N., Mast, F. W., & Roebers, C. M. (2019). Individual differences in basic numerical skills: The role of executive functions and motor skills. *Journal of Experimental Child Psychology, 182,* 187-195. https://doi.org/10.1016/j.jecp.2019.01.021

Gathercole, S. E. (1998). The development of memory. *Journal of Child Psychology and Psychiatry, 39*(1), 3-27. https://doi.org/10.1111/1469-7610.00301

George, D., & Mallery, P. (2019). *IBM SPSS statistics 26 step by step: A simple guide and reference.* Routledge.

Gershon, J. (2002). A meta-analytic review of gender differences in ADHD. *Journal of Attention Disorders*, 5, 143– 154. https://doi.org/10.1177/108705470200500302

Gerstadt, C. L., Hong, Y. J., & Diamond, A. (1994). The relationship between cognition and action: Performance of children 312–7 years old on a Stroop-like day-night test. *Cognition, 53*(2), 129-153.

Ghodrati, S., Askari Nejad, M. S., Sharifian, M., & Nejati, V. (2021). Inhibitory control training in preschool children with typical development: An RCT study. *Early Child Development and Care, 191*(13), 2093-2102. https://doi.org/10.1080/03004430.2019.1691544

Goldstein, T. R., & Lerner, M. D. (2018). Dramatic pretend play games uniquely improve emotional control in young children. *Developmental Science, 21*(4), e12603-n/a. https://doi.org/10.1111/desc.12603

Gözüm, A., Kandır, A. (2018). Beş Yaş Çocuklar İçin Frankfurter Konsantrasyon Testi'nin (Frankfurter Test Für Funjahrıge Konzentration-Ftf-K) Güvenirlik Çalışması. 54 Değişen Dünyada Eğitim içinde (53-66. ss). Ankara: Pegem. DOI: 10.14527/9786052412480.04

Grenell, A., Prager, E. O., Schaefer, C., Kross, E., Duckworth, A. L., & Carlson, S. M. (2019). Individual differences in the effectiveness of self-distancing for young children's emotion regulation. *British Journal of Developmental Psychology, 37*(1), 84-100. https://doi.org/10.1111/bjdp.12259

Gunzenhauser, C., Saalbach, H., & von Suchodoletz, A. (2017). Boys have caught up, family influences still continue: Influences on executive functioning and behavioral self-regulation in elementary students in Germany. *PsyCh Journal, 6*(1), 29– 42. https://doi.org/10.1002/pchj.157

Hamamcı, B., & Balaban Dagal, A. (2022). Self-regulation and play: How children's play directed with executive function and emotion regulation. *Early Child Development and Care, 192*(13), 2149-2159. https://doi.org/10.1080/03004430.2021.1990906

Harris, P. L. (2000). *The work of the imagination. Understanding children's worlds.* Oxford: Blackwell Publishers.

Harris, P. L., Kavanaugh, R. D., Wellman, H. M., & Hickling, A. K. (1993). Young children's understanding of pretense. *Monographs of the Society for Research in Child Development, 58*(1), i-107. https://doi.org/10.2307/1166074

Heffner, M., Greco, L. A., & Eifert, G. H. (2003). Pretend you are a turtle: Children's responses to metaphorical versus literal relaxation instructions. *Child & Family Behavior Therapy, 25*(1), 19-33. https://doi.org/10.1300/J019v25n01_02

Hill, T. M., & Bartow Jacobs, K. (2020). "The mouse looks like a boy": Young Children's talk about gender across human and nonhuman characters in picture books. *Early Childhood Education Journal, 48*(1), 93-102.

Hoehl, S., Palumbo, L., Heinisch, C., & Striano, T. (2008). Infants' attention is biased by emotional expressions and eye gaze direction. *Neuroreport, 19*(5), 579–582.

Hofmann, W., Schmeichel, B. J., & Baddeley, A. D. (2012). Executive functions and self-regulation. *Trends in cognitive sciences, 16*(3), 174–180. https://doi.org/10.1016/j.tics.2012.01.006

Hommel, B., Li, K. Z. H., & Li, S. (2004). Visual Search Across the Life Span. *Developmental Psychology, 40*(4), 545–558. https://doi.org/10.1037/0012-1649.40.4.545

Hooper, C. J., Luciana, M., Conklin, H. M., & Yarger, R. S. (2004). Adolescents' performance on the iowa gambling task: Implications for the development of decision making and ventromedial prefrontal cortex. *Developmental Psychology, 40*(6), 1148-1158. https://doi.org/10.1037/0012-1649.40.6.1148

Huizinga, M., Dolan, C. V., & van der Molen, Maurits W. (2006). Age-related change in executive function: Developmental trends and a latent variable analysis. *Neuropsychologia, 44*(11), 2017-2036. https://doi.org/10.1016/j.neuropsychologia.2006.01.010

Jensvold, M. L. A., & Fouts, R. S. (1993). Imaginary play in chimpanzees (pan troglodytes). *Human Evolution, 8*(3), 217-227. https://doi.org/10.1007/BF02436716

Jo, S., Kim, J. Y., & Han, S. W. (2021). Top-down control of attention under varying task loads. *Acta Psychologica, 216*, 103310-103310. https://doi.org/10.1016/j.actpsy.2021.103310

Karniol, R., Galili, L., Shtilerman, D., Naim, R., Stern, K., Manjoch, H., & Silverman, R. (2011). Why superman can wait: Cognitive self-transformation in the delay of gratification paradigm. *Journal of Clinical Child and Adolescent Psychology, 40*(2), 307-317. https://doi.org/10.1080/15374416.2011.546040

Karpov, Y. V. (2005). *The neo-vygotskian approach to child development*. Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9781316036532

Kaymak, S. (1995). Yuvaya giden beş yaşındaki çocuklarla dikkat toplama çalışmaları. (Unpublished PhD Thesis), Ankara University, Ankara.

Kelly, R., Hammond, S., Dissanayake, C., & Ihsen, E. (2011). The relationship between symbolic play and executive function in young children. *Australasian Journal of Early Childhood, 36*(2), 21-27. https://doi.org/10.1177/183693911103600204

Köhler, W. (1927). *The mentality of apes* (2nd rev. ed.) (E. Winter, Trans.). Routledge & Kegan Paul. https://doi.org/10.1037/11338-000

Kolb, B., Mychasiuk, R., Muhammad, A., Li, Y., Frost, D. O., & Gibb, R. (2012). Experience and the developing prefrontal cortex. *Proceedings of the National Academy of Sciences - PNAS, 109*(Supplement 2), 17186-17193. https://doi.org/10.1073/pnas.1121251109

Korkman, M., Kirk, U., & Kemp, S. L. (2007). *NEPSY II. Administrative manual.* San Antonio, TX: Psychological Corporation.

Krasnor, L. R., & Pepler, D. J. (1980). The study of children's play: Some suggested future directions. *New Directions for Child and Adolescent Development, 1980*(9), 85-95. https://doi.org/10.1002/cd.23219800908

Kulesa, A., Krzywinski, M., Blainey, P., & Altman, N. (2015). Points of significance: Sampling distributions and the bootstrap. *Nature Methods, 12*(6), 477-478. https://doi.org/10.1038/nmeth.3414

Lazarus, A. A., & Abramovitz, A. (1962). The use of "emotive imagery" in the treatment of children's phobias. *Journal of Mental Science, 108*, 191. https://doi.org/10.1192/bjp.108.453.191

Lee, K., Bull, R., & Ho, R. M. H. (2013). Developmental changes in executive functioning. *Child Development, 84*(6), 1933-1953. https://doi.org/10.1111/cdev.12096

Leslie, A. M. (1987). Pretense and representation: The origins of "theory of mind". *Psychological Review, 94*(4), 412-426. https://doi.org/10.1037/0033-295X.94.4.412

Liew, J. (2011). Effortful control, executive functions, and education: bringing self-regulatory and social-emotional competencies to the table. *Child Development Perspectives, 6,* 105-111. https://doi.org/10.1111/j.1750-8606.2011.00196.x

Lillard, A. S., Lerner, M. D., Hopkins, E. J., Dore, R. A., Smith, E. D., & Palmquist, C. M. (2013). The impact of pretend play on children's development: A review of the evidence. *Psychological Bulletin, 139*(1), 1-34. https://doi.org/10.1037/a0029321

Lonigan, C. J., Spiegel, J. A., Goodrich, J. M., Morris, B. M., Osborne, C. M., Lerner, M. D., & Phillips, B. M. (2017). Does preschool self-regulation predict later behavior problems in general or specific problem behaviors? *Journal of Abnormal Child Psychology, 45*(8), 1491-1502. https://doi.org/10.1007/s10802-016-0260-7

Macdonald, J. A., Beauchamp, M. H., Crigan, J. A., & Anderson, P. J. (2014). Age-related differences in inhibitory control in the early school years. *Child Neuropsychology, 20*(5), 509– 526. https://doi.org/10.1080/09297049.2013.822060

Malagoli, C., & Usai, M. C. (2018). The effects of gender and age on inhibition and working memory organization in 14- to 19-year-old adolescents and young adults. *Cognitive Development, 45,* 10– 23. https://doi.org/10.1016/j.cogdev.2017.10.005

Mansouri, F. A., Fehring, D. J., Gaillard, A., Jaberzadeh, S., & Parkington, H. (2016). Sex dependency of inhibitory control functions. *Biology of Sex Differences, 7*(1), 1-13. https://doi.org/10.1186/s13293-016-0065-y

Marsh, R., Zhu, H., Schultz, R. T., Quackenbush, G., Royal, J., Skudlarski, P., & Peterson, B. S. (2006). A developmental fMRI study of self-regulatory control. *Human Brain Mapping, 27*(11), 848-863. https://doi.org/10.1002/hbm.20225

Martin, C. L., & Ruble, D. N (2009). Patterns of Gender Development.*Annual Review of Psychology* 61, 353–383.

McClelland, M. M., Geldhof, G. J., Cameron, C. E., & Wanless, S. B. (2015). Development and self-regulation. In W. F. Overton, P. C. M. Molenaar, & R. M. Lerner (Eds.), *Handbook of child psychology and developmental science: Theory and method* (pp. 523-565). Hoboken, NJ, US: John Wiley & Sons Inc.

Mesulam, M. M. (1981). A cortical network for directed attention and unilateral neglect. *Annals of Neurology, 10,* 309-325.

Meuwissen, A. S., & Zelazo, P. D. (2014). Hot and cool executive function: Foundations for learning and healthy development. *Zero to Three, 35*(2), 18-23.

Mileva-Seitz, V. R., Ghassabian, A., Bakermans-Kranenburg, M. J., van den Brink, J. D., Linting, M., Jaddoe, V. W. V., Hofman, A., Verhulst, F. C., Tiemeier, H., & van Ijzendoorn, M. H. (2015). Are boys more sensitive to sensitivity? Parenting and executive function in preschoolers. *Journal of Experimental Child Psychology*, 130, 193– 208. https://doi.org/10.1016/j.jecp.2014.08.008

Mills, G. E., & Gay, L. R. (2016). *Educational research: Competencies for analysis and applications, (11th ed).* London, England: Pearson.

Moffitt, T. E., Arseneault, L., Belsky, D., Dickson, N., Hancox, R. J., Harrington, H., Houts, R., Poulton, R., Roberts, B. W., Ross, S., Sears, M. R., Thomson, W. M., & Caspi, A. (2011). A gradient of childhood self-control predicts health, wealth, and public safety. *Proceedings of the National Academy of Sciences - PNAS, 108*(7), 2693-2698. https://doi.org/10.1073/pnas.1010076108

Montroy, J. J., Bowles, R. P., Skibbe, L. E., McClelland, M. M., & Morrison, F. J. (2016). The development of self-regulation across early childhood. *Developmental Psychology*, *52*(11), 1744– 1762. https://doi.org/10.1037/dev0000159

Morgan, G.A., Leech, N.L., Gloeckner, G.W., & Barrett, K.C. (2011). *IBM SPSS for Introductory Statistics: Use and Interpretation,* Fourth Edition (4th ed.). Routledge. https://doi.org/10.4324/9780203842966

Morrison F.J., Ponitz C.C., McClelland M.M. (2010). Self-regulation and academic achievement in the transition to school. In S.D. Calkins, M. Bell (Eds.) *Child Development at the Intersection of Emotion and Cognition* (pp. 203–240). Washington, DC: Am. Psychol. Assoc.

Müller, U., & Kerns, K. (2015). The development of executive function. In L. S. Liben, U. Müller, & R. M. Lerner (Eds.), *Handbook of child psychology and developmental science: Cognitive processes* (pp. 571–623). John Wiley & Sons, Inc. https://doi.org/10.1002/9781118963418.childpsy214

Murray, D.W., Rosanbalm, K.D., Christopoulos, C., & Hamoudi, A. (2015). *Self-regulation and toxic stress: Foundations for understanding self-regulation from an applied developmental perspective.* Retrieved from https://hdl.handle.net/10161/10283.

Nassauer, K.W., & Halperin, J.M. (2003). Dissociation of perceptual and motor inhibition processes through the use of novel computerized conflict tasks. *Journal of the International Neuropsychological Society, 9*, 25-30.

Nelson, C. A. (2007). What would Superman do? In L. C. Rubin (Ed.), *Using superheroes in counseling and play therapy* (pp. 49–67). New York: Springer.

O'Brien, J. W., Dowell, L. R., Mostofsky, S. H., Denckla, M. B., & Mahone, E. M. (2010). Neuropsychological profile of executive function in girls with attention-deficit/hyperactivity disorder. *Archives of Clinical Neuropsychology*, *25*(7), 656– 670. https://doi.org/10.1093/arclin/acq050

Pauen, S. (2016). Understanding early development of self-regulation and co-regulation: EDOS and PRESCO. *Journal of Self-Regulation and Regulation, 2,* 3-16. 1802-1817.

Pelphrey, K., & Reznick, J. (2003). Working memory in infancy. In R. V. Kail (Ed), *Advances in Child Development and Behavior, 31*, (pp. 173-227). Academic Press.

Petersen, I. T., Hoyniak, C. P., McQuillan, M. E., Bates, J. E., & Staples, A. D. (2016). Measuring the development of inhibitory control: The challenge of heterotypic continuity. *Developmental Review, 40*, 25-71. https://doi.org/10.1016/j.dr.2016.02.001

Piaget, J. (1962). *Play, dreams and imitation in childhood*. Norton.

Posner, M. I., Rothbart, M. K., Sheese, B. E., & Voelker, P. (2014). Developing attention: Behavioral and brain mechanisms. *Advances in Neuroscience (Hindawi), 2014*, 405094. https://doi.org/10.1155/2014/405094

Pratt, J., Radulescu, P. V., Guo, R. M., & Abrams, R. A. (2010). It's alive! animate motion captures visual attention. *Psychological Science, 21*(11), 1724-1730. https://doi.org/10.1177/0956797610387440

Raatz, U. & Möhling, R. (1971). Frankfurter Tests für Fünfjahrige-Konzentration (FTF-K). Weinheim: Beltz

Reck, S. G., & Hund, A. M. (2011). Sustained attention and age predict inhibitory control during early childhood. *Journal of Experimental Child Psychology, 108*(3), 504-512. https://doi.org/10.1016/j.jecp.2010.07.010

Ristic, J., & Enns, J. T. (2015). Attentional development. In L. S. Liben, U. Müller, & R. M. Lerner (Eds.), *Handbook of child psychology and developmental science: Cognitive processes* (pp. 158–202). John Wiley & Sons, Inc.. https://doi.org/10.1002/9781118963418.childpsy205

Robin, A., Schneider, M., & Dolnick, M. (1976). The turtle technique: An extended case study of self- control in the classroom. *Psychology in the Schools, 13*(4), 449-453. https://doi.org/10.1002/1520-6807(197610)13:4<449::AID-PITS2310130420>3.0.CO;2-W

Rogers, S., & Evans, J. (2008). *Inside role-play in early childhood education: Researching young children's perspectives*. Routledge. https://doi.org/10.4324/9780203930304

Rubin, L. C. (2007). Introduction: Look, up in the sky! An introduction to the use of superheroes in psychotherapy. In L. C. Rubin (Ed.), *Using superheroes in counseling and play therapy* (pp. 3–21). New York: Springer.

Ruff, H. A., & Rothbart, M. K. (2001). *Attention in early development: Themes and variations*. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780195136326.001.0001

Sachet, A. B. , & Mottweiler, C. M. (2013). The distinction between role-play and object substitution in pretend play In M. Taylor (Ed),. *The oxford handbook of the development of imagination*., pp. 175-185. Oxford University Press.

Sadeghi, S., Shalani, B., & Nejati, V. (2022). Sex and age-related differences in inhibitory control in typically developing children. *Early Child Development and Care, 192*(2), 292-301. https://doi.org/10.1080/03004430.2020.1755668

Sawyer, J. (2017). I think I can: Preschoolers' private speech and motivation in playful versus non-playful contexts. *Early Childhood Research Quarterly, 38*, 84-96. https://doi.org/10.1016/j.ecresq.2016.09.004

Seymour, K. E., Mostofsky, S. H., & Rosch, K. S. (2016). Cognitive load differentially impacts response control in girls and boys with ADHD. *Journal of Abnormal Child Psychology*, *44*(1), 141– 154. https://doi.org/10.1007/s10802-015-9976-z

Sigel , I. E . (1970). The distancing hypothesis: A causal hypothesis for the acquisition of representational thought. In M. R. Jones (Ed.), Miami Symposium on the Prediction of Behavior, 1968: Effects of Early Experience , pp. 99–118 . Coral Gables, FL : University of Miami Press.

Sigel, I. E. (2002). The psychological distancing model: A study of the socialization of cognition. *Culture & Psychology, 8*(2), 189-214. https://doi.org/10.1177/1354067X02008002438

Solianik, R., Brazaitis, M., & Skurvydas, A. (2016). Sex-related differences in attention and memory. *Medicina (Kaunas, Lithuania), 52*(6), 372-377. https://doi.org/10.1016/j.medici.2016.11.007

Sparks, S. (2017). Can batman teach grit? "the 'batman effect': Improving perseverance in young children". *Education Week, 36*(17), 5-5.

Stich, S., & Tarzia, J. (2015). The pretense debate. *Cognition, 143*, 1-12. https://doi.org/10.1016/j.cognition.2015.06.007

Taylor, M. (2013). *The oxford handbook of the development of imagination*. Oxford University Press. https://doi.org/10.1093/oxfordhb/9780195395761.001.0001

Theeuwes, J. (2004). Top-down search strategies cannot override attentional capture.*Psychonomic Bulletin & Review, 11*(1), 65-70. https://doi.org/10.3758/BF03206462

Theeuwes, J. (2010). Top–down and bottom–up control of visual selection. *Acta Psychologica, 135*(2), 77-99. https://doi.org/10.1016/j.actpsy.2010.02.006

Thibodeau, R. B., Gilpin, A. T., Brown, M. M., & Meyer, B. A. (2016). The effects of fantastical pretend-play on the development of executive functions: An intervention study. *Journal of Experimental Child Psychology, 145*, 120-138. https://doi.org/10.1016/j.jecp.2016.01.001

Thibodeau-Nielsen, R. B., Gilpin, A. T., Nancarrow, A. F., Pierucci, J. M., & Brown, M. M. (2020). Fantastical pretense's effects on executive function in a diverse sample of preschoolers. *Journal of Applied Developmental Psychology, 68*, 101137-10. https://doi.org/10.1016/j.appdev.2020.101137

Thorell, L. B., Lindqvist, S., Bergman Nutley, S., Bohlin, G., & Klingberg, T. (2009). Training and transfer effects of executive functions in preschool children.*Developmental Science, 12*(1), 106-113. https://doi.org/10.1111/j.1467-7687.2008.00745.x

Tiego, J., Testa, R., Bellgrove, M. A., Pantelis, C., & Whittle, S. (2018). A hierarchical model of inhibitory control. *Frontiers in Psychology, 9*, 1339. https://doi.org/10.3389/fpsyg.2018.01339

Treisman, A. (1969). Strategies and models of selective attention. *Psychological Review, 76*(3), 282–299.

Treisman, A. M. (1964). Selective attention in man. *British Medical Bulletin, 20*(1), 12–16.

Treisman, A. M., & Gelade, G. (1980). A feature-integration theory of attention. *Cognitive Psychology, 12*(1), 97–136. https://doi.org/10.1016/0010-0285(80)90005-5

Usai, M. C. (2023). Inhibitory abilities in girls and boys: More similarities or differences? *Journal of Neuroscience Research, 101*(5), 689-703. https://doi.org/10.1002/jnr.25034

Van der Stigchel, S., Belopolsky, A. V., Peters, J. C., Wijnen, J. G., Meeter, M., & Theeuwes, J. (2009). The limits of top-down control of visual attention. *Acta Psychologica, 132*(3), 201–212. https://doi.org/10.1016/j.actpsy.2009.07.001

Vecera, S. P., Cosman, J. D., Vatterott, D. B., & Roper, Z. J. J. (2014). The control of visual attention. toward a unified account. *The Psychology of Learning and Motivation, 60*, 303-347. https://doi.org/10.1016/B978-0-12-800090-8.00008-1

Veraksa, A. N., Gavrilova, M. N., Bukhalenkova, D. A., Almazova, O., Veraksa, N. E., & Colliver, Y. (2021). Does batman™ affect EF because he is benevolent or skilful? the effect of different pretend roles on pre-schoolers' executive functions. *Early Child Development and Care, 191*(10), 1567-1576. https://doi.org/10.1080/03004430.2019.1658091

Verbruggen, F., & Logan, G. D. (2008). Response inhibition in the stop-signal paradigm. *Trends in Cognitive Sciences, 12*(11), 418-424. https://doi.org/10.1016/j.tics.2008.07.005

Vygotsky, L. S. (1978). Mind in society: The development of higher psychological functions. Cambridge, MA: Harvard University Press. (Original work published 1933).

Vygotsky, L. S., & Luria, A. (1994). Tool and symbol in child development. In R. Van der Veer , & J. Valsiner (Eds.), The Vygotsky reader , pp. 99–174 . Cambridge, MA : Blackwell Publishers .

Vygotsky, L. S. (1967). Play and its role in the mental development of the child. *Soviet Psychology, 5*(3), 6–18.

Vygotsky, L. S. (2004). Imagination and creativity in childhood. *Journal of Russian & East European Psychology, 42*(1), 7–97.

Wellman, H. M., & Liu, D. (2004). Scaling of theory-of-mind tasks. *Child Development, 75*(2), 523-541. https://doi.org/10.1111/j.1467-8624.2004.00691.x

Werner, H., & Kaplan, B. (1963). *Symbol formation* New York : Wiley .

White, R. E., & Carlson, S. M. (2016). What would batman do? self-distancing improves executive function in young children. *Developmental Science, 19*(3), 419-426. https://doi.org/10.1111/desc.12314

White, R. E., & Carlson, S. M. (2021). Pretending with realistic and fantastical stories facilitates executive function in 3-year-old children. Journal of Experimental Child Psychology, 207, 105090-105090. https://doi.oe of children 312–7 years old on a Stroop-like day-night test. *Cognition, 53*(2), 129-153.

White, R. E., Prager, E. O., Schaefer, C., Kross, E., Duckworth, A. L., & Carlson, S. M. (2017). The "Batman effect": Improving perseverance in young children. *Child Development, 88*(5), 1563-1571. https://doi.org/10.1111/cdev.12695

White, R. E., Thibodeau-Nielsen, R. B., Palermo, F., & Mikulski, A. M. (2021). Engagement in social pretend play predicts preschoolers' executive function gains across the school year. *Early Childhood Research Quarterly, 56*, 103-113. https://doi.org/10.1016/j.ecresq.2021.03.005

Whitebread, D., Neale, D., Jensen, H., Liu, C., Solis, S.L., Hopkins, E., Hirsh-Pasek, K. Zosh, J. M. (2017). The role of play in children's development: a review of the evidence (research summary). The LEGO Foundation, DK.

Welch, B. L. (1951). On the comparison of several mean values: An alternative approach. *Biometrika, 38*(3/4), 330-336.

Wiebe, S. A., Sheffield, T. D., & Espy, K. A. (2012). Separating the fish from the sharks: a longitudinal study of preschool response inhibition. Child development, *83*, 1245–1261. https://doi.org/10.1111/j.1467-8624.2012.01765.x

Wodka, E. L., Mostofsky, S. H., Prahme, C., Gidley Larson, J. C., Loftis, C., Denckla, M. B., & Mahone, E. M. (2008). Process examination of executive function in ADHD: Sex and subtype effects. *Clinical Neuropsychologist, 22*(5), 826– 841. https://doi.org/10.1080/13854040701563583

Woodward, L. J., Lu, Z., Morris, A. R., & Healey, D. M. (2017). Preschool self regulation predicts later mental health and educational achievement in very preterm and typically developing children. *Clinical Neuropsychologist, 31*(2), 404-422. https://doi.org/10.1080/13854046.2016.1251614

Wyman, E., Rakoczy, H., & Tomasello, M. (2009). Normativity and context in young children's pretend play. *Cognitive Development, 24*(2), 146-155. https://doi.org/10.1016/j.cogdev.2009.01.003

Yamamoto, N., & Imai-Matsumura, K. (2019). Gender differences in executive function and behavioural self-regulation in 5 years old kindergarteners from East Japan. *Early Child Development and Care, 189*, 56– 67. https://doi.org/10.1080/03004430.2017.1299148

Yücel, M., Fornito, A., Youssef, G., Dwyer, D., Whittle, S., Wood, S. J., Lubman, D. I., Simmons, J., Pantelis, C., & Allen, N. B. (2012). Inhibitory control in young adolescents: The role of sex, intelligence, and temperament. *Neuropsychology*, *26*(3), 347– 356. https://doi.org/10.1037/a0027693

Zelazo, P. D. (2006). The dimensional change card sort (DCCS): A method of assessing executive function in children. *Nature Protocols, 1*(1), 297. https://doi.org/10.1038/nprot.2006.46

Zelazo, P. D., Anderson, J. E., Richler, J., Wallner-Allen, K., Beaumont, J. L., & Weintraub, S. (2013). ii. nih toolbox cognition battery (cb): Measuring executive function and attention. *Monographs of the Society for Research in Child Development, 78*(4), 16-33. https://doi.org/10.1111/mono.12032

Zelazo, P. D., Blair, C. B., & Willoughby, M. T. (2016). *Executive function: Implications for education.* NCER 2017-2000. National Center for Education Research.

Zimmerman, D. W. (2004). A note on preliminary tests of equality of variances. *British Journal of Mathematical and Statistical Psychology, 57*(1), 173-181.