

**Executive Function and Effortful Control:  
Relations with Theory of Mind and Social Behavior**

by

İrem Korucu

A Thesis Submitted to the  
Graduate School of Social Sciences  
In Partial Fulfillment of the Requirements for  
The Degree of  
Master of Arts  
In  
Developmental Psychology  
Koç University  
July 2014

Koc University  
Graduate School of Social Sciences and Humanities

This is to certify that I have examined this copy of a master's thesis by

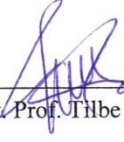
İrem Korucu

and have found that it is complete and satisfactory in all respects,  
and that any and all revisions required by the final  
examining committee have been made.

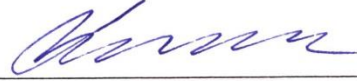
Committee Members:



Assoc. Prof. Bilge Yağmurlu



Asst. Prof. Tilbe Göksun



Prof. Sibel Kazak Berument

Date:

17/07/2014

## **STATEMENT OF AUTHORSHIP**

This thesis contains no material which has been accepted for any award or any other degree or diploma in any university or other institution. It is affirmed by the candidate that, to the best of her knowledge, the thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

Signed

İrem Korucu

## ACKNOWLEDGMENTS

The fact that this journey was completed in the face of many adversities and challenges makes this work all the more precious.

Throughout this journey, this thesis would not have been possible without the support of very special people in my life, who will always be in my mind and in my heart in whatever road I pursue.

First and foremost, I would like to thank to my advisor, Bilge Yağmurlu for her consistent support, guidance and patience during the process of this master thesis and this challenging program. I will forever be grateful to her for believing in me, and for being there for me as a guide whenever I need through this process. I would like to extend special thanks to the rest of my thesis committee members, Asst. Prof. Tilbe Göksun and Prof. Dr. Sibel Kazak Berument for their valuable knowledge, critical comments and scientific assistance.

I would also like to express my gratitude to Prof. Dr. Çiğdem Kağıtçıbaşı for allowing me to benefit her wisdom, experience and perspective of research during the time of my teaching assistantships. I am indebted to all of the faculty members in our department for making this program a lot more difficult, helping us to survive in adverse conditions and leading me to become stronger than ever.

I am deeply grateful to my friends Gizem Gündüz and Yasemin Sandıkçı in my cohort for their everlasting and unconditional support and for being great friends in the last two years.

Without their emotional support and cheerful friendships, it would be very hard to overcome the most stressful times in my life through these two years in Koç University. Also, I would like to express my deepest gratitude to Erol Kiroğlu for being in my life, and for making these last six year in Istanbul unforgettable.

Finally, I would like to thank my parents Hülya Korucu and Kadir Korucu and my brother Kerem Korucu for their love, support and encouragement throughout my whole life and in my all decisions, which mean the world to me.

## ABSTRACT

It is argued that self-regulation skill is necessary both for displaying constructive behavior and for controlling negative social behavior, and self-regulation might affect social behaviors by increasing the ability to understand others' minds. In this research, in order to examine behavioral and cognitive aspects of self-regulation, we focused on both effortful control and executive function, and investigated their concurrent associations with socially competent and aggressive behaviors, and theory of mind (ToM). The participants were 212 preschool children in Turkey. We assessed executive functions with behavioral measures, and effortful control with mother reports. We used six tasks for comprehensive assessment of mental state understanding. Children's social competency and aggressive behavior were assessed with teacher reports. SEM results showed that when receptive language was controlled, ToM was significantly associated with social competence but not aggressive behavior. Both effortful control and executive functions were significantly related with social competency, aggressive behavior, and ToM; the pathways from each self-regulation skill were in similar strength. ToM was linked with social competence, but it did not have a mediating role in the relations of self-regulation with social competence. The findings highlighted the importance of self-regulation for socio-cognitive and social development in the preschool years.

*Keywords:* Social competence, aggression, theory of mind, executive function, effortful control, preschool period.

## ÖZET

Öz-düzenleme becerisinin hem yapıcı davranışlar gösterme, hem de olumsuz sosyal davranışların kontrol edilmesindeki rolü birçok çalışmada vurgulanmış ve aynı zamanda bu becerinin başkalarının zihnini anlama yeteneğini artırarak sosyal davranışları etkilediği tartışılmıştır. Bu çalışmada, öz düzenleme becerisinin davranışsal ve bilişsel yönlerini araştırmak için, hem yönetici işlevler hem de ketleyici kontrole odaklanılmış, sosyal yetkinlik, saldırgan davranışlar ve zihin kuramı yeteneği ile ilişkileri incelenmiştir. Araştırma, Türkiye’de yaşayan 3-6 yaş arası 212 çocuk, aileleri ve öğretmenleriyle yapılmıştır. Çocukların yönetici işlevleri bireysel değerlendirmelerle, ketleyici kontrolleri ise anneleri tarafından doldurulan ölçeklerle değerlendirilmiştir. Zihin kuramı yeteneklerini ölçmek için altı farklı etkinlikten oluşan Zihin Kuramı Ölçeği uygulanmıştır. Çocukların sosyal yetkinlikleri ve saldırgan davranışları ise öğretmenleri tarafından değerlendirilmiştir. Yapısal eşitlik modellemesi sonuçları, çocukların alıcı dil becerileri kontrol edildikten sonra, zihin kuramı yeteneklerinin sosyal yetkinlikleri ile anlamlı düzeyde ilişkili olduğunu, fakat saldırgan davranışları ile ilişkili olmadığını göstermiştir. Hem ketleyici kontrolün hem de yönetici işlevlerin sosyal yetkinlik, saldırgan davranış ve zihin kuramı ile benzer kuvvetlerde ilişkili olduğu bulunmuştur. Zihin kuramı yeteneği sosyal yetkinlik ile anlamlı düzeyde ilişkiliyken, zihin kuramı öz düzenleme beceresi ve sosyal yetkinlik arasındaki ilişkiye aracılık etmemiştir. Bulgular, okul öncesi dönemdeki çocukların sosyal ve sosyo-bilişsel gelişimlerinde öz düzenleme becerisinin önemine dikkat çekmektedir.

*Anahtar Kelimeler:* Sosyal yetkinlik, saldırgan davranış, zihin kuramı, yönetici işlevler, ketleyici kontrol, okul öncesi dönem.

## TABLE OF CONTENTS

STATEMENT OF AUTHORSHIP .....	iii
ACKNOWLEDGMENTS .....	iv
ABSTRACT .....	vi
ÖZET .....	vii
LIST OF TABLES .....	x
LIST OF FIGURES .....	xi
Chapter 1 .....	1
INTRODUCTION .....	1
Chapter 2 .....	3
LITERATURE REVIEW .....	3
2.1 Effortful Control, Executive Functions and Social Behaviors .....	3
2.2 Executive Function, Effortful Control and Theory of Mind .....	6
2.3 Theory of Mind, Social Competence and Aggressive Behavior .....	8
Chapter 3 .....	10
PRESENT STUDY .....	10
Chapter 4 .....	12
METHOD .....	12
4.1 Participants .....	12
4.2 Measures .....	12
4.2.1 Social competence. ....	12
4.2.2 Aggressive behavior. ....	14
4.2.3 Effortful control. ....	14



4.2.4 Executive function .....	15
4.2.5 Theory of Mind (ToM) .....	15
4.2.6 Receptive language .....	16
4.3 Procedure .....	17
Chapter 5 .....	19
RESULTS .....	19
5.1 Structural Equation Modeling .....	19
5.1.1 <i>Measurement Model</i> .....	19
5.1.2 <i>Structural Model</i> .....	21
Chapter 6 .....	24
DISCUSSION .....	24
References .....	29
Appendix A .....	46
Appendix B .....	50
Appendix C .....	54
Appendix D .....	58
Appendix E .....	61

## LIST OF TABLES

Table 1. Descriptive Statistics.....	13
Table 2. Structural Correlations between Latent Variables.....	20

## LIST OF FIGURES

Figure 1. Standardized estimates for the structural model predicting social competence and aggression.....	23
--	----

## Chapter 1

### INTRODUCTION

Preschool period is a time of rapid growth in children's cognitive and social abilities (Cutting & Dunn, 1999; Jenkins & Astington, 2000; Walker, 2005), which are necessary for successful adaptation to school (Bierman, Nix, Greenberg, Blair, & Domitrovich, 2008; Blair, 2002; Valiente, Lemery-Chalfant, Swanson, & Reiser, 2008). Given the significance of early cognitive and social competencies, there has been a growing interest to investigate their precursors. A large body of research has shown that self-regulation skills are necessary both for displaying constructive behavior (Eisenberg, Smith, Sadovsky, & Spinrad, 2004) and for controlling negative social behavior (Olson, Sameroff, Kerr, Lopez, & Wellman, 2005; Olson, Lopez-Duran, Lunkenheimer, Chang, & Sameroff, 2011). Self-regulation might affect social behaviors by increasing the ability to understand others' minds (Hughes, Dunn & White, 1998; Riggs, Jahromi, Razza, Dillworth-Bart, & Mueller, 2006 for a review). Although the role of theory of mind (ToM) in social competency is more clear-cut (Astington, 2003), there is inconsistency in the reported links between ToM and aggression (see R. Blair, 2003; Sutton, Smith, & Swettenham, 1999).

Studies on social development mostly focus on behavioral aspects of self-regulation such as temperamentally based effortful control. In ToM research, however, the focus is more on cognitively loaded executive function. Executive function and effortful control are related skills, but they also have unshared elements (Liew, 2012). Coming from different research traditions, many studies have focused only on one of them, and these two skills have rarely been examined in the same research. There exists limited work that investigates their relations with ToM, and to our knowledge, no research exists focusing on their relations with ToM and social behaviors simultaneously. In this research, in order to examine social and cognitive aspects of self-

regulation, we focused on both effortful control and executive function and investigated their concurrent associations with socially competent and aggressive behaviors, and the mediating role of ToM in these relations.

## Chapter 2

### LITERATURE REVIEW

#### 2.1 Effortful Control, Executive Functions and Social Behaviors

Self-regulation is a multi-dimensional construct including behavioral and cognitive process that enable an individual to manage attention, behavior, cognition and arousal optimally to guide his/her goal directed activities (Baumeister & Vohs, 2004; Blair & Diamond, 2008, Calkins & Howse, 2004). This multidimensional nature has given rise to different approaches in examination of self-regulation, such as a behavioral and temperament-based approach and a cognitive-neural systems approach (Liew, 2012; Zhou, Chen, & Main, 2012). Researchers who adopt the temperament-based approach to study self-regulation focus on effortful control, whereas those who adopt the neural systems approach focus on executive functions.

Effortful control refers to the ability to regulate behavioral tendencies by attentional, inhibitory control and activational control mechanisms (Rothbart & Bates, 2006). Effortful control emerges at the end of the first year, develops rapidly in the toddler and preschool years; it is shaped by heredity and environmental factors, and displays moderate continuity across lifetime (Eisenberg, 2005; Goldsmith et al., 1987; Nigg, 2006; Posner & Rothbart, 1998; Rothbart, 1989; Rothbart, Sheese, & Posner, 2007). Executive function is defined as complex and interrelated set of cognitive processes including inhibition of dominant response, mental set shifting, maintenance and manipulation of information by working memory processes that are utilized in planning, problem solving and goal directed thoughts (Garon, Bryson, & Smith, 2008; Miyake, Friedman, Emerson, Witzki, & Howerter, 2000). Executive function is conceptualized as a higher order, hierarchical, cognitive ability; basic skills needed for its components emerge before three years of age, develops and becomes coordinated during preschool years and found to be moderately responsive to training (Garon et al., 2008; Zelazo, Craik, & Booth, 2004).

Temperamentally based effortful control and cognitively loaded executive functions have some conceptual overlap (Liew, 2012). Attentional processes and inhibitory control mechanisms are crucial self-regulatory processes for both. But despite this partial overlap, there are also subtle differences and unshared elements between effortful control and executive functions (Blair & Razza, 2007; Liew, 2012). Working memory and higher order processes such as planning or hierarchical representations (Zelazo, 2004) are more salient in executive functions and executive function research focuses more on affectively neutral contexts (for review Garon et al., 2008; Zelazo, Müller, Frye, & Marcovitch, 2003), including cognitive outcomes such as ToM and academic achievement (Blair, 2002; Blair & Razza, 2007; Carlson, Moses, & Breton, 2002). Effortful control research focuses more on emotion-laden contexts (Valiente et al., 2003), and emotion-related regulation of behavior including social outcomes such as social competence and behavioral problems (Olson et al., 2005; Spinrad et al., 2006). Many studies investigated only one of them and these two aspects of self-regulation have rarely been studied together. In one study, Blair and Razza (2007) found that both effortful control (teacher reported) and executive functions predicted mathematics and literacy skills in 3- to 5-years-old children. In this study, executive function was found to be predictive of both mathematics ability and literacy skills but with stronger predictions for mathematics compared to literacy skills. Neuenschwander et al. (2012) examined these two aspects of self-regulation in relation with different aspects of school adaptation including school achievement such as standardized achievement tests and grades, and learning related behaviors (teacher reported classroom behavior such as listening to instructions and following directions, *e.g.*, *'the child forces himself to do task even though he is tired'*) in kindergarten and first grade children. Their results revealed that executive functions predicted all aspects of adaptation to school one year later, whereas effortful control predicted learning related behavior one year later, but not achievement test performance. Moreover, Jahromi and Stifter

(2008) studied emotional, behavioral and cognitive aspect of self-regulation in relation to false belief understanding in preschoolers, and they found that executive function predicted false belief understanding one year later while behavioral (effortful control) and emotional control did not significantly predict false belief understanding when verbal ability was controlled.

Social behaviors are examined more frequently with effortful control, compared to executive functions. Children who are able to regulate their behaviors focus and shift attention, and sensitive to stimuli were found to display social competence and low problematic behaviors, whereas those who display poor effortful control skills were found to experience difficulties with peers and teachers (Denham et al., 2003; Eisenberg et al., 2003; Liew, Eisenberg, & Reiser, 2004; Olson et al., 2005; Orta, Corapci, Yagmurlu, & Aksan, 2013; Spinrad et al., 2006). Studies have also shown that children with better regulatory and attentional skills are low in aggressiveness since they control their anger by using non-hostile verbal methods rather than explicit aggressive techniques (Eisenberg, Fabes, Nyman, Bernzweig, & Pinulas, 1994). The vast majority of the literature examined the relations of effortful control with social behaviors and the association was also confirmed both longitudinally and cross-culturally. Valiente et al. (2011) found that both mother and teacher reported (e.g., Children's Behavior Questionnaire, CBQ) and observed effortful control at age 6 predicted higher social competence and lower externalizing problems two years later, when children were 8 years old. Similarly, Zhou, Main, and Wang (2010) reported that Chinese children with better effortful control (mother and teacher reported, CBQ) at first or second grade had higher social competence at fifth or sixth grade, respectively.

Different from effortful control, executive function has been investigated less in relation to socially competent behavior, but quite frequently with mental state understanding in children (Martin & Failow, 2010). However, components of executive function have also equivalents at the social-emotional level such as controlling behavioral responses and problem solving, thus



directly related to social behaviors (Riggs et al., 2006). Research which investigates the links between executive function and social behavior mostly focus on behavioral problems and developmental disorders such as attention deficit hyperactivity disorder (Pennington & Ozonoff, 1996; Willcutt, Doyle, Nigg, Faraone, & Pennington, 2005) and autism (Ozonoff, Pennington, & Rogers, 1991; Lopez, Lincoln, Ozonoff, & Lai, 2005). Many studies have revealed that impairment in executive function is associated with externalizing problems (Hughes et al., 1998; Hughes & Ensor, 2008) and antisocial behaviors (Hughes, White, Sharpen, & Dunn, 2000).

Studies which examine executive function in relation to positive social outcomes are limited in number (Charman, Carrol, & Sturge, 2001; Hughes 1998; Riggs et al., 2006) compared to the studies that focus on problematic behaviors. Studies mostly found a positive association both concurrently and longitudinally (Bierman et al., 2008), but others reported a non-significant link from preschool to kindergarten (Razza & Blair, 2009). In sum, there is good empirical evidence both for effortful control and executive function predicting different aspects of social behaviors, with better examinations of effortful control with social competence and for executive function with aggression.

## **2.2 Executive Function, Effortful Control and Theory of Mind**

The ability to understand other peoples' minds has been linked with cognitive and behavioral regulation. ToM refers the ability to understand and infer the mental states of others, including beliefs, desires, thoughts and intentions in order to predict and explain behavior (Premack & Woodruff, 1978; Wellman, 1990). It is a fundamental milestone in socio-cognitive development and an important accomplishment for an adult-like understanding of the social world. Although new findings suggest that mental state understanding begins earlier in infancy, around 15-months of age (Onishi & Baillergeon, 2005; Sodian, 2011), a significant advancement in ToM occurs between 3 and 5 years of age (Jenkins & Astington, 2000; Wellman, Cross, &

Watson, 2001). This development is also parallel to the major growth of self-regulatory skills (Kochanska, Coy, & Murray, 2001). A certain level of executive function skills such as inhibition, attentional processes and mental flexibility are necessary for children to understand the presence of different mental states by distancing themselves from salient aspects of reality (Carlson et al., 2002; Moses & Tahiroglu, 2010).

Studies conducted with typical and atypical samples have revealed moderate to strong correlations between executive function and ToM (Pellicano, 2010; Devine & Hughes, 2014; Perner & Lang, 1999 for a review). While the nature of the association between the two is bidirectional (Hughes & Ensor, 2007; Kloo & Perner, 2003; Müller, Liebermann-Finestone, Carpendale, Hammond, & Bibok, 2012), Devine and Hughes (2014) in their recent meta-analytic study showed that early executive function predicted later ToM (i.e., false belief understanding) more strongly than the reverse direction. In line with this finding, both concurrent (e.g., Carlson & Moses, 2001; Frye, Zelazo, & Palfai, 1995; Hughes et al., 1998) and longitudinal (e.g., Carlson, Mandell, & Williams, 2004, Hughes, 1998, Hughes & Ensor, 2007, Müller et al., 2012) evidence suggest that executive function is necessary for the development of ToM (Devine & Hughes, 2014).

Research which investigates effortful control in relation to ToM is scarce. Blair and Razza (2007) investigated the relations among effortful control and false belief understanding in addition to executive function in their study and their relations with children's mathematical and literacy ability in kindergarten. Teacher reported effortful control was found to be moderately correlated with false belief understanding of preschool children from low income families whereas mother reported effortful control was not significantly related to false belief understanding (Blair & Razza, 2007). This finding was interpreted by the authors as a result of the low-income sample characteristics, and attributed to the possible misunderstanding of the

items by parents. Similarly, Carlson and Moses (2001) revealed that parent-report inhibitory control was not significantly related to ToM task performance (four ToM tasks; location false belief, contents false belief, deceptive pointing, appearance-reality) whereas performances on the effortful control tasks are found to be correlated with the performances on ToM tasks (Carlson, Moses, & Claxton, 2004).

### **2.3 Theory of Mind, Social Competence and Aggressive Behavior**

The literature shows that understanding other peoples' minds is associated with social behavior (Astington, 2003; Dunn, 1995). During preschool years, there is an increase in the ability to realize that people may hold different beliefs and some may have mistaken beliefs. This understanding helps children coordinate their own thoughts and beliefs better, and to engage in more complex social behaviors. Studies of preschool children have shown that better mental state understanding was positively related with positive peer interaction and social competence (Lalonde & Chandler, 1995; Razza & Blair, 2009; Watson, Nixon, Wilson, & Capage, 1999), smooth connected conversations (Slomkowski & Dunn, 1996), and interpersonal problem solving (Capage & Watson, 2001). There are also findings which have revealed a non-significant association between ToM and socially competent behavior (Newton & Jenvey, 2011) and peer acceptance (Badenes, Estevan, & Bacete, 2000). Although there is mixed evidence, a meta-analytic study showed that there is a significant but moderate relation between ToM and positive peer status such as being popular and liked by peers in 3 to 5 years of children (Slaughter, Imuta, Peterson, & Henry, 2014).

These findings suggest that preschoolers' inability to understand different perspectives may lead to difficulties in their relationships with peers and social adjustment (Walker, 2005). It is also argued that representing the inner states of others leads to suppression of aggression directly, or results in empathic responding which in turn prevents aggression (Eisenberg et al.,

1996; Feshbach, 1987). Therefore, lack of socio-cognitive understanding is considered as a significant predictor of aggressive behavior (Crick & Dodge, 1994; Lemerise & Arsenio, 2000). Empirical support for this claim comes from both cross-sectional and longitudinal studies. Cross-sectional studies have revealed that ToM was negatively related to aggressive and disruptive behavior (Capage & Watson, 2001) even when verbal ability was controlled (Hughes et al., 1998; Hughes & Ensor, 2006). Longitudinal studies similarly showed that when verbal ability and regulatory skills were controlled children who had delays in ToM at age two displayed more aggressive behavior at age four (Hughes & Ensor, 2007).

It is, however, also argued that an advanced ToM does not always guarantee social success or inhibition of aggressive behavior. Some findings reported a non-significant link between ToM and emotional and behavioral difficulties (Happé & Frith, 1996) and disruptive behaviors (Sutton, Reeves, & Keogh, 2000). Moreover, some studies even found a positive association between ToM and bullying behavior in children (Caravita, Di Blasio, & Salmivalli, 2010; Sutton et al., 1999) and antisocial behavior in adults (e.g., psychopaths; Blair et al., 1996). These findings suggest that children may also use their mind-reading skills to manipulate and dominate others in social situations and select aggressive strategies to achieve personal gains (Crick & Dodge, 1996; Sutton et al., 1999). These mixed findings suggest that the association between theory of mind and aggressive behavior has a complex nature.

The literature shows that all these abilities, ToM (Happe, 1995; Jenkins & Astington, 1996; Milligan, Astington, & Dack, 2007), effortful control (Blair & Razza, 2007) executive function (Blair, 2003; Carlson et al., 2004; Hughes & Ensor, 2008) and social behaviors (Astington & Jenkins, 1995) are related with age and language. Therefore, when investigating the relation between mental state understanding, executive function, effortful control and social behavior, the effects of language ability and age needs to be considered.

### Chapter 3

#### PRESENT STUDY

A review of the literature revealed that two different aspects of self-regulatory skills, executive function and effortful control, have been linked to social competency and aggressive behavior in childhood (Blair & Razza, 2007; Eisenberg et al., 2004; Hughes et al., 1998; Olson et al., 2005). The ability to understand others' minds has also shown to be necessary for positive social interactions (Astington, 2003; Capage & Watson, 2001). The links between executive function and ToM (Carlson et al., 2002; Hughes et al., 1998; Moses & Tahiroglu, 2010 for a review), and ToM and social behavior (Lalonde & Chandler, 1995; Watson et al., 1999; Yagmurlu, 2014) have been widely examined, but the limited number of studies which investigated their associations simultaneously were mostly conducted with specific groups such as children from low income populations (Razza & Blair, 2009) and children with behavioral disorders at clinical (Charman et al., 2001; Fahie & Symons, 2003) or nonclinical level (Hughes et al., 1998). And although cognitively loaded executive function shares some features with the temperamentally based effortful control, to our knowledge, they have not been studied together in relation to ToM and social behavior. The present study aimed to explore their individual links with these domains, and investigated the concurrent associations of executive function and effortful control with ToM, and socially competent and aggressive behaviors in a sample of preschool children from diverse socioeconomic backgrounds. We proposed that ToM could play a mediating role in the relations between self-regulation (executive function and effortful control) and social behavior (socially competent and aggressive behavior).

It was specifically predicted that executive function and effortful control would be positively related with ToM and socially competency, and negatively with aggressive behavior. Similarly ToM would be positively associated with social competency and negatively with

aggressive behavior, which are hypothesized to have inverse relations with each other. Given the findings in the extant literature, we expected that the link between executive function and ToM would be stronger than the one between effortful control and ToM.

In this study, we worked with a large sample of preschool children from diverse socioeconomic backgrounds. We assessed their executive function with behavioral measures and effortful control with mother reports. We used six tasks (the Theory of Mind scale of Wellman and Liu, 2004) for comprehensive assessment of mental state understanding. Children's socially competent and aggressive behaviors were assessed with teacher reports. To investigate direct and indirect associations among self-regulation, ToM and social behaviors, we conducted mediation analyses in Structural Equation Modeling (SEM). Due to the established role of language and age in mental state understanding and age in executive function, they are used as additional control variables in our model.

## Chapter 4

### METHOD

#### 4.1 Participants

The participants were 212 preschool children ( $M = 53.69$  months,  $SD = 10.34$ ) (106 girls), their mothers and preschool teachers from five different cities of Turkey (see Table 1 for descriptive statistics). The sample included sixty-four 3-year-olds, eighty-two 4-year-olds, fifty-seven five-year-olds and nine six-year-olds. Mean age of girls ( $M = 54.24$ ,  $SD = 10.02$ ) and boys ( $M = 53.15$ ,  $SD = 10.66$ ) did not significantly differ from each other ( $F(1,210) = .58$ ,  $p = .45$ ).

The mothers' mean age was 34.88 years ( $SD = 5.10$ ) and the teachers' mean age was 29.98 years ( $SD = 11.07$ ). Among the mothers, 2 were illiterate, 16.9% had a primary school diploma, 7% graduated from secondary school, 30.2% from high school, 44.8% graduated from a university. Among the fathers, 1 was illiterate, 16.6% had graduated from primary school, 8% had a secondary school diploma, 29.2% had a high school diploma and 43% had a university degree. The total monthly household income ranged from 2,001 TL (905 \$) to 7,000 TL (3155 \$). This information revealed that the sample included children coming from diverse socioeconomic backgrounds.

#### 4.2 Measures

**4.2.1 Social competence.** We assessed children's social competence during peer play and during everyday interactions with peers via two scales, both of which were rated by the child's teacher (for similar assessment see Etel & Yagmurlu, in press). Socially competent behavior during peer play was measured by the Play Interaction subscale (e.g., *'Help settle peer conflicts'*) of Penn Interactive Peer Play Scale (PIPPS; Fantuzzo, Mendez, & Tighe, 1998). Social competency during general peer and teacher interactions was assessed by the Social Competence

Table 1

*Descriptive statistics (N = 212)*

Variables	<i>M</i>	<i>SD</i>	Min	Max
Executive Function				
Day-night (0-10)	7.70	3.17	0	10.00
Peg tapping I (0-12)	7.98	4.13	0	12.00
Peg tapping II (0-12)	6.44	4.10	0	12.00
Effortful Control				
Attention regulation (1-7)	4.01	.97	1.14	6.20
Inhibitory control (1-7)	5.16	.92	2.50	7.00
Perceptual sensitivity (1-7)	6.31	.58	4.25	7.00
Theory of Mind (0-6)	3.21	1.26	0	6.00
Social Competence				
PIPPS interaction subscale (1-4)	2.90	.60	1.00	4.00
SCBE social competence subscale (1-4)	3.12	.56	1.57	4.00
Aggressive Behavior				
PIPPS disruption subscale (1-4)	1.48	.39	1.00	2.83
SCBE aggression subscale (1-4)	1.41	.43	1.00	3.30

subscale (e.g., ‘*Cooperate with other children in group activities*’) of the Social Competence and Behavioral Evaluation Scale (SCBE; LaFreniere & Dumas, 1996).

Each subscale included 7 items being rated on a 4-point Likert scale (1 = ‘never’ and 4 = ‘always’), and in the present study, both had high internal consistency ( $\alpha = .81$ ). The subscale scores were computed by averaging the scores for each item.



**4.2.2 Aggressive behavior.** Children's aggressive behavior was measured similarly, using the PIPPS and SCBE scale. To assess aggressive behavior during peer play, the Play Disruptions subscale (e.g., *'Starts fights and arguments'*) of Penn Interactive Peer Play Scale (Fantuzzo et al., 1998) was used. To compute the Play Disruption score, we took the mean of the 12 items in the subscale ( $\alpha = .86$ ). To measure aggressive behavior during general peer and teacher interactions, the Anger-Aggression subscale (e.g., *'Hits, bites or kicks other children'*) of SCBE (LaFreniere & Dumas, 1996) was used; the Anger-Aggression score was computed by taking the mean of the 10 items in the subscale ( $\alpha = .86$ ).

**4.2.3 Effortful control.** Children's effortful control was by the three subscales of the Child Behavior Questionnaire (CBQ; Rothbart, Ahadi, & Herseyh, 1994) completed by the mothers: inhibitory control, attention regulation, and perceptual sensitivity (see Neuenschwander, Röthlisberger, Cimeli, & Roebbers, 2012 for similar measurement). The Inhibitory Control subscale assessed the ability to plan and suppress inappropriate responses in novel or uncertain conditions (10 items; e.g., *'Can wait before entering into new activities if he/she is asked to'*). Perceptual Sensitivity assessed the capacity for detection of slight and low intensity stimuli from the environment (8 items; e.g., *'Notices it when parents are wearing new clothing'* and *'Notices the smoothness or roughness of objects he/she touches'*). Attention regulation tapped both the tendency to sustain attentional focus in task related issues and capacity to shift attention between tasks (7 items; e.g., *'Has trouble concentrating when listening to a story'* *'Has a lot of trouble stopping an activity when called to do something else'* -reverse scored). All the items were rated on a 7 point Likert scale (1 = 'extremely untrue', 7 = 'extremely true'), and the total score was computed by averaging the items for each subscale. Internal consistency values were .77 for Inhibitory Control, .65 for Perceptual Sensitivity, and .63 for Attention Regulation.

**4.2.4 Executive function.** Executive function was measured with two tasks which require children to inhibit a dominant response, remember the rule and perform the subdominant response for correct responding: The day-night and peg-tapping tasks.

The day-night task (Gerstadt, Hong, & Diamond, 1994) is one of the most commonly used Stroop-like tasks developed to measure EF in young children, where children are required to point pictures in incompatible ways (Montgomery & Koeltzow, 2010). In the modified version (Orta et al., 2013) of the day-night task, children were asked to point the picture of nighttime sky with stars and a moon when experimenter says the word 'day', and to show the picture of daytime with a bright yellow sun when experimenter says the word 'night'. Three practice trials were introduced until the child showed correct understanding of the rules, then he/she was administered a series of 10 test trials. Each correct response scored as 1 point.

In the peg-tapping task (Diamond & Taylor, 1996), a wooden peg was presented to the child after explaining the rules for the task. The child was asked to tap twice when the experimenter tapped once (Rule 1) and to tap once when the experimenter tapped twice (Rule 2). After the practice trials, the child was administered a series of 12 test trials. Each correct response scored as 1 point (Peg Tapping I). Next, a new rule (Rule 3) was introduced to the child: not to tap after the experimenter tapped three times. After the practice trials, the child was administered a series of 12 test trials with each correct response scored as 1 point (Peg Tapping II). For each task (I and II), the child's total score was the sum of correct responses on 12 trials with a maximum possible score of 12.

**4.2.5 Theory of Mind (ToM).** The Theory of Mind scale of Wellman and Liu (2004) which includes six tasks was used to measure ToM : diverse desires (DD), knowledge access (KA), contents false belief (CFB), diverse beliefs (DB), explicit false beliefs (EFB), and hidden emotion (HE). Earlier studies have not reported any effect of task order (Wellman & Liu, 2004,

Alayli, Yagmurlu, Etel, Sandikci, & Korucu, 2013); hence, they were presented in the order as presented above.

In DD task, child judges that different people like and want different things. The child is asked to predict the snack choice of someone else with opposite preferences after choosing his/her own preferred food (carrot or cookie). In KA task, child sees a toy in a container and is supposed to judge if someone who does not see the inside of the container knows what is in the closed container. In CFB task, child is presented with a distinctive box which is a pencil case and sees that box contains a band-aid rather than pencils. Knowing that, child predicts the belief of a person who does not see inside the box. In DB task, child judges that different people can hold different beliefs about the same thing when true or false belief is not known. The child is asked to state his/her own belief about the place that a pet is hiding (garage or bushes) and then child predicts the search behavior of a person who has the opposite belief. In EFB task, child listens to a story about a boy who has a mistaken belief about the place of his gloves. Child is told that his gloves are in the backpack, but the boy thinks they are in the wardrobe. Child predicts where the boy searches for his gloves, either in backpack or wardrobe. In HE task, child is told a story about a boy being teased by friends and does not want his friends to call him a baby. Child is asked how the boy really feels inside and looks on his face. Therefore, child judges that a person can display a different emotion than he/she actually feels.

Each task included a contrast or control question and a target question. Children who passed both control, contrast and target questions got a score of 1, and all scores were summed to compute the total ToM score (see Wellman & Liu, 2004).

**4.2.6 Receptive language.** Children's receptive language was measured by the Turkish Expressive and Receptive Language Test (TIFALDI-AD; Berument & Guven, 2010). The test includes four pictures on one plate and the child is asked to show the one which fits correctly to

the word read by the experimenter. This scale was found to be a valid and reliable tool to assess receptive vocabulary skills of 2 to 12 year old children (Berument & Guven, 2010; see also Baydar et al., 2014). To obtain receptive vocabulary scores regardless of the total number of items that the child answered, a three parameter Item Response Theory was applied to measure latent vocabulary scores. These scores were regressed on linear and quadratic indicators of age (in months), resulting the age standardized z-scores as an indicator of receptive language ability level (see Baydar et al., 2014, Etel & Yagmurlu, in press for similar computations).

### 4.3 Procedure

The measures utilized in this study were previously translated into Turkish and used in research conducted with preschool children in Turkey. The Turkish versions of the PIPPS (Öztürk, 2011; Etel & Yagmurlu, 2011), SCBE (Corapci, Aksan, Arslan-Yalcin, & Yagmurlu, 2010; Etel & Yagmurlu, 2011), CBQ (Batum & Yagmurlu, 2007), day-night and peg tapping tasks (Etel & Yagmurlu, 2011; Orta et al., 2013), and the ToM scale (Etel & Yagmurlu, 2011; Kahraman, 2012) have all been found to be reliable and valid measures.

Majority of the children ( $n = 199$ ) were recruited from kindergartens and child care centers. These centers were located in five cities; Istanbul, Bursa, Balikesir, Mugla and Tekirdag. Thirteen children were recruited via convenience and snowball sampling; they were not attending preschool.

The data were collected after getting the approval of the University Ethics committee and written informed consents of the directors of the kindergartens/childcare centers and the mothers. Individual assessments were done either in the centers or in homes of children by a female experimenter, in a separate and quite room where no one else was present. During the session, the child was first given the language test, and then the day-night and peg tapping tasks (lasted about 30-40 minutes). After a 15-minutes break, the theory of mind scale was given (lasted about 20-30

minutes). The mother (CBQ) and teacher reports (PIPPS, SCBE) were completed within the following two weeks. For the children who did not attend to preschool ( $n = 13$ ), the teacher-rated scales were filled out by an adult who knew the child very well, other than the parents (i.e., aunt, grandparent or close neighbor). At the end of the session, incentives (a t-shirt and a coloring book) were given to each child regardless of his/her performance.

## Chapter 5

### RESULTS

Data were analyzed with SPSS 20 and Mplus 6.12 (Muthen & Muthen, 1998-2011). Model fit was evaluated with chi-square ( $\chi^2$ ) value, comparative fit index (*CFI*), root mean square error of approximation (*RMSEA*) and standardized root mean square residual (*SRMR*).

#### 5.1 Structural Equation Modeling

SEM was used to examine the associations among regulatory skills (executive function and effortful control), ToM and social behaviors (social competence and aggression) simultaneously, and to analyze if ToM mediates the relations of regulatory skills with social competence and aggressive behavior. SEM allowed us to use multiple indicators to model comprehensive relations among the constructs and to test the hypothesized mediational model. First, we analyzed the adequacy of the measurement model which examines how well the indicators account for the latent constructs. Next, we tested the full structural model to examine how well the hypothesized model fits the data.

As the first step, a measurement model of 6 latent constructs with 12 observed indicator variables was tested. Effortful control was indicated by maternal reports of attention regulation, inhibitory control, and perceptual sensitivity. Executive function was indicated by three measured variables: day-night, peg-tapping I and peg-tapping II. The total ToM score computed from the six tasks was the indicator for ToM. Social competence and aggressive behavior were both indicated by two teacher-rated scale scores. Receptive vocabulary score was used as the indicator of the language construct.

5.1.1 *Measurement Model.* The method of scale setting for latent variables was applied for three indicators (i.e., peg-tapping I for executive function, inhibitory control for effortful control and aggressive behavior during general interactions with peers for aggression) before

running the measurement model. These indicators were chosen as marker variables and made equal to the scaled latent constructs as the representatives without any effect for the overall fit of the model (Little, Slegers, & Card, 2006). The measurement model provided good fit to the data ( $\chi^2(50, N = 212) = 104.94, p < .01, CFI = .95, RMSEA = .07$  (90% confidence interval [CI] = .05 to .09),  $SRMR = .05$ ), which showed that all indicators loaded significantly on their intended constructs.

Structural correlations between latent constructs indicated that correlations between all the variables were significant in expected directions except the correlation between age and effortful control (see Table 2). Associations between social competence, effortful control, executive function, ToM, language and age were positive. Aggression correlated negatively with social competence, effortful control, executive function, ToM, language and age.

Table 2

*Structural correlations between latent variables (N = 212)*

	1	2	3	4	5	6
1. Effortful Control	-					
2. Executive Function	.22***	-				
3. Theory of Mind	.21***	.47***	-			
4. Receptive Language	.22***	.46***	.37***	-		
5. Social Competence	.25***	.37***	.33***	.36***	-	
6. Aggressive Behavior	-.23***	-.31***	-.27***	-.22***	-.45***	-
7. Age	.06	.60***	.48***	.37***	.28***	-.36***

\*\*\*  $p < .001$ ; \*\*  $p < .01$ ; \*  $p < .05$

5.1.2 *Structural Model*. We specified a structural model to assess the hypothesized direct and indirect relationships among the constructs. Figure 1 provides the SEM results (factor loadings of each task on its latent construct, standardized parameter estimates among latent constructs) for the hypothesized model. The loadings of the single indicators (i.e., ToM, receptive language and age) were fixed at 1 (see Eisenberg et al., 2004; Sandler, Tein, Mehta, Wolchik, & Ayers, 2000 for similar procedures). The role of age in executive function and the role of age and language in ToM were controlled in the analysis of the structural model.

The SEM results revealed that the model fit was good<sup>1</sup>, as indicated in the fit indices ( $\chi^2(56, N = 212) = 150.74, p < .01, CFI = .92, RMSEA = .089$  (90% CI = .07 to .11),  $SRMR = .08$ ). All the hypothesized paths were significant in expected directions, except the path from ToM to aggression. ToM predicted higher social competence, but not lower aggression. The paths from executive function and effortful control to social competence and aggression were significant. The path from executive function to ToM and the path from effortful control to ToM were both significant. The indirect effect of executive function on social competence through ToM was notable but not statistically significant ( $\beta = .03, p < .10$ ). The other indirect paths were also non-significant.

To examine the strength of the relations between ToM and executive function, and ToM and effortful control, we conducted further analysis. Specifically, these two paths were set equal to each other (i.e., constrained model), and then compared with our original hypothesized model (i.e., without constraints). The model was run twice, once without constraints and once with the constrained ("nested") model. The constrained model assumed that the link from executive

---

<sup>1</sup> According to Hu and Bentler (1999), the good fit between the hypothesized model and the observed data is indicated by cutoff values close to .95 for *CFI*, .06 for *RMSEA* within 90% CI, .08 for *SRMR*.

Bollen (1989) reported that values of the ratio of  $\chi^2$  to df 3 and less indicate good fit.



function to ToM did not statistically differ from the link from effortful control to ToM. If the delta-chi square test (with delta df) was significant, it would be proposed that the constraints significantly harmed model fit. But the constrained model and the model without constraints did not differ from each other, revealing that the two models were equal ( $\chi^2_{\text{diff}}(1) = 1.64, p > .05$ ).

We also examined the strength of paths from executive function and effortful control to social competence and aggression, in the same way. We found that effortful control and executive function predicted social competence equally well ( $\chi^2_{\text{diff}}(1) = 1.89, p > .05$ ). Similarly, the magnitude of path coefficients from effortful control and executive function to aggression did not differ from each other ( $\chi^2_{\text{diff}}(1) = 2.55, p > .05$ ). These results indicated that the predictive power of executive function and effortful control for ToM, social competence and aggression were similar.

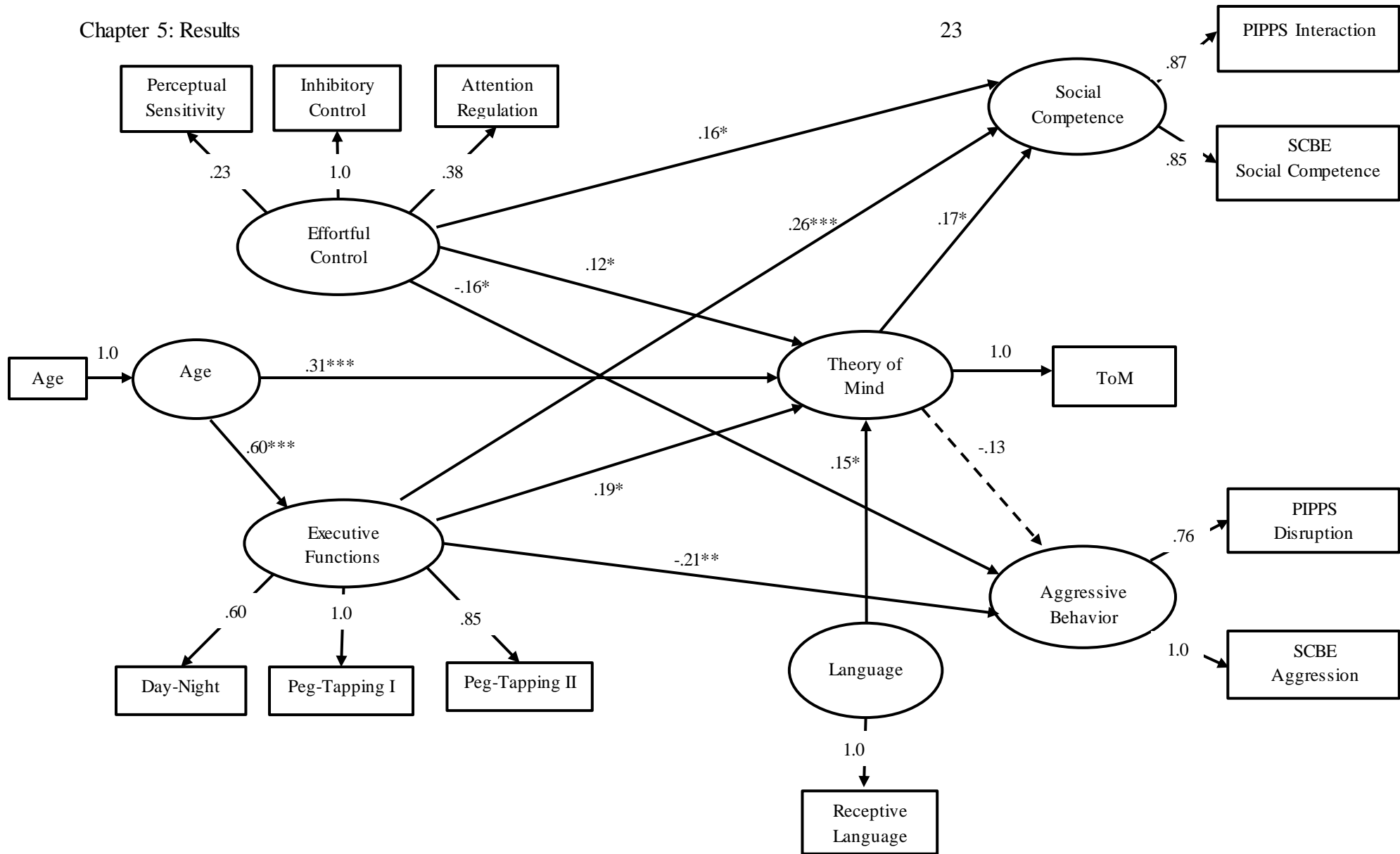


Figure 1. Standardized estimates for the structural model predicting social competence and aggression.

Note. Dashed line indicates hypothesized but non-significant paths. \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$ .

## Chapter 6

### DISCUSSION

The literature makes a distinction between behavioral aspects and cognitive aspects of self-regulation. The literature on social development focuses more on effortful control (behavioral aspect), while executive function (cognitive aspect) is studied more in cognitive and clinical psychology studies (Zhou et al., 2012). Social development research which investigates executive functioning frequently examines mental state understanding as well, and tests the mediating role of ToM in the relations between executive skills and social behaviors. But although ToM is associated with social behavior (Astington, 2003), it has rarely been studied in relation to regulation skills with a stronger behavioral component. The purpose of the present study was to investigate the concurrent associations of both behavioral and cognitive aspects of self-regulation with socially competent and aggressive behavior, and to explore the mediating role of ToM in the relations between self-regulation skills and social outcomes. In line with the literature (e.g., Olson et al., 2005; Riggs et al., 2006), we expected that both effortful control and executive function would be positively related with ToM and socially competent behavior, and negatively with aggressive behavior. We also predicted that ToM would mediate these relations, and be associated higher social competency and lower levels of aggressive behavior. We expected that the association of ToM with executive function would be stronger than its link with effortful control. The results partially confirmed our predictions.

Our findings indicated that even after the effect of language was controlled, children's understanding of mental states was significantly associated with their socially competent behavior. Previous studies have reported both significant (Razza & Blair, 2009; Watson et al., 1999) and non-significant associations (Badenes et al., 2000; Newton & Jenvey, 2011), but a recent meta-analysis study by Slaughter et al. (2014) revealed a positive significant association

between ToM and social competence (positive peer relations). As Astington (2003) discussed in detail in her review paper, theory of mind allows individuals to interpret and predict the actions of others, and the ability to consider different and sometimes conflicting beliefs, desires and knowledge is necessary for constructive social interactions. But for aggressive behaviors, the role of ToM was found to be non-significant in our study. While this result was contrary to our expectations, it is consistent with findings showing that an advanced mental state understanding does not guarantee the inhibition of aggressive behavior in children (Happé & Frith, 1996; Renouf et al., 2010; Sutton et al., 2000) and adults (Richell, Mitchell, Newman, Baron-Cohen, Blair, 2003). A good understanding of the mind can serve different purposes, helping or hurting, and it depends on many factors, contextual and individual (Carlo, Knight, Eisenberg, & Rotenberg, 1991; Ronald & Happé, 2005). Different forms of aggressive behavior might also have differential relations with ToM. Mental state understanding can be positively associated with indirect and social aggression, but this link for other forms of aggressive behavior such as reactive and physical is usually negative or non-significant (Renouf et al., 2010). Hence, it might be argued that ToM is related to aggressive acts in a meaningful way when a specific form of aggression is tapped; however, in this study our interest was on the general, multi-faceted aggression displayed by young children toward peers and adults and our measure for aggressive behavior did not allow investigating these different aggression forms separately.

As predicted, both effortful control and executive functions were directly and significantly related with social competency and aggressive behavior, and the relations of the two regulatory skills with the social behaviors were in similar strength. We also found that the strength of the associations of effortful control and executive functions with ToM was similar. This was contrary to our expectation which was based on the abundance of studies examining and showing a link between ToM and executive functions. These findings are remarkable as they

show that the more behavioral aspect and the more cognitively loaded aspect of self-regulation are equally needed for understanding others' mental states and for engaging in harmonious social interactions. It is also noteworthy that the correlation between effortful control and executive functions was significant but moderate, indicating that the two are not tapping exactly the same processes. Working memory and higher order processes are more salient in executive functions, but attentional processes and inhibition are common elements in both. Executive attention network consisting of anterior cingulate cortex is highlighted as central and believed to provide the neural basis for the development of both effortful control and executive function's attentional components, and prefrontal cortex is linked with executive function's higher order rule representation and switching components (Garon et al., 2008; Posner & Rothbart, 1998; Rothbart et al., 2007). In terms of the underlying mechanisms, activational control processes (inhibiting a dominant and activating a subdominant response) that resolve conflicts among responses are emphasized more in effortful control, and found to be related with social and behavioral competencies. In executive functioning, one generally controls and regulates over cognitive automatic processes by top down and higher order processes, and this ability is generally linked with goal directed problem solving with complex rules (Zelazo et al., 2003). So taken together, it appears that the behavioral and cognitive aspects of self-regulation have commonalities but they do not overlap; and even when examined together, each self-regulation skill is individually associated with mental state understanding and social behaviors.

A different pattern found for the two self-regulation skills was for the age-related changes. Our data revealed that among all the child outcome variables examined, the only one which did not correlate with age was effortful control. This was an unexpected result given the common finding that a significant improvement occurs in effortful control in the second to fourth years of life (Kochanska et al., 2001; Rothbart & Bates, 2006). However, some researchers state

that some temperamental characteristics display increasing stability after the first two years of life (Henderson & Wachs, 2007), and effortful control displays moderate continuity across lifetime (Nigg, 2006; Rothbart et al., 2007). While our findings suggest that temperamentally based effortful control might be less open to change even in the preschool years, this finding needs to be replicated.

Our data revealed that none of the indirect paths were significant; that is, mental state understanding did not mediate the associations between self-regulation skills and social behaviors. The mediational role of ToM in the relation between executive function and social competence was notable but non-significant. Earlier studies had conceptually suggested such a potential mediational role for ToM (Hughes et al., 1998; Watson et al., 1999), but this model is not supported widely by empirical evidence (e.g., Kolnik, 2010; Razza & Blair, 2009). In our study, when we tested the model without controlling for the effect of age, the mediational role of ToM was significant ( $\beta = .06, p < .05$ ). So, it might be argued that the strength of the associations between ToM, executive functions and social competency is partially due to age related changes in these skills, and the role of age must be accounted for while testing these relations in developmental models. Longitudinal design of this study is also needed to examine whether this tendency of mediational role of ToM continues over a longer period of time.

While the significant link between self-regulation and social behaviors has been shown in many research, the current study reveals this link for two aspects of self-regulation that rely partly on different processes. And it is notable that the results were not affected by shared reporter/method variance. Children's effortful control was measured with mother reports, social behavior with teacher reports, and executive function and theory of mind were measured with individual assessments. Another strong point was the comprehensive assessment of ToM, which tapped both understanding of different beliefs and also desires, knowledge and emotions. Studies

which investigate the relations between regulation, ToM and social behavior frequently focus solely on false belief understanding as the indicator of mental state understanding. However, mind reading ability is a complex and multidimensional capacity, and the false belief measures leave out some of these capacities (Repacholi, Slaughter, Pritchard, & Gibbs, 2003).

Still the cross-sectional nature of the study necessitates being cautious while interpreting the findings. The data were collected at one time point; so, we cannot draw inferences about causality. The relations between theory of mind and social competence (Blair & Razza, 2009; Jenkins & Astington, 2000) and between self-regulatory skills and theory of mind are bi-directional (Hughes & Ensor, 2007; Müller et al., 2012). Studies with a longitudinal design will be more informative about the mediational mechanisms in the complex relations between mental state understanding, self-regulation, and social behaviors. The present study points at effortful control and executive functions as two important regulatory skills which are individually and significantly linked with positive and negative social development, irrespective of improvement in theory of mind and language.

### References

- Alaylı, A., Yagmurlu, B., Etel, E., Sandikci, Y., & Korucu, I. (2013). Social withdrawal in Turkish institution-reared children: An examination of its stability and early predictors. Poster presented at the *2013 Society for Research in Child Development Biennial Meeting*, Seattle, USA.
- Astington, J. W. (2003). Sometimes necessary, never sufficient: False-belief understanding and social competence. In B. Repacholi & V. Slaughter (Eds.), *Individual differences in theory of mind: Implications for typical and atypical development* (pp. 13-38). New York: Psychology Press.
- Astington, J. W., & Jenkins, J. M. (1995). Theory of mind development and social understanding. *Cognition and Emotion, 9*, 151-165. doi: 10.1080/02699939508409006
- Badenes, L., Estevan, R., & Bacete, F. J. G. (2000). Theory of mind and peer rejection at school. *Social Development, 9*, 271-283. doi: 10.1111/1467-9507.00125
- Batum, P., & Yagmurlu, B. (2007). What counts in externalizing behaviors? The contributions of emotion and behavior regulation. *Current Psychology, 25*, 272-294. doi: 10.1007/BF02915236
- Baydar, N., Küntay, A., Yagmurlu, B., Aydemir, N., Cankaya, D., Gökşen, F., & Cemalcılar, Z. (2014). "It takes a village" to support the vocabulary development of children with multiple risk factors. *Developmental Psychology, 50*, 1014-1025. doi: 10.1037/a0034785
- Baumeister, R. F., & Vohs, K. D. (Eds.). (2004). *Handbook of self-regulation: Research, theory, and applications*. New York: Guilford.
- Berument, S. K., & Guven, A. G. (2010). Turkish Expressive and Receptive Language Test: Receptive Vocabulary Subscale (TIFALDI-RT). Turkish Psychological Society.



- Bierman, K. L., Nix, R. L., Greenberg, M. T., Blair, C., & Domitrovich, C. E. (2008). Executive functions and school readiness intervention: Impact, moderation and mediation in the Head Start REDI program. *Development and Psychopathology*, *20*, 821-843. doi: 10.1017/S0954579408000394
- Blair, C. (2002). School readiness: Integrating cognition and emotion in a neurobiological conceptualization of children's functioning at school entry. *American Psychologist*, *57*, 111-127. doi: 10.1037/0003-066X.57.2.111
- Blair, C. (2003). Behavioral inhibition and behavioral activation in young children: Relations with self-regulation and adaptation to preschool in children attending head start. *Developmental Psychobiology*, *42*, 301-311. doi: 10.1002/dev.10103
- Blair, C., & Diamond, A. (2008). Biological processes in prevention and intervention: The promotion of self-regulation as a means of preventing school failure. *Development and Psychopathology*, *20*, 899-911. doi: 10.1017/S0954579408000436
- Blair, C., & Razza, R. P. (2007). Relating effortful control, executive function, and false belief understanding to emerging math and literacy ability in kindergarten. *Child Development*, *78*, 647-663. doi: 10.1111/j.1467-8624.2007.01019.x
- Blair, R. J. R. (2003). Did Cain fail to represent the thought of Abel before he killed him? The relationship between theory of mind and aggression. In B. Repacholi, & V. Slaughter (Eds.), *Individual differences in theory of mind* (pp. 143-170). New York: Psychology Press.
- Bollen, K. A. (1989). *Structural equations with latent variables*. New York: John Wiley.
- Calkins, S. D., & Howse, R. B. (2004). Individual differences in self-regulation: Implications for childhood adjustment. In P. Philippot & R. S. Feldman (Eds.), *The regulation of emotion* (pp. 307-332). Mahwah, NJ: Lawrence Erlbaum.

- Capage, L., & Watson, A. C. (2001). Individual differences in theory of mind, aggressive behavior, and social skills in young children. *Early Education and Development, 12*, 613-628. doi: 10.1207/s15566935eed1204\_7
- Caravita, S. C. S., Di Blasio, P., & Salmivalli, C. (2010). Early adolescents' participation in bullying: Is ToM involved? *Journal of Early Adolescence, 30*, 138-170. doi: 10.1177/0272431609342983
- Carlo, G., Knight, G.P., Eisenberg, N., & Rotenberg, K.J. (1991). Cognitive processes and prosocial behaviors among children: The role of affective attributions and reconciliations. *Developmental Psychology, 27*, 456-461. doi:10.1037/0012-1649.27.3.456.
- Carlson, S. M., Mandell, D. J., & Williams, L. (2004). Executive function and theory of mind: stability and prediction from ages 2 to 3. *Developmental Psychology, 40*, 1105-1122. doi: 10.1037/0012-1649.40.6.1105
- Carlson, S. M., & Moses, L.J. (2001). Individual differences in inhibitory control and children's theory of mind. *Child Development, 72*, 1032-1053. doi: 10.1111/1467-8624.00333
- Carlson, S. M., Moses, L. J., & Breton, C. (2002). How specific is the relation between executive function and theory of mind? Contributions of inhibitory control and working memory. *Infant and Child Development, 11*, 73-92. doi: 10.1002/icd.298
- Carlson, S. M., Moses, L. J., & Claxton, L. J. (2004). Individual differences in executive functioning and theory of mind: An investigation of inhibitory control and planning ability. *Journal of Experimental Child Psychology, 87*, 299-319. doi: 10.1016/j.jecp.2004.01.002

- Charman, A., Carroll, F., & Sturge, C. (2001). Theory of mind, executive function and social competence in boys with ADHD. *Emotional and Behavioral Difficulties*, *6*, 31-49. doi: 10.1080/13632750100507654
- Corapci, F., Aksan, N., Arslan-Yalcin, D., & Yagmurlu, B. (2010). The psychometric evaluation of the social competence and behavior evaluation scale with Turkish preschoolers. *Turkish Journal of Child and Adolescent Mental Health*, *17*, 3-14.
- Crick, N. R., & Dodge, K. A. (1994). A review and reformulation of social information-processing mechanisms in children's social adjustment. *Psychological Bulletin*, *115*, 74-101. doi: 10.1037/0033-2909.115.1.74
- Crick, N. R., & Dodge, K. A. (1996). Social information-processing mechanisms in reactive and proactive aggression. *Child Development*, *67*, 993-1002. doi: 10.1111/j.1467-8624.1996.tb01778.x
- Cutting, A. L., & Dunn, J. (1999). Theory of mind, emotion understanding, language, and family background: Individual differences and interrelations. *Child Development*, *70*, 853-865. doi: 10.1111/1467-8624.00061
- Denham, S. A., Kimberly, A. B., DeMulder, E., Levitas, J., Sawyer, K., Auerbach-Major, A., & Queenan, P. (2003). Preschool emotional competence: Pathway to social competence? *Child Development*, *74*, 238-256. doi: 10.1111/1467-8624.00533
- Devine, R. T., & Hughes, C. (2014). Relations between false belief understanding and executive function in early childhood: A meta-analysis. *Child Development*, [Epub ahead of print] 1-18. doi: 10.1111/cdev.12237
- Diamond, A., & Taylor, C. (1996). Development of an aspect of executive control: Development of the abilities to remember what I said and to "Do as I say, not as I do". *Developmental*

- Psychobiology*, 29, 315-334. doi: 10.1002/(SICI)1098-2302(199605)29:4<315::AID-DEV2>3.0.CO;2-T
- Dunn, J. (1995). Children as psychologists: the later correlates of individual differences in understanding of emotions and other minds. *Cognition and Emotion*, 9, 187-201. doi: 0.1080/02699939508409008
- Eisenberg, N. (2005). Temperamental effortful control (self-regulation). In R. E. Tremblay, M. Boivin, R. DeV. Peters (eds.), *Encyclopedia on Early Childhood Development* [online]. Montreal, Quebec: Centre of Excellence for Early Childhood Development and Strategic Knowledge Cluster on Early Child Development, 1-6. Available at: <http://www.child-encyclopedia.com/documents/EisenbergANGxp2-Temperament.pdf>.
- Eisenberg, N., Fabes, R. A., Guthrie, I. K., Murphy, B. C., Maszk, P., Holmgren, R., & Suh, K. (1996). The relations of regulations and emotionality to problem behavior in elementary school children. *Development and Psychopathology*, 8, 141-162. doi: 10.1017/S095457940000701X
- Eisenberg, N., Fabes, R. A., Nyman, M., Bernzweig, J., & Pinulas, A. (1994). The relations of emotionality and regulation to children's anger-related reactions. *Child Development*, 65, 109-128. doi: 10.1111/1467-8624.ep9406130683
- Eisenberg, N., Smith, C. L., Sadovsky, A., & Spinrad, T. L. (2004). Effortful control: Relations with emotion regulation, adjustment, and socialization in childhood. In R. F. Baumeister & K. D. Vohs (Eds.), *Handbook of self-regulation: Research, theory, and applications* (pp. 259-282). New York: Guilford.
- Eisenberg, N., Spinrad, T. L., Fabes, R. A., Reiser, M., Cumberland, A., Shepard, S. A., ... Thompson, M. (2004). The relations of effortful control and impulsivity to children's

- resiliency and adjustment. *Child Development*, 75, 25-46. doi:10.1111/j.1467-8624.2004.00652.x.
- Eisenberg, N., Valiente, C., Fabes, R. A., Smith, C. L., Reiser, M., Shepard, S. A., ... Cumberland, A. J. (2003). The relations of effortful control and ego control to children's resiliency and social functioning. *Developmental Psychology*, 39, 761-776. doi: 10.1037/0012-1649.39.4.761
- Etel, E., & Yagmurlu, B. (in press). Theory of mind, executive function, and social competence: Findings from institution-reared Turkish children. *International Journal of Behavioral Development*.
- Etel, E., & Yagmurlu, B. (2011). Social competence in Turkish children from disadvantaged backgrounds: Relations with executive function and theory of mind. Poster presented at the 2011 Society for Research in Child Development Biennial Meeting, Montreal, Canada.
- Fahie, C. M., & Symons, D.K. (2003). Executive functioning and theory of mind in children clinically referred for attention and behavior problems. *Journal of Applied Developmental Psychology*, 24, 51-73. doi: 10.1016/S0193-3973(03)00024-8
- Fantuzzo, J., Mendez, J., & Tighe, E. (1998). Parental assessment of peer play: Development and validation of the parent version of the Penn Interactive Peer Play Scale. *Early Childhood Research Quarterly*, 13, 659-676. doi: 10.1016/S0885-2006(99)80066-0
- Feshbach, N. D. (1987). Parental empathy and child adjustment/maladjustment. In N. Eisenberg & J. Strayer (Eds.), *Empathy and its development* (pp. 271-291). New York: Cambridge University Press.
- Frye, D., Zelazo, P. D., & Palfai, T. (1995). Theory of mind and rule-based reasoning. *Cognitive Development*, 10, 483-527. doi: 10.1016/0885-2014(95)90024-1

- Garon, N., Bryson, S. E., & Smith, I. M. (2008). Executive function in preschoolers: A review using an integrative framework. *Psychological Bulletin, 134*, 31–60. doi: 10.1037/0033-2909.134.1.31
- Gerstadt, C. L., Hong, Y. J., & Diamond, A. (1994). The relationship between cognition and action: performance of children -7 years old on a stroop- like day-night test. *Cognition, 53*, 129-153. doi: 10.1016/0010-0277(94)90068-X
- Goldsmith, H. H., Buss, A. H., Plomin, R., Rothbart, M. K., Thomas, A., Chess, S.,... McCall, R. B. (1987). What is temperament? Four approaches. *Child Development, 58*, 505-529. doi: 10.2307/1130527
- Happé, F. (1995). The role of age and verbal ability in the theory of mind task performance of subjects with autism. *Child Development, 66*, 843-855. doi: 10.1111/j.1467-8624.1995.tb00909.x
- Happé, F., & Frith, U. (1996). Theory of mind and social impairment in children with conduct disorder. *British Journal of Developmental Psychology, 14*, 385-398. doi: 10.1111/j.2044-835X.1996.tb00713.x
- Henderson, H. A., & Wachs, T. D. (2007). Temperament theory and the study of cognition-emotion interactions across development. *Developmental Review, 27*, 396–427. doi: 10.1016/j.dr.2007.06.004
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1-55.
- Hughes, C. (1998). Finding your marbles: Does preschoolers' strategic behavior predict later understanding of mind? *Developmental Psychology, 34*, 1326-1339. doi: 10.1037/0012-1649.34.6.1326

- Hughes, C., Dunn, J., & White, A. (1998). Trick or Treat?: Uneven understanding of mind and emotion and executive dysfunction in “Hard-to-manage” preschoolers. *Journal of Child Psychology & Psychiatry & Allied Disciplines*, *39*, 981-994. doi: 10.1111/1469-7610.00401
- Hughes, C., & Ensor, R. (2006). Behavioral problems in 2-year olds: Links with individual differences in theory of mind, executive function, and harsh parenting. *Journal of Child Psychology and Psychiatry*, *47*, 488-487. doi: 10.1111/j.1469-7610.2005.01519.x
- Hughes, C., & Ensor, R. (2007). Positive and protective: Effects of early theory of mind on preschool problem behaviors. *Journal of Child Psychology and Psychiatry*, *48*(10), 1025-1032. doi: 10.1111/j.1469-7610.2007.01806.x
- Hughes, C., & Ensor, R. (2008). Does executive function matter for preschoolers' problem behaviors. *Journal of Abnormal Child Psychology*, *36*, 1-14. doi: 10.1007/s10802-007-9107-6
- Hughes, C., White, A., Sharpen, J., & Dunn, J. (2000). Antisocial, angry, and unsympathetic: 'Hard-to-manage' preschoolers' peer problems and possible cognitive influences. *Journal of Child Psychology and Psychiatry*, *41*, 169-179. doi: 10.1111/1469-7610.00558
- Jahromi, L. B., & Stifter, C. A. (2008). Individual differences in preschoolers' self-regulation and theory of mind. *Merrill-Palmer Quarterly*, *54*, 125-150
- Jenkins, J. M., & Astington, J. W. (1996). Cognitive factors and family structure associated with theory of mind development in young children. *Developmental Psychology*, *32*, 70-78. doi: 10.1037/0012-1649.32.1.70
- Jenkins, J. M., & Astington, J. W. (2000). Theory of mind and social behavior: Causal models tested in a longitudinal study. *Merrill-Palmer Quarterly*, *46*, 203-220.

- Kahraman, O. G. (2012). An investigation of the effects of a theory-of-mind based intervention program on 48-60months-old children's cognitive perspective taking and prosocial behaviors. Unpublished doctoral dissertation. Gazi University, Ankara.
- Kochanska, G., Coy, K. C., & Murray, K. T. (2001). The development of self-regulation in the first four years of life. *Child Development, 72*, 1091-1111. doi: 10.1111/1467-8624.00336
- Kolnik, S. (2010). Predicting school readiness: Executive functions, problem behaviors and theory of mind in preschoolers. (Doctoral dissertation). Retrieved from: [http://scholarlyrepository.miami.edu/oa\\_dissertations](http://scholarlyrepository.miami.edu/oa_dissertations)
- Kloo, D., & Perner, J. (2003). Training transfer between card sorting and false-belief understanding: Helping children apply conflicting descriptions. *Child Development, 74*, 1823-1839. doi: 10.1046/j.1467-8624.2003.00640.x
- Lalonde, C. E., & Chandler, M. J. (1995). False belief understanding goes to school: on the social-emotional consequences of coming early or late to a first theory of mind. *Cognition and Emotion, 9*, 167-185. doi: 10.1080/02699939508409007
- LaFreniere, P. J., & Dumas, J. E. (1996). Social competence and behavior evaluation in children ages 3 to 6 years: The short form (SCBE-30). *Psychological Assessment, 8*, 369-377. doi: 10.1037/1040-3590.8.4.369
- Lemerise, E. A., & Arsenio, W. F. (2000). An integrated model of emotion processes and cognition in social information processing. *Child Development, 71*, 107-118.
- Liew, J. (2012). Effortful control, executive functions, and education: Bringing self-regulatory and social-emotional competencies to the table. *Child Development Perspectives, 6*, 105-111. doi: 10.1111/j.1750-8606.2011.00196.x



- Liew, J., Eisenberg, N., & Reiser, M. (2004). Preschoolers' effortful control and negative emotionality, immediate reactions to disappointment, and quality of social functioning. *Journal of Experimental Child Psychology, 89*, 298-319. doi: 10.1016/j.jecp.2004.06.004
- Little, T. D., Slegers, D. W., & Card, N. A. (2006). A non-arbitrary method of identifying and scaling latent variables in SEM and MACS models, *Structural Equation Modeling: A Multidisciplinary Journal, 13*, 59-72, doi: 10.1207/s15328007sem1301\_3
- Lopez, B., Lincoln, A., Ozonoff, S., & Lai, Z. (2005). Examining the relationship between executive functions and restricted, repetitive symptoms of autistic disorder. *Journal of Autism and Developmental Disorders, 35*, 445-460. doi: 10.1007/s10803-005-5035-x
- Martin, J., & Failows, L. (2010). Executive function: Theoretical concerns. In J. Carpendale, G. Iarocci, U. Müller, B. Sokol, & A. Young (Eds), *Self- and Social-Regulation: Social Interaction and the Development of Social Understanding and Executive Functions* (pp. 35-55). New York: Oxford University Press.
- Milligan, K., Astington, J., & Dack, L. (2007). Language and theory of mind: Meta-analysis of the relation between language ability and false-belief understanding. *Child Development, 78*, 622-646. doi: 10.1111/j.1467-8624.2007.01018.x
- Miyake, A., Friedman, N. P., Emerson, M. J., Witzki, A. H., Howerter, A., & Wager, T. D. (2000). The unity and diversity of executive functions and their contributions to complex "frontal lobe" tasks: A latent variable analysis. *Cognitive Psychology, 41*, 49-100. doi: 10.1006/cogp.1999.0734
- Montgomery, D., & Koeltzow, T. (2010). A review of the day-night task: The Stroop paradigm and interference control in young children. *Developmental Review, 30*, 308-330. doi: 10.1016/j.dr.2010.07.001

- Moses, L. J., & Tahiroglu, D. (2010). Clarifying the relation between executive function and children's theories of mind. In J. Carpendale, G. Iarocci, U. Müller, B. Sokol, & A. Young (Eds), *Self- and Social-Regulation: Social Interaction and the Development of Social Understanding and Executive Functions* (pp. 218-233). New York: Oxford University Press.
- Muthén, L. K., & Muthén, B. O. (1998–2011). *Mplus user's guide* (6th ed.). Los Angeles, CA: Muthén & Muthén.
- Müller, U., Liebermann-Finestone, D. P., Carpendale, J. M., Hammond, S. I., & Bibok, M. B. (2012). Knowing minds, controlling actions: The developmental relations between theory of mind and executive function from 2 to 4 years of age. *Journal of Experimental Child Psychology, 111*, 331-348. doi: 10.1016/j.jecp.2011.08.014
- Newton, E., & Jenvey, V. (2011). Play and theory of mind: associations with social competence in young children. *Early Child Development & Care, 181*, 761-773. doi: 10.1080/03004430.2010.486898
- Neuenschwander, R., Röthlisberger, M., Cimeli, P., & Roebbers, C. M. (2012). How do different aspects of self-regulation predict successful adaptation to school? *Journal of Experimental Child Psychology, 113*, 353-371. doi: 10.1016/j.jecp.2012.07.004
- Nigg, J. T. (2006). Temperament and developmental psychopathology. *Journal of Child Psychology and Psychiatry, 47*, 395-422. doi: 10.1111/j.1469-7610.2006.01612.x
- Olson, S. L., Lopez-Duran, N., Lunkenheimer, E. S., Chang, H., & Sameroff, A. J. (2011). Individual differences in the development of early peer aggression: Integrating contributions of self-regulation, theory of mind, and parenting. *Development and Psychopathology, 23*, 253-266. doi: 10.1017/S0954579410000775

- Olson, S. L., Sameroff, A. J., Kerr, D. C. R., Lopez, N. L., & Wellman, H. M. (2005). Developmental foundations of externalizing problems in young children: The role of effortful control. *Development and Psychopathology, 17*, 25-45. doi: 10.1017/S0954579405050029
- Onishi, K. H., & Baillergeon, R. (2005). Do 15-month-old infants understand false belief?. *Science, 308*, 255-258. doi:10.1126/science.1107621
- Orta, I.M., Corapci, F., Yagmurlu, B., & Aksan, N. (2013). The mediational role of effortful control and emotional dysregulation in the link between maternal responsiveness and Turkish preschoolers' social competency and externalizing symptoms. *Infant and Child Development, 22*, 459-479. doi: 10.1002/icd.1806
- Ozonoff, S., Pennington, B.F., & Rogers, S.J. (1991). Executive function deficits in high-functioning autistic children: Relationship to theory of mind. *Journal of Child Psychology and Psychiatry, 32*, 1081-1106. doi: 10.1111/j.1469-7610.1991.tb00351.x
- Öztürk, A. (2011). Social competence and parent child system in preschool. Unpublished doctoral dissertation. Hacettepe University, Ankara.
- Pellicano, E. (2010). The development of core cognitive skills in autism: A 3-year prospective study. *Child Development, 81*, 1400-1416. doi: 10.1111/j.1467-8624.2010.01481.x
- Pennington, B. F., & Ozonoff, S. (1996). Executive function and developmental psychopathology. *Journal of Child Psychology and Psychiatry, 1*, 51-87. doi: 10.1111/j.1469-7610.1996.tb01380.x
- Perner, J., & Lang, B. (1999). Development of theory of mind and executive control. *Trends in Cognitive Sciences, 3*, 337-344. doi: 10.1016/S1364-6613(99)01362-5

- Posner, M. I., & Rothbart, M. K. (1998). Attention, self-regulation, and consciousness. *Philosophical Transactions of the Royal Society of London Series, Biological Sciences*, 353, 1915-1927. doi: 10.1098/rstb.1998.0344
- Premack, D., & Woodruff, G. (1978). Does the chimpanzee have a theory of mind? *Behavioral and Brain Sciences*, 1, 515-526. doi: 10.1017/S0140525X00076512
- Razza, R.A., & Blair, C. (2009). Associations among false-belief understanding, executive function, and social competence: A longitudinal analysis. *Journal of Applied Developmental Psychology*, 30, 332-343. doi: 10.1016/j.appdev.2008.12.020
- Renouf, A., Brendgen, M., Parent, S., Vitaro, F., Zelazo, P. D., Boivin, M., ... Séquin, J. R. (2010). Relations between theory of mind and indirect and physical aggression in kindergarten: Evidence of the moderating role of prosocial behaviors. *Social Development*, 19, 535-555. doi: 10.1111/j.1467-9507.2009.00552.x
- Repacholi, B., Slaughter, V., Pritchard, M. & Gibbs, V. (2003). Theory of mind, Machiavellianism and social functioning in childhood. In B. Repacholi & V. Slaughter (Eds.), *Individual differences in theory of mind: Implications for typical and atypical development* (pp. 67 - 97). New York: Psychology Press.
- Richell, R. A., Mitchell, D. G., Newman, C., Leonard, A., Baron-Cohen, S., & Blair, R. J. (2003). Theory of mind and psychopathy: Can psychopathic individuals read the "language of the eyes"? *Neuropsychologia*, 41, 523-526. doi: 10.1016/S0028-3932(02)00175-6
- Riggs, N.R., Jahromi, L.B., Razza, R.P., Dillworth-Bart, J.E., & Mueller, U. (2006). Executive function and the promotion of social-emotional competence. *Journal of Applied Developmental Psychology*, 27, 300-309. doi: 10.1016/j.appdev.2006.04.002
- Ronald, A., & Happé, F. (2005). Nice and nasty theory of mind in preschool children: Nature and nurture. *Social Development*, 14, 664-684. doi:10.1111/j.1467-9507.2005.00323.x

- Rothbart, M. K. (1989). Temperament and development. In G. A. Kohnstamm, J. A. Bates, & M. K. Rothbart (Eds.), *Temperament in childhood* (pp. 187-247), New York: Wiley.
- Rothbart, M. K., Ahadi, S. A., & Hershey, K. L. (1994). Temperament and social behavior in childhood. *Merrill-Palmer Quarterly*, *40*, 21-39.
- Rothbart, M. K., & Bates, J. E. (2006). Temperament. In W. Damon, R. M. Lerner, & N. Eisenberg (Eds.), *Handbook of child psychology: Vol.3. Social, emotional, and personality development, 6th ed.* (pp. 99-166). New York: Wiley.
- Rothbart, M. K., Sheese, B. E., & Posner, M. I. (2007). Executive attention and effortful control: Linking temperament, brain networks and genes. *Child Development Perspectives*, *1*, 2-7. doi: 10.1111/j.1750-8606.2007.00002.x
- Sandler, I. N., Tein, J. Y., Mehta, P., Wolchik, S., & Ayers, T. (2000). Coping efficacy and psychological problems of children of divorce. *Child Development*, *71*, 1099-1118. doi: 0009-3920/2000/7104-0025
- Slaughter, V., Imuta, K., Peterson, C. C., & Henry, J. (2014). Meta-analysis of children's theory of mind and peer status in the preschool and early school years. Invited symposium paper to be presented at the 23<sup>rd</sup> *Biennial Meeting of International Society for the Study of Behavioural Development (ISSBD)*, China.
- Slomkowski, C., & Dunn, J. (1996). Young children's understanding of other people's beliefs and feelings and their connected communication with friends. *Developmental Psychology*, *32*, 442-447. doi: 10.1037/0012-1649.32.3.442
- Sodian, B. (2011). Theory of mind in infancy. *Child Development Perspectives*, *5*, 39-43. doi: 10.1111/j.1750-8606.2010.00152.x

- Spinrad, T., Eisenberg, N., Cumberland, A. J., Fabes, R. A., Valiente, C., Shepard, S. A., ... Guthrie, I. K. (2006). The relation of emotion-related regulation to children's social competence: A longitudinal study. *Emotion, 6*, 498-510. doi: 10.1037/1528-3542.6.3.498
- Sutton, J., Reeves, M. M., & Keogh, E. E. (2000). Disruptive behaviour, avoidance of responsibility and theory of mind. *British Journal of Developmental Psychology, 18*, 1-11. doi: 10.1348/026151000165517
- Sutton, J., Smith, P. K., & Swettenham, J. (1999). Bullying and 'theory of mind': A critique of the 'social skills deficit' view of anti-social behavior. *Social Development, 8*, 117-127. doi: 10.1111/1467-9507.00083.
- Valiente, C., Eisenberg, N., Haugen, R., Spinrad, T. L., Hofer, C., Liew, J., & Kupfer, A. (2011). Children's effortful control and academic achievement: Mediation through social functioning. *Early Education and Development, 22*, 411-433. doi: 10.1080/10409289.2010.505259.
- Valiente, C., Eisenberg, N., Smith, C. L., Reiser, M., Fabes, R. A., Losoya, S., ... Murphy, B. C. (2003). The relations of effortful control and reactive control to children's externalizing problems: A longitudinal assessment. *Journal of Personality, 71*, 1171-1196. doi: 10.1111/1467-6494.7106011
- Valiente, C., Lemery-Chalfant, K., Swanson, J., & Reiser, M. (2008). Prediction of children's academic competence from their effortful control, relationships, and classroom participation. *Journal of Educational Psychology, 100*, 67-77. doi: 10.1037/0022-0663.100.1.67
- Walker, S. (2005). Gender differences in the relationship between young children's peer-related social competence and individual differences in theory of mind. *Journal of Genetic Psychology, 166*, 297-312. doi: 10.3200/GNTP.166.3.297-312

- Watson, A. C., Nixon, C. L., Wilson, A., & Capage, L. (1999). Social interaction skills and theory of mind in young children. *Developmental Psychology, 35*, 386-391.  
doi: 10.1037/0012-1649.35.2.386
- Wellman, H. (1990). *The child's theory of mind*. Cambridge, MA: MIT Press.
- Wellman, H. M., Cross, D., & Watson, J. (2001). Meta-analysis of theory-of-mind development: The truth about false-belief. *Child Development, 72*, 655-684. doi: 10.1111/1467-8624.00304.
- Wellman, H.M., & Liu, D. (2004). Scaling of theory-of-mind tasks. *Child Development, 75*, 523-541. doi: 10.1111/j.1467-8624.2004.00691.x
- Willcutt, E. G., Doyle, A. E., Nigg, J. T., Faraone, S. V., & Pennington, B. F. (2005). Validity of the executive function theory of attention deficit hyperactivity disorder: A meta-analytic review. *Biological Psychiatry, 57*, 1336-1346. doi: 10.1016/j.biopsych.2005.02.006
- Yagmurlu, B. (2014). Relations among sociocognitive abilities and prosocial behavior. *Journal of Child and Family Studies, 23*, 591-603. doi: 10.1007/s10826-013-9726-1
- Zelazo, P. D. (2004). The development of conscious control in childhood. *Trends in Cognitive Sciences, 8*, 12-17. doi: 10.1016/j.tics.2003.11.001
- Zelazo, P. D., Craik, F. I. M., & Booth, L. (2004). Executive function across the life span. *Acta Psychologica, 115*, 167-183. doi: 10.1016/j.actpsy.2003.12.005
- Zelazo, P. D., Muller, U., Frye, D., & Marcovitch, S. (2003). The development of executive function in early childhood. *Monographs for the Society for Research on Child Development, 68* (Serial No. 27), 11-119.
- Zhou, Q., Chen, S. H., & Main, A. (2012). Commonalities and differences in the research on children's effortful control and executive function: A call for an integrated model of self-

regulation. *Child Development Perspectives*, 6, 112-121. doi: 10.1111/j.1750-8606.2011.00176.x

Zhou, Q., Main, A., & Wang, Y. (2010). Temperament effortful control and anger/frustration to Chinese children's academic achievement and social adjustment: A longitudinal study. *Journal of Educational Psychology*, 102, 180-196. doi: 10.1037/a0015908



## Appendix A

### Anne Anket Kitapçığı

#### Genel Bilgiler:

Anketi doldurduğunuz tarih: Gün\_\_\_\_ Ay\_\_\_\_ Yıl\_\_\_\_\_

(Çocuğunuz herhangi bir yuvaya devam ediyorsa):

Kurumun adı: \_\_\_\_\_ Sınıf: \_\_\_\_\_

#### Çalışmaya Katılan Çocuk ile İlgili Sorular:

1. Çocuğın adı ve soyadı: \_\_\_\_\_

2. Çocuğın doğum tarihi: Gün\_\_\_\_ Ay\_\_\_\_ Yıl\_\_\_\_\_

3. Çocuğın cinsiyeti (lütfen işaretleyiniz): Erkek  Kız

4. Çocuk dışarıda anaokuluna/okul öncesi kuruma devam ediyor mu? Evet  Hayır

5. Çocuğın ilk kez anaokuluna/kreşe başladığı tarih: Ay\_\_\_\_ Yıl\_\_\_\_\_

6. Çocukta tanısı konulmuş herhangi bir gelişimsel sorun var mı? (örnek: otizm, Down sendromu-mongolizm, dikkat eksikliği, öğrenme güçlüğü, hiperaktivite)

---



---



---

7. Bu çalışmada yer alan çocuğunuz **dışında** evde sizinle birlikte yaşayan başka bir çocuğunuz/çocuklarınız var mı?

Hayır

Evet, (Lütfen aşağıdaki tabloyu doldurunuz)

Çocuğunuzun Adı	Cinsiyeti	Doğum Yılı

Çocuğun Sağlığı ve Gelişimi ile İlgili Sorular:

10. Çocuğunuzun geçirdiği önemli bir kaza, ameliyat veya ciddi bir hastalık var mı?

Lütfen belirtiniz:

---



---



---

11. Çocuğunuzun bilinen önemli bir kronik (devamlı) sağlık sorunu (örnek: kalça çıkığı, astım, kalp, şeker, romatoid artrit, depresyon) ve/veya sürekli kullanması gereken ilaçlar var mı?

Lütfen belirtiniz:

---



---



---

12. Aşağıda yer alan durumlar kronik (devamlı) ve ileri derecede çocuğunuzda varsa lütfen yanına işaret koyunuz:

Kekeleme problemi (Şimdi veya geçmişte)	
Konuşma gecikmesi (şimdi veya geçmişte)	
Altını ıslatma (sürekli olarak çiş-kaka tutamama)	
Nörolojik sorun (epilepsi vb.)	
Bağışıklık sistemi hastalığı	
Ciddi engel (görme, işitme, ortopedik vb engel.)	

13. Çocuğunuzun son 6 aydır sürekli olarak kullandığı bir cihaz veya alet var mı? (örnek: gözlük, atel, koltuk değneği vb.)

Lütfen belirtiniz: \_\_\_\_\_

---

14. Çocuğunuzun evde bakıcısı var mı? Evet  Hayır

14.a. Evet ise; haftada kaç saatini onunla geçiriyor? \_\_\_\_\_

15. Evde konuşulan dil nedir? \_\_\_\_\_

15.a. Bakıcının çocuğunuzla konuştuğu dil nedir? \_\_\_\_\_

16. Çocuğunuzun evde sürekli beraber yaşadığı tüm yetişkinleri (anne, baba, nine, dede, teyze, amca vb.) lütfen sıralayınız:

	Çocukla olan yakınlığı/ akrabalık ilişkisi	Yaş (yaklaşık olarak)
1		
2		
3		
4		
5		

### Anne ile ilgili bilgiler

1. Annenin doğum tarihi: Gün\_\_\_\_\_ Ay\_\_\_\_\_ Yıl\_\_\_\_\_

2. Annenin eğitimi

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

3. Anne şu anda çalışıyor mu? (uygun olan seçeneğın altındaki rakamı daire içine alınız)

Evet (Tam zamanlı, haftada 40 saat)	Evet (Yarı-zamanlı, haftada 20-25 saat )	Hayır (Çalışmıyor)
1	2	3

4. Annenin şu anki medeni hali (uygun olan seçeneğın altındaki rakamı daire içine alınız)

Evli	Boşanmış veya dul	Ayrı yaşıyor	Yeniden evlenmiş
1	2	3	4

**Baba ile ilgili bilgiler**

5. Babanın doğum tarihi: Gün\_\_\_\_\_ Ay\_\_\_\_\_ Yıl\_\_\_\_\_

6. Babanın eğitimi

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

7. Baba şu anda çalışıyor mu? (uygun olan seçeneğin altındaki rakamı daire içine alınız)

Evet (Tam zamanlı, haftada 40 saat)	Evet (Yarı-zamanlı, haftada 20-25 saat )	Hayır (Çalışmıyor)
1	2	3

8. Babanın şu anki medeni hali (uygun olan seçeneğin altındaki rakamı daire içine alınız)

Evli	Boşanmış veya dul	Ayrı yaşıyor	Yeniden evlenmiş
1	2	3	4

9. **Hane halkının** toplam geliri (evde sürekli yaşayan tüm bireylerin toplam kazancı):

Ayda 630 TL'nin altında	1
Ayda 630 – 1000TL	2
Ayda 1001 –2000 TL	3
Ayda 2001 – 4000 TL	4
Ayda 4001 – 7000 TL	5
Ayda 7001 – 12000 TL	6
Ayda 12000 TL'nin üzerinde	7

## Appendix B- Sosyal Beceri Ölçeği

### **Bölüm A**

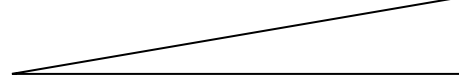
Aşağıda, çocukların **serbest oyun zamanında yaşıtlarına** gösterdikleri bazı davranışlar yer almaktadır. Lütfen her bir ifadeyi dikkatlice okuyunuz ve söz konusu davranışı (**bu çalışmada yer alan**) çocuğunuzun son **6 ay içerisinde** ne sıklıkla yaptığını işaretleyiniz. Soruları cevaplarırken çocuğunuzun söz konusu davranışı “**oyun zamanında**” ne kadar yaptığını düşününüz. Eğer çocuk anlatılan davranışı **hiçbir zaman** yapmıyorsa 1’i; **bazen** yapıyorsa 2’yi; **sık sık** yapıyorsa 3’ü; **her zaman** yapıyorsa 4’ü işaretleyiniz.

	<b>Hiçbir zaman</b>	<b>Bazen</b>	<b>Sık sık</b>	<b>Her zaman</b>
1. Diğer çocuklara oyun sırasında yardımcı olur.	1	2	3	4
2. Oyun zamanında kavga veya tartışma başlatır.	1	2	3	4
3. Oyun zamanında diğerleri tarafından dışlanır.	1	2	3	4
4. Oyunda sırasını beklemeyi reddeder.	1	2	3	4
5. Oyun oynayan çocukların çevresinde dolanır, aralarına girmeye tereddüt eder.	1	2	3	4
6. Oyuncaklarını paylaşır.	1	2	3	4
7. Oyun zamanında içe kapanır.	1	2	3	4
8. Oyun zamanında amaçsızca çevrede dolanır.	1	2	3	4
9. Diğer çocukların oyunla ilgili fikirlerini reddeder.	1	2	3	4
10. Oyun zamanında diğer çocuklar tarafından görmezden gelinir/yok sayılır.	1	2	3	4
11. Oyun sırasında gereksiz yere gevezelik eder, konuşur.	1	2	3	4
12. Oyun sırasında arkadaşları arasında çıkan anlaşmazlıkları yatıştırmaya çalışır.	1	2	3	4
13. Oyun zamanında başkalarının eşyalarına zarar verir.	1	2	3	4
14. Oyun sırasında başkalarıyla farklı görüşte olduğunu kavga etmeden ifade eder.	1	2	3	4
15. Oyuna çağrıldığında katılmayı reddeder.	1	2	3	4

	<b>Hiçbir zaman</b>	<b>Bazen</b>	<b>Sık sık</b>	<b>Her zaman</b>
16. Oyuna girebilmek için başkasının yardımına ihtiyaç duyar.	1	2	3	4
17. Oyun sırasında başkalarına sözlü olarak sataşır.	1	2	3	4
18. Oyun sırasında ağlar, mızızlanır, huysuzluk eder.	1	2	3	4
19. Diğerlerini oyuna katılmaları için çağırır, onları teşvik eder.	1	2	3	4
20. Oyun sırasında başkalarının elindekileri (eşya ya da oyuncak) zorla alır.	1	2	3	4
21. Oyun sırasında birilerinin canı yandığında veya üzüldüklerinde onları teselli eder.	1	2	3	4
22. Oyun kurallarını anlayıp takip etmede zorlanır.	1	2	3	4
23. Herhangi bir oyuna başlayabilmek için bir yetişkinin yönlendirmesine ihtiyaç duyar.	1	2	3	4
24. Başkalarının oyununu bozar.	1	2	3	4
25. Oyun zamanında mutsuz görünür.	1	2	3	4
26. Oyun zamanında saldırgandır.	1	2	3	4
27. Oyun sırasında olumlu duygular gösterir (örn: güler, kahkaha atar).	1	2	3	4
28. Oyun kurma konusunda yaratıcıdır.	1	2	3	4
29. Oyunu ve arkadaşlarını yönetmek ister.	1	2	3	4
30. Arkadaşlarıyla oynarken bir etkinlikten başka bir etkinliğe geçmesi gerektiğinde uyumsuz davranıp düzeni bozar.	1	2	3	4

**Bölüm B**

Aşağıda, çocukların **genel olarak** gösterdikleri bazı **duygu ve davranışlar** yer almaktadır. Lütfen her bir ifadeyi dikkatlice okuyunuz ve söz konusu duyguyu veya davranışı **(bu çalışmada yer alan)** çocuğunuzun **son 6 ay içerisinde “genel olarak”** ne sıklıkla yaptığını işaretleyiniz. Eğer çocuğunuz anlatılan davranışı **hiçbir zaman** yapmıyorsa 1’i; **bazen** yapıyorsa 2’yi; **sık sık** yapıyorsa 3’ü; **her zaman** yapıyorsa 4’ü işaretleyiniz.



	<b>Hiçbir zaman</b>	<b>Bazen</b>	<b>Sık sık</b>	<b>Her zaman</b>
31. Yüz ifadesinden duygularını anlamak zordur.	1	2	3	4
32. Zorda olan bir çocuğu teselli eder ya da ona yardımcı olur.	1	2	3	4
33. Kolaylıkla hayal kırıklığına uğrayıp sinirlenir.	1	2	3	4
34. Faaliyeti kesintiye uğradığında kızar. (örneğin; yemek zamanı elindeki oyunu vb. bırakması gerektiğinde kızgınlık gösterir.)	1	2	3	4
35. Huysuzdur, çabuk kızıp öfkelenir.	1	2	3	4
36. Gündelik işlerde yardım eder (örneğin; sofrayı kurulumda, ev toplanırken yardımcı olur.)	1	2	3	4
37. Çekingen ve ürkektir; yeni ortamlardan ve durumlardan kaçınır (örneğin; yeni biriyle tanıştığında, yeni bir oyun öğrenilirken vb.).	1	2	3	4
38. Genel olarak üzgün, mutsuz ya da depresiftir.	1	2	3	4
39. Yaşlıları arasında çekingendir ya da yaşlılarıyla olmaktan huzursuz görünür.	1	2	3	4
40. En ufak bir şeyde bağırır ya da çılgınlık atar.	1	2	3	4
41. Hareketsizdir, oynayan çocukları uzaktan seyreder.	1	2	3	4
42. Anlaşmazlıklara çözüm yolları arar.	1	2	3	4
43. Yaşlılarından ayrı, kendi başına kalır.	1	2	3	4
44. Diğer çocukların görüşlerine önem verir.	1	2	3	4

	<b>Hiçbir zaman</b>	<b>Bazen</b>	<b>Sık sık</b>	<b>Her zaman</b>
45. Diğer çocuklara vurur, onları ısırır ya da tekmeler.	1	2	3	4
46. Yaşlılarıyla yaptığı faaliyetlerde veya oyunlarda onlarla iş birliği yapar.	1	2	3	4
47. Diğer çocuklarla anlaşmazlık yaşar.	1	2	3	4
48. Genel olarak halsiz ve yorgun görünür.	1	2	3	4
49. Oyuncaklara iyi bakar, oyuncakların kıymetini bilir.	1	2	3	4
50. Yaşlılarıyla faaliyetlere katılmayı reddeder ya da faaliyet sırasında konuşmaz.	1	2	3	4
51. Kendinden küçük çocuklara karşı dikkatlidir.	1	2	3	4
52. Yaşlıları arasında fark edilmez, siliktir.	1	2	3	4
53. Diğer çocukları istemedikleri şeyleri yapmaya zorlar.	1	2	3	4
54. Annesine kızdığı zaman ona vurur ya da çevresindeki eşyalara zarar verir.	1	2	3	4
55. Genel olarak endişeli görünür.	1	2	3	4
56. Makul açıklamalar yapıldığında, söyleneni kabul eder.	1	2	3	4
57. Annesinin söylediklerine karşı çıkar.	1	2	3	4
58. Cezalandırıldığında (örneğin; herhangi bir şeyden yoksun bırakıldığında) başkaldırır, karşı koyar.	1	2	3	4



## Appendix C

## ÇOCUK DAVRANIŞLARI ANKETİ

Bu ankette çocukların davranışları ile ilgili çeşitli ifadeler yer almaktadır. Ankette yer alan soruların doğru ya da yanlış cevapları yoktur. Çocuklar, bu ifadelerde sözü geçen davranışlar bakımından birbirlerinden farklılık gösterebilmektedir. Bizim amacımız bu farklılıkları daha iyi anlamaktır.

Lütfen son **6 ayı** göz önünde bulundurarak, çocuğunuzun aşağıda tarif edilen durumlar karşısında nasıl davrandığını en iyi gösteren şıkkı işaretleyiniz.

	Tamamen yanlış	Oldukça yanlış	Biraz yanlış	Ne doğru Ne yanlış	Biraz doğru	Oldukça doğru	Tamamen doğru
1. Oyuncak toplama gibi işler bitene kadar onunla uğraşmaya devam eder.	1	2	3	4	5	6	7
2. Dokunduğu nesnelere pürüzlü ya da pürüzsüz olduğunun hemen farkına varır.	1	2	3	4	5	6	7
3. Genellikle bir faaliyete aceleyle, düşünmeden girer.	1	2	3	4	5	6	7
4. Ağrı hissetmek canını çok sıkır.	1	2	3	4	5	6	7
5. Annesi veya babası yeni bir kıyafet giydiğinde veya dış görünüşünde bir değişiklik olduğunda bunun farkına varır.	1	2	3	4	5	6	7
6. Başkaları konuşurken bazen sözlerini keser.	1	2	3	4	5	6	7
7. Bir şeye konsantre olmuşken dikkatini çekmek zordur.	1	2	3	4	5	6	7
8. Ne istediğine çabucak karar verir ve yapmaya koyulur.	1	2	3	4	5	6	7
9. Bir faaliyete aklını vermekte zorlanır.	1	2	3	4	5	6	7

	Tamamen yanlış	Oldukça yanlış	Biraz yanlış	Ne doğru Ne yanlış	Biraz doğru	Oldukça doğru	Tamamen doğru
10. Üstü ısladığında veya üşüdüğünde oldukça rahatsız olur.	1	2	3	4	5	6	7
11. Bir şey yapmaya karar vermeden önce genellikle durup düşünür.	1	2	3	4	5	6	7
12. Oldukça alçak seslerin bile farkına varır.	1	2	3	4	5	6	7
13. Başka bir şey yapması söylendiğinde yapmakta olduğu işi bırakmakta çok zorlanır.	1	2	3	4	5	6	7
14. Etrafta ilgisini dağıtan sesler olduğunda bir faaliyete konsantre olmakta zorlanır.	1	2	3	4	5	6	7
15. Bazen resimli bir kitaba gömülür ve uzun süre bakar/okur.	1	2	3	4	5	6	7
16. Dışarı çıkmaya hevesliyken, bazen heyecan ve telaşla üstüne uygun kıyafetleri (örn: palto) giymeden fırlar.	1	2	3	4	5	6	7
17. Yemeğe gelirken oyununu kolayca bırakır.	1	2	3	4	5	6	7
18. Oturma odasındaki yeni eşyaları ve değişiklikleri hemen fark eder.	1	2	3	4	5	6	7
19. Durup düşünmeden aklına ilk geleni söyleme eğilimi vardır.	1	2	3	4	5	6	7
20. Canını acıtabileceği yerlerde temkinli davranır.	1	2	3	4	5	6	7
21. Onunla konuştuğumda bazen beni duymuyor gibi görünür.	1	2	3	4	5	6	7
22. Hiç bir işi tamamlamadan birinden diğerine geçer.	1	2	3	4	5	6	7

	Tamamen yanlış	Oldukça yanlış	Biraz yanlış	Ne doğru Ne yanlış	Biraz doğru	Oldukça doğru	Tamamen doğru
23. Anne ve babasının yüz ifadelerini hızlıca fark eder.	1	2	3	4	5	6	7
24. Küçük bir kesik veya çürük keyfini oldukça kaçırır.	1	2	3	4	5	6	7
25. Parçaların üst üste konmasını veya eklenmesini gerektiren uğraşlara (lego gibi) kendini verir ve uzun süre çalışır.	1	2	3	4	5	6	7
26. İsteddiği bir şeyi (ör: oyuncak) hemen elde etmek ister.	1	2	3	4	5	6	7
27. Hikâye dinlerken ilgisi kolayca dağılır.	1	2	3	4	5	6	7
28. Nesnelerdeki ufak lekeleri, kirleri bile fark eder.	1	2	3	4	5	6	7
29. Bir faaliyetten diğerine kolaylıkla geçer.	1	2	3	4	5	6	7
30. Çok parlak ışık veya renklerden rahatsız olur.	1	2	3	4	5	6	7
31. Yeni bir faaliyeti deneyen en son çocuklardan biridir.	1	2	3	4	5	6	7
32. İstendiğinde, yapmakta olduğu işi kolaylıkla bırakabilir.	1	2	3	4	5	6	7
33. Yemek, sigara veya parfüm gibi kokuları genellikle fark eder.	1	2	3	4	5	6	7
34. İlginç bir oyuncakla oynarken çevresiyle ilgilenmez.	1	2	3	4	5	6	7
35. Söylendiğinde sesini alçaltabilir.	1	2	3	4	5	6	7

	Tamamen yanlış	Oldukça yanlış	Biraz yanlış	Ne doğru Ne yanlış	Biraz doğru	Oldukça doğru	Tamamen doğru
36. Yünlü giysiler, kıyafetlerdeki etiketler gibi pürüzlü/sert maddelerin cildine değmesinden rahatsızlık duyar.	1	2	3	4	5	6	7
37. Hareketlerini kontrol etmesi gereken oyunlarda (deve-cüce vb) iyidir.	1	2	3	4	5	6	7
38. Talimatları takip etmekte zorlanır.	1	2	3	4	5	6	7
39. Yeni bir faaliyete başlamadan önce beklemesi söylendiğinde bekleyebilir.	1	2	3	4	5	6	7
40. Azıcık canı yansa bile hemen ağlar.	1	2	3	4	5	6	7
41. Bir şey için sırada beklemekte zorlanır.	1	2	3	4	5	6	7
42. Yerinde kıpırdamadan oturması söylendiğinde, bunu yapmakta güçlük çeker (örn: sinemada, sınıfta).	1	2	3	4	5	6	7
43. Tehlikeli olduğu söylenen yerlere yavaş ve temkinli yaklaşır.	1	2	3	4	5	6	7
44. Dikkatli olması gereken yerlerde (örn: karşıdan karşıya geçerken) temkinli değildir.	1	2	3	4	5	6	7
45. “Hayır” dendiğinde yapmakta olduğu şeyi kolayca bırakabilir.	1	2	3	4	5	6	7
46. Çok yüksek ve cızırtılı seslerden rahatsız olur.	1	2	3	4	5	6	7
47. Bir şeyi yapmaması gerektiği söylendiğinde, genellikle içinden gelen dürtüye karşı koyabilir.	1	2	3	4	5	6	7

## Appendix D

### Yönetici İşlevler Değerlendirmeleri

#### 1. Gündüz - Gece

Araştırmacı: ‘Şimdi çok acayip bir oyun oynayacağız seninle. Eğer ben sana ‘Gündüzün resmini göster’ deseysen sen bana bu kartı gösterirdin, değil mi? Çünkü gündüz olduğunda güneş açar. Peki.. ben sana ‘Bana gecenin resmini göster’ deseysen, sen bu bana kartı gösterirdin, değil mi? Evet, çünkü gece gökyüzünde ay ve yıldızlar olur. Ama biz şimdi bunların tam tersini yapacağız. Ben ‘gece’ dediğimde, senin bana üzerinde güneş resmi olan bu kartı göstermeni istiyorum (araştırmacı elini gündüz resminin üstüne koyar ve bekletmeden geri çeker). Ben ‘gündüz’ dediğimde senin bana üzerinde ay resmi olan bu kartı göstermeni istiyorum (araştırmacı elini gece resminin üstüne koyar ve bekletmeden geri çeker). Haydi biraz alıştırmaya yapalım (gerçek denemelere geçmeden önce çocuğa iki tur yardımcı olunur).

Gerçek denemelere geçmeden önce yapılan alıştırmada denemelerinde çocuğa yanlış yaptıysa düzeltici yönerge verilmelidir: Örneğin, acayip bir oyun bu; gece deyince bunu göstereceksin, haydi bir deneme daha yapalım, ‘gece’.... Çocuk doğru yaptıysa övücü sözler söylenir: Örneğin ‘Aferin, gece dedim, sen gündüzü gösterdin’ gibi.

Araştırmacı: ‘Unutma, eğer ben gece dersem güneş kartını göstereceksin, gündüz dersem ay kartını göstereceksin. Kelimenin tam tersini gösteren karta işaret edeceksin. Bakalım sen bu acayip/tuhaf oyunu oynayabilecek misin? ‘

Gece - gece - gündüz - gece - gündüz

ARA

Gece - gündüz - gündüz - gece - gündüz

NOT: Çocuğun her denemeden sonra elini kartlardan geri çekmesi, elini herhangi bir kartın üzerinde bırakmaması çok önemlidir. Bu konuda her deneme öncesi, gerektiğinde hatırlatma yapılır: Örneğin, "Göster, sonra çek elini, tamam mı?" "Çek elini şimdi" gibi.

## 2. Ritim Tutma

Araştırmacı: "Şimdi başka bir oyuna geçelim. Bu kalemleri tıklatarak bir ritim oyunu oynayacağız. Öncelikle bu kalemlerden hangisini istersin?"

"Şimdi eğer masaya böyle bir kere tıklatırsam (tıklatır ve bitirince kalemi havada tutar), senin iki kere tıkatmanı istiyorum (Çocuğun doğru yapmasını sağlar). Aferin, aynen böyle" (Tebessüm).

"Eğer böyle iki kere tıklatırsam (iki defa tıklatır), senin sadece bir kere tıkatmanı istiyorum (Çocuğun doğru yapmasını sağlar). Aferin, aynen böyle" (Tebessüm).

İki kez tek ve çift tıkatma alıştırmaları yaparlar. Araştırmacı, çocuğun doğru yapmasına yardımcı olur, ona ne kadar iyi olduğu konusunda olumlu geribildirim verir, heyecan gösterir: "Harika! Sen bu oyunu nasıl oynayacağını biliyorsun. Hadi, şimdi gerçekten oynayalım."

Bir İki İki Bir İki Bir

Araştırmacı: "Benimle çok güzel oynuyorsun hadi biraz daha oynayalım. Unutma ben bir kere tıkatınca sen iki kere, ben iki kere tıkatınca sen bir kere tıkatıyorsun."

İki Bir Bir İki Bir İki

Araştırmacı: "Aferin... Hadi biraz daha zorlaştıralım bu oyunu. Bakalım daha zor bir ritmi oynayabilecek misin? Şimdi, eğer böyle bir kere tıklatırsam (tıklatır), senin sadece iki kere tıkatmanı istiyorum (Çocuğun doğru yapmasını sağlar), iki kere tıklatırsam (tıklatır) senin bir

defa tıkladmanı istiyorum (Çocuğun doğru yapmasını sağlar), ama 3 kere tıkladırsam senin hiiiiiiç tıkladmanı istemiyorum. Hadi bir deneme yapalım. (Bir İki Üç deneme yaparlar). “Aferin, sen bu oyunu öğrenmişsin”.

Bir İki Üç İki Bir Üç

Araştırmacı: “Benimle çok güzel oynuyorsun hadi biraz daha oynayalım. Unutma ben bir kere tıkladınca sen iki kere, ben iki kere tıkladınca sen bir kere tıkladıyorsun, ben üç kere tıkladınca, sen hiç tıkladılmıyorsun.”

Üç İki Bir İki Bir Üç

Araştırmacı: “Aferin çok güzel oynadın benimle.”

NOT: Çocuk eğer “Kaç tane vurdun hatırlamadım/anlamadım” derse “Olabilir, devam edelim” diyoruz; eğer “Kuralı hiç hatırlamıyorum” derse kuralı hatırlatıyoruz.

## Appendix E

### Zihin Kuramı Yeteneđi Gelişimsel Ölçeđi

**Veriliş sırası:** Farklı istek, bilgi erişimi, içerik yanlış inanış, farklı inanış, belirgin yanlış inanış, saklı duygu

#### 1. Farklı istek

*Materyaller:* Küçük bir erkek oyuncak bebek. Yarısında bir havuç, diđer yarısında bir kurabiye resmi bulunan 22x28 cm boyutlarında kâğıt.

Önce araştırmacı oyuncacı ve resimleri gösterir ve çocuđa tanıtır: “Bu Ali (oyuncak bebeđi kâğıdın üzerine, iki resmin ortasına yerleştirin). Ali'nin karnı acıkmiş ve canı bir şeyler yemek istiyor. Burada iki farklı yiyecek var: bir havuç (işaret et) ve bir kurabiye (işaret et).”

Sonra çocuđa *kendi isteđi* sorulur: “Sen en çok hangi yiyeceđi **seviyorsun?** En çok havucu (işaret et) mu, yoksa kurabiyeyi (işaret et) mi seversin?”

Eđer çocuk “Havuç” derse, “Peki, bu iyi bir seçim. **Ama...** Ali aslında kurabiyeleri **sever** (işaret etme). Havucu sevmez. **Onun en çok sevdiđi** yiyecek kurabiyedir.” denir.

Eđer çocuk “Kurabiye” derse, “Peki, bu iyi bir seçim. **Ama...** Ali aslında havucu **sever** (işaret etme). Kurabiyeyi sevmez. **Onun en çok sevdiđi** şey havuçtur.” denir.

Sonra *hedef soruya* geçilir: “Evet şimdi yemek yeme zamanı. Ali **yalnızca bir** yiyeceđi seçebilir, **sadece birini**. Ali (Ali'yi işaret et) hangi yiyeceđi **seçecek?** ... Havucu mu, kurabiyeyi mi?”

*Puanlama:* Çocuk *hedef soruya*, *kendi isteđi sorusuna* verdiđi cevabın tersi biçimde cevap verirse doğru cevap vermiş olur.

#### 2. Farklı İnanış

*Materyaller:* Küçük bir kız oyuncak bebek. Yarısında çalılık ve diđer yarısında bir garaj resmi bulunan 22x28 cm boyutlarında kâğıt.



Önce arařtırmacı oyuncuđı ve resimleri gösterir ve çocuđa tanıtır: “Şimdi başka bir oyuna geçiyoruz. Bu Ayşe (oyuncak bebeđi kâğıdın üzerine, iki resmin ortasına yerleřtirin). Ayşe kedisini bulmak istiyor. Kedisini çalıřlıkların içinde (iřaret et) saklanıyor olabilir ya da garajın içinde (iřaret et) saklanıyor olabilir.”

Sonra çocuđa *kendi inaniřı* sorulur: ”Sence kedi nerede? Çalıřlıkların içinde mi (iřaret et) yoksa... garajın içinde mi (iřaret et)?”

Eđer çocuk “Çalıřlıklar” derse, “Evet bu iyi bir fikir. **Ama...** Ayşe kedisinin garajın içinde (iřaret etme) olduđunu **düřünüyor**. Kedinin garajın içinde olduđunu düřünüyor.” denir.

Eđer çocuk “Garaj” derse, “Evet bu iyi bir fikir. **Ama...** Ayşe kedisinin çalıřlıkların içinde (iřaret etme) olduđunu **düřünüyor**. Kedinin çalıřlıkların içinde olduđunu **düřünüyor**.” diye cevap verilir.

Sonra *hedef soruya* geçilir: “Peki... Ayşe (Ayşe’yi iřaret et) kedisini nerede **arayacak**?

Çalıřlıkların içinde mi yoksa garajın içinde mi?”

*Puanlama*: Bu bölümdeki sorunun cevabının dođru olarak puanlanması için çocuđun *hedef soruyu kendi inaniř sorusuna* verdiđi yanıtın tersi biçimde cevaplaması gerekmektedir.

### 3. Bilgi Eriřimi

*Materyaller*: Kolayca tanımlanamayan (yani dıř görünüşünden ne kutusu olduđu anlaşılmayan, örnek: çikolata, bardak) kare řeklinde küçük bir kutu. Kutuya sığacak büyüklükte oyuncak bir köpek. Küçük bir kız oyuncak bebek.

Arařtırmacı önceki oyunun materyallerini kaldırır ve yeni materyalleri çıkartır: “Burada bir kutu var (kutunun üzerine parmađını koy).”

Arařtırmacı çocuđa sorar: “Sence kutunun içinde ne var (kutuyu iřaret et)?”

Çocuk cevap verse de vermese de arařtırmacı meraklı ve heyecanlı bir řekilde: “Haydi bir bakalım... Aaa içinde **bir köpek** varmıř!” der.

Araştırmacı köpeği göstermek için kutunun kapağını açar ve çocuğun köpeği gördüğünden emin olduktan sonra kutuyu kapatır.

Çocuğun kutunun içinde ne olduğunu öğrenip öğrenmediği anlamak için *kontrol* sorusu sorulur:

“Peki...Söyle bakalım, ne vardı kutunun içinde?”

Eğer çocuk burada hata yaparsa, soruyu doğru yanıtlayana kadar içerisinde bulunanlar tekrar gösterilir.

Araştırmacı eline bebeği alır: “Ve işte Zeynep. Zeynep bu kutunun içindekini **daha önce hiç görmedi.**”

Sonra *hedef soruya* geçilir. Araştırmacı “Peki... Zeynep kutuda ne olduğunu **biliyor mu?**” diye sorar. Çocuğun cevabından sonra *hafıza sorusu* sorulur. Araştırmacı “Zeynep bu kutunun içini **gördü mü?**” diye sorar.

*Puanlama:* Bu bölümdeki sorunun cevabının doğru olarak puanlanması için çocuğun *hedef soruyu* ve *hafıza sorusunu* “hayır” olarak yanıtlaması gerekmektedir.

#### 4. Belirgin Yanlış İnanış

Materyaller: Erkek oyuncak bebek. Bir yarısında dolap diğer yarısında sırt çantası resmi bulunan 22x28cm boyutlarında kâğıt.

Araştırmacı önceki oyunun materyallerini kaldırır ve yeni materyalleri çıkartır: “Bak bu Murat. Murat eldivenlerini arıyor. Murat’ın eldivenleri ya sırt çantasında (işaret et) ya da dolapta (işaret et) olabilir. **Aslında,** Murat’ın eldivenleri sırt çantasında. Ama Murat eldivenlerin **dolapta** (işaret et) olduğunu **düşünüyor.**”

Araştırmacı çocuğa hedef soruyu sorar: “Peki... Murat eldivenlerini nerede **arayacak?** Sırt çantasında mı yoksa dolapta mı?”

Sonra gerçeklik sorusu sorulur: “Murat’ın eldivenleri **gerçekte** nerede? Sırt çantasında mı dolapta mı?”

*Puanlama:* Çocuk *hedef soruyu*, “dolap” ve *gerçeklik sorusunu* “sırt çantası” olarak yanıtlarsa doğru cevap vermiş olur.

## 5. İçerik Yanlış İnanış

*Materyaller:* Ön yüzünde görünür biçimde boya kalemleri resimleri olan standart bir boya kalem kutusu. Kutunun içinden çıkacak bir yara bandı. Küçük bir erkek oyuncak bebek.

Araştırmacı diğer materyalleri kaldırırken yeni materyalleri çıkarır: “Şimdi ben sana başka bir şey göstereceğim. Burada bir kalem kutusu var.”

Araştırmacı boya kalem kutusunu çocuğun önüne koyar: “Sence bu kalem kutusunun içinde ne var?”

Bu soruya çocuğun “kalem” demesi için gerekirse yönlendirmede bulunulur. Örneğin birinci yönlendirmede araştırmacı “İçinde kalem olabilecek gibi mi görünüyor?” der. Çocuk yine de “kalem” demezse, ikinci yönlendirme yapılır, “Bu ne çeşit bir kutu? İçinde ne olmalı?” denir. Üçüncü yönlendirmede ise araştırmacı “Burada kalemler mi olmalı yoksa kitaplar mı?” diye sorar.

Çocuktan “kalem” cevabını aldıktan sonra araştırmacı heyecanla: “Hadi bakalım... Aaa içinde **bir yara bandı** varmış!”

Araştırmacı boya kalem kutusunun içindeki yara bandını dışarı çıkarır ve çocuğun yara bandını gördüğünden emin olduktan sonra yara bandını tekrar boya kalem kutusunun içine koyar ve kapağını kapatır.

Çocuğun boya kalem kutusunun içinde yara bandı olduğunu öğrenip öğrenmediği kontrol edilir: “Peki... Ne vardı kutunun içinde?” (*kontrol sorusu*)

Eğer çocuk burada hata yaparsa, soruyu doğru yanıtlayana kadar kutunun içindeki yara bandı tekrar gösterilir.

Araştırmacı eline bebeği alır: “İşte Ahmet geldi (Ahmet’i gösterir). Ahmet bu boya kalemi kutusunun içini **daha önce hiç görmedi.**”

Sonra *hedef soruya* geçilir. Araştırmacı “Peki... Ahmet kutunun içinde ne olduğunu **düşünür?**

Boya kalemi mi yoksa bir yara bandı mı?” diye sorar. Çocuk yanıtlamazsa soru tekrarlanır.

Çocuğun cevabından sonra *hafıza sorusuna* geçilir. Araştırmacı “Ahmet bu kutunun içini **gördü mü?**” diye sorar.

*Puanlama:* Bu bölümdeki sorunun cevabının doğru olarak puanlanması için çocuğun *hedef soruyu* “boya kalemi” olarak ve *hafıza sorusunu* (görme hakkında olan son soru) “hayır” olarak yanıtlaması gerekmektedir.

## 6. Saklı Duygu

**Materyaller:** Arkası dönük olduğu için yüzü görünmeyen bir erkek çocuğun başının resmi (8x8 cm ebatlarına yakın). Duygu Ölçeği: Sırasıyla mutlu, normal (ne mutlu ne üzgün) ve üzgün ifadeleri olan üç basit yüz çizimi içeren 8x25 cm ebatlarında bir kâğıt (yalnızca siyah-beyaz dairesel çizgilerden oluşan basit gözler, çizgi şeklinde ağızlar vb. içeren basit yüz çizimleri).

Oyuna hazırlık amacıyla araştırmacı duygu ölçeğini çıkarır ve çocuğun önüne koyar: “Şimdi sana bir çocuk hakkında hikâye anlatacağım. Bu hikâyede, çocuk mutlu hissediyor olabilir (duygu ölçeği üzerinde işaret eder). Üzgün hissediyor olabilir (duygu ölçeği üzerinde işaret eder). Ya da ne mutlu ne üzgün hissediyor olabilir (duygu ölçeği üzerinde işaret eder).”

Araştırmacı çocuğun yüzlerin hangi duyguları anlattığını öğrenip öğrenmediğini kontrol eder.

Araştırmacı her ifadeyi teker teker sorar: “Şimdi bana gösterebilir misin? Bu yüzlerden hangisi mutlu? Hangisi üzgün? Hangisi ne mutlu ne üzgün?”

Eğer çocuk hata yaparsa ön hazırlık baştan yapılır.

Araştırmacı: “Aferin sana... Tamam, şimdi hikâyeye geçelim. Hikâyeyi anlattıktan sonra, sana çocuğun **içinde gerçekten nasıl hissettiğini** (kendi kalbine dokunarak) ve yüz olarak **nasıl**

**görüldüğünü** (kendi yanağına dokunarak) soracağım. Çocuk içinde başka bir şey hissediyor ama yüzünde bunu farklı gösteriyor olabilir. Senin bana çocuğun içinde nasıl hissettiğini ve yüzünde nasıl görüldüğünü söylemeni istiyorum”.

Araştırmacı hikâyeyi anlatmaya başlar: “Bu hikâye Mehmet hakkında (resmi göster). Mehmet’in arkadaşları birlikte oynuyor ve şakalaşıyorlardı. Büyük çocuklardan biri olan Gül, Mehmet hakkında kötü bir şaka yaptı ve herkes buna güldü. Mehmet dışında herkes bu şakanın çok komik olduğunu düşündü. Ama Mehmet şaka hakkında nasıl hissettiğini diğer çocukların görmesini istemedi, çünkü ona bebek derlerdi. Yani, Mehmet nasıl hissettiğini saklamaya çalıştı.”

Sonra çocuğa 2 hafıza sorusu sorulur:

“Gül, Mehmet hakkında kötü bir şaka yaptığında diğer çocuklar ne yaptı?”

“Hikâyede, diğer çocuklar Mehmet’in ne hissettiğini bilselerdi ne yaparlardı?”

Üç duygu resmini göstererek: “Peki, herkes güldüğünde, Mehmet gerçekte nasıl hissetti? Mutlu mu, üzgün mü, yoksa ne mutlu ne üzgün mü?”

Neden?

“Herkes güldüğünde, Mehmet nasıl görünmeye çalıştı? Mutlu mu, üzgün mü, yoksa ne mutlu ne üzgün mü?”

Neden?

Çocuğun başarılı olması için hedef duygu sorusuna, hedef görünüş sorusundan daha olumsuz bir cevap vermesi gereklidir.