

CANSU SÜMER

PRESCHOOLERS' SCREEN MEDIA USE AND SELF-REGULATION

Bilkent University 2018

RELATIONSHIPS BETWEEN PRESCHOOLERS'
SCREEN-BASED MEDIA USE
AND SELF-REGULATION ABILITIES

A Master's Thesis

by
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August 2018

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AND SELF-REGULATION ABILITIES

The Graduate School of Economics and Social Sciences
of
İhsan Doğramacı Bilkent University

by

CANSU SÜMER

In Partial Fulfillment of the Requirements for the Degree of
MASTER OF ARTS IN PSYCHOLOGY

THE DEPARTMENT OF
PSYCHOLOGY
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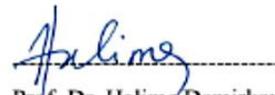
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ABSTRACT

RELATIONSHIPS BETWEEN PRESCHOOLERS' SCREEN-BASED MEDIA USE AND SELF-REGULATION ABILITIES

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August 2018

Screen-based media technologies have become integrated into nearly every aspect of families' lives. The long-term impact of these technologies on children has only recently started to be investigated. While past developmental research has looked at children's attention abilities as related to TV viewing, it is yet to be investigated whether and how children's use of next-generation screen-based media devices (e.g., tablets, smartphones, etc.) are related to their self-regulation. Given that parents are children's gateway for using these devices in terms of access, it is crucial to understand the purposes and contexts in which parents allow children to use these technologies. Accordingly, the current study investigated parents' uses of TV and mobile devices for child-related purposes (e.g., keeping the child occupied) and preschoolers' abilities to regulate their emotions, behavior and cognitive processes. Parents' ratings and children's performance-based scores were obtained for children's emotion and behavior regulation. Parents also reported their frequency of using TV and mobile devices for child-related purposes. Significant correlations were found between parents' frequency

of using these devices to calm their child when she/he is upset and parent reports of children's emotion regulation. However, parents' frequency of using these devices for child-related purposes was not correlated with children's performance-based scores. Implications of these findings, limitations, and future directions are discussed.

Keywords: Child-Related Technology Use, Preschool Children, Screen-Based Media Devices, Screen Viewing, Self-Regulation

ÖZET

ANAOKULU ÇOCUKLARININ EKRANA DAYALI MEDYA CİHAZLARINI KULLANMALARI VE ÖZDENETİM BECERİLERİ ARASINDAKİ İLİŞKİLER

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Ağustos 2018

Ekranaya dayalı medya teknolojileri aile hayatının neredeyse tüm unsurlarının bir parçası haline gelmiştir. Bu teknolojilerin çocuklar üzerindeki uzun süreli etkileri yalnızca yakın bir zamanda araştırılmaya başlanmıştır. Her ne kadar önceki gelişimsel araştırmalar çocukların dikkat yetenekleri ile TV izleme arasındaki ilişkiyi incelemiş olsa da, çocukların yeni nesil ekrana dayalı medya cihazlarını (örn. tablet bilgisayarlar, akıllı telefonlar, vb.) kullanımları ile özdenetim becerileri arasında nasıl bir ilişki olduğu henüz araştırılmamıştır. Çocukların bu cihazlara erişim yolunun ebeveynlerden geçtiği kabul edildiğinde, ebeveynlerin çocuklarına bu teknolojilere hangi amaçlarla ve hangi bağlamlarda izin verdiğinin anlaşılması elzemdir. Buna göre, bu çalışmada ebeveynlerin TV ve mobil cihazları çocukla ilgili amaçlar (örn. çocuğu meşgul etmek) için kullanımları ile anaokulu çağındaki çocukların duygularını, davranışlarını ve bilişsel süreçlerini kontrol edebilme yetenekleri incelenmiştir. Ebeveynlerin puanlamaları ve çocukların performansa dayalı skorları çocukların duygu ve davranış kontrolleri için elde edilmiştir. Ayrıca ebeveynler TV ve mobil cihazları çocukla ilgili amaçlar için

kullanma sıklıklarını da rapor etmişlerdir. Ebeveynlerin bu cihazları çocuk üzgün olduğunda çocuğu sakinleştirme amacıyla kullanma sıklığı ile çocukların duygu kontrolüne ilişkin ebeveyn raporları arasında önemli bağıntılar bulunmuştur. Ancak, ebeveynlerin bu cihazları çocukla ilgili aynı amaçlar için kullanma sıklığı ile çocukların performans dayalı skorları ile bağıntılı değildir. Bu bulguların etkileri, sınırları ve gelecekteki olası yönelimleri tartışılmıştır.

Anahtar kelimeler: Anaokulu Çocukları, Çocukla İlgili Teknoloji Kullanımı, Ekran Görüntüleme, Ekrana Dayalı Medya Cihazları, Özdenetim

ACKNOWLEDGMENTS

Above all, I owe a great debt of gratitude to Asst. Prof. Jed Allen. He is by far the best adviser and teacher I have ever had. His lectures in the past 5 years, which I attended to both as an undergraduate and a graduate student, not only laid the foundation for my academic path but also taught me how to ask the right questions to scaffold my own learning. His feedback, even the smallest ones, always helped me to improve myself. I am much obliged to him for his time and effort.

I am sincerely grateful to Asst. Prof. Hande Ilgaz. It was an opportunity to have attended her lectures. It is thanks to her courses that I learned what a wonderful lecture should be like. I am also thankful for her guidance for she never hesitated to help me when I needed advice. Her valuable opinions and advice have continuously broadened my perspective.

I would like to thank my defence committee for their precious time and feedback on my thesis.

I am thankful to all parents, their children, and the preschools that participated in this study for their willingness to participate in this study. Without their time, this project would not be possible.

I am indescribably grateful to Elçin Baykal Kök for standing by me throughout the whole journey. Without her precious presence, advice, generosity and warmth, it would be very difficult to complete my studies. I am very lucky to have known you.

I would like to thank Berfu Ulusoy and Bartuğ Çelik for their precious time and assistance with data collection. I am greatly indebted to you for your help. I would also like to sincerely thank Emre Aydın, Ecem Mutlu, Bahar Bozbiyık, Ezgi Ersen, Feride Nur Haskaraca, Eda Önođlu, but most importantly Alican Bařdemir, for their time and endless support. You bring joy to my heart!

Finally, I am thankful to my brother Can Sümer, for his continuous assistance and insightful feedback with the translations.

Last but not least, I am grateful to my family for their unceasing moral and material support. Even when I doubted myself and questioned my path, they have never stopped supporting and encouraging me to continue. It is all thanks to their love and understanding that I completed my studies. From the bottom of my heart, thank you for being patient with me.

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CHAPTER 1

INTRODUCTION

In this section, literature on self-regulation is reviewed. First, different traditions in the self-regulation literature are described. Specifically, the temperamental approach and the cognitive approach are reviewed. Next, the socialization and development of self-regulation are discussed. Following this, literature on the relationships between self-regulation and screen-based media use is presented. The research on children's self-regulation abilities and screen-based media use is reviewed. Next, studies on parents' using screen-based media for various child-related purposes are described. Finally, the gap in the literature and research questions related to children's self-regulation abilities and their screen-based media use are discussed.

Broadly construed, self-regulation is one's ability to change his or her emotions and behaviors in order to achieve one's goals (von Suchodolets, Trommsdorff, & Heikamp, 2011). Because self-regulation takes different descriptions based on different approaches, there is no consensus on a single definition (Berger, 2011). The term self-regulation is used synonymously with self-control (e.g., House, 2011), executive function (see Carlson, 2003), or effortful control (e.g., Rothbart & Bates, 2006) in various parts of the literature. Nevertheless, it can be argued that self-regulation is a "superordinate construct" that involves willful control over attention, emotion, and behavior (Berger, 2011).

The reason behind the abovementioned lack of consensus on the definition of self-regulation might lie in a foundational division. Liew (2012) argues that there are two main approaches to self-regulation. Researchers who have a behavioral or temperament-based foundation give priority to effortful control, whereas those who come from a cognitive or neural-systems background focus on executive functions (for a detailed review, see Bridgett, Burt, Edwards, & Deater-Deckard, 2015).

1.1. Temperamental approach to self-regulation

Effortful control is a component of temperament which is defined as the “constitutional differences in reactivity and self-regulation” (Rothbart & Derryberry, 1981, p. 37). The most frequently used definition of effortful control is that it is the “efficiency of executive attention - including the ability to inhibit a dominant response and/or to activate a subdominant response, to plan, and to detect errors” (Rothbart & Bates, 2006, p. 129). Put differently, it is one’s ability to control his or her attention (i.e., shifting and focusing) and behavior (i.e., inhibition and activation) (Eisenberg & Morris, 2002; Valiente, Lemery-Chalfant, & Reiser, 2007). Eisenberg, Smith, and Spinrad (2011) argue that effortful control has a fundamental role in the “self-regulation of emotions”. In their example, when people experience or are likely to experience negative feelings, they may engage in various strategies to cope with these experiences. Some people may distract themselves by disengaging their attention from the situation and focusing on something else, whereas others may suppress the emotional expression of negative feelings by making use of inhibitory control. In support of this view, Carlson and Wang (2007) found a positive association between emotion regulation and inhibitory control in 4- to 6-year-old children. In short, effortful control, especially its inhibitory and attention control aspects are central for emotion related self-regulation (Eisenberg et al., 2011).

1.2. Cognitive approach to self-regulation

Following the temperament literature, the second approach to self-regulation is the cognitive-based tradition. This approach takes executive functions as a measure of self-regulation. Similar to effortful control, executive function refers to a set of self-regulatory processes (Bernier, Carlson, & Whipple, 2010). In neuroscience, developmental, and cognitive literatures (Bridgett et al., 2015), executive functioning is conceptualized as consisting of a group of cognitive processes that include shifting between tasks, “updating and monitoring of working memory contents”, and inhibiting dominant responses (Miyake, Friedman, Emerson, Witzki, & Howerter, 2000). In their review of the self-regulation literature, Zhou, Chen, and Main (2012) argue that there are a number of labels that are used for executive functioning such as executive control, cognitive control, or supervisory attention.

Instead of viewing effortful control and executive functioning as incompatible, it has been suggested that they be taken as complementary (Liew, 2012) and overlapping (Bridgett et al., 2015). For both forms of self-regulation, inhibitory and attentional control are of central importance (Liew, 2012) such that, like effortful control, executive functioning also involves suppressing a dominant response and activating a subdominant response (Blair & Razza, 2007). Indeed, in various parts of the literature, there are a number of effortful control studies and executive functioning studies that make use of “similar measures of inhibition” (Zhou et al., 2012, p. 5). In addition, both executive functioning (Blair & Razza, 2007; Blankson, O'Brien, Leerkes, Calkins, & Marcovitch, 2015) and effortful control (Blair & Razza, 2007) are positively related to receptive vocabulary knowledge among preschoolers. However, it is crucial to note that, despite the attention and inhibitory control

elements that they have in common, working memory is a component of executive functioning but not of effortful control (Liew, 2012).

Depending on the research focus, the developmental literature usually uses either effortful control or executive functioning measures to study self-regulation of behavior (see Blair & Razza, 2007 for an exception). Zhou and colleagues (2012) argue that studies of effortful control usually have an emphasis on “emotion-laden contexts” whereas studies of executive functioning are more likely to have “emotion-neutral” contexts. For instance, studies that have investigated how parent variables (e.g., parents’ self-regulation, parents’ reactions to children’s negative emotions) relate to child outcomes have measured parents and/or children’s temperament. Specifically, these studies measured participants’ (i.e., both children’s and parents’) effortful control abilities. There are also some studies that measure parents’ executive functioning (e.g., Deater-Deckard, Wang, Chen, & Bell, 2012).

1.3. Development of self-regulation

Throughout development, there is a transition in the agency of direction or source of the self-regulation processes. These processes change from being other-directed or other-initiated to being self-directed or self-initiated (Grolnick, Kurowski, McMenamy, Rivkin, & Bridges, 1998; Kopp, 1982). In the beginning of their lives, infants depend on their caregivers for arousal modulation (Kopp, 1982). Through development their autonomy increases and they become more adept at behavior and emotion control.

Studies that looked at children’s effortful control abilities as an indication of their self-regulation report a significant development in this construct between 22 to 33 months of age as measured by behavioral assessments and parent-reports (Kochanska, Murray, & Harlan, 2000). Grolnick, Bridges, and Connell (1996) found

that, by the time toddlers are 2 years old, they are capable of distracting themselves through reorienting their attention from forbidden objects towards substitute ones in the environment. Moreover, Grolnick and colleagues (1996) argue that this ability may be facilitated by the improvements in children's effortful control as well as their representational capacities.

Parallel to children's development, parents' strategies to regulate their children's emotional arousal change (e.g., Grolnick et al., 1998). For instance, in a cross-sectional study, Grolnick and colleagues (1998) investigated the emotion regulation strategies mothers used with their 12-, 18-, 24-, and 32-month-old toddlers. They found that, in situations that required the children to wait, mothers used distraction, reassurance, and following (i.e., "mother reflecting, extending or elaborating upon the child's distress or preoccupation with the desired object" such as saying "I know you want the crackers", p. 442) strategies more with younger toddlers and that the use of these strategies decreased over time.

In addition, children show significant improvements in their inhibitory abilities when they are around 4 years of age (Jones, Rothbart, & Posner, 2003; Reed, Pien, & Rothbart, 1984). Carlson (2005) argues that there is a significant improvement in children's working memory and inhibition abilities between ages 3 and 5 years.

Also, Kopp (1982) argues that from preschool years onward, children are capable of showing certain behaviors marked by self-regulatory abilities "such as meeting the new situational demands and a (...) capacity for delay and waiting" (p. 207).

Empirical studies on preschool children's inhibitory control and emotion regulation abilities support these arguments (e.g., Carlson & Wang, 2007). Thus, by the time children are 5 or 6 years old, they have had developed a certain level of self-regulatory abilities.

1.4. Socialization of self-regulation

Parents are fundamental for the optimal development of children's self-regulation. For example, 4- to 8-year-old children whose parents use cognitive coping strategies (e.g., reframing or distraction), instead of physical coping strategies (e.g., physical comforting), are found to have better emotion regulation (Morris et al., 2011). Moreover, the family- or parent-related variables that contribute to the development of self-regulation are intrinsically tied to one another. For instance Morris, Silk, Steinberg, Myers, and Robinson (2007) present a tripartite model of familial variables that influence the socialization of emotion regulation. Among other pathways, they suggest that the emotional climate in the family (e.g., parenting style, marital relations) and parenting practices (e.g., reactions to emotions, emotion coaching) influence one another and are both influenced by parent characteristics (e.g., reactivity and regulation). Kiss, Fechete, Pop, and Susa (2014) argue that the factors that directly or indirectly influence children's self-regulation development mainly include parental characteristics (such as parents' feelings about negative emotions, their own self-regulation abilities) and parenting variables (such as parent reactions to children's negative emotions; Kiss et al., 2014). Literature suggests that, when parents feel in control of their emotions in situations where they are faced with their children's negative emotions, "they are more likely to be supportive and help alleviate a child's distress", which would better enable the child to behave appropriately (Fabes, Leonard, Kupanoff, & Martin, 2001, p. 908; also see Morris et al., 2007).

1.5. Self-regulation and screen-based media use

Recently, there has been a growing interest in the role of "screen-based media" devices (e.g., TV, smart-phones, and tablet computers; Kostyrka-Allchorne, Cooper,

& Simpson, 2017a) in daily life. In terms of self-regulation, contemporary literature indicates connections between adults' self-regulatory abilities and the use of screen-based media (see Greenwood & Long, 2009). For instance Frey, Benesch, and Stutzer (2007) reported a negative relationship between TV viewing and life satisfaction, which was inferred to be the result of self-control problems. In addition, in a study where participants were exposed to experimentally induced success or failure, participants' tendencies to watch television decreased when they felt good about themselves. In contrast, when they felt bad about themselves, their tendencies to watch television increased, indicating the use of television as a strategy to regulate negative emotions (Moskalenko & Heine, 2003). In younger populations, Duckworth and Seligman (2005) found a negative association between the amount of time that 13-year-olds spent watching TV and their self-discipline. More recently, Nathanson and Beyens (2017) found a negative association between 3- to 5-year-old children's effortful control and the time they spend using tablets. However, this relationship was found only among children who had less than 10 hours of sleep per night. In sum, research indicates causal and correlational connections between the use of screen-based media and self-regulation in different age groups.

There is growing interest in understanding the impact of screen-based media on various developmental outcomes related to self-regulation. While most of the literature has focused on the effect of television on attention and its regulation (e.g., Cooper, Uller, Pettifer, & Stolc, 2009; Zimmerman & Christakis, 2007; see Courage & Setliff, 2010 for a review on infants and toddlers), there are also a number of other studies that have investigated the longitudinal impact on self-regulation (e.g., in Japan; Inoue et al., 2016), and on vocabulary and executive functioning (e.g., in the US; Blankson et al., 2015).

1.6. Children's access to screen-media

Parents are the gateway to their children's access to media devices. Indeed, earlier studies have constantly demonstrated parents' role as a mediator in terms of children's use of screen media. Parents report that they implement rules specifically about the content their children can access (e.g., certain websites; Hiniker, Schoenebeck, & Kietz, 2016) and the amount of exposure to these devices (Mazmanian & Lanette, 2017). They report that they restrict and control their children's media use through installing filters to the Internet browser, deciding on time limits, and co-viewing (Uhls & Robb, 2017). Finally, parents indicate they impose more restrictive rules to their younger children compared to older children or adolescents (Davies & Gentile, 2012; Top, 2016).

In addition to setting rules, another way parents act as a gateway is through granting their children ownership to these devices. No study specifically investigated parents' tendencies to pass their mobile devices to their child or to allow their child to use these devices due to the fact that their child does not own one. In other words, it is not known how children's habits of mobile device use as occasionally allowed by their parents changes after they have their own devices (e.g., the child owning his own smart-phone versus the parent lending his or her own to the child). It is likely, however, that having one's own mobile device compared to asking for permission to use it would increase the frequency of device use. Therefore it is possible that, until children are granted a mobile device, such as a smart-phone, for their personal use, they depend on their parents to be allowed to use these devices in terms of being permitted to use the family/common device or the parent's own. This is especially likely for preschool-aged children.

1.7. Use of screen-based media devices for child-related purposes

Even though there are no studies that specifically investigate how parents use screen-based media devices for various child-related purposes (e.g., keeping the child busy, as a wind down device, etc.), the literature points at the frequent use of these devices in different contexts (e.g., while travelling or waiting). In the literature, parents have indicated that they use technological devices such as mobile phones and tablet computers to keep their child busy while they are doing chores or to calm their child. For instance, mothers of 15- to 36-month-old babies with social-emotional difficulties report that they use smart-phones or tablets to calm their child or keep their child occupied (Radesky, Peacock-Chambers, Zuckerman, & Silverstein, 2016). In the US, parents report that they allow their young children to play on mobile devices as a way to create some free-time for themselves as parents or as a wind-down time for the child (Oduor et al., 2016). Observational studies in the US show that, in restaurants, some parents use these devices as a way to keep their child entertained or to calm the child when she or he becomes active (Radesky et al., 2014a). In the UK, mothers of 2- to 4-year-olds reported using these devices for similar purposes (Bentley, Turner, & Jago 2016). While the most widely used device was TV, mothers also gave “their child a tablet or smart-phone to play games or watch programs on as a means of downtime” (p. 5). It was indicated in that same study that “screen-viewing was (...) encouraged by mothers when they felt their child getting too wound up or excited, to calm the child down and prevent disruptive behavior” (p. 5). Indeed, Bentley and colleagues (2016) argue that the portable nature of mobile devices makes these devices convenient for use during travelling or situations that require waiting. These findings demonstrate parents’ role as a

“gatekeeper” to access and use screen-based media devices (Knowles, Kirk, & Hughes, 2015).

1.8. Current study

Recently, there has been a growing number of parents who report that their children tend to “zone out”, to have less energy or to act slowly when they screen-view (e.g., Bentley et al., 2016). However, there is a substantial gap in the literature for understanding the influence of children’s use of screen-based media devices on their self-regulation abilities (Kildare & Middlemiss, 2017; Radesky et al., 2014a; Radesky et al., 2016; Radesky & Christakis, 2016). Despite parent reports of increased use of screen-based media in various contexts, there are no available studies that look at the impact of children’s screen-based media use and their self-regulatory abilities. Therefore, the current study specifically aimed to investigate the relationship between parents’ use of screen-based media for child-related purposes (e.g., keeping the child busy, calming him down) and children’s abilities to regulate their own emotions, behaviors, and attention. Accordingly, the current study aimed to answer 3 main research questions:

The first question was related to age-related changes. Specifically, it inquired about (1a) age-related changes in preschool-aged children’s frequency of using screen-based media, and (1b) age-related changes in preschool-aged children’s abilities to regulate their emotions, behavior, and attention.

The second question asked whether parents use screen-based media devices (e.g., smart-phones, tablets, television) for child-related purposes such as keeping the child busy/entertained, calming their child down, or as downtime for the child.

The final question was related to what the relationships between parents’ use of screen media for child-related purposes and children’s self-regulatory abilities were.

Interviews with parents regarding the use of screen-based media in the family consistently point at electronic media being used to keep children busy or calm while parents attend to household chores. However, as Radesky and colleagues (Radesky et al., 2014a; Radesky et al., 2016; Radesky & Christakis, 2016) and Kildare and Middlemiss (2017) point out, research is lacking about how the chronic use of these devices for such purposes is related to children's developing self-regulatory abilities.

CHAPTER 2

METHOD

2.1. Participants

In total, 37 preschools were contacted and informed about the study. Of these schools, 15 agreed to participate. Following this, a total of 758 consent forms were sent out to families through the administrators and teachers. Of these, 85 families approved to participate in the study and were sent questionnaires. However, 3 children did not want to play ($M = 48.6$). One child was tested at home.

Some of the families had participated in a prior study which used the same child measures. This prior study was carried out with 5-year-old children in Kocaeli in January 2018. The parents who had participated in that study were sent out informed consent forms about the current study. Nine families approved to participate and filled out the questionnaires. Thus, their data from that prior study and questionnaires for the current study were combined and used.

For the final dataset, child measures were available from 82 participants and parent measures were available from 77 parents. Of these, 70 participants had both child measures and parent measures. Of the 82 children (45 female, 37 male) that were tested, 8 were 3 years old ($M = 44.50$, $SD = 2.07$, $range = 41-47$ months), 23 were 4 years old ($M = 55.13$, $SD = 2.98$, $range = 48-59$ months), 41 were 5 years old ($M =$

66.39, $SD = 3.21$, $range = 60-71$ months), and 10 were 6 years old ($M = 73.7$, $SD = 2.00$, $range = 72-77$ months).

Mothers' age ranged from 25 years to 49 years ($M = 37.13$, $SD = 4.87$, $N = 70$).

Eighty-one mothers had education data available. Nearly half of these mothers had a university degree (49.4%), followed by those that had a high school degree (22.2%), a graduate degree (17.3%), and a doctorate degree (4.9%). Less than 6% of the mothers had a middle school degree, an elementary school degree or other degree.

Eighty mothers had employment data available. More than half of these mothers had a full-time job (58.7%), followed by those that were unemployed (36.3%). The rest of the mothers either had a part-time job or had a home-based job.

Fathers' age ranged from 29 years to 53 years ($M = 39.36$, $SD = 5.53$, $N = 67$).

Seventy-nine fathers had education data available. Similar to mothers, nearly half of these fathers had a university degree (46.8%), followed by those who had a high school degree (22.8%), a graduate degree (15.2%), a doctorate degree (5.1%) or a middle school degree (5.1%). Less than 5% had either an elementary school degree or other degree. In addition, 80 fathers had employment data available. Nearly all fathers had a full-time job (93.8%). The rest of the fathers either had a part-time job, a home-based job, or were unemployed.

Seventy-seven families had income data available. Nearly half of these families had an income of more than 7.000 TL (49.4%), followed by those that had an income between 3.000-5.000 TL (20.8%), those that had between 5.000-7.000 (18.2%), and those that had between 1.000-3.000 TL (10.4%). Only 1 family had an income less than 1.000 TL.

2.2. Materials

2.2.1. Parent measures

2.2.1.1 Demographic form

Parents filled a demographics form that included information about parents' age, education, income, number of children, and time their child wakes up in the morning and goes to sleep at night.

2.2.1.2. Parent use of screen-based media devices for child-related purposes

There is no standardized scale on parents' reasons to use screen-based media devices for various purposes such as calming the child or keeping him busy. For this reason, a screen-based media-related demographics form was created. The form involved questions inquiring the technological devices families have at home, what kind of mobile phone the parents have (i.e., a normal mobile phone, a smart-phone), whether the child has a mobile phone of his/her own.

In order to investigate parents' motivations and reasons for using screen-based media devices for child-related purposes, one question was taken from Cingel and Krcmar (2013) and was translated to Turkish. This question asked about parents' reasons for letting their child use screen-based media devices. Parents were asked to rate 15 items on a 5-point Likert scale (1: Completely disagree – 5: Completely agree). In addition, in order to investigate parents' frequency of using these devices for child-related purposes, one question was taken from a doctorate thesis by Archer (2017) and was translated to Turkish. Parents were asked to rate the frequency with which they used mobile devices and TV for various purposes on a 5-point Likert scale (1: Never - 5: Always). The question was asked for mobile devices and TV, separately. There were 8 items on each question.

2.2.1.3. Emotion Regulation Checklist

The Emotion Regulation Checklist (ERC; Shields & Cicchetti, 1997) is an adult-report developed to measure children's emotion regulation processes including

affective lability, intensity, valence, flexibility, and situational appropriateness (Shields & Cicchetti, 1997). While the scale was originally developed to measure 6- to 12-year-old children's emotion regulation, previously it has been used to measure preschool-aged children's emotion regulation capacities as well (e.g., Molina et al., 2014).

There are 24 items that are rated on a 4-point Likert scale (1: Never - 4: Almost always). It can be administered to parents and/or teachers. The items load onto 2 factors; Lability/Negativity and Emotion Regulation. "The Lability/Negativity subscale is comprised of items representing a lack of flexibility, mood lability, and dysregulated negative affect; sample items include "Exhibits wide mood swings" and "Is prone to angry outbursts." The Emotion Regulation subscale includes items describing situationally appropriate affective displays, empathy, and emotional self-awareness; sample items include "Is empathic toward others," and "Can say when s/he is feeling sad, angry or mad, fearful or afraid"" (Shields & Cicchetti, 1997, p. 910). Shields and Cicchetti (1997) report that the Cronbach's α were .96 for Emotion Regulation and .83 for Emotion Lability/Negativity. Shields and Cicchetti also report that the scale is able to distinguish between maltreated and comparison children. The Turkish version of the scale is available in an unpublished master's thesis by Atay (2009). In study by Atay (2009), the Emotion Lability/Negativity subscale had a Cronbach's α of .81 whereas the Emotion Regulation subscale had an α of .73.

2.2.1.4. Children's Behavior Questionnaire

Children's Behavior Questionnaire (CBQ; Rothbart, Ahadi, Hershey, & Fisher, 2001) is a parent-report that is designed to tap into 3- to 7-year-old children's temperament. The short version was developed by Putnam and Rothbart (2006). The short form consists of 94 items and 15 scales. Of these scales, Attentional Focusing,

Inhibitory Control, and Impulsivity scales were the most relevant in terms of behavior and attention regulation. There are a total of 18 questions that measure children's Attention Focusing (i.e., "Capacity to maintain attentional focus on task-related channels", Rothbart et al., 2001, p. 1406), Inhibitory Control (i.e., "Capacity to plan and to suppress inappropriate approach responses under instructions or novel or uncertain situations", Rothbart et al., 2001, p. 1406), and Impulsivity (i.e., "Speed of response initiation", Rothbart et al., 2001, p. 1406). The parent is asked to rate these items on a 7-point Likert scale from 1 (Extremely untrue) to 7 (Extremely true). The questionnaire was translated into Turkish by Burcu Akin Sari.

2.2.2. Child measures

2.2.2.1. Dimensional Change Card Sort

Dimensional Change Card Sort (DCCS; Zelazo, 2006) is a measure of executive function. The task involves cards of a blue elephant, a blue car, a red elephant, and a red car. The task consists of three parts. In the first part, children were asked to sort cards according to one of the two colors (blue or red; "color game"). This part consisted of 6 trials. Before the trials began, children went through 2 practice trials. In the second part, children were asked to sort the cards according to their shape (elephant, car; "shape game"). In this part, there were no practice trials. This part also consisted of 6 trials. If children were successful in 5 trials out of 6, they moved on to the third part of the task. In this last part, children were presented with the same cards as the earlier trials; however, some of the cards had a black border around the picture (border elephant, no-border elephant, border car, no-border car; "border game"). Children were told to apply the color rule if the card had a frame and to apply the shape rule if the card did not have a frame. There were 2 practice trials. This part consisted of 12 trials in total.

In each trial, children got 1 if they answered accurately and they got 0 if they answered inaccurately. In total, children could get a total score out of 3: They got 1 if they correctly answered 5 out of 6 trials in the first phase; they got 1 if they correctly answered 5 out of 6 in the second phase; and they got 1 if they correctly answered 9 out of 12 trials.

2.2.2.2. Tapping task

The “knock-tap” task was developed as a measure of motor inhibition and working memory (as cited in Joseph, McGrath, & Tager-Flusberg, 2005). The task consists of 2 possible actions: knocking with one’s knuckles on the flat surface and tapping on the surface with one’s palm. Before the task, the experimenter asked the child to draw a shape on a piece of paper in order to find out the dominant hand of the child. There were 2 parts in the task. In the first part, participants were asked to repeat the action the experimenter carried out. Specifically, children were asked to “knock” when the experimenter “knocked” and to “tap” when the experimenter “tapped”. In the second part, the rule was reversed; children were now asked to “tap” when the experimenter “knocked” and to “knock” when the experimenter “tapped”. Before the trials began, participants were informed that, after each “knocking” action, the experimenter was going to put her hand horizontally on the table so that the child could understand it was his/her turn to make an action. Before each part began, there were 2 practice trials. Both parts consisted of 10 trials. For each trial, children got 1 if they answered accurately and they got 0 if they answered inaccurately. Children’s total score after the rule is reversed was taken as their Knock/Tap score. Children could get a maximum score of 10.

2.2.2.3. Day and Night Task

The Day and Night Task is a stroop-like task designed by Gerstadt, Hong, and Diamond (1994) to tap into inhibitory control of action. The task can be administered to 3½- to 7-year-olds (Gerstadt et al., 1994). In the task, there were 2 separate cards that depicted a sun and a moon. The task consisted of 2 parts. In the first part, participants were asked to say “sun” when they are shown the sun card and to say “moon” when they were shown the moon card. In the second part, the rule was changed and the participants were now required to say “moon” when they saw the sun card and to say “sun” when they saw the moon card. Before each part began, there were 2 practice trials. Without the practice trials, the task consisted of 16 trials in each part. For each trial, children got 1 if they were accurate and 0 if they were inaccurate. Children’s total score after the rule is reversed was taken as their Day/Night score. Children could get a maximum score of 16.

2.2.2.4. TIFALDI

It is important to account for children’s language abilities as literature suggests associations between this construct and executive functioning among preschoolers (e.g., Blankson et al., 2015). The Turkish Expressive and Receptive Language (TIFALDI) was developed by Kazak Berument and Güven (2013). The test can be administered to children between the ages of 2 to 12 years. In the Receptive Language part, participants were shown 4 different black and white pictures and were asked to select the target word. In this part, there were 104 target items. In the Expressive Language part, participants were shown a single black and white picture and were asked to name it. There were 80 target items in this part. In both the Receptive Language part and the Expressive Language part, participants started from sections that are compatible with their age groups.

2.3. Procedure

Prior to data collection, the approval of the Bilkent University Ethics committee was obtained. The approval Ministry of National Education in Ankara was obtained including a list of 29 preschools in the Çankaya district. The preschools that accepted to participate distributed the consent forms to the parents. The consent forms involved information about the study and the demographic form attached to it. Both parents had to sign the consent form. On the consent forms, parents were able to indicate whether they wanted to fill out the forms hardcopy (i.e., on paper) or online (i.e., Qualtrics). Data was collected from children whose both parents gave their written consent. The questionnaires for the parents were sent to families as a hardcopy or via an online link. The main caregiver of the child was asked to fill out the forms.

In the schools, the testing took place in a quiet room or classroom. Children were tested individually. The experimenter coded children's answers during testing.

Children were introduced to the tasks one by one. They were administered the tasks with the order of DCCS, tapping task, day/night task, and TIFALDI. On average, the whole procedure took 20-25 minutes. Children were gifted stickers for their participation. After data collection was over, 3 families that had filled out the forms were randomly chosen and were each gifted with 75 lira gift cards from D&R.

CHAPTER 3

RESULTS

3.1. Preliminary analyses

Before the analyses were carried out, missing data in the parent measures were evaluated. Participants who had more than 50% of the data missing were excluded from analyses, whereas mean replacement was carried out for participants who had less than 50% missing data in order to make up for the missing data points.

Mothers' education and income were strongly correlated with each other ($r = .549$, $n = 84$, $p < .000$). Therefore, these 2 variables were standardized and summed up in order to create a Composite socioeconomic status (SES) variable.

3.1.1. Sleep

Parents answered two open-ended questions about their children's wake time in the morning and bedtime in the evening ($N = 80$). Duration of sleep time was calculated through extracting children's bedtime from their wake time. Some parents reported time slots instead of an exact time of bedtime or wake time (e.g., 21:30-22:00). In cases like this, the midpoint of the 2 hours were taken as the participant's bedtime or wake time (e.g., to follow the earlier example, 21:45).

On average, children had a sleeping duration of 10 hours per day ($range = 7$ hrs 45 min – 12 hrs). An independent samples t-test revealed that there was no significant difference between boys ($M = 10.01$, $SD = .83$) and girls ($M = 9.98$, $SD = .89$; $t(78)$

= -.167, $p = .86$). However, there was a negative correlation between sleep duration and SES ($r = -.377, p < 0.001$) and a positive correlation between sleep duration and age when SES was controlled for ($r = .28, p < 0.05$).

3.1.2. Household devices

Seventy-seven parents reported the devices they had at home. No child owned a mobile phone. All mothers owned a mobile phone: 74 had a smart-phone, 1 had a regular mobile phone, and 2 owned both a smart-phone and a regular mobile phone. Seventy-four fathers owned a smart-phone, 1 owned both a smart-phone and a regular mobile phone, and 1 father did not own a mobile phone. Of these families, 72 had a television at home, 69 had an internet connection, 64 had a laptop or a PC, 56 had a tablet computer, and 39 had a DVD player (see Figure 1 for descriptives on all household devices). Even in cases where the family did not own a tablet computer, either one of the parents owned a smart-phone. This data made sure that all families owned at least one mobile device.

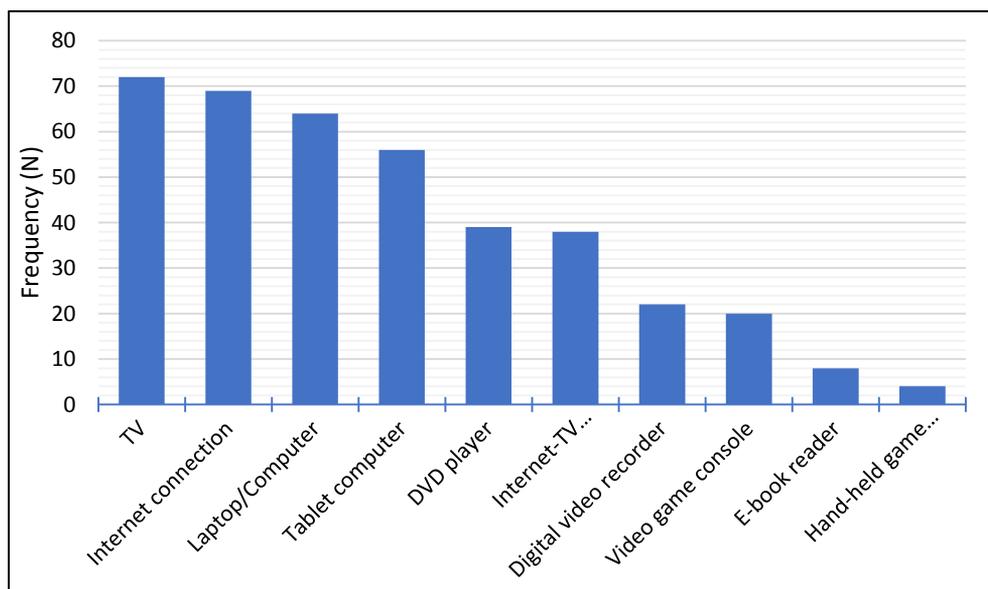


Figure 1. Descriptives of household devices

3.2. Child self-regulation

Research question (1b) inquired the age-related changes in children's abilities to regulate their emotions, behavior, and attention. In this section, children's performance on the 3 subscales of Children's Behavior Questionnaire (i.e., Attention Focusing, Inhibitory Control, and Impulsivity), on Emotion Regulation Checklist, and on 3 Executive Functioning tasks are described.

3.2.1. Children's Behavior Questionnaire

Eighteen items were taken from the short form developed by Putnam and Rothbart (2006). In their study, the authors report that the Cronbach's α was .75 for Attentional Focusing scale, .72 for the Impulsivity scale, and .72 for the Inhibitory Control scale. In the current study, the internal consistencies were .70 for the Attention Focusing scale ($M = 31.00$, $SD = 6.23$), .51 for the Impulsivity scale ($M = 26.08$, $SD = 5.31$), and .78 for the Inhibitory Control scale ($M = 33.65$, $SD = 5.78$). Impulsivity was negatively correlated with Attention Focusing ($r = -.27$, $n = 74$, $p < .05$) and Inhibitory Control ($r = -.44$, $n = 74$, $p < .001$) whereas Attention Focusing was positively correlated with Inhibitory Control ($r = .62$, $n = 75$, $p < .001$). SES and children's age in months were not correlated with Impulsivity, Attention Focusing, or Inhibitory Control (see Table 1 for the mean distributions between 4 age groups). Three one-way ANOVAs confirmed there were no significant differences between the 4 age groups in terms of their Impulsivity, Attention Focusing, and Inhibitory Control scores. Independent samples t-tests revealed that boys had significantly lower Attention Focusing ($M = 29.01$, $SD = 7.06$, $t(73) = 2.54$, $p < .05$) and Inhibitory Control ($M = 31.51$, $SD = 6.14$, $t(73) = 2.99$, $p < .01$), and higher Impulsivity ($M = 27.80$, $SD = 5.18$, $t(72) = -2.59$, $p < .05$) than girls ($M = 32.57$, $SD = 5.05$; $M = 35.34$, $SD = 4.93$; and $M = 24.69$, $SD = 5.07$, respectively).

Table 1. Mean distributions of Attention Focusing, Inhibitory Control, Impulsivity, and Composite EC scores across 4 age groups

	Attention Focusing	Inhibitory Control	Impulsivity	Composite EC
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
3-year-olds	30.20 (6.74)	32.60 (4.78)	27.78 (4.82)	72.90 (12.75)
4-year-olds	29.47 (6.43)	33.47 (6.05)	25.45 (4.33)	74.00 (13.26)
5-year-olds	32.27 (6.23)	34.21 (5.35)	25.79 (5.48)	80.86 (10.45)
6-year-olds	30.85 (4.45)	33.00 (8.79)	27.14 (8.19)	75.33 (19.06)
Total	31.00 (6.23)	33.65 (5.78)	26.08 (5.31)	77.02 (12.78)

Finally, Inhibitory Control (IC) and Attention Focusing (AF) were highly correlated with each other ($r = .64, n = 75, p < .001$) even when age was controlled for ($r = .64, n = 72, p < .001$). Impulsivity was also negatively correlated with both IC and AF when age was controlled for ($r = -.44, n = 71, p < .001$ and $r = -.26, n = 71, p < .05$, respectively). Therefore, Impulsivity scores were reversed. When the IC, AF, and reverse-Impulsivity items were combined, the Cronbach's α was .78. Analysis revealed that when 3 items were excluded from the scale, the α would be increased to .83. Therefore, a composite Effortful Control (EC) score was created by summing the IC, AF, and reverse-Impulsivity scores without the 3 items. This new variable was not significantly associated with SES or age in months. Indeed, one-way ANOVA tests confirmed that there were no significant differences between the 4 age groups in terms of Composite EC. However, Composite EC was positively correlated with gender, such that an independent samples t-test revealed that boys had significantly lower Composite EC ($M = 72.00, SD = 12.91, t(65) = 2.77, p < .01$) than girls ($M = 80.42, SD = 11.67$).

3.2.2. Emotion Regulation Checklist

In the original article by Shields and Cicchetti (1997), the Emotion Regulation subscale had an internal consistency of .83 and the Lability/Negativity subscale had an internal consistency of .96. Shields and Cicchetti also found these subscales to be negatively correlated with each other, $r = -.50, p < .001$.

The information about which items made up which of the 2 subscales was unavailable. Therefore in the current study, all 24 items of the ERC were initially subjected to a factor analysis. It has been suggested earlier that factor loadings less than .4 may be suppressed (as cited by Field, 2009). Therefore, items with absolute values below .4 were suppressed. One item was excluded due to low variance. This left 20 items to carry out analysis with. Items loaded to 2 factors.

Five items loaded to the first factor. A closer investigation revealed that these 5 items described emotional lability and negativity. Therefore the factor was labeled Emotional Negativity subscale, $\alpha = .71$. Fifteen items loaded to the second component. A further examination of the items revealed that this scale described emotion regulation. Thus, this factor was labeled Emotion Regulation subscale, $\alpha = .81$. Similar to Shields and Cicchetti (1997), who found a negative correlation ($r = -.50, p < .001$), in the current study the 2 subscales were negatively correlated with each other, $r = -.50, n = 76, p < .001$.

Age and SES were not significantly correlated with Emotional Negativity or Emotion Regulation. Gender was not correlated with Emotional Negativity.

However, an independent samples t-test showed that girls ($M = 3.84, SD = .37$) had significantly higher Emotion Regulation than boys ($M = 3.61, SD = .40, t(74) = .239, p < .05$). A further one-way ANOVA confirmed that there were no differences between the 4 age groups in terms of Emotion Regulation or Emotional Negativity.

See Table 2 for mean distributions of Emotion Regulation and Emotional Negativity across 4 age groups).

Table 2. Mean distributions of Emotion Regulation and Emotional Negativity scores across 4 age groups

	Emotion Regulation	Emotional Negativity
	Mean (SD)	Mean (SD)
3-year-olds	3.81 (.45)	1.52 (.48)
4-year-olds	3.78 (.41)	1.58 (.38)
5-year-olds	3.70 (.40)	1.53 (.35)
6-year-olds	3.73 (.34)	1.65 (.39)
Total (n = 76)	3.74 (.40)	1.55 (.37)

3.2.3. Executive Functioning

There were 3 child measures that tapped into children's Executive Functioning (EF). Gender was not correlated with any EF task. Age was positively and significantly correlated with all EF tasks (for DCCS: $r = .36, p < .001$; for Day/Night: $r = .28, p < .05$; for Knock/Tap: $r = .35, p < .05$). However, further one-way ANOVA tests revealed that there were significant age differences in children's Day/Night scores ($F(3, 76) = 1.955, p > .05$) whereas the 4 age groups were statistically different from each other in terms of their performances in DCCS ($F(3, 78) = 8.106, p < .001$) and Knock/Tap ($F(3, 74) = 3.558, p < .05$). SES was positively and significantly correlated with Day/Night ($r = .24, p < .05$) and DCCS ($r = .25, p < .05$) but not with Knock/Tap such that children whose families have higher SES had higher Day/Night and DCCS scores. See Table 3 for descriptive statistics on these tasks.

Table 3. Mean distributions of EF scores across 4 age groups

	DCCS (out of 3)	Day/Night	Knock/Tap
	Mean (SD)	Mean (SD)	Mean (SD)
3-year-olds	1.00 (.53)	13.00 (3.54)	7.00 (3.38)
4-year-olds	1.87 (.54)	14.41 (1.76)	7.64 (3.03)
5-year-olds	2.07 (.60)	14.98 (1.60)	9.00 (1.78)
6-year-olds	1.80 (.42)	15.60 (.96)	9.50 (.70)
Total (n = 82)	1.88 (.63)	14.70 (1.93)	8.49 (2.39)

The total scores of the 3 tasks were significantly correlated with each other (correlations range between .24 and .36, $p < .01$ for all). Therefore, a composite EF score was calculated by standardizing the total scores of each task and summing them up. SES and gender were not correlated with Composite EF. There was a statistically significant positive correlation between children's age and Composite EF score ($r = .44$, $n = 78$, $p < .001$) such that older children had higher EF scores. One-way ANOVA tests confirmed that the 4 age groups were statistically different from each other in their Composite EF scores ($F(3, 74) = 6.069$, $p < .01$).

3.3. TIFALDI

Children were administered TIFALDI in order to account for the relationship between language and EF. Because the expressive language and receptive language scores were highly correlated ($r = .78$, $n = 78$, $p < .001$), the raw receptive and expressive scores were summed in order to create a composite language score.

Gender was not correlated with the composite language score. However, there was a positive correlation between language and SES ($r = .31$, $n = 77$, $p < .01$) and age ($r =$

.67, $n = 78$, $p < .001$) suggesting that both older children and children whose families have higher SES have higher language scores.

3.4. Screen-based media use

Regarding children's and parents' screen-based media use habits, parents had answered a number of questions. Below, analyses on children's duration of device use, parents' motivations for using screen-based media in general, parents' frequency of using these devices for child-related purposes, and the relationships between parents' using these devices for various reasons and children's self-regulation are reported.

3.4.1. Duration of watching TV and using mobile devices

Research question (1a) inquired the age-related changes in children's duration of using screen-based media. Parents reported how many hours their children watched TV and used mobile devices on a typical week day and weekend. Descriptive statistics revealed that on a week day, 37.7% of children watched between 0-1 hours of TV and 75% used mobile devices for 0 to 1 hours. On a weekend, children watched TV more and used mobile devices more; specifically, 36.8% of children watched between 2-4 hours of TV and used tablet computers and mobile phones for 1 to 2 hours.

There were no significant gender differences in children's duration of using these devices. The 4 variables related to duration of device use (i.e., week day TV watching, weekend TV watching, week day mobile device use, and weekend mobile device use) were not normally distributed. Therefore, we carried out a Kruskal-Wallis H analysis. The analysis ensured that there were no statistically significant differences between 4 age groups (for week day TV watching, $\chi^2(3) = 1.982$; for week day mobile device use, $\chi^2(3) = 6.432$; for weekend TV watching, $\chi^2(3) =$

5.444; for weekend mobile device use, $\chi^2(3) = .794$; $p > .05$ for all). Finally, there was a negative correlation between SES and week day TV watching ($r = -.32$, $p < .01$) and week day mobile device use ($r = -.25$, $p < .05$) suggesting that children whose families have higher SES watch TV less and use mobile devices less in the week days.

3.4.2. Parent motives for using screen-based media devices

Parents were asked to rate 15 items that inquired their motivations for using screen-based devices. Similar to Cingel and Krcmar's study (2013), we have carried out an exploratory factor analysis by using the varimax rotation, $KMO = .76$. The factor analysis in Cingel and Krcmar's study resulted in 5 factors: to do chores ($\alpha = .80$), for enjoyment ($\alpha = .77$), for educational benefits ($\alpha = .92$), so the child could relax ($\alpha = .81$), and as a reward ($\alpha = .90$). However, in the current study an initial factor analysis in which 5 factors were extracted resulted with 1 factor having only 1 item. Further analysis showed that extracting 4 factors would be a better solution (see Table 4 for factor loadings).

Table 4. Exploratory factor analysis item loadings for parent motives for using screen-based media

	Factor			
	1	2	3	4
“So I can do chores around the house”	.791			
“To allow myself free time”	.773			
“To help alleviate my stress”	.675			
“To give my child some down time”	.557	.444		
“To help my child relax”	.533			
“As a reward if my child doesn’t act up”		.881		
“Only if they are well behaved”		.841		
“As a reward for my child’s good behavior”		.735		
“So my child can learn something”			.878	
“For educational benefits”			.868	
“Because these devices are educational”			.812	
“Because my child likes it”				.846
“So my child can watch his/her favorite show”				.679
“Because they ask me for it”				.673
“As part of a daily routine”	.517			.561

Note: Loadings that are bold are included in the factors.

In the current study, with a total of 5 items, items related to parent and child relaxing and the item related to doing chores loaded to one factor. The factor was therefore named Motivation of Parent-Child Release, $\alpha = .82$, $M = 2.31$, $SD = .89$. The 3 items in Factor 2 was related to using screen-based devices as a reward. Therefore the factor was named Reward Motivation, $\alpha = .84$, $M = 1.89$, $SD = .89$. The third factor was made up of 3 items that were related to education and learning purposes. Thus, this factor was labeled Educational Motivation, $\alpha = .84$, $M = 3.02$, $SD = .94$. The last factor was made up of 4 items that were related to child’s enjoyment, therefore the factor was labeled Enjoyment Motivation, $\alpha = .72$, $M = 3.03$, $SD = .87$ (See Table 2 for the descriptives of parents’ motivations for using screen-based media). Paired samples t-tests revealed that, except for the Enjoyment Motivation and Education Motivation ($t(74) = .18$, $p > .05$), the mean scores of the parent motivations were statistically different from each other (for Parent-Child Release and Enjoyment $t(74)$

= -7.28, $p < .05$; for Parent-Child Release and Education $t(74) = -6.00, p < .05$; for Parent-Child Release and Reward $t(74) = -4.26, p < .05$; for Enjoyment and Reward $t(74) = 9.86, p < .05$; for Education and Reward $t(74) = 9.26, p < .05$).

Except for one variable, parents' motivations were not associated with demographics data: There was a positive correlation between SES and Enjoyment Motivation ($r = .24, n = 73, p < .05$) such that families with higher SES backgrounds let their children use screen-based media for their children's enjoyment purposes more. Further one-way ANOVA tests confirmed there were no age or gender differences in terms of parents' motivations.

Table 5. Descriptives of parent motivations for using screen-based media across 4 age groups

	Parent-Child Release	Enjoyment	Reward	Education
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
3-year-olds	2.47 (.43)	3.19 (.74)	2.33 (.66)	3.10 (1.07)
4-year-olds	2.45 (1.20)	2.94 (1.04)	1.76 (.99)	2.88 (1.04)
5-year-olds	2.17 (.73)	3.00 (.74)	1.88 (.90)	3.13 (.82)
6-year-olds	2.25 (.86)	3.28 (1.03)	1.80 (.81)	2.85 (1.08)
Total (n = 75)	2.31 (.89)	3.03 (.87)	1.89 (.89)	3.02 (.94)

Finally, a correlation analysis was carried out with parents' motivations and the duration of children's using these devices. There was a positive correlation between the duration of mobile device use in the weekend and Motivation of Parent-Child Release ($r = .24, n = 75, p < .05$) suggesting that parents who let their children use mobile devices in the weekends more in the weekends also have the motivation to spare time for themselves and for their children. There were also positive correlations between Reward Motivation and the duration of mobile device use in

the weekend ($r = .30, n = 75, p < .01$) and in the week day ($r = .34, n = 75, p < .01$).

This suggests that parents who let their children use mobile devices more also use these devices more to reward their children. See Table 6 for the correlations between parents' motivations to use screen-based media, demographics variables, and duration of children's using these devices on a week day and weekend.

Table 6. Correlations between parents' motivations for using screen-based media, demographics variables, and duration of children's using these devices on a week day and weekend.

	1	2	3	4	5	6	7	8	9	10	11	12
1. Age	1											
2. Gender	-.143	1										
3. SES	.130	.049	1									
4. Number of siblings	.159	.029	-.217*	1								
5. Motivation of Parent-Child Release	-.117	.012	.153	-.029	1							
6. Child Enjoyment motivation	.043	.099	.249*	.165	.520**	1						
7. Education motivation	.049	-.125	.182	.035	.388**	.365**	1					
8. Reward motivation	-.094	-.126	-.031	-.077	.553**	.357**	.355**	1				
9. Week day TV	.075	-.020	-.321**	.102	.217	.219	.116	.197	1			
10. Week day mobile devices	-.102	.036	-.273*	.159	.103	.004	.049	.347**	.336**	1		
11. Weekend TV	.245*	-.059	-.133	.112	.200	.319**	.055	.087	.670**	.066	1	
12. Weekend mobile devices	.105	-.079	-.121	.096	.246*	.110	.105	.302**	.461**	.595**	.416**	1

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

3.4.3. Parents' frequency of using screen-based media devices for child-related purposes

The second research question of the current study asked whether parents use screen-based media devices (e.g., smart-phones, tablets, television) for child-related purposes such as keeping the child busy/entertained, calming their child down, or as downtime for the child. Parents were asked to indicate how frequently they use TV and mobile devices for various child-related purposes on a 5-point Likert scale (1: Never – 5: Always).

3.4.3.1. Parents' use of mobile devices for child-related purposes

Parents used tablets and mobile phones most frequently as an educational tool ($M = 2.64$, $SD = 1.00$) and to keep the child busy when the parent has chores to do ($M = 2.40$, $SD = 1.01$). They used these devices least frequently to settle their child before bed ($M = 1.16$, $SD = .57$). See Table 7 for the descriptives.

Table 7. Descriptives of parents' frequency of using mobile devices for child-related purposes

	<i>M (SD)</i>	<i>N</i>
As a reward	1.83 (.90)	75
As an educational device	2.64 (1.00)	76
To keep the child busy when the parent has chores to do	2.40 (1.01)	75
To calm the child when she/he is over-active	1.65 (.89)	74
To settle the child before sleep	1.16 (.57)	75
To calm the child when she/he is upset	1.36 (.65)	75
To keep the child quiet	1.81 (.96)	74
To occupy the child	1.97 (.94)	75

Gender and SES were not correlated with parents' frequency of using mobile devices for child-related purposes. However, children's age was positively correlated with parent's frequency of using these devices as educational ($r = .26$, $n = 76$, $p < .05$) such that parents of older children use mobile devices more for educational purposes.

Children’s age was negatively correlated with using these devices to settle the child before sleep ($r = -.24, n = 75, p < .05$), such that parents of younger children use mobile devices more to settle children before bed.

3.4.3.2. Parents’ use of TV for child-related purposes

Unlike the case of mobile devices, parents used TV most frequently for the purpose of keeping their child occupied when they have chores to do ($M = 2.54, SD = .88$) and, similarly, to keep the child occupied ($M = 2.17, SD = .92$) followed by educational purposes ($M = 2.09, SD = .98$). Similar to the case with mobile devices, parents used TV least frequently to settle their child before bed ($M = 1.16, SD = .57$; Table 8 for the descriptives).

Table 8. Descriptives of parents’ using TV for child-related purposes

	<i>M (SD)</i>	<i>N</i>
As a reward	1.57 (.79)	75
As an educational device	2.09 (.98)	76
To keep the child busy when the parent has chores to do	2.54 (.88)	76
To calm the child when she/he is over-active	1.71 (.91)	75
To settle the child before sleep	1.37 (.91)	75
To calm the child when she/he is upset	1.44 (.77)	74
To keep the child quiet	1.84 (.93)	75
To occupy the child	2.17 (.92)	74

Children’s age and gender were not correlated with parents’ frequency of using TV for child-related purposes. However, counter to our expectations, SES was positively correlated with parent’s frequency of using TV to keep their child busy ($r = .27, n = 73, p < .05$) such that parents with higher SES used TV more to keep their children busy.

3.4.3.3. Correlations between frequency of using screen-based media for child-related purposes and other variables

Bivariate correlation analyses revealed significant links between a number of child variables and using mobile devices for various purposes (see Table 9 for the correlations between child self-regulation measures and parents' frequency of using screen-based media for child-related purposes). In addition to these correlations, parents' frequencies of using TV for child-related purposes were also analyzed with relation to the same child variables and demographics variables. However, analyses revealed only 1 significant correlation, which was between the frequency of using TV to calm the child when she/he is upset and Emotional Negativity, $r = .29$, $n = 74$, $p < .05$. This finding is not included in Table 9.

Table 9. Correlations between child self-regulation measures and parents' frequency of using mobile devices for child-related purposes

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Age	1																		
2. Gender	-.143	1																	
3. SES	.130	.049	1																
4. Composite EC	.210	.326**	.072	1															
5. Emotional Negativity	.031	.041	-.082	-.218	1														
6. Emotion Regulation	-.103	.279*	.208	.531**	-.454**	1													
7. Composite EF	.444**	-.010	.216	.137	-.007	-.099	1												
8. Day/Night	.282*	.052	.243*	-.129	.093	-.144	.687**	1											
9. Knock/Tap	.354**	.122	.103	.049	.081	-.073	.772**	.366**	1										
10. DCCS (out of 3)	.361**	-.020	.256*	.191	-.073	-.023	.709**	.321**	.247*	1									
11. TIFALDI	.674**	-.147	.313**	.261*	.043	-.103	.575**	.381**	.290*	.633**	1								
12. As a reward	-.081	-.081	-.076	-.225	.150	-.027	-.219	-.148	-.135	-.215	-.242	1							
13. As an educational device	.263*	-.161	.144	.036	.004	-.092	.059	.064	.002	.154	.109	.304**	1						
14. To keep the child busy when the parent has chores to do	-.210	.112	.173	-.132	.147	.024	-.296*	-.054	-.163	-.276*	-.256*	.323**	.200	1					
15. To calm the child when she/he is over-active	-.163	-.038	.144	-.155	.100	-.075	-.344**	-.066	-.274*	-.286*	-.191	.467**	.184	.564**	1				
16. To settle the child before sleep	-.248*	.013	.117	-.174	.092	-.062	-.110	-.101	.038	-.142	-.331**	.081	-.043	.059	.218	1			
17. To calm the child when she/he is upset	-.051	-.047	-.038	-.163	.223	-.299**	-.194	.069	-.197	-.209	-.204	.268*	.152	.235*	.483**	.171	1		
18. To keep the child quiet	-.138	-.030	.117	-.037	.086	-.055	-.306*	-.089	-.303*	-.155	-.123	.295*	.173	.660**	.700**	.081	.404**	1	
19. To occupy the child	-.173	-.082	.151	-.044	.136	-.019	-.119	.080	-.194	-.058	-.059	.326**	.189	.629**	.615**	.033	.390**	.700**	1

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

3.4.4. Relationships between children’s self-regulation abilities and parents’ frequency of using screen-based media for child-related purposes

The third research question of the current study had asked about the relationships between parents’ frequency of using screen media for child-related purposes and children’s self-regulatory abilities. Accordingly, regression analyses were carried out with significantly correlated items related to parents’ using TV and mobile devices for specific purposes and relevant measures of child self-regulation.

3.4.4.1. Using TV for child-related purposes and child’s self-regulation

First, a hierarchical regression analysis was carried out in order to investigate whether the frequency of using TV to calm the child when she/he is upset predicts child’s Emotional Negativity. The control variables were child’s gender and SES. Control variables were entered at Step 1 and the predictor (i.e., frequency of using TV to calm the child when she/he is upset) was entered at Step 2. Parents’ frequency of using TV for calming purposes significantly and positively predicted children’s Emotional Negativity. See Table 10 for the summary of the regression analysis.

Table 10. Summary of hierarchical regression analysis for variables predicting children’s Emotional Negativity

Model	Variables	<i>B</i>	<i>SE B</i>	Sig.	<i>R</i> ²	ΔR^2
1					.009	.009
	Gender	.17	.45	.70		
	SES	-.09	.13	.48		
2					.094	.085*
	Gender	.03	.43	.93		
	SES	-.10	.12	.39		
	Using TV to calm the child	.72	.28	.01*		

*p < .05, **p < .01

3.4.4.2. Using mobile devices for child-related purposes and child’s self regulation

The second regression analysis investigated whether the frequency of using mobile devices to calm the child when she/he is upset predicted child’s Emotion Regulation. The control variables were child’s gender and SES and they were entered at Step 1. The predictor (i.e., frequency of using mobile devices to calm the child when she/he is upset) was entered at Step 2. Results indicated that both child’s gender and parent’s using mobile devices to calm the child significantly and negatively predicted Emotion Regulation. The interaction between gender and using mobile devices for this purpose did not make any significant contribution to the overall model. See Table 11 for the summary of the regression analysis.

Table 11. Summary of hierarchical regression analysis for variables predicting children’s Emotion Regulation

Model	Variables	<i>B</i>	<i>SE B</i>	Sig.	<i>R</i> ²	ΔR^2
1					.116	.116*
	Gender	3.25	1.35	.01*		
	SES	.68	.39	.08		
2					.194	.078*
	Gender	3.10	1.0	.02*		
	SES	.64	.37	.09		
	Using mobile devices to calm the child	-2.61	1.00	.01*		

p* < .05, *p* < .01

The third and final regression was carried out in order to investigate whether using mobile devices to keep the child quiet, to calm the child when she/is over-active, and to keep the child busy when the parent has chores predict child’s Composite EF scores. Control variables were child’s age, gender, SES, and children’s language scores. None of the predictors made a significant contribution. However, only

children's language predicted their EF performance. See Table 12 for the summary of the regression analysis.

Table 12. Summary of hierarchical regression analysis for variables predicting children's Composite Executive Functioning

Model	Variables	<i>B</i>	<i>SE B</i>	Sig.	<i>R</i> ²	ΔR^2
1					.345	.345**
	Gender	.30	.43	.47		
	SES	.04	.13	.71		
	Age in months	.02	.03	.43		
	Language	.04	.01	.00**		
2					.414	.069
	Gender	.21	.42	.60		
	SES	.12	.13	.36		
	Age in months	.02	.03	.48		
	Language	.03	.01	.00**		
	To keep the child busy when the parent has chores to do	-.02	.29	.92		
	To keep the child quiet	-.26	.34	.44		
	To calm the child when she/he is over-active	-.35	.33	.28		

p* < .05, *p* < .01

CHAPTER 4

DISCUSSION

The aim of this study was to investigate the relationships between parents' using screen-based media devices (e.g., tablet computers, TV, smart-phones) for child-related purposes and children's self-regulation abilities. Accordingly, we first aimed to find out whether there are age-related changes in children's development of self-regulation abilities and in their frequency of using screen-based media devices. Our second research question asked whether parents ever use these devices for purposes such as keeping their child busy or calming their child down. Moving from this point, our final research question was related to the relationships between parents' frequencies of using these devices for child-related purposes and children's abilities to regulate their emotions, attention, and behavior. Accordingly, there were 3 measures of children's self-regulation: emotion regulation (i.e., emotional negativity and emotional regulation), behavior/attention regulation (i.e., attention focusing, inhibitory control, and impulsivity), and executive functioning.

First of all, we did not find any significant association between our direct measures (i.e., executive functions) and indirect measures (i.e., effortful control and emotion regulation) in this study. As mentioned earlier, executive functions consist of a group of cognitive processes such as inhibition, planning, shifting and updating rules, and working memory (Miyake et al., 2000). Similarly, effortful control is control over

behavior (i.e., inhibition and activation) and attention (i.e., shifting and focusing) (Eisenberg & Morris, 2002; Valiente et al., 2007). In the sense that executive functions and effortful control share the inhibition of a dominant response and activating a subdominant response, we would expect children's performances in the executive functioning tasks (i.e., day/night, knock/tap, DCCS) to be correlated with parents' reports of children's inhibitory control, attention focusing, and impulsivity. This, however, was not the case in the current study. There are 2 possible reasons to explain this discrepancy.

The first reason is related to a foundational difference in the approaches of effortful control and executive functions. Blair and Razza (2007) suggest that executive functions focus "on volitional control of cognitive self-regulatory processes, whereas effortful control includes to some extent, although not exclusively by any means, a focus on automatic or nonconscious aspects of emotional reactivity and regulation" (p. 648). In other words, it is likely that effortful control is related to processes that are deployed in affectively- or emotionally-laden conditions whereas executive functions are involved in "conditions that are essentially affectively neutral" (Blair & Razza, 2007, p. 64). This possibility is further supported in our study by the result that parent reports of emotion regulation and of behavior regulation were positively correlated with each other, which was similar to earlier findings (Carlson & Wang, 2007), whereas there was no correlation between emotion regulation and executive functions.

The second possible reason is in contrast to the first issue and is related to data collection. If children's behavior and attention regulation and their executive functioning do share similar underlying cognitive mechanisms and yet do not show any significant correlations with each other, it might be because executive

functioning was measured directly by testing children whereas data regarding their behavior/attention regulation was acquired through parent reports. In other words, we used direct measures of executive functioning and indirect measures of behavior/attention regulation (as well as emotion regulation). In their review of the executive functioning literature, Toplak, West, and Stanovich (2013) argue that direct measures and indirect measures of executive functions do not “capture the same (...) underlying process” (p. 140). They argue that the performance-based scores capture participants’ optimal performance (i.e., “the task interpretation is determined externally by the examiner and is not left up to the participant”, p. 138) whereas reports or ratings of executive functioning reflect participants’ typical performance (i.e., “the extent to which individuals accomplish goal pursuits under unstructured conditions”, p. 140). As a solution to this limitation, future studies could involve direct measures of emotion regulation (e.g., Disappointing Gift Paradigm; Saarni, 1984) and effortful control (e.g., Walk-a-Line-Slowly; Kochanska, Murray, & Coy, 1997).

Our research question that was related to the age-related changes in children’s self-regulation abilities was only partially confirmed. While we found an increase in children’s executive functioning as they develop, there were no changes in their emotion regulation or behavior/attention control skills. The absence of a significant link between children’s age and their emotion regulation abilities parallels some parts of the literature (e.g., Atay, 2009; Batum, 2005) but not others (e.g., Kochanska et al., 1996; see Bridgett et al., 2015 for a detailed review including the change and stability of behavioral regulation).

One possible reason for why we did not find age differences in our indirect measures is related to temperament as a general construct. Literature has demonstrated that

temperament is relatively stable throughout childhood. For instance, it has been demonstrated that temperament (as measured by behavioral inhibition or lack of it towards unfamiliar peers and adults) was stable from toddlerhood to preschool years (Garcia-Coll, Kagan, & Reznick, 1984; Kagan, Reznick, Clarke, Snidman, & Garcia-Coll, 1984) and from 3 to 11 years of age (Scarpa, Raine, Venables, & Mednick, 1995). Furthermore, other dimensions of temperament (i.e., positive emotionality, negative emotionality, and constraint) have also been found to be stable in toddlerhood, in preschool years, and in middle childhood (Neppl et al., 2010). Therefore, it is possible that the lack of age differences in our temperament scale might stem from this continuity and stability of temperament.

It is also important to note that a considerable amount of items in the ERC are conceptually similar to items that capture temperament. Items such as “Is a cheerful child” or “Is whiny or clingy around adults” might be reflecting the extent to which children are regulated instead of children’s actual capacity to regulate themselves. In addition, some items in the scale also capture aspects of behavioral regulation. For instance, Batum (2005) highlighted this conceptual overlap and argued that the item “”Is impulsive” is not an aspect of emotion regulation (...). This item measures the impulsivity aspect of behavior regulation” (p. 87). Thus, given that some of the ERC items are reflecting temperament, this could explain why there were no age differences in this scale in the current study.

In addition, we found gender differences in parent reports of children’s behavioral self-regulation and emotion regulation but not in children’s performances in executive functioning tasks. Parents of girls reported that their children had higher scores of inhibitory control and attention focusing and lower impulsivity than did

parents of boys. These gender differences in inhibition and impulsivity are in line with the literature (Kochanska et al., 1996).

The other research question that inquired the age-related changes investigated the possible changes in children's use of screen-based media devices. Literature demonstrated that children's screen media time increases between the ages of 0 and 8 years (Rideout, 2017). However, in our study, we found no age differences in children's using these devices regardless of whether it is a week day or weekend. One possible reason for this finding might be the way our question was structured. In our questionnaire, we asked parents to indicate how many hours their children used these devices on a 6-Point scale. The answer options consisted of 1- or 2-hour time slots (e.g., 0-1 hour, 1-2 hours, 2-4 hours, etc). As a comparison, Cingel and Kremer (2013) "used a scale from 0 minutes to over 2 hours, broken into intervals of 15 and 30 minutes" (p. 382). It is likely that the options in our study were too broad to capture more refined, minute-based differences that might exist in different age groups.

In addition to our research questions, we also aimed to understand parents' motivations for using screen-based media devices. We used the same question as Cingel and Kremer (2013) did in their study; however, different from them, we found 4 main parent motivations instead of 5. Parents in our study reported that they let their children use TV and mobile devices because they find these devices to be educational. They also indicated allowing their children use these because their children enjoy it and ask the parent for using these devices. This latter finding (i.e., children's enjoying and asking the parent to use these devices) supports the assumption that parents are indeed the gateway to preschoolers' access to mobile devices and TV.

Our second research question inquired whether and how frequently parents used mobile devices and TV for various purposes. In the study from which the target questions were taken (Archer, 2017), the target groups were infants and toddlers. Moreover, Archer (2017) only looked at parents' using mobile devices and not at TV use. In this sense, the current study was first to investigate parents' using both mobile devices and TV for preschoolers' screen-based media devices.

We found that parents in our study used mobile devices and TV for similar reasons in terms of occupying their child or keeping their children busy when they have chores to do. Parents also used both mobile devices and TV as educational tools. Parents in Cingel and Krcmar's study (2013), in which screen-based media devices were taken as a whole, indicated that they found these devices to be educational. However, parents in our study indicated that they used mobile devices more for educational purposes compared to TV. There is a great variety of content in terms of applications or "apps" that parents could choose to download to their tablet computers and smart-phones. With TV, however, there is not as much variety and freedom to choose from. Therefore, with mobile devices it is more convenient for the parent to download apps that they find educational for their child. Regardless, the finding that parents use both TV and mobile devices as educational is in line with a recent survey in which 67% of parents of 0- to 8-year-olds found screen-based media devices helpful for their children's learning (Rideout, 2017).

There have been numerous studies on the relationships between screen-based media use and different aspects of self-regulation. On one side of the literature, it has been demonstrated that video games and computer programs had a positive impact on attention control, such as attentional flexibility and visual attention (Dye, Green, & Bavelier, 2009; Green & Bavelier, 2003, 2006), and on working memory (Holmes et

al., 2009; Klingberg et al., 2009; Trick, Jaspers-Fayer, & Serhi, 2005) among both adults and children. On the other side, studies suggest that the nature of these relationships may be rather adverse (e.g., Moskalenko & Heine, 2003; Nathanson & Beyens, 2017).

Recently, there's been a growing interest in the role of the next-generation screen media devices in the family context. In the past studies, parents have consistently indicated using TV and mobile devices for keeping the child busy, settling him/her before bedtime, to calm him/her down, as a reward etc (e.g., Bentley et al., 2016; Radesky et al., 2014a, 2016; Rideout, 2017). The gap in the literature, for which the current study aimed to provide a partial answer, was related to the relationships between parents' using screen-based media devices for such purposes and children's self-regulatory abilities.

Accordingly, we found that parents' frequency of using both TV and mobile devices to calm their child when she/he was upset predicted poorer emotion regulation in children. Specifically, using TV to calm the child predicted higher emotional negativity or lability in children (e.g., having mood swings, not being cheerful or happy, showing negative emotions in social situations with peers or adults, etc).

Similarly, using tablet computers and smart-phones to calm the upset child predicted lower child emotion regulation (e.g., not being able to modulate excitement, responding negatively to peers and adults, transitioning poorly from one activity to another). In contrast, our direct measures were not related to parents' using these devices for child-related purposes. Due to the correlational nature of this study, there are 2 ways to explain regulation effects.

First, it is possible that parents of preschoolers that have difficulties with emotion regulation or behavior regulation might be using screen-based media devices for

calming their children when she/he is upset more frequently compared to parents whose children do not have as much difficulty with emotion regulation. In line with this, Radesky and colleagues (2016) found that 15- to 36-month old children with social-emotional difficulties (as measured by parent-reports) were more likely to be given mobile devices by their parents to calm down when they were upset compared to those that did not have as much difficulty. Furthermore, Radesky and colleagues (2014b) found that 9-month old infants who had regulatory difficulties (e.g., being frequently fussy, demanding constant attention of the parent, not being able to wait without getting upset) viewed more hours of TV at 2 years of age compared to infants who did not have regulation problems earlier. It is possible that parents of children with emotional difficulties may be making use of the immediate distraction these devices provide in order to calm their child (also see Radesky, Schumacher, & Zuckerman, 2015). The mobile nature of tablet computers and smart-phones make these devices an ideal and immediate solution that may help parents to distract and calm an upset child, especially when the family is not at home.

The second explanation is that, parents' using screen-based media devices when their child is upset might hinder their child from developing necessary skills for emotion control. In the short term, the immediate distraction mobile devices provide to children can be quite useful, such as during painful procedures (McQueen, Cress, & Tothy, 2012). Parents also indicate that they make use of these devices to distract their child from having a tantrum when they are at public places (Wartella, Rideout, Lauricella, & Connell, 2013). In short, screen-based media, especially mobile devices are helpful for parents to distract and calm their children quickly. On the other hand, Radesky and colleagues (2014b) and Plowman, McPake, and Stephen (2010) suggest that children's screen time may be replacing enriching parent-child

interactions, which would promote children's ongoing development of emotional and cognitive abilities. Therefore, in the long term, chronic dependency to these devices for children's distraction and soothing might result in children's acquiring emotion and behavior regulation abilities that are sub-optimal. On this point, we could suggest that parents' frequent use of these devices for soothing their children might result in children's lower emotion regulation. Regardless, future longitudinal studies are needed to test this possibility.

Radesky and colleagues (2014b) suggest that the relationship might be bidirectional, such that, parents of young children who are difficult to soothe might be using these devices for calming their children. In turn, increased screen viewing might decrease the time parent and children spend together, which would otherwise be enriching for children's social and emotional development.

To date, there are no studies that directly demonstrated that children's using screen-based media when they are upset might be affecting their subsequent emotion regulation development. In other words, it is yet to be investigated whether children's using screen-based devices as a self-regulation strategy hinders their later emotional development. On the other hand, a number of studies (e.g., Radesky et al., 2014b, 2015) have pointed at the opposite direction; that is, parents of children with social-emotional difficulties tend to use these devices to help their children regulate themselves. In the light of the current literature, our results could be interpreted to suggest that parents whose children have lower emotion regulation abilities are more likely to use TV and mobile devices to regulate their children's distress compared to parents whose children do not have as much difficulty with self-regulation.

There are a number of limitations in this study. Instead of a correlational study, an alternative and more informative method would be carrying out a longitudinal study

which would enable us to understand parents' long-term use of these devices for child-related purposes and children's later self-regulation skills. A significant relationship between parents' chronic use of screen-based media and children's subsequent self-regulation abilities could indicate a causal relationship between the parent behavior and children's abilities while accounting for children's initial regulatory abilities. Further, given the literature on the associations between parent's self-regulation and those of their children, future studies could investigate whether and how parents' self-regulation fits into the picture regarding their reasons for using screen-based media. As an example, it is possible that parents who have poor emotion regulation and/or coping strategies might be using screen-based media devices to distract their child more frequently due to its immediate calming effects for the child and therefore for the parent. Given the parent reports about using these devices for creating some free-time for themselves (Oduor et al., 2016), this possibility is worth looking into in the future.

In terms of the ERC, it is also important to note that all parents in our study rated their children highly on the emotion regulation scale, such that there was an overall ceiling effect ($M = 3.74$ out of a score of 4). One way to overcome this issue would be to include teacher reports in addition to parent reports. Some of the earlier studies that used ERC (e.g., Atay, 2009; Batum, 2005) administered the scale to children's teachers in addition to the parents. These studies used the composite ERC scores as children's overall emotion regulation scores. Thus, creating a composite ERC score from both teachers' and parents' ratings would provide us with a more objective scale of emotion regulation.

Another limitation of this study is related to content. Parents were not asked to report the types of programs their children watch on TV or the apps their children use on

mobile devices. For both TV and mobile devices, but the latter more than the former, parents indicated using screen-based media devices for educational purposes. To our knowledge, there are no studies that systematically looked at the relationship between children's cognitive regulation and the content of the apps they regularly use on mobile devices. However, in terms of TV watching, Zimmerman and Christakis (2007) found that, average viewing time of violent (e.g., Looney Tunes, Lion King) and non-violent entertainment (e.g., Bambi, Flintstones) on TV before 3 years of age was associated with attention regulation problems 5 years later, whereas watching educational TV programs (e.g., Sesame Street, Blue's Clues) was not associated. In future studies, the inclusion of questions regarding TV programs and app content as well as the children's frequency of watching and using these can tell us about possible relationships with children's self-regulation.

In addition, counter to our expectations, we found that older children slept more. In our study, we asked parents to indicate their children's waking time and bed time. However, we did not ask parents whether and how long their children take naps. It is likely that, when they do, younger children take longer naps than older children. In turn, this may compensate for their daily sleeping needs and result in later bedtimes compared to older children. Therefore it would have been informative to include questions regarding the naps children take throughout the day.

Furthermore, in this study we did not include questions about children's computer use. Even though parents were asked to report their reasons for using screen media devices in general, there were no questions that specifically asked about how frequently parents used computers or laptops for child-related purposes. Similar to TV and mobile devices, computers also allow children to watch videos and/or movies. In the current study, there were more families that own a computer/laptop

(N = 64) than those who own a tablet (N = 56) (see Fig. 1). Therefore, it is possible that parents might be using computers as much as they use tablets for child-related purposes, especially at home. Thus, addition to TV and mobile devices, it would be informative to also ask parents how frequently they used computers or laptops for various reasons as well.

Finally, in the current study, we asked parents whether their children own a mobile phone. In the future studies, parents can also be asked whether the family has a tablet computer designated only for their children's personal use. Rideout (2017) recently reported that in 2011, less than 1% of 0- to 8-year old children had their own tablet computer whereas in 2017, this number increased to 42%. It is possible that, when children are given a tablet for their individual use, they may not need as much parental permission for using these devices. Therefore, parents' frequency of using mobile devices (at least tablets) for child-related purposes might change depending on whether or not their child owns a tablet computer.

The current study was the first attempt in the literature that attempted to investigate the relationships between parents' reasons of using screen-based media devices and preschoolers' emotional and cognitive self-regulation. While we did not find any associations related to children's executive functioning, we found significant associations between parents' using TV and mobile devices to calm their child when she/he is upset and children's emotion regulation and behavioral and attentional control. In the future, longitudinal studies can be carried out by using more refined measures of screen viewing and by using both performance-based and rating-based measures of children's self-regulation abilities.

REFERENCES

- Archer, K. (2017). *Infants, Toddlers and Mobile Technology: Examining Parental Choices and the Impact of Early Technology Introduction on Cognitive and Motor Development* (doctorate thesis). Wilfrid Laurier University, Ontario, Canada.
- Atay, Z. (2009). *The relationship between maternal emotional awareness and emotion socialization practices* (master's thesis). Boğaziçi University, Istanbul, Turkey.
- Batum, P. (2005). *The Role of Emotion Regulation and Behavior Regulation in Children's Externalizing Behaviors* (masters's thesis). Koç University, İstanbul, Turkey.
- Bentley, G. F., Turner, K. M., & Jago, R. (2016). Mothers' views of their preschool child's screen-viewing behaviour: a qualitative study. *BMC public Health, 16*(1), 718-728. <https://doi.org/10.1186/s12889-016-3440-z>
- Berger, A. (2011). *Human brain development series. Self-regulation: Brain, cognition, and development*. Washington, DC, US: American Psychological Association. <http://dx.doi.org/10.1037/12327-000>
- Bernier, A., Carlson, S. M., & Whipple, N. (2010). From external regulation to self-regulation: Early parenting precursors of young children's executive functioning. *Child Development, 81*(1), 326-339. <https://doi.org/10.1111/j.1467-8624.2009.01397.x>
- 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*(2), 647-663. <https://doi.org/10.1111/j.1467-8624.2007.01019.x>
- Blankson, A. N., O'Brien, M., Leerkes, E. M., Calkins, S. D., & Marcovitch, S. (2015). Do hours spent viewing television at ages 3 and 4 predict vocabulary and executive functioning at age 5?. *Merrill-Palmer Quarterly, 61*(2), 264-289. <http://dx.doi.org/10.13110/merrpalmquar1982.61.2.0264>
- Bridgett, D. J., Burt, N. M., Edwards, E. S., & Deater-Deckard, K. (2015). Intergenerational transmission of self-regulation: A multidisciplinary review and integrative conceptual framework. *Psychological Bulletin, 141*(3), 602-654. <https://doi.org/10.1037/a0038662>

- Carlson, S. M. (2003). Executive function in context: Development, measurement, theory, and experience. *Monographs of the Society for Research in Child Development*, 68(3), 138-151.
<https://doi.org/10.1111/j.1540-5834.2003.06803012.x>
- Carlson, S. M. (2005). Developmentally sensitive measures of executive function in preschool children. *Developmental Neuropsychology*, 28(2), 595-616.
https://doi.org/10.1207/s15326942dn2802_3
- Carlson, S. M., & Wang, T. S. (2007). Inhibitory control and emotion regulation in preschool children. *Cognitive Development*, 22(4), 489-510.
<https://doi.org/10.1016/j.cogdev.2007.08.002>
- Cingel, D. P., & Krcmar, M. (2013). Predicting media use in very young children: The role of demographics and parent attitudes. *Communication Studies*, 64(4), 374-394. <https://doi.org/10.1080/10510974.2013.770408>
- Cooper, N. R., Uller, C., Pettifer, J., & Stolc, F. C. (2009). Conditioning attentional skills: examining the effects of the pace of television editing on children's attention. *Acta Paediatrica*, 98(10), 1651-1655.
<https://doi.org/10.1111/j.1651-2227.2009.01377.x>
- Courage, M. L., & Setliff, A. E. (2010). When babies watch television: Attention-getting, attention-holding, and the implications for learning from video material. *Developmental Review*, 30(2), 220-238.
<https://doi.org/10.1016/j.dr.2010.03.003>
- Davies, J. J., & Gentile, D. A. (2012). Responses to children's media use in families with and without siblings: A family development perspective. *Family Relations*, 61(3), 410-425. <https://doi.org/10.1111/j.1741-3729.2012.00703.x>
- Deater-Deckard, K., Wang, Z., Chen, N., & Bell, M. A. (2012). Maternal executive function, harsh parenting, and child conduct problems. *Journal of Child Psychology and Psychiatry*, 53(10), 1084-1091.
<https://doi.org/10.1111/j.1469-7610.2012.02582.x>
- Duckworth, A. L., & Seligman, M. E. (2005). Self-discipline outdoes IQ in predicting academic performance of adolescents. *Psychological Science*, 16(12), 939-944. <https://doi.org/10.1111/j.1469-7610.2012.02582.x>
- Dye, M. W., Green, C. S., & Bavelier, D. (2009). The development of attention skills in action video game players. *Neuropsychologia*, 47(8-9), 1780-1789.
<https://doi.org/10.1016/j.neuropsychologia.2009.02.002>
- Eisenberg, N., & Morris, A. S. (2002). Children's emotion-related regulation. In R. V. Kail (Ed.), *Advances in Child Development and Behavior*, Vol. 30 (pp. 189-229). San Diego, CA, US: Academic Press.
- Eisenberg, N., Smith, C. L., & Spinrad, T. L., (2011). Effortful Control: Relations with Emotion Regulation, Adjustment, and Socialization in Childhood. In K.

- R. F. Baumeister & D. Vohs (Eds.) *Handbook of self-regulation: Research, theory, and applications* (pp. 263-283). New York: Guilford Publications.
- Fabes, R. A., Leonard, S. A., Kupanoff, K., & Martin, C. L. (2001). Parental coping with children's negative emotions: Relations with children's emotional and social responding. *Child Development*, 72(3), 907-920.
<https://doi.org/10.1111/1467-8624.00323>
- Field, A. (2009). *Discovering statistics using SPSS*. Sage publications.
- Frey, B. S., Benesch, C., & Stutzer, A. (2007). Does watching TV make us happy?. *Journal of Economic Psychology*, 28(3), 283-313.
<https://doi.org/10.1016/j.joep.2007.02.001>
- Garcia-Coll, C., Kagan, J., & Reznick, J. S. (1984). Behavioral inhibition in young children. *Child Development*, 55(3), 1005-1019.
<http://dx.doi.org/10.2307/1130152>
- Gerstadt, C. L., Hong, Y. J., & Diamond, A. (1994). The relationship between cognition and action: performance of children 312-7 years old on a stroop-like day-night test. *Cognition*, 53(2), 129-153.
[https://doi.org/10.1016/0010-0277\(94\)90068-X](https://doi.org/10.1016/0010-0277(94)90068-X)
- Green, C. S., & Bavelier, D. (2003). Action video game modifies visual selective attention. *Nature*, 423(6939), 534-537. <https://doi.org/10.1038/nature01647>
- Green, C. S., & Bavelier, D. (2006). Enumeration versus multiple object tracking: The case of action video game players. *Cognition*, 101(1), 217-245.
<https://doi.org/10.1016/j.cognition.2005.10.004>
- Greenwood, D. N., & Long, C. R. (2009). Mood specific media use and emotion regulation: Patterns and individual differences. *Personality and Individual Differences*, 46(5), 616-621. <https://doi.org/10.1016/j.paid.2009.01.002>
- Grolnick, W. S., Bridges, L. J., & Connell, J. P. (1996). Emotion regulation in two-year-olds: Strategies and emotional expression in four contexts. *Child Development*, 67(3), 928-941. <https://doi.org/10.1016/j.paid.2009.01.002>
- Grolnick, W. S., Kurowski, C. O., McMenemy, J. M., Rivkin, I., & Bridges, L. J. (1998). Mothers' strategies for regulating their toddlers' distress. *Infant Behavior and Development*, 21(3), 437-450.
[https://doi.org/10.1016/S0163-6383\(98\)90018-2](https://doi.org/10.1016/S0163-6383(98)90018-2)
- Hiniker, A., Schoenebeck, S. Y., & Kientz, J. A. (2016, February). Not at the dinner table: Parents' and children's perspectives on family technology rules. In *Proceedings of the 19th ACM conference on computer-supported cooperative work & social computing* (pp. 1376-1389). Association for Computing Machinery. <https://doi.org/10.1145/2818048.2819940>

- Holmes, J., Gathercole, S. E., Place, M., Dunning, D. L., Hilton, K. A., & Elliott, J. G. (2009). Working memory deficits can be overcome: Impacts of training and medication on working memory in children with ADHD. *Applied Cognitive Psychology, 24*(6), 827-836. <https://doi.org/10.1002/acp.1589>
- House, J. (2011). Are media exposure and self-control related? (master's thesis). Ryerson University, Ontario, Canada.
- Inoue, S., Yorifuji, T., Kato, T., Sanada, S., Doi, H., & Kawachi, I. (2016). Children's Media Use and Self-Regulation Behavior: Longitudinal Associations in a Nationwide Japanese Study. *Maternal and Child Health Journal, 20*(10), 2084-2099. <https://doi.org/10.1007/s10995-016-2031-z>
- Jones, L. B., Rothbart, M. K., & Posner, M. I. (2003). Development of executive attention in preschool children. *Developmental Science, 6*(5), 498-504. <https://doi.org/10.1111/1467-7687.00307>
- Joseph, R. M., McGrath, L. M., & Tager-Flusberg, H. (2005). Executive dysfunction and its relation to language ability in verbal school-age children with autism. *Developmental Neuropsychology, 27*(3), 361-378. <https://doi.org/10.1111/1467-7687.00307>
- Kagan, J., Reznick, J. S., Clarke, C., Snidman, N., & Garcia-Coll, C. (1984). Behavioral inhibition to the unfamiliar. *Child Development, 55*(6), 2212-2225. <http://dx.doi.org/10.2307/1129793>
- Kazak Berument, S., & Güven, A. G. (2013). Turkish expressive and receptive language test: I. standardization, reliability and validity study of the receptive vocabulary sub-scale. *Turk Psikiyatri Dergisi, 24*(3), 192. Retrieved from: http://www.turkpsikiyatri.com/PDF/C24S3/05_1238_turkce_ifade.pdf
- Kildare, C. A., & Middlemiss, W. (2017). Impact of parents mobile device use on parent-child interaction: A literature review. *Computers in Human Behavior, 75*, 579-593. <https://doi.org/10.1016/j.chb.2017.06.003>
- Kiss, M., Fecete, G., Pop, M., & Susa, G. (2014). Early childhood self-regulation in context: Parental and familial environmental influences. *Cognitie, Creier, Comportament/Cognition, Brain, Behavior, 18*(1), 55-85.
- Klingberg, T., Fernell, E., Olesen, P. J., Johnson, M., Gustafsson, P., Dahlström, K., ... & Westerberg, H. (2005). Computerized training of working memory in children with ADHD-a randomized, controlled trial. *Journal of the American Academy of Child & Adolescent Psychiatry, 44*(2), 177-186. <https://doi.org/10.1097/00004583-200502000-00010>
- Knowles, A. M., Kirk, A. F., & Hughes, A. R. (2015). Parents' perceptions of their children's sedentary behaviour. *Qualitative Research in Sport, Exercise and Health, 7*(4), 449-465. <https://doi.org/10.1080/2159676X.2015.1008026>

- Kochanska, G., Murray, K., Jacques, T. Y., Koenig, A. L., & Vandegest, K. A. (1996). Inhibitory control in young children and its role in emerging internalization. *Child Development, 67*(2), 490-507. <https://doi.org/10.1111/j.1467-8624.1996.tb01747.x>
- Kochanska, G., Murray, K., & Coy, K. C. (1997). Inhibitory control as a contributor to conscience in childhood: From toddler to early school age. *Child Development, 68*(2), 263-277. <https://doi.org/10.1111/j.1467-8624.1997.tb01939.x>
- Kochanska, G., Murray, K. T., & Harlan, E. T. (2000). Effortful control in early childhood: continuity and change, antecedents, and implications for social development. *Developmental Psychology, 36*(2), 220. <http://dx.doi.org/10.1037/0012-1649.36.2.220>
- Kopp, C. B. (1982). Antecedents of self-regulation: A developmental perspective. *Developmental Psychology, 18*(2), 199-214. <http://dx.doi.org/10.1037/0012-1649.18.2.199>
- Kostyrka-Allchorne, K., Cooper, N. R., & Simpson, A. (2017a). The relationship between television exposure and children's cognition and behaviour: A systematic review. *Developmental Review, 44*, 19-58. <https://doi.org/10.1016/j.dr.2016.12.002>
- Liew, J. (2012). Effortful control, executive functions, and education: Bringing self-regulatory and social-emotional competencies to the table. *Child Development Perspectives, 6*(2), 105-111. <https://doi.org/10.1111/j.1750-8606.2011.00196.x>
- Mazmanian, M., & Lanette, S. (2017, February). "Okay, One More Episode": An Ethnography of Parenting in the Digital Age. In *Proceedings of the 20th ACM conference on computer-supported cooperative work & social computing* (pp. 2273-2286). Association for Computing Machinery. <https://doi.org/10.1145/2998181.2998218>
- McQueen, A., Cress, C., & Tothy, A. (2012). Using a tablet computer during pediatric procedures: a case series and review of the "apps". *Pediatric Emergency Care, 28*(7), 712-714. <https://doi.org/10.1097/PEC.0b013e31825d24eb>
- 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*(1), 49-100. <https://doi.org/10.1006/cogp.1999.0734>
- Molina, P., Sala, M. N., Zappulla, C., Bonfigliuoli, C., Cavioni, V., Zanetti, M. A., ... & Raccanello, D. (2014). The Emotion Regulation Checklist–Italian translation. Validation of parent and teacher versions. *European Journal of Developmental Psychology, 11*(5), 624-634. <https://doi.org/10.1080/17405629.2014.898581>

- Morris, A. S., Silk, J. S., Steinberg, L., Myers, S. S., & Robinson, L. R. (2007). The role of the family context in the development of emotion regulation. *Social Development, 16*(2), 361-388. <https://doi.org/10.1111/j.1467-9507.2007.00389.x>
- Morris, A. S., Silk, J. S., Morris, M. D., Steinberg, L., Aucoin, K. J., & Keyes, A. W. (2011). The influence of mother–child emotion regulation strategies on children’s expression of anger and sadness. *Developmental Psychology, 47*(1), 213-225. <http://dx.doi.org/10.1037/a0021021>
- Moskalenko, S., & Heine, S. J. (2003). Watching your troubles away: Television viewing as a stimulus for subjective self-awareness. *Personality and Social Psychology Bulletin, 29*(1), 76-85. <https://doi.org/10.1177/0146167202238373>
- Nathanson, A. I., & Beyens, I. (2017). The role of sleep in the relation between young children’s mobile media use and effortful control. *British Journal of Developmental Psychology, 36*(1), 1-21. <https://doi.org/10.1111/bjdp.12196>
- Neppel, T. K., Donnellan, M. B., Scaramella, L. V., Widaman, K. F., Spilman, S. K., Ontai, L. L., & Conger, R. D. (2010). Differential stability of temperament and personality from toddlerhood to middle childhood. *Journal of Research in Personality, 44*(3), 386-396. <https://doi.org/10.1016/j.jrp.2010.04.004>
- Oduor, E., Neustaedter, C., Odom, W., Tang, A., Moallem, N., Tory, M., & Irani, P. (2016). The frustrations and benefits of mobile device usage in the home when co-present with family members. *Proceedings of the 2016 ACM Conference on Designing Interactive Systems*, 1315-1327. <https://doi.org/10.1145/2901790.2901809>
- Plowman, L., McPake, J., & Stephen, C. (2010). The technologisation of childhood? Young children and technology in the home. *Children & Society, 24*(1), 63-74. <https://doi.org/10.1111/j.1099-0860.2008.00180.x>
- Putnam, S. P., & Rothbart, M. K. (2006). Development of short and very short forms of the Children’s Behavior Questionnaire. *Journal of Personality Assessment, 87*(1), 102-112. https://doi.org/10.1207/s15327752jpa8701_09
- Radesky, J. S., Kistin, C. J., Zuckerman, B., Nitzberg, K., Gross, J., Kaplan-Sanoff, M., ... & Silverstein, M. (2014a). Patterns of mobile device use by caregivers and children during meals in fast food restaurants. *Pediatrics*, peds-2013. <https://doi.org/10.1542/peds.2013-3703>
- Radesky, J. S., Silverstein, M., Zuckerman, B., & Christakis, D. A. (2014b). Infant self-regulation and early childhood media exposure. *Pediatrics*, peds-2013. <https://doi.org/10.1542/peds.2013-2367>
- Radesky, J. S., Schumacher, J., & Zuckerman, B. (2015). Mobile and interactive media use by young children: the good, the bad, and the unknown. *Pediatrics, 135*(1), 1-3. <https://doi.org/10.1542/peds.2014-2251>

- Radesky, J. S., & Christakis, D. A. (2016). Increased screen time: implications for early childhood development and behavior. *Pediatric Clinics*, 63(5), 827-839. <https://doi.org/10.1016/j.pcl.2016.06.006>
- Radesky, J. S., Peacock-Chambers, E., Zuckerman, B., & Silverstein, M. (2016). Use of mobile technology to calm upset children: associations with social-emotional development. *JAMA Pediatrics*, 170(4), 397-399. DOI:10.1001/jamapediatrics.2015.4260
- Reed, M. A., Pien, D. L., & Rothbart, M. K. (1984). Inhibitory self-control in preschool children. *Merrill-Palmer Quarterly*, 30(2), 131-147.
- Rideout, V. (2017). *The Common Sense census: Media use by kids age zero to eight*. San Francisco, CA: Common Sense Media.
- Rothbart, M. K., & Derryberry, D. (1981). Development of individual differences in temperament. In M. E. Lamb and A. L. Brown (Eds.), *Advances in Developmental Psychology: Volume 1* (pp. 37-86). Hillsdale, New Jersey: Lawrence Elbaum Associates.
- Rothbart, M. K., Ahadi, S. A., Hershey, K. L., & Fisher, P. (2001). Investigations of Temperament at Three to Seven Years: The Children's Behavior Questionnaire. *Child Development*, 72(5), 1394-1408. <https://doi.org/10.1111/1467-8624.00355>
- Rothbart, M. K., & Bates, J. E. (2006). Temperament. In W. Damon, R. M. Lerner, & N. Eisenberg (Eds.), *Handbook of child psychology, social, emotional, and personality development: Volume 3* (pp. 99-166). Hoboken, New Jersey: John Wiley & Sons.
- Saarni, C. (1984). An observational study of children's attempts to monitor their expressive behavior. *Child Development*, 55(4), 1504-1513. DOI: 10.2307/1130020
- Scarpa, A., Raine, A., Venables, P. H., & Mednick, S. A. (1995). The stability of inhibited/uninhibited temperament from ages 3 to 11 years in Mauritian children. *Journal of Abnormal Child Psychology*, 23(5), 607-618. <https://doi.org/10.1007/BF01447665>
- Shields, A., & Cicchetti, D. (1997). Emotion regulation among school-age children: The development and validation of a new criterion Q-sort scale. *Developmental Psychology*, 33(6), 906-916. <http://dx.doi.org/10.1037/0012-1649.33.6.906>
- Top, N. (2016). Socio-demographic differences in parental monitoring of children in late childhood and adolescents' screen-based media use. *Journal of Broadcasting & Electronic Media*, 60(2), 195-212. <http://dx.doi.org/10.1080/08838151.2016.1164168>

- Toplak, M. E., West, R. F., & Stanovich, K. E. (2013). Practitioner review: Do performance-based measures and ratings of executive function assess the same construct?. *Journal of Child Psychology and Psychiatry*, 54(2), 131-143. <https://doi.org/10.1111/jcpp.12001>
- Trick, L. M., Jaspers-Fayer, F., & Sethi, N. (2005). Multiple-object tracking in children: The "Catch the Spies" task. *Cognitive Development*, 20(3), 373-387. <https://doi.org/10.1016/j.cogdev.2005.05.009>
- Uhls, Y. T., & Robb, M. B. (2017). How Parents Mediate Children's Media Consumption. In F. C. Blumberg, & P. J. Brooks (Eds.), *Cognitive Development in Digital Contexts* (pp. 325-343). Academic Press. <https://doi.org/10.1016/B978-0-12-809481-5.00016-X>
- Valiente, C., Lemery-Chalfant, K., & Reiser, M. (2007). Pathways to problem behaviors: Chaotic homes, parent and child effortful control, and parenting. *Social Development*, 16(2), 249-267. <https://doi.org/10.1111/j.1467-9507.2007.00383.x>
- von Suchodoletz, A., Trommsdorff, G., & Heikamp, T. (2011). Linking maternal warmth and responsiveness to children's self-regulation. *Social Development*, 20(3), 486-503. <https://doi.org/10.1111/j.1467-9507.2010.00588.x>
- Wartella, E., Rideout, V., Lauricella, A. R., & Connell, S. (2013). Parenting in the age of digital technology. *Report for the Center on Media and Human Development School of Communication Northwestern University*.
- Zelazo, P. D. (2006). The Dimensional Change Card Sort (DCCS): A method of assessing executive function in children. *Nature Protocols*, 1(1), 297-301. DOI: 10.1038/nprot.2006.46
- 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(2), 112-121. <https://doi.org/10.1111/j.1750-8606.2011.00176.x>
- Zimmerman, F. J., & Christakis, D. A. (2007). Associations between content types of early media exposure and subsequent attentional problems. *Pediatrics*, 120(5), 986-992. <https://doi.org/10.1542/peds.2006-3322>

APPENDIX A:
DEMOGRAPHIC FORM

Tarih:
ID:

1. Adınız ve soyadınız: E-mail adresiniz:
2. Yaşınız: Cep telefonunuz:
3. Cinsiyetiniz: Kadın Erkek Eşinizin e-mail adresi:
4. Çocuklarınız/çocuğunuzla olan yakınlığınız:
 Anne Baba Diğer:

5. Çocuk sayısı: 1 2 3 Diğer:

6. Çocuğunuzun (çocuklarınızın) adı: Çocuğunuzun/çocuklarınızın doğum tarihi:

7. Eğitim durumunuz nedir?

- | | |
|--|--|
| <input type="checkbox"/> Okuryazar değil | <input type="checkbox"/> Üniversite |
| <input type="checkbox"/> İlköğretim | <input type="checkbox"/> Yüksek Lisans |
| <input type="checkbox"/> Ortaokul | <input type="checkbox"/> Doktora |
| <input type="checkbox"/> Lise | <input type="checkbox"/> Diğer: _____ |

8. İşiniz:

- Tam zamanlı çalışmaktayım
 Yarı zamanlı çalışmaktayım
 İşlerimi evden yürütmekteyim
 Şu anda çalışmamaktayım
 Okula devam etmekteyim

9. Eşinizin yaşı:

10. Eşinizin eğitim durumu nedir?

- | | |
|--|--|
| <input type="checkbox"/> Okuryazar değil | <input type="checkbox"/> Üniversite |
| <input type="checkbox"/> İlköğretim | <input type="checkbox"/> Yüksek Lisans |
| <input type="checkbox"/> Ortaokul | <input type="checkbox"/> Doktora |
| <input type="checkbox"/> Lise | <input type="checkbox"/> Diğer: |

11. Eşinizin İşi:

- Tam zamanlı çalışmakta
 Yarı zamanlı çalışmakta
 İşlerini evden yürütmekte
 Şu anda çalışmamakta
 Okula devam etmekte

12. Evinizin aylık gelir düzeyi:

- 1.000 TL`den az
 1.000 TL- 3.000 TL
 3.000 TL-5.000 TL
 5.000 TL- 7.000 TL
 7.000 TL`den fazla

13. Evinizin aylık gelir düzeyini nasıl değerlendirirsiniz?

- Düşük Orta Seviyede İyi seviyede Çok iyi seviyede

14. Çocuğunuz sabahları saat kaçta kalkıyor? (1`den fazla çocuğunuz varsa lütfen çalışmamıza katılmasına izin verdiğiniz çocuğunuz için yanıtlayın)

15. Çocuğunuz akşamları saat kaçta yatıyor? (1`den fazla çocuğunuz varsa lütfen çalışmamıza katılmasına izin verdiğiniz çocuğunuz için yanıtlayın)

**APPENDIX B: PARENT USE
OF SCREEN-BASED MEDIA
DEVICES FOR CHILD
RELATED PURPOSES**

1. Aşağıdakilerden hangileri evinizde bulunmaktadır? (Birden fazla seçeneği işaretleyebilirsiniz.)

- Kablolu veya uydu televizyon
- Dijital video kaydedicisi veya aboneli olduğunuz kablo/uydu platformlarının program kayıt özelliği
- Bir DVD oynatıcı
- Bir laptop veya masaüstü bilgisayar
- İnternet erişimi (kablolu, kablosuz ya da DSL)
- Bir video oyun konsolu
- Elde oynanan bir video oyun konsolu
- Bir tablet bilgisayar
- Bir e-okuyucu
- Televizyonunuzu internete bağlamanızı ve böylece internetten film veya dizi indirmenizi/izlemenizi sağlayacak bir araç/yol

2. Sizin ne tür bir cep telefonunuz var?

- Bir “akıllı telefon” (yani fotoğraf çekebilen, videolar izlenebilen, internete bağlanabilen bir telefon)
- Normal bir cep telefonu (sadece konuşmak ve mesajlaşmak için)
- Hem bir akıllı telefonum hem de normal bir cep telefonum var
- Cep telefonum yok

3. Eşinizin ne tür bir cep telefonu var?

- Bir “akıllı telefon” (yani fotoğraf çekebilen, videolar izlenebilen, internete bağlanabilen bir telefon)
- Normal bir cep telefonu (sadece konuşmak ve mesajlaşmak için)
- Hem bir akıllı telefonu hem de normal bir cep telefonu var
- Cep telefonu yok
- Bilmiyorum

4. Çocuğunuzun kendisine ait bir cep telefonu var mı? Varsa ilk kaç yaşında alındı?

- Bir “akıllı telefonu” var (yani fotoğraf çekebilen, videolar izlenebilen, internete bağlanabilen bir telefon). Alınan yaş _____
- Normal bir cep telefonu var (sadece konuşmak ve mesajlaşmak için). Alınan yaş _____
- Cep telefonu yok

5. Haftaici bir günü düşündüğünüzde, çocuğunuz ortalama kaç saat televizyon izliyor?

- 0-1 saat 1-2 saat 2-4 saat 4-6 saat 6-8 saat
 8 saatten fazla

6. Haftaici bir günü düşündüğünüzde, çocuğunuz cep telefonu veya tablet gibi mobil cihazları ortalama kaç saat kullanıyor?

- 0-1 saat 1-2 saat 2-4 saat 4-6 saat 6-8 saat
 8 saatten fazla

7. Haftasonu bir günü düşündüğünüzde, çocuğunuz ortalama kaç saat televizyon izliyor?

- 0-1 saat 1-2 saat 2-4 saat 4-6 saat 6-8 saat
 8 saatten fazla

8. Haftasonu bir günü düşündüğünüzde, çocuğunuz cep telefonu veya tablet gibi mobil cihazları ortalama kaç saat kullanıyor?

- 0-1 saat 1-2 saat 2-4 saat 4-6 saat 6-8 saat
 8 saatten fazla

9. Cep telefonu veya tablet gibi mobil cihazları ařađıdakiler iin ne sıklıkta kullanırsınız?

	Hibir zaman	Nadiren	Bazen	Sık sık	Her zaman
ocuđunuz iin dl olarak	1	2	3	4	5
ocuđunuz iin bir eđitim aracı olarak	1	2	3	4	5
Yapacak bir iřiniz olduđunda ocuđunuzu oyalamak iin	1	2	3	4	5
ocuđunuz ok hareketli olduđunda onu sakinleřtirmek iin	1	2	3	4	5
ocuđunuz yatmadan nce onu uykuya hazırlamak iin	1	2	3	4	5
ocuđunuz zgn olduđunda onu sakinleřtirmek iin	1	2	3	4	5
ocuđunuzun sessiz kalmasını sađlamak iin	1	2	3	4	5
ocuđunuzu meřgul etmek iin	1	2	3	4	5

10. Televizyonu ařađıdakiler iin ne sıklıkta kullanırsınız?

	Hibir zaman	Nadiren	Bazen	Sık sık	Her zaman
ocuđunuz iin dl olarak	1	2	3	4	5
ocuđunuz iin bir eđitim aracı olarak	1	2	3	4	5
Yapacak bir iřiniz olduđunda ocuđunuzu oyalamak iin	1	2	3	4	5
ocuđunuz ok hareketli olduđunda onu sakinleřtirmek iin	1	2	3	4	5
ocuđunuz yatmadan nce onu uykuya hazırlamak iin	1	2	3	4	5
ocuđunuz zgn olduđunda onu sakinleřtirmek iin	1	2	3	4	5

Çocuğunuzun sessiz kalmasını sağlamak için	1	2	3	4	5
Çocuğunuzu meşgul etmek için	1	2	3	4	5

11. Çocuğumun cep telefonu, bilgisayar, tablet ve televizyon gibi teknolojik cihazları kullanmasına izin veririm çünkü...

	Kesinlikle katılmıyorum	Katılmıyorum	Ne katılıyorum ne katılmıyorum	Katılıyorum	Kesinlikle katılıyorum
...bu cihazlar eğiticiidir.	1	2	3	4	5
...kendime boş zaman tanıyabilmek için.	1	2	3	4	5
...günlük rutinin bir parçası olarak.	1	2	3	4	5
...çocuğum bundan hoşlandığı için.	1	2	3	4	5
...çocuğumun bir şeyler öğrenmesi için.	1	2	3	4	5
...çocuğumun rahatlamasına yardım etmek için.	1	2	3	4	5
...sadece ve sadece uslu durmuşsa.	1	2	3	4	5
...stresimi hafifletebilmek için.	1	2	3	4	5
...çocuğuma sakinleşme ve dinlenme süresi sağlamak için.	1	2	3	4	5
...çocuğumun en sevdiği programı izleyebilmesi için.	1	2	3	4	5
...eğitsel yararları olduğu için.	1	2	3	4	5
...yaramazlık yapmadığında çocuğumu ödüllendirmek için.	1	2	3	4	5
...çocuğum benden bunu istediği için.	1	2	3	4	5
...ev işlerini yapabilmem için.	1	2	3	4	5
...çocuğumun olumlu davranışlarını ödüllendirmek için.	1	2	3	4	5
...çocuğumun olumlu davranışlarını ödüllendirmek için.	1	2	3	4	5

APPENDIX C: EMOTION REGULATION CHECKLIST

Aşağıda çeşitli duygusal durumlara ilişkin ifadeler yer almaktadır.
Aşağıdaki durumları çocuğunuzda ne sıklıkta gözlemlediğinizi yanlarındaki
sayıları işaretleyerek belirtiniz.

	Hiçbir zaman	Bazen	Sık sık	Her zaman
1. Neşeli bir çocuktur.	1	2	3	4
2. Duygu hali çok değişkendir (çocuğun duygu durumunu tahmin etmek zordur çünkü neşeli ve mutluyken birden üzülebilir).	1	2	3	4
3. Yetişkinlerin arkadaşça ya da nötr yaklaşımlarına olumlu karşılık verir.	1	2	3	4
4. Bir faaliyetten diğerine rahatça geçer; kızıp sinirlenmez, endişelenip kaygılanmaz, sıkıntı duymaz, veya aşırı derecede heyecanlanmaz.	1	2	3	4
5. Üzüntüsünü veya sıkıntısını kolayca atlatabilir (örneğin, canını sıkan bir olay sonrasında uzun süre surat asmaz, endişeli veya üzgün durmaz).	1	2	3	4
6. Kolayca hayal kırıklığına uğrayıp sinirlenir (huysuzlaşır, öfkelenir).	1	2	3	4
7. Yaşlılarının arkadaşça ya da nötr yaklaşımlarına olumlu karşılık verir.	1	2	3	4
8. Öfke patlamalarına, huysuzluk nöbetlerine eğilimlidir.	1	2	3	4
9. Hoşuna giden bir şeye ulaşmak için bekleyebilir (örneğin, şeker almak için sirasını beklemesi gerektiğinde keyfi kaçmaz veya heyecanını kontrol edebilir).	1	2	3	4

10. Başkalarının sıkıntı hissetmesinden keyif duyar (örneğin, biri incindiğinde veya ceza aldığında güler, başkalarıyla alay etmekten zevk alır).	1	2	3	4
11. Heyecanını kontrol edebilir (örneğin, çok hareketli oyunlarda kontrolünü kaybetmez veya uygun olmayan ortamlarda aşırı derecede heyecanlanmaz).	1	2	3	4
12. Mızımsızdır ve yetişkinlerin yanından ayrılmaz.	1	2	3	4
13. Ortalığı karıştırarak çevresine zarar verebilecek enerji patlamaları ve taşkınlıklara eğilimlidir.	1	2	3	4
14. Yetişkinlerin sınır koymalarına sinirlenir.	1	2	3	4
15. Üzülüğünü, kızıp öfkeli olduğunu, veya korktuğunu söyleyebilir.	1	2	3	4
16. Bitkin veya halsiz görünür.	1	2	3	4
17. Oyuna başkalarını katmaya çalışırken aşırı enerjik ve heyecanlıdır.	1	2	3	4
18. Yüzü ifadesizdir; yüz ifadesinden duyguları anlaşılmaz.	1	2	3	4
19. Arkadaşlarının arkadaşça veya nötr yaklaşımlarına olumsuz karşılık verir (örneğin, kızgın bir ses tonuyla konuşabilir ya da ürkek davranabilir).	1	2	3	4
20. Düşünmeden, ani tepkiler verir.	1	2	3	4
21. Kendini başkalarının yerine koyarak onların duygularını anlar; başkaları üzgün ya da sıkıntılı olduğunda onlara ilgi gösterir.	1	2	3	4
22. Başkalarını rahatsız edecek veya etrafa zarar verebilecek kadar enerjik ve hareketli davranır.	1	2	3	4
23. Yaşlıları ona saldırgan davranır ya da zorla işine karışırsa yerinde olumsuz duygular (kızgınlık, korku, öfke, sıkıntı vb) gösterir.	1	2	3	4
24. Oyuna başkalarını katmaya çalışırken olumsuz duygular gösterir.	1	2	3	4

APPENDIX D: CHILDREN'S
BEHAVIOR
QUESTIONNAIRE –
EFFORTFUL CONTROL

Lütfen başlamadan önce dikkatlice okuyunuz.

Sonraki sayfalarda çocuğunuzun çeşitli durumlardaki tepkilerini tanımlayan çeşitli ifadelerle karşılaşacaksınız. Bu durumlar karşısında **sizin çocuğunuzun** tepkisinin nasıl olacağını belirtmenizi istiyoruz. Elbette, “doğru” tepki diye bir şey yoktur, çocuklar çok farklı şekillerde tepki gösterebilirler ve biz de bu farklılıkların neler olduğunu öğrenmeye çalışıyoruz. Lütfen her ifadeyi okuyup onun, çocuğunuzun **geçtiğimiz altı ay içinde** benzer durumlardaki tepkisini **doğru** mu **yanlış** mı ifade ettiğine karar veriniz.

Eğer bu ifade;

çocuğunuz için son derece yanlışsa 1’i

çocuğunuz için oldukça yanlışsa 2’yi

çocuğunuz için biraz yanlışsa 3’ü

çocuğunuz için ne doğru ne yanlışsa 4’ü

çocuğunuz için biraz doğruysa 5’i

çocuğunuz için oldukça doğruysa 6’yı

çocuğunuz için son derece doğruysa 7’yi

daire içine alınız.

Eğer çocuğunuzda böyle bir durumla karşılaşmamışsanız ve bu nedenle o maddeyi yanıtlayamıyorsanız o zaman **X (söz konusu değil)** seçeneğini daire içine alınız

Lütfen **her durum** için bir rakamı ya da uygun değil şikkını daire içine aldığınızdan emin olunuz.

	Son derece yanlış	Oldukça yanlış	Biraz yanlış	Ne doğru ne yanlış	Biraz doğru	Oldukça doğru	Son derece doğru	Söz konusu değil
1. Genellikle düşünmeden harekete geçer.	1	2	3	4	5	6	7	X
2. Bir işle uğraşırken zihnini o iş üzerinde tutmakta zorlanır.	1	2	3	4	5	6	7	X
3. Bir işi bitirmeden diğer işe geçer.	1	2	3	4	5	6	7	X
4. Sıklıkla yeni ortamlara atılır.	1	2	3	4	5	6	7	X
5. Yeni durumlara alışması uzun zaman alır.	1	2	3	4	5	6	7	X
6. İstenirse, yeni etkinliklere geçmeden önce bekleyebilir.	1	2	3	4	5	6	7	X
7. Ne yapacağına karar verirken yavaşır ve acele etmez.	1	2	3	4	5	6	7	X
8. Gezmeye gitmeden önce ihtiyaçlarını hazırlar.	1	2	3	4	5	6	7	X
9. Aklına gelen ilk şeyi durup düşünmeden hemen söyler.	1	2	3	4	5	6	7	X
10. İstendiğinde, sakince oturmakta zorlanır (sinemada, otobüste vs.)	1	2	3	4	5	6	7	X
11. Resim yaparken ya da kitap boyarken çok iyi yoğunlaşır.	1	2	3	4	5	6	7	X
12. Yönergeleri* takip etmede iyidir *Yönerge: Dur!, Geri dön!, Sağa dön! vs gibi...	1	2	3	4	5	6	7	X

13. Bir şey oluştururken veya bir şeyleri bir araya getirirken yaptığı işe odaklanır ve uzun süre ilgilenir.	1	2	3	4	5	6	7	X
14. Tehlikeli olduğu söylenen yerlere yavaş ve dikkatlice yaklaşır.	1	2	3	4	5	6	7	X
15. Hayır dendiğinde yaptığı şeyi kolayca bırakabilir.	1	2	3	4	5	6	7	X
16. Yeni bir etkinliği neredeyse en son deneyen çocuktur.	1	2	3	4	5	6	7	X
17. Bir öykü dinlerken dikkati kolayca dağılır.	1	2	3	4	5	6	7	X
18. Bazen resimli kitaplara dalıp gider ve uzun süre onlara bakar.	1	2	3	4	5	6	7	X

