

PRESCHOOL CHILDREN'S SELF-REGULATION, PARENTAL FEEDING STYLES  
AND EMOTIONAL EATING BEHAVIORS: A SHORT-TERM LONGITUDINAL  
STUDY

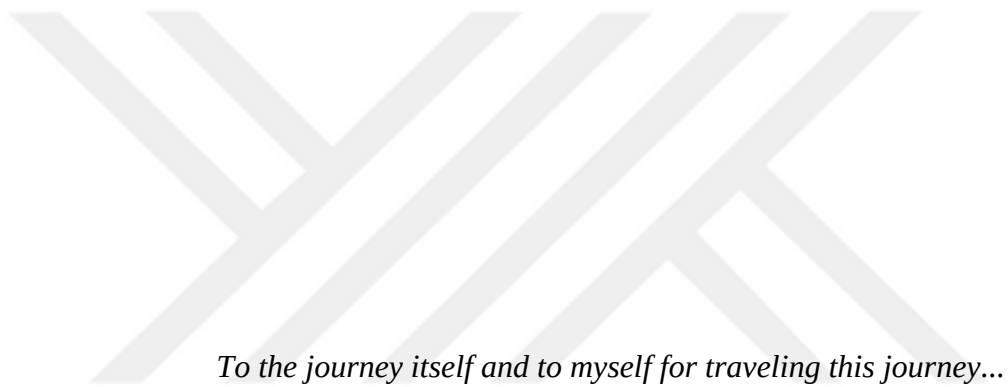
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*To the journey itself and to myself for traveling this journey...*

## ABSTRACT

Children's emotional eating could be driven by their individual characteristics and parenting behaviors. From this perspective, in this study, we tested the child-driven and parent-driven antecedents of emotional eating to understand the underlying mechanisms of emotional eating in children. In detail, we explored the transactional association among parental feeding styles, mealtime technoference, and children's self-regulation in predicting emotional eating during preschool years. We collected data from 231 children at two-time points, the fall and spring semesters. Children's ages ranged between 36 to 76 months ( $M = 58.49$ ,  $SD = 9.07$ ) in the fall and aged between 44 to 80 months ( $M = 65.26$ ,  $SD = 8.27$ ) in the spring. Parents reported children's eating behaviors, feeding styles, and mealtime technoference in the fall and spring semesters. Researchers measured children's performance-based self-regulation. Cross-lagged path analyses were conducted for a total of six different models. We found a bidirectional relationship between mealtime technoference and children's emotional overeating behaviors but could not find bidirectional relations between parental feeding styles (emotional and control feeding) and children's emotional eating behaviors. However, emotional overeating was predicted by parental emotional feeding and child self-regulation; parental control feeding was predicted by emotional undereating. These results show that emotional eating is an outcome of both child- and parent-driven factors. The results are discussed in detail within the Transactional Human Development Model (THDM) framework.

*Keywords:* Children's emotional eating, parental emotional feeding, parental control feeding, mealtime technoference, self-regulation

## ÖZET

Çocukların bireysel özellikleri ve ebeveyn davranışları, çocukların duygusal yeme davranışlarını yordamaktadır. Mevcut çalışmada, duygusal yeme davranışının altında yatan mekanizmaları anlamak amacıyla, duygusal yemenin çocuk ve ebeveyn kaynaklı öncülleri test edilmiştir. Nitekim, okul öncesi yaştaki çocukların duygusal yeme davranışlarını yordayan ebeveyn besleme stilleri, yemek vakitlerindeki teknoloji kaynaklı ebeveyn-çocuk etkileşim kesintileri (yemek vakti teknolojik kesintiler) ve çocukların öz-düzenleme becerileri arasındaki çift yönlü ilişkiyi araştırılmıştır. 231 çocuktan güz ve bahar dönemlerinde olmak üzere iki farklı zaman diliminde veri toplanmıştır. Örneklemi oluşturan çocukların yaşları güz döneminde 36 ila 76 ay arasında ( $Ort. = 58,49$ ,  $SS = 9,07$ ) ve bahar döneminde 44 ila 80 ay arasında ( $Ort. = 65,26$ ,  $SS = 8,27$ ) değişmiştir. Ebeveynler hem güz hem bahar dönemlerinde çocukların duygusal yeme davranışlarını, ebeveyn besleme stillerini ve yemek vakti teknolojik kesintileri raporlamıştır. Ayrıca çocukların öz-düzenleme becerileri araştırmacılar tarafından okul ortamında ölçülmüştür. Altı farklı model için çapraz bağlanmış panel analizleri yürütülmüştür. Bulgular, yemek vakitlerindeki teknolojik kesintiler ile çocukların duygusal aşırı yeme davranışları arasında çift yönlü bir ilişki göstermiştir. Ancak, ebeveyn besleme stilleri (duygusal ve kontrollü besleme) ile çocukların duygusal yeme davranışları arasında çift yönlü ilişkiler bulunamamıştır. Bununla birlikte, ebeveyn duygusal besleme ve öz-düzenleme becerileri duygusal aşırı yeme davranışını yordamıştır ve duygusal az yeme davranışı ebeveyn kontrollü besleme davranışını yordamıştır. Sonuçlar, duygusal yemenin hem çocuk hem de ebeveyn kaynaklı öncüllerle ilişkili olduğunu göstermektedir. Sonuçlar Etkileşimli İnsan Gelişim Modeli çerçevesinde detaylıca tartışılmıştır.

*Anahtar Kelimeler:* Çocuklarda duygusal yeme davranışı, ebeveyn duygusal besleme, ebeveyn kontrollü besleme, yemek vakti teknolojik kesintiler, öz-düzenleme

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## CHAPTER 1

### INTRODUCTION

Children's healthy development is a foundation for their concurrent and future outcomes. A healthy diet is one of the fundamental needs for healthy development in the early years of life. Identifying eating behaviors is crucial to support children's healthy development. Eating is a complex and multifaceted behavior based on biopsychosocial origins (Puder & Munsch, 2010; Russell & Russell, 2018). Eating behaviors in early childhood are defined as children's early relationship with food and behavioral reactions to internal and environmental food signals (Birch & Davison, 2001; Kral & Rauh, 2010; Russell & Russell, 2018). The developmental trajectory of eating behaviors begins at earlier ages and continues to shape throughout the lifespan (Herle et al., 2020; Singer et al., 1995). Individual differences in eating behaviors contribute to weight problems (Wardle et al., 2001). Besides physical outcomes, unhealthy eating behaviors are associated with emotional and behavioral problems and poorer social skills (Mustillo et al., 2003; Puder & Munsch, 2010; Vila et al., 2004). For example, children with eating problems show more behavior problems (e.g., oppositional defiant disorder); and children with psychosocial problems are more prone to eating problems (Mustillo et al., 2003). Due to eating behaviors being linked to psychosocial problems, eating behaviors at early ages predict later eating disorders such as anorexia nervosa and bulimia nervosa in adolescence (Herle et al., 2020; Marchi & Cohen, 1990). Children exhibiting maladaptive eating patterns are 7% more likely to be diagnosed with binge eating disorder at later ages (Herle et al., 2020).

Eating behaviors of young children are categorized into different components. Emotional eating, using food as a mechanism for regulating emotions, is one of the prominent ones due to its sustained relationship with children's developmental outcomes (Messerli-Bürgy et al., 2018). For example, emotional eating is associated with the likelihood of obesity risk over time and inability to control eating and binge eating problems (Goossens et al., 2008; Sultson et al., 2017; Tanofsky-Kraff et al., 2004). Emotional eating is one of the most observed eating patterns in childhood; 65% of parents having preschool-aged children reported emotional eating behaviors for their children (Blissett et al., 2010; Steinsbekk et al., 2018). Considering the prevalence and prominence of emotional eating in children, the focus of the current study will be framed around emotional eating in children.

Emotional eating refers to children's eating responses regardless of the presence of satiety when they are emotionally aroused to cope with these intense emotions, such as when they feel stress, anxiety, anger, or boredom (Sleddens et al., 2008; Stone et al., 2022). Emotional eating occurs in two forms; over and under eating as a response to emotions (Wardle et al., 2001). The foods provide comfort for emotional overeaters, and they prefer to eat more while feeling distressed, especially those with high energy-dense foods like ice cream, chips, and cake (van Strien et al., 2019). Children may distract themselves from unpleasant emotions by eating palatable foods because they provide instant pleasure and reward (Macht, 2008). Emotional overeating is related to later weight problems in children (Webber et al., 2009), depression and anxiety (Fox et al., 2016), the onset of binge eating (Stice et al., 2002), and bulimia nervosa (Ricca et al.,

2012). On the contrary, emotional undereaters prefer not to eat to cope with emotions, which is related to being underweight in childhood (Jansen et al., 2012; Wardle et al., 2001). Studies indicate that emotional undereating is related to later anorexia nervosa diagnoses (e.g., Ricca et al., 2012). Overall, both emotional overeating and undereating undermine children's healthy development, promising further investigation of the underpinnings of emotional eating in early years.

Emotional overeating and undereating behaviors emerge during preschool years. It is mainly stable and continues across the years (Ashcroft et al., 2008; Herle et al., 2017). Herle et al. (2017) examined the biological and environmental influences on emotional eating via a longitudinal twin study. Surprisingly, they found that genetic heredity, as indicated by anthropometric measures, DNA markers, and health records, only plays a minor role (7%) in emotional eating. However, environmental factors such as socio-economic status, physical activity options, and health-related parental behaviors have a significant amount of (91%) influence on emotional eating, showing that emotional eating is mainly learned by the environment. Although environmental impacts contain a wide variety of factors, the researchers point out the importance of parental behaviors for the development of children's emotional eating patterns (Blissett et al., 2010; Stone et al., 2022; van Strien, 2018). In accordance with Bronfenbrenner's (1992) ecological approach, one of the immediate environments where children interact and learn certain behaviors is family; thus, parental behaviors and attitudes play an essential role in children's emotional eating.

During mealtimes, parents have the primary responsibility for feeding their children. Mainly, parents organize their children's eating environment, such as what, when, where, and how to eat (Steinsbekk et al., 2016; Ventura & Birch, 2008). The eating environment is essential for children to learn and obtain certain eating styles and patterns from their immediate surroundings. Parenting behaviors during mealtimes may change according to context and are linked to several factors (Mitchell et al., 2009; Vreeland et al., 2019). Recent statistics show that parents frequently use technological devices during mealtimes (Newsham et al., 2020; Radesky et al., 2014; 2015). Parental preoccupation with such devices during meals may decrease their attention to children's behaviors and needs (Radesky et al., 2015). Thus, technological devices may serve as a disruptor in mealtimes, and these devices may interrupt parents-child interactions and communication during meals due to decreased parental attention. These interruptions are defined as mealtime technofence (Gramm et al., 2020). Due to these disruptions, parents might become less responsive and sensitive and show less warmth to children's emotional and physical cues; in turn, maladaptive forms of eating may occur (Braden et al., 2014; Radesky et al., 2014, 2015; Topham et al., 2011). To our knowledge, so far no study has investigated the relationship between technofence and emotional eating; therefore, one of the aims of the current study is to examine this association.

On the other hand, parents' goal-directed behaviors and strategies for managing children's eating patterns refer to parental feeding style, which is an important factor related to children's emotional eating behaviors (Faith et al., 2004; Hankey et al., 2015; Powell et al., 2017). Parental feeding style is associated with young children's emotional

eating (Carper et al., 2000; van Strien & Bazelier, 2007). Parents may reinforce or discourage children's emotional eating behaviors through their feeding styles (Blissett et al., 2010; Sleddens et al., 2010). Studies showed that parental emotional and control feeding behaviors are related to children's emotional eating (Farrow et al., 2015). In both feeding styles, parents undermine the children's regulatory capacities for eating. For example, if parents use food as a soothing tool when the child is emotionally aroused (e.g., crying, screaming, whining), in that case, the child may alleviate and escape from the unpleasant emotions by pairing the food and feeling comfort (Blissett et al., 2010). Due to this association, self-regulatory problems -referring to difficulties in managing behaviors, emotions, and thoughts according to the context- and maladaptive forms of eating, like emotional eating, may occur (Karoly, 1993).

Beyond parental behaviors, children's individual characteristics, like regulatory skills, are crucial in the development of emotional eating (Dohle et al., 2018; Giuliani & Kelly, 2021; Messerli-Bürgy et al., 2018). Indeed, Russell and Russell (2018) suggest that children's eating behaviors are sophisticated interactions of children's characteristics and environment. Self-regulation refers to strategies for controlling emotions, behavior, and thoughts according to changing context and is an important factor associated with children's eating behaviors, especially for emotional eating (Barnhart et al., 2021; Cross et al., 2014; Francis et al., 2018; Frankel et al., 2021; Tan & Holub, 2011; Tan & Lumeng, 2018). Children having self-regulatory problems can have difficulties managing their impulses. When they are emotionally aroused, their likelihood of reaching food for regulation may increase (Stone et al., 2022). For example, in a

longitudinal study, children with low self-regulation at age six showed higher emotional eating behaviors when they were eight years old (Steinsbekk et al., 2020). Emotional eating could be one of the regulatory strategies for children having low self-regulation. However, it remains unclear whether emotional eating may prompt self-regulatory problems.

Together aforementioned studies provide insights that emotional eating has a complex nature. Due to emotional eating mainly based on environmental influences, comprehensive studies are required to understand its underlying mechanisms. Family is the primary environment where children experience interpersonal interactions, such as parenting, parental feeding styles, and family mealtime routines. Emotional eating is linked to parental feeding styles such that; using foods for emotion regulation and controlling children's eating are related to emotional eating. Additionally, mealtime technoference, which could decrease parental responsiveness and sensitivity to children's needs during mealtimes, can be related to emotional eating. Further, feeding styles and mealtime technoference could be a risk factor for the development of emotional eating and may interact with children's self-regulatory problems and contribute to lower odds of self-regulation. Children with inadequate self-regulation may have more tendency to emotional eating. Grounded on these empirical findings, emotional eating behaviors could be a result of individual differences in self-regulation or eating behaviors could manifest certain outcomes in children. This bidirectional association warrants testing the directionality of eating behaviors in early childhood. To address the directional associations, we examined children's emotional eating behaviors

at two different time points in the context of their parental feeding styles, mealtime technoference, and self-regulation. By doing so, we aspired to identify child- and parent-driven factors for children's emotional eating behaviors.

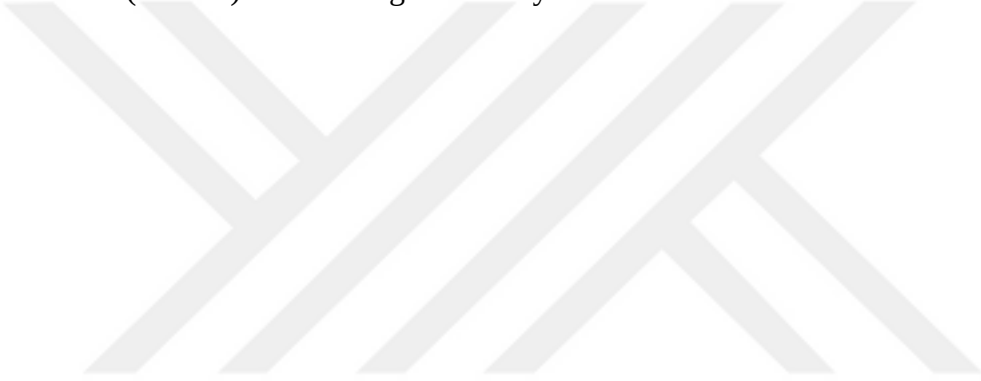
### **1.1. Theoretical Background**

The current study investigating the associations among children's emotional eating, self-regulation, and parent-related factors is conceptualized in the Transactional Human Development Model (THDM) framework. According to this model, children have constant interactions with their environment. However, children are not passive receivers of stimuli in their environment; they have an influence on their environment through bidirectional interactions over time (Sameroff, 1975). The THMD suggests that ongoing interactions between children's characteristics (e.g., biological tendencies, temperament, cognitive capacities) and the environment (e.g., parent-related factors) influence the developmental trajectory of children (Sameroff, 2009).

From the perspectives of the THMD, children's emotional eating behavior could be conceptualized as an outcome of both environmental factors (i.e., parental feeding styles and mealtime technoference) and individual characteristics (i.e., self-regulation). Further, examining the contributions of child self-regulation and parenting in the context of feeding to children's emotional eating behaviors over time may show the distinct driving contributions of self-regulation and parental influences. For example, emotional and control feeding may alter children's attitudes toward food, they may perceive food as a reward or punishment (Farrow et al., 2015). They could be more susceptible to eating as a response to external cues instead of internal cues, resulting in emotional

eating (Carper et al., 2000; van Strien & Bazelier, 2007). On the other hand, children with emotional eating problems may induce certain parental feeding styles. Parents may start using emotional feeding and control feeding to deal with children's emotional eating behaviors, and in turn, this behavior may emerge or increase over time. The underlying reason parents use certain feeding styles might be related to children's self-regulation. Parents who perceive their children as having self-regulatory problems may show more maladaptive parenting behaviors (Scaramella & Leve, 2004). They may use the food as a soothing tool for helping to regulate children's emotions instead of using supportive regulation strategies. This parenting behavior may hinder parents from showing supportive regulatory strategies and account likelihood of self-regulatory problems and emotional eating. Although studies show that children's self-regulation skills play an important role in children's emotional eating, self-regulatory skills can be both antecedents and consequent of children's emotional eating (Pieper & Laugero, 2013; Steinsbekk et al., 2020; Stone et al., 2022). As defined, emotional eating is a response to dealing with intense emotions and may provide a temporary distraction from those emotions. Unlike the other regulation strategies that require cognitive and emotional effort, food provides easily accessible and immediate comfort (Macht, 2008). Therefore, this response can become habitual, and children may use food as a default strategy instead of exploring alternative ways to regulate themselves (Ouwens et al., 2009). This relationship may negatively contribute to children's self-regulation in the long term if children continue using emotional eating as a coping strategy.

In a similar line, technofence may diminish positive parenting behaviors like sensitivity and responsiveness and result in self-regulatory problems and emotional eating (Belsky et al., 2000; Radesky et al., 2014). Taken all these links among emotional eating, parental feeding styles, mealtime technofence and self-regulation into consideration, we will frame this study according to Transactional Human Development Model (THDM) and investigate their dynamic associations.



## CHAPTER 2

### LITERATURE REVIEW

#### 2.1. Children's Emotional Eating

Emotional eating is a dysfunctional coping strategy that results in changes of food intake when one is emotionally aroused, such as while dealing with challenging events (Messerli-Bürge et al., 2018). Individuals may respond differently during emotionally aroused situations; some people may tend to engage in emotional overeating, while others lose their appetite and engage in emotional undereating, and others may not use food as a response (Macht, 2008). A longitudinal study conducted in the United Kingdom examined when the differences in these eating tendencies begin to develop and their consistency (Ashcroft et al., 2008). They measured children's eating behaviors, including emotional over and under-eating, when they were aged four and seven years later. Children showing emotional overeating at age four still had high scores on the emotional overeating scale at age eleven. The correlation between the emotional overeating score at age four and eleven was .45, indicating a moderate positive correlation. Furthermore, children showing emotional undereating at age four had greater scores on the emotional undereating scale. The correlation between children's emotional undereating scores at ages four and eleven was .29, referring to a small to medium positive correlation. Similar findings were found from the Norwegian sample (Steinsbekk et al., 2018). They measured children's emotional overeating behaviors at three different time points when children aged six, eight, and ten. Children's emotional overeating behaviors at these different ages had a high correlation from .52 to

.60. These studies show that emotional eating emerges during preschool years and is stable across the years during childhood.

Emotional eating in children could be a foundation for future health and development-related outcomes. For example, emotional overeating predicts an increase in weight status, while emotional undereating predicts weight loss in both adults and children (Guerrini-Usubini et al., 2023; Steinsbekk & Wichstrom, 2015). The development of emotional eating in early childhood could be influenced by both individual characteristics and environmental factors (Herle et al., 2017). In a systematic literature review, empirical cross-sectional studies of parental feeding styles and parenting behaviors revealed significant undermining associations with children's emotional eating behaviors (Ventura & Birch, 2008). In addition, children's individual characteristics, such as self-regulation, could support or undermine their emotional eating behaviors (Pieper & Laugero, 2013; Steinsbekk et al., 2020; Stone et al., 2022). In the following sections, we will summarize the existing evidence for parental feeding styles, mealtime technoference, and children's self-regulation as predictors of emotional eating in early childhood.

## **2.2. Predictors of Emotional Eating in Early Childhood**

Children's interactions and communications with their caregivers during mealtimes are prominent for both their psychological and physiological health (Kiefner-Burmeister & Hinman, 2020). That is, in part, because parental approaches support or inhibit the developmental trajectory of children. Although the burgeoning literature has focused on parent-child interactions in early childhood, little attention has been given to

mealtime interactions (Van-Vliet et al., 2022). From this perspective, we focused on parental feeding styles and parents' mealtime technoference as predictors of children's emotional eating behaviors.

### **2.2.1. Parental Feeding Styles and Emotional Eating**

Meeting the nutritional needs of the children and identifying and eliminating eating problems are important for children's healthy development and the parent-child relationship. Parental feeding styles refer to purposeful parental behaviors and approaches while feeding children in terms of parental control of what, where, when, how, and how much the child should eat (Birch & Fisher, 1998; Steinsbekk et al., 2016). Parents are mainly responsible for children's food preferences, organizing the food and mealtime environment, and deciding feeding behaviors according to their children's needs. A large body of previous studies suggests that parental feeding style is linked to children's eating behaviors (Faith et al., 2004; Hankey et al., 2015, Pesch et al., 2020; Powell et al., 2017). In fact, the mere presence of parents is also associated with children's eating behaviors. An observational study showed that if children know their mothers monitor them, their food preferences change (Klesges et al., 1991). In this study, we will discuss the link between parental feeding styles and emotional eating behaviors in the context of two different types of feeding: emotional feeding and control over eating.

Parental behaviors during feeding may encourage or discourage the patterns of children's emotional eating behaviors (Tan & Holub, 2015). The parental behavior of using food to comfort the child with high emotional arousal may teach the child that

food is a soothing tool. In this feeding style, referring to emotional feeding, the child may pair food with positive emotions (Savage et al., 2022). An experimental study was conducted to investigate the role of the emotional feeding of parents on three to five years old children's emotional eating (Blissett et al., 2010). They assigned children to a negative mood induction group or a control group. In the experimental group, children's negative emotions were triggered via missing puzzle tasks and a sad story. Children in the control group received no missing puzzles and no story. Later, children rated their mood on 5 points scale. After children reported their negative mood, eating behaviors were measured using the Eating Absence of Hunger Task (EAH). This task measures children's eating behaviors, whether they prefer to eat healthy or unhealthy snacks or play with toys when they feel full during five minutes when the researcher left the room. The total calorie count is calculated to measure how many calories children consume during alone time. Higher energy intake was found to be related to eating behavior problems (Fisher & Birch, 2002). Results of this experimental study indicated children whose parents reported emotional feeding consumed more food and higher calories in this task. However, children whose parents did not report emotional feeding consumed less food and lower calorie consumption. Study shows that children who learned food is a soothing tool eat more when experiencing negative emotions. Moreover, another longitudinal study tested the link between children's emotional eating behaviors and parental feeding styles (Farrow et al., 2015). They measured parental feeding styles, including emotional feeding and control over feeding, when children were five years old. After two years, children were invited to the laboratory, and researchers conducted

a mood-induction task. They increased children's negative emotions using this mood induction task. Results showed that children whose parents use control feeding and emotional feeding have a higher tendency to eat more calories when their negative emotions are inducted, even if they are full. According to this study, parental emotional feeding and control feeding are longitudinally related to children's emotional eating behaviors.

Parental control feeding refers to how parents decide, manage and control behaviors to the children's food choices, eating environment, and behaviors (Birch et al., 2001). In this feeding style, parents may set certain rules for their children about what to eat, how to eat, and how much to eat (Birch et al., 2001; Wardle et al., 2001, 2005). These controlling behaviors may result in different ways. Firstly, parents having control over their children's eating may structure a healthy diet and preferences for their children. On the other hand, this control may arise a struggle for the child, and an unhealthy relationship between the child and food may occur. Although this feeding style benefits parents in the short-term, longitudinal studies found positive relations between parental control feeding and children's emotional eating behaviors and child weight problems (Orrell-Valente et al., 2007; Farrow et al., 2015; Puhl & Schwartz, 2003; Rodgers et al., 2013). This feeding style underestimates the children's regulation capacities and may make them more susceptible to eating as a response to external cues (e.g., emotional stressors) rather than internal cues (e.g., hunger). Being more sensitive to external cues rather than internal cues is one of the underlying mechanisms of emotional eating (Carper et al., 2000; van Strien & Bazelier, 2007). For example, at

mealtimes, a parent does not let the child eat more (external cue, parental interference). Even if the child still feels hungry and needs to continue eating, the child may stop eating. The child stops using self-regulatory strategies while eating and becomes more predisposed to external signals.

Although parental influences on their children's eating behaviors are evident, the studies are mainly cross-sectional in nature, and thus temporal precedence is required. Parental feeding style may influence the emotional eating of children and vice versa. Parents may drive their children to suppress their emotions by either providing food as a means of emotional comfort (emotional feeding) or by exerting control over their food intake (control feeding). Additionally, since emotional and control feeding may change children's perceptions of food, they may see food as a reward or punishment (Farrow et al., 2015). They could be more susceptible to eating as a response to external cues instead of internal cues (Carper et al., 2000; van Strien & Bazelier, 2007). Also, parents may be more likely to control children's diets to decrease children's emotional eating behaviors (Haycraft et al., 2012). Contrary, children prone to show emotional eating behaviors may reduce alternative ways for parents to feed their children. Thus, they may use emotional feeding or need to control their children's eating behaviors. Children's tendency to emotional eating may alert parents to restrict children's eating behaviors, in turn emotional eating may increase. Children may learn emotional eating via emotional feeding or having less opportunity to regulate themselves because of parental control. To enrich our understanding of emotional eating and its relation to parental feeding

practices, we aimed to examine transactional relations between parental feeding styles (i.e., emotional feeding and control feeding) and children's emotional eating.

### **2.2.2. Mealtime Technoference and Emotional Eating**

In addition to parental differences in terms of feeding styles, parents use screen media frequently during mealtimes (Radesky et al., 2014). The portability of electronic devices allows parents to constantly access online content like social media, news, text, and phone calls (Pew Research Center, 2021). An observational study conducted at fast food restaurants showed that parents use mobile devices at least once during a meal (Radesky et al., 2014). Parents' attention was divided between their mobile devices and their children. This study also showed that parents ignore their children's bids for attention for a while and reply late during the meal. Parents absorbed in their phones are insensitive to their children's expressed needs such that parents are unresponsive, react harshly, and less interested in their children's eating behaviors (Radesky et al., 2015).

Determining parental behaviors and addressing the family roles are necessary to regulate children's eating behaviors; however, parents' divided attention between the child's needs and the screens represents a growing dilemma. Children's eating is a complex behavior involving several predictors and contributing factors (Puder & Munsch, 2010; Russell & Russell, 2018). However, technology use during meals is associated with less communication during meals, giving little importance to mealtimes and consuming more unhealthy food (Fulkerson et al., 2014). Thus, parental screen use during a meal has been becoming one of the important undermining factors for children's eating behaviors (Domoff et al., 2019; Kong et al., 2013; Robinson et al.,

2017; Saltzman et al., 2019). In an observational study, parent-child interactions during meals are videotaped (Radesky et al., 2015). Parents who were using a mobile phone during meals communicated less with their children compared to parents who did not use it. Hence, parental screen use during meals may interrupt and serve as a distractor in parent-child mealtime interactions. These interruptions during meals refer to *mealtime technoference* (Gramm et al., 2020). The term "*technoference*" corresponds to parental distractions due to technology use in parent-child interactions in any context (McDaniel & Radesky 2018a, b; McDaniel & Coyne 2016).

Disruptions in mealtimes may elicit an inability for a parent and child to identify each other's mood, a lack of attention, and being away from each other; thus, a stressful eating environment may occur (Kong et al., 2013). For example, Gramm et al. (2020) showed that children whose parents experience more mealtime technoference are more food responsive, referring to more likely to perform eating behaviors according to environmental cues rather than internal cues (Jansen et al. 2003; Sleddens et al. 2008; Wardle et al. 2001). Parents may perceive food responsiveness as positive behavior, although it has been related to obesogenic eating behaviors and inability to listen to hunger/satiety cues. (Gramm et al., 2020). Parental use of technology during mealtimes might decrease positive parenting behaviors because it disrupts parent-child interactions and communications. Since positive parenting behaviors are important in the development of children's eating behaviors, mealtime technoference may induce children's emotional eating behaviors (Faith et al., 2004; Hankey et al., 2015, Pesch et al., 2020; Powel et al., 2017). In line with this assumption, Wong et al. (2020) showed

that for 3-year-old children, parental problematic use of technology, which was linked to more technoference, was associated with behavioral problems via fewer parent-child interactions. Considering previous evidence, we may assume that mealtime technoference may decrease parental responsiveness and sensitivity to their children. Also, parents will be able to understand their children's needs less because their attention is divided with technological devices. Therefore, children may develop maladaptive eating strategies because of a lack of parental responsiveness. Emotional eating may occur as a consequence of parental mealtime technoference. On the other hand, increased emotional eating behaviors of children may create concerns for parents about children's eating patterns. Thus, parents may decrease their use of technology during meals to improve children's healthy dietary habits. To our knowledge, no study investigated the relationship between children's emotional eating and mealtime technoference.

### **2.2.3. Self-Regulation and Emotional Eating**

Children whose parents are less sensitive and less responsive to their needs for regulation could be more prone to emotional eating. Self-regulation is an umbrella construct that corresponding emotional, behavioral, and cognitive adjustments, including monitoring, inhibiting, and controlling behaviors, emotions, and impulses (Baumeister & Heatherton 1996). The development of self-regulation starts at the end of infancy, and the abilities gradually increase during toddlerhood and preschool ages (Kochanska et al., 2000). Self-regulation skills have a crucial role in children's development such that it is positively linked to social and academic adjustment and

positive health outcomes, whereas negatively related to behavioral problems and obesity (Eisenberg et al., 2009; McClelland et al., 2015; Miller et al., 2018; Sawyer et al., 2015; Whitetaker et al., 2019).

Self-regulation, especially cognitive aspects of self-regulation (i.e., inhibitory control) is found to be associated with eating behavior related problems (Allom & Mullan, 2014; Anzman-Frasca et al., 2015; Francis et al., 2009; Francis & Susman, 2009). For example, Pieper and Laugero (2013) investigated the relationship between self-regulation and children's eating behaviors. They measured young children's self-regulation through multiple informants such that researchers measured executive function by lab-based objective tasks, teachers reported children's cognitive skills, and parents rated temperament-based questionnaires. They found that children with low self-regulation reported by teachers performed poorly at eating absence of hunger task (EAH). In this study, this task measures children's eating behaviors when they are not hungry and eating absence of hungry signals emotional eating behaviors (Fisher & Birch, 2002). However, objective measures of executive function and eating absence of hunger were not related, but the sample size was too small ( $n=37$ ) to interpret the results sufficiently. They also measured children's emotional arousal through skin conductance and revealed that high emotional arousal is related to consuming more total and sweet calories. This tendency was higher for children having low self-regulation (i.e., effortful control). These results show that children having low self-regulatory skills are at a higher risk of displaying emotional eating. Accordingly, children with low self-regulation are more susceptible to developing emotional eating behaviors.

On the other hand, a later study found a relationship between EAH and the objective measure of self-regulation (i.e., delay of gratification) (Hughes et al., 2015). Surprisingly, the association was in the opposite direction than expected. Children better at the delay of gratification ate more at EAH task. The possible explanation is that children who were more interested in snacks waited longer at the delay of gratification task for the food reward. However, EAH task does not include waiting for a reward. Consequently, they performed poorly in the EAH task but better at delay of gratification task. A recent study by Giuliani and Kelley (2021) also investigated the relationship between eating behaviors and self-regulation. They measured self-regulation through delay of gratification task, which measures food related self-regulation, referring to one's ability to control and manage energy intake. They also measured regulation abilities via attentional and inhibitory control tasks, referring to not food related self-regulation. They concluded that food-related self-regulation might be a better predictor of children's eating behaviors. However, Francis et al. (2021) found relations between children's general self-regulation and eating behaviors using latent profile analysis. Children having the lowest self-regulation displayed maladaptive eating patterns. This study concludes that preschool-aged children's behavioral regulation and eating patterns are linked. Also, processes of self-regulation can be shared across food and non-food-related regulation. Research on the links between self-regulation and children's eating behaviors is mainly focused on the self-regulation of eating instead of general self-regulation. Therefore, it is valuable to investigate this relationship by considering the contextual factors that might be the underlying reason for the mixed results and

understand the role of general self-regulation. Although the relationship between self-regulation and emotional eating is found to be negative, research measuring comprehensive self-regulation, including cognitive, behavioral, and emotional aspects of self-regulation, is limited (Francis et al., 2022; Stone et al., 2022; Tan & Lumeng, 2018; Pieper & Laugero, 2013).

In short, children having self-regulatory problems might be more inclined to show emotional eating behaviors because they might have less regulatory strategies and control over their behaviors. The prefrontal cortex, which corresponds to improved self-regulatory skills (e.g., executive function), plays an important role in children's emotional and habitual food intake (Dallman, 2010). Therefore, having higher self-regulation may hinder emotional eating; however, self-regulatory problems might prompt children to eat as a response to emotions (McPhie et al., 2014). On the other hand, the emotional eating behaviors of children may trigger regulatory problems because food is an easy way to regulate, and children may not have the opportunity to learn regulatory strategies. It is valuable to investigate this relationship by considering the contextual factors that might be the underlying reason for the mixed results and understand the role of self-regulation. Therefore, we aimed to examine the transactional relations between children's self-regulation and emotional eating.

### **2.3. Transactional Associations among Self-Regulation, Parental Feeding Practices, Mealtime Technoference, and Emotional Eating**

Emotional eating is considered as a maladaptive form of eating behavior, related with both individual and environmental factors (Farrow et al., 2015; Hughes et al., 2015;

Puhl & Schwartz, 2003). Revealing the child-driven and parent-driven antecedents of emotional eating would shed light on understanding the underlying mechanisms of emotional eating in children. From this perspective, we aimed to explore transactional association among parental feeding styles, mealtime technofence, and children's self-regulation in predicting emotional eating during preschool years. Evidence from some studies suggests that parental feeding styles (i.e., emotional feeding and control over feeding) contribute to children's emotional eating (Ashcroft et al., 2008; Stifter & Moding, 2015). Additionally, longitudinal studies have found that parental feeding style may hinder children from developing positive regulatory strategies and increase children's inclination to engage in emotional eating (Steinssbekk et al., 2018). However, even if the differences in parental feeding styles (i.e., emotional feeding and control feeding) are relatively low, the likelihood of children regulating their emotions with food can be high (Carnell & Wardle, 2007; Wardle & Carnell, 2007). In detail, parents may be more prone to use such feeding styles if their child comforts with the food, in turn parents may more use these feeding strategies. For example, parents with children easily soothed by food may use food to regulate their child's emotions through such feeding styles and reinforce the association between food and emotion regulation. Increased association between food and comfort may create a bidirectional relationship between parental feeding styles and emotional eating. Parental use of food for regulation can be an easy way for parents to comfort their children and escape from the challenges of the emotion regulation process during meals. Thus, parental motivation to use food for regulation may increase. On the other hand, children's emotional eating behaviors

may alert parents to restrict children's eating behaviors, which then increases emotional eating. These potential explanations raise the question that emotional eating might drive the maladaptive forms of parental feeding styles or maladaptive parental feeding practices may drive emotional eating in children.

Another way for parents to escape from challenges during mealtimes could be technology. Parents can feel stressed and exhausted with children's challenging behaviors (i.e., self-regulatory problems) and may seek escape. Therefore, self-regulatory problems may predict parental use of technology during mealtimes, and technofence may occur. Moreover, technofence can be a predictor of emotional eating because it may decrease parental responsiveness. Decreased responsiveness and children's need for regulation during mealtimes may drive emotional eating. Children show more emotional eating behavior, when they feel negative emotions; if their parents show less warmth and interest (Topham et al., 2011). Studies show that identifying the parenting behaviors during parent-child mealtime interactions may help to understand the underlying mechanisms of emotional eating (Savage et al., 2007; Topham et al., 2011).

Children's emotional eating can be related by environmental factors such as parental feeding styles and mealtime technofence and also by individual factors such as self-regulation. The ability to self-regulate is negatively associated with children's emotional eating (Hughes et al., 2015; Pieper & Laugero, 2013; Stone et al., 2022; Tan & Lumeng, 2018). Children having high self-regulatory abilities may not need food for regulation because monitoring and controlling their emotions is easier for them. On the

other hand, children who learned to regulate emotions by food may not have an opportunity to learn other regulation strategies.

Overall, children's emotional eating behavior could be conceptualized as an outcome of both environmental factors (i.e., parental feeding practices) and individual characteristics (i.e., self-regulation). Further, examining the contributions of these factors to children's emotional eating behaviors over time shows the distinct driving effects of environmental and individual factors. Within the context of these transactions, the directions of these relations should be investigated. This simultaneous relationship will be investigated in this study by utilizing a cross-lagged path analysis.

#### **2.4. The Significance of the Current Study**

The present study examines cross-lagged associations of emotional eating, parental feeding styles, mealtimes technoference and self-regulation over time. Although, a number of studies revealed the associations among children's emotional eating, parental feeding styles (i.e., emotional feeding and control feeding), and self-regulation), they were cross-sectional and inadequate to infer directional relations (Barnhart et al., 2021; Cross et al., 2014; Francis et al., 2021; Frankel et al., 2018; Tan & Holub, 2011; Tan & Lumeng, 2018). Thus, the present study utilized a cross-lagged path analysis in order to examine the complex interrelations of emotional eating with these individual and environmental factors over time. Previous researchers examined the relationship between emotional eating, parental feeding styles, and self-regulation. However, this research aims to investigate their bidirectional associations. Self-regulation may play a role in eating behaviors that involve several processes, like

understanding the internal cues for hunger and satiety and deciding what to eat according to these cues (Dohle et al., 2018). Difficulties in self-regulation can be a predictor of emotional eating, such that children with lower inhibitory control are more likely to perform unhealthy eating patterns (Giuliani & Kelly, 2021; Rendall et al., 2022; Tan & Lumeng, 2018). Although most studies show relations between self-regulation and emotional eating, no study has yet revealed the directionality of this link.

Furthermore, to our knowledge, the association between mealtime technofence and emotional eating has not been investigated yet. Mealtime technofence has been found to be related to some other aspects of eating behaviors (e.g., food neophobia); emotional eating also can be related to mealtime technofence. (Coyne et al., 2021; Milkovich et al., 2020).

Therefore, the purpose of the present study was to examine transactional relations between parental feeding styles (i.e., emotional feeding and control feeding), mealtime technofence, and child self-regulation predicting children's emotional eating. This study plays an explorative role in understanding the potential relationship between mealtime technofence and emotional eating because this is the first study to investigate this relationship. Therefore, we analyzed parental feeding styles and mealtime technofence separately to disaggregate their unique contributions in predicting children's emotional eating. By examining these variables separately, we will be able to obtain valuable insights into their distinctive roles in emotional eating. Also, our findings will contribute to the literature for this relationship and enhance theoretical understanding regarding whether parental feeding styles and mealtime technofence

have similar or different relations with the emotional eating behaviors of children. For this purpose, we investigated the bidirectional relations among those variables by utilizing cross-lagged panel models (see Figure 1, Figure 2, for conceptual models).

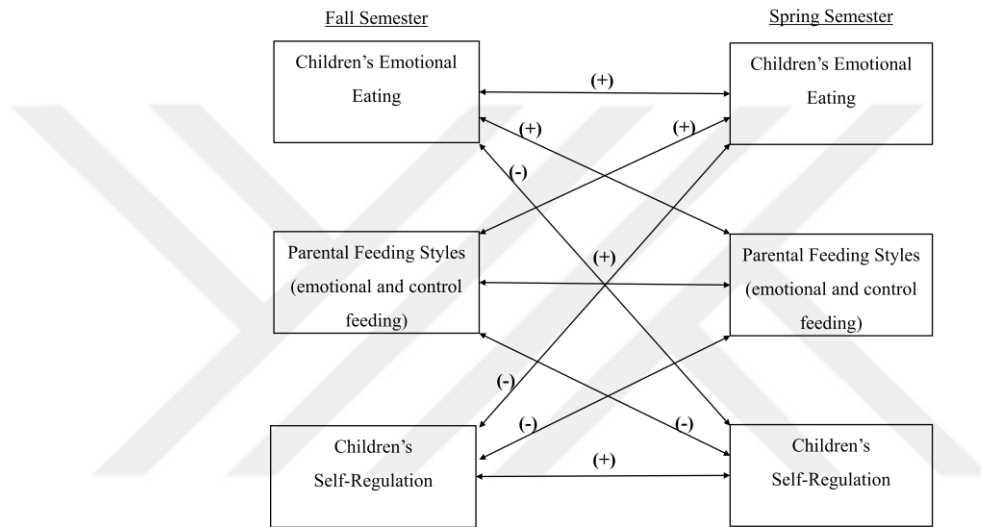


**Figure 1**  
*Conceptual Model 1*

*Note.* Cross-lagged model of children's emotional eating, parental feeding styles (emotional and control feeding), and self-regulation.

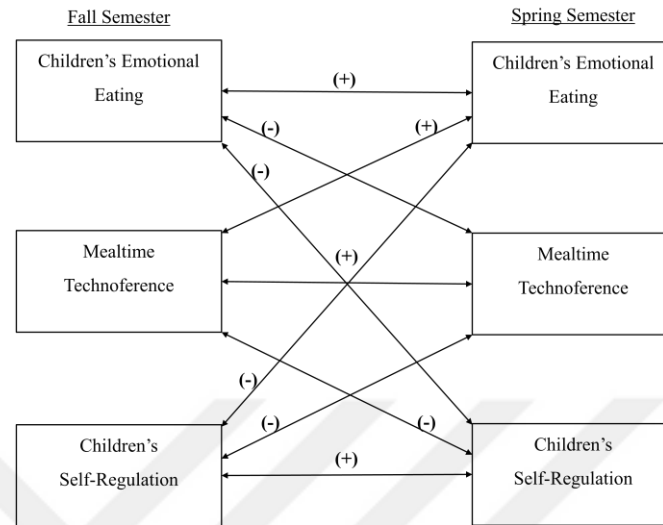


**Figure 2**  
*Conceptual Model 2*

*Note.* Cross-lagged model of children's emotional eating, mealtime technoference, and self-regulation.

## 2.5. Research Questions and Hypotheses

For the proposed study, our aim and hypotheses are as follows,

**Aim 1:** Investigating the stability of emotional eating, self-regulation, parental feeding styles and mealtime technoference from fall to spring semester over half a year. We aimed to examine the stability over half a year via an autoregressive design. (See Figure 1 and Figure 2).

**Hypothesis 1A:** As the previous work suggested, emotional eating in fall would predict greater emotional eating in spring (Steinsbekk et al., 2018).

**Hypothesis 1B:** Parental feeding styles (emotional feeding and control feeding) would be stable from fall to spring.

**Hypothesis 1C:** Mealtime technoference would persist from fall to spring.

**Hypothesis 1D:** Self-regulation of children could be stable from fall to spring.

This is because earlier research established that self-regulatory problems persist throughout various years (Cliff et al., 2017; ten Braak et al., 2017).

**Aim 2:** Examining the transactional associations among emotional eating, self-regulation, and parental feeding styles from fall to spring.

**Hypothesis 2A:** Emotional eating in fall would predict higher emotional feeding and control feeding but lower self-regulation in spring.

**Hypothesis 2B:** Emotional feeding and control feeding in fall would predict greater emotional eating but lower self-regulation in spring.

**Hypothesis 2C:** Lower self-regulation in fall would predict more emotional eating, emotional feeding and control feeding at spring.

**Aim 3:** Testing a cross-lagged model examining the transactional relations of emotional eating, self-regulation, and mealtime technoference from fall to spring.

**Hypothesis 3A:** Emotional eating in fall would predict lower mealtime technoference and lower self-regulation in spring.

**Hypothesis 3B:** Mealtime technoference in fall would predict greater emotional eating but lower self-regulation in spring.

**Hypothesis 3C:** Lower self-regulation in fall would predict greater emotional eating and mealtime technoference in spring.

## CHAPTER 3

### METHOD

#### 3.1. Participants

The present study had a short-term longitudinal design. The data were collected during the fall and the spring semesters of 2021-2022 academic year. We collected data from one public and two private nursery schools. Inclusion criteria for the study was to being a parent with a normally developing preschool child.

During the data collection in the fall semester, we recruited 203 children across three schools. Children aged between 36 to 76 months ( $M = 58.49$ ,  $SD = 9.07$ ) in the fall and aged between 44 to 80 months ( $M = 65.26$ ,  $SD = 8.27$ ) in the spring. Of these children, 45% were girls, and 55% were boys in fall. Forty-seven of the children dropped out of the study in the spring. However, 28 children who did not participate in the research during the fall semester were recruited in the spring semester, in total 231 children participated to study.

Mothers' ages ranged from 24 years to 47 years ( $M = 34.09$ ,  $SD = 4.82$ ) and fathers' ages ranged from 24 years to 50 years ( $M = 37.53$ ,  $SD = 4.76$ ). See Table 1 for detailed demographics. For the analyses, a composite score of parental socio-economic status (SES) was calculated by averaging standardized scores (z-scores) of parental education and income level for the fall and spring.

**Table 1**  
*Participants' Demographic Information (N = 231)*

|                               | Fall     |          |                    |          |           |              | Spring   |          |                    |          |           |              |
|-------------------------------|----------|----------|--------------------|----------|-----------|--------------|----------|----------|--------------------|----------|-----------|--------------|
|                               | <i>n</i> | <i>%</i> | <i>Missing (%)</i> | <i>M</i> | <i>SD</i> | <i>Range</i> | <i>n</i> | <i>%</i> | <i>Missing (%)</i> | <i>M</i> | <i>SD</i> | <i>Range</i> |
| <b>Child Characteristics</b>  |          |          |                    |          |           |              |          |          |                    |          |           |              |
| Sex                           | 202      |          | 12.6               |          |           |              | 184      |          | 20.3               |          |           |              |
| Girls                         | 91       | 45       |                    |          |           |              | 78       | 57.8     |                    |          |           |              |
| Boys                          | 111      | 55       |                    |          |           |              | 106      | 42.2     |                    |          |           |              |
| Age (Months)                  | 202      |          | 12.6               | 58.49    | 9.07      | 36-76        | 182      |          | 21.2               | 65.26    | 8.27      | 44-80        |
| <b>Family Characteristics</b> |          |          |                    |          |           |              |          |          |                    |          |           |              |
| Mothers' Age                  | 145      |          | 37.2               | 34.09    | 4.82      | 24-47        | 115      |          | 50.2               | 35.10    | 5.01      | 24-48        |
| Fathers' Age                  | 144      |          | 37.7               | 37.53    | 4.76      | 24-50        | 115      |          | 50.2               | 38.39    | 4.93      | 24-54        |
| Employment                    | 148      |          | 35.9               |          |           |              | 115      |          | 50.2               |          |           |              |
| Employed                      | 77       | 52       |                    |          |           |              | 63       | 54.8     |                    |          |           |              |
| Unemployed                    | 71       | 48       |                    |          |           |              | 52       | 45.2     |                    |          |           |              |
| Education Status              | 148      |          | 35.9               |          |           |              | 115      |          | 50.2               |          |           |              |
| Primary School                | 3        | 2        |                    |          |           |              | 6        | 5.2      |                    |          |           |              |
| Secondary School              | 9        | 6.1      |                    |          |           |              | 2        | 1.7      |                    |          |           |              |
| High School                   | 39       | 26.4     |                    |          |           |              | 28       | 24.3     |                    |          |           |              |
| Undergraduate                 | 88       | 59.5     |                    |          |           |              | 70       | 60.9     |                    |          |           |              |
| Master's Degree               | 8        | 5.4      |                    |          |           |              | 8        | 7.0      |                    |          |           |              |
| Doctorate                     | 1        | 0.7      |                    |          |           |              | 1        | 0.9      |                    |          |           |              |
| Marital Status                | 147      |          | 36.4               |          |           |              | 116      |          | 49.8               |          |           |              |
| Married                       | 143      | 97.3     |                    |          |           |              | 112      | 96.6     |                    |          |           |              |
| Divorced                      | 2        | 1.4      |                    |          |           |              | 2        | 1.7      |                    |          |           |              |
| Separated                     | 1        | 0.7      |                    |          |           |              | 1        | 0.9      |                    |          |           |              |
| Living Together               | 1        | 0.7      |                    |          |           |              | 0        | 0        |                    |          |           |              |

|                 |     |      |      |     |      |      |
|-----------------|-----|------|------|-----|------|------|
| Second Marriage | 0   | 0    |      | 1   | 0.9  |      |
| Family Income   | 138 |      | 40.3 | 111 |      | 51.9 |
| 1000-3000 TL    | 8   | 5.8  |      | 1   | 0.9  |      |
| 3001-5000 TL    | 24  | 17.4 |      | 3   | 2.7  |      |
| 5001-7000 TL    | 33  | 23.9 |      | 15  | 13.5 |      |
| 7001-9000 TL    | 22  | 15.9 |      | 18  | 16.2 |      |
| 9000 TL +       | 51  | 37.0 |      | 74  | 66.7 |      |

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*Note.* *M* = Mean, *SD* = Standard Deviation.

## 3.2. Measures

### 3.2.1. Children's Emotional Eating Behaviors

Parents reported on their children's emotional eating behaviors using the Children's Eating Behavior Questionnaire (CEBQ) in the fall and spring semesters. Wardle et al. (2001) developed this questionnaire, and Yılmaz et al. (2011) adapted it for the Turkish sample. This scale has 35 items and consists of 8 subscales: food responsiveness, enjoyment of food, emotional overeating, desire to drink, satiety responsiveness, slow eating, emotional undereating, and fussiness. Parents rated their children's eating behavior with a 5-point Likert-type scale (1= never to 5= always). For the study, emotional overeating and undereating scales were used as representatives of emotional eating. Each scale has four items; eight are used to measure children's emotional eating behaviors. The emotional overeating questions indicate whether children overeat if they are emotionally charged (e.g., “My child eats more when worried”). Emotional undereating questions represent whether children do not prefer to eat if they are emotionally loaded (e.g., “My child eats less when s/he is angry”).

Aligned with the purpose of the current study, we ran a confirmatory factor analysis (CFA) to test whether a two-factor solution (i.e., emotional over and under-eating) existed in the current data. Thus, we conducted CFA using the JASP 0.17.1 software to understand whether emotional eating could be a single or 2-factor, aligned with the original scale. Results showed that the 2-factor model of emotional eating fits the data,  $\chi^2(240) = 368.519, p < .001$ ; Comparative Fit Index (CFI) = 0.96, Tucker-Lewis Index (TLI) = 0.95, Root Mean Square Error of Approximation (RMSEA) = 0.06, 90% C.I. =

0.04, 0.07, Standardized Root Mean Square Residual (SRMR) = 0.08. Therefore, further analyses were conducted using two separate emotional eating behavior scores referring to emotional overeating and emotional undereating. The Cronbach's alpha values of emotional overeating and undereating subscales were respectively .79 and .74 in the original scale, respectively .78 and .70 for the fall semester and respectively .87 and .67 for the spring semester.

### **3.2.2. Parental Feeding Styles**

We used the Parental Feeding Style Questionnaire (PFSQ) for measuring parental feeding styles in both fall and spring semesters. This scale is developed by Wardle et al. (2002) and adapted by Turkish by Özçetin et al. (2010). Parents rated their feeding behaviors on 27 items with a 5-point Likert-type scale (1= never to 5= always). This scale consists of four subscales, emotional feeding, instrumental feeding, prompting/encouraging to eat, and control feeding. For the purpose of the study, we used emotional feeding and control feeding subscales. The emotional feeding subscale has five questions (e.g., *"I give my child something to eat to make him/her feel better when s/he is feeling upset"*), and the control feeding subscale have eight questions (e.g., *"I decide the times when my child eats his/her meals"*). Higher scores in emotional and control feeding indicate a higher tendency to emotional feeding and parents have higher controlled behaviors over their children such that regulating and restricting children's eating behaviors. The Cronbach's alpha values of the original scale were .83 for emotional feeding and .81 for control feeding. In the current study, for fall semester

Cronbach alpha values were .88 and .77; and for spring semester .90 and .73 respectively for emotional feeding and control feeding subscales.

### **3.2.3. Mealtime Technoference**

Interruptions in parent-child interactions during mealtimes were measured via the revised version of DISRUPT scale in the fall and spring semesters (McDaniel, 2021; McDaniel & Radesky, 2018). The scale was initially developed without referencing the mealtimes; however, Gramm et al. (2020) revised the scale by referring to mealtime interruptions in parent-child interactions. The scale consists of 5 questions (e.g., *“During mealtimes with my child, there are times my child tries to get my attention because I am on my phone or mobile device”*). Parents responded to the items on a 6-point scale (1= strongly disagree to 6= strongly agree). Higher scores on this scale indicate higher mealtime technoference. The current study was the first to use this scale with Turkish parents; therefore, we conducted CFA using JASP 0.17.1 software. Results showed that one-factor solution fit the data well,  $\chi^2(5) = 5.538$ ,  $p = .354$ , CFI = 0.99, TLI = 0.99, SRMR = 0.01, RMSEA = 0.02, 90% C.I. = 0.00, 0.12. The internal consistency of scale is .94 for the original scale. For the current study, Cronbach alpha value was .93 for the fall and .89 for the spring semesters.

### **3.2.4. Children’s Self-Regulation**

We used the balance beam, pencil tap, tower task, and snack delay tasks from the Preschool Self-Regulation Assessment (PSRA; Smith-Donald et al., 2007) and the gift delay task from Carlson and Moses (2001) to assess children's self-regulation. These

tasks have been previously used and validated with Turkish children (Acar et al., 2019; Acar et al., 2022).

**Balance Beam (Walk a Line Slowly).** This task measures the cognitive dimension of self-regulation (Roth, 1991). Children were asked to walk on a 2 meters flat strip taped to the ground. After the baseline walk, the experimenter asked the children to walk again but more slowly, and for the third trial, the children were asked to walk too slowly. The other experimenter coded the children's time completing every trial during the task. The differences between the baseline-second trial and baseline-third trial was calculated and averaged. The score in this task measures the children's ability to inhibit movement if instructed. Higher scores represent better self-regulation abilities.

**Pencil Tap.** This task measures children's executive function skills (Raver et al., 2011). The child and the experimenter each had one pencil in the task. The experimenter instructed, "Tap the pencil once if I tap twice and tap the pencil twice if I tap once." Before actual trials, the child and experimenter practiced up to six times. The experimenter gives feedback like "well done" but if the child makes a mistake, the experimenter corrects the child and reminds the game's rules again. After the practice trials, 16 scored trials were completed without providing feedback. Correct trial percentages were calculated, and higher scores represent better self-regulatory skills.

**Tower Task.** A tower task was conducted to measure the children's inhibitory control skills (Smith-Donald et al., 2007). The experimenter asked the children to build a tower together with blocks. The rule of the game was waiting for the turn after putting a block. The first tower was built with six blocks as a practice trial, and children were

warned if they did not wait their turn. The second tower was built with twelve blocks as an actual trial, and the experimenter did not remind the game's rules. Other experimenter coded children's waiting turn status on a 3-point scale; if the children always waited their turn, they were scored 2; if they did not wait at least once, they were scored 1; and if they did not wait at all, they were scored 0. The scores ranged from 0 to 2, and higher scores indicate higher inhibitory control.

**Snack Delay.** This task measures children's delay of gratification skills. It is frequently used in studies investigating the eating behaviors of children to measure self-regulation and self-regulation of eating (Francis et al., 2021; Giuliani & Kelly, 2021; Power et al., 2022). In this task, the experimenter put a cracker under a transparent cup and asked to wait to eat the cracker until the experimenter rang the bell at four trials, respectively, 10 sec, 20 sec, 30 sec, and 60 sec. During the waiting process, children were instructed to put flat their hands on the table. In every trial, the experimenter lifted but did not ring the bell when half of the time passed, respectively, 5 sec, 10 sec, 15 sec, and 30 sec. Before the actual four trials, a practice trial was conducted to help the child understand the game's rules. Other experimenter coded the children as follows "eats the cracker = 1, touches the cracker = 2, touches the chronometer or the cup = 3, waits for eating without touching anything = 4". The experimenter also coded whether the child waits with flat hands (yes =1; no =0). For scoring, children's waiting status (ranges 1 to 4) and hand placement (ranges 0 to 1) were summed, and each trial's score was averaged. Higher scores indicate better behavioral and emotional control.

**Gift Wrap.** This task also measures children's delay of gratification and inhibitory control skills (Voigt, 2012). In this task, the experimenter wanted to give the child a "gift" but indicated that they forgot to wrap it. The children are asked not to look to make the gift a surprise. For this purpose, children were turned to a wall where they could not see the wrapping for 60-sec. The other experimenter coded the children's status: "turns around for looking at the gift = 0, peeks over shoulders = 1, does not peek or turn = 2". Also, the time was coded if the child peeked or turned around to look at the gift. The first time the child peeked over the shoulders was recorded, and the number of peeking was coded. The task ends if the child turns around to look at the gift completely. Three components of the tasks are standardized and averaged; higher scores indicate a better delay of gratification and inhibitory control skills.

At least two qualified experimenters administered the tasks. The first experimenter performed the task with a child, and the second experimenter coded the children's responses and behaviors. The tasks were always conducted in the same order: "Balance Beam, Pencil Tap, Tower Task, Snack Delay, and Gift Wrap." Previous research has shown that self-regulation tasks in this research can be used as a composite self-regulation score (Acar et al., 2021; Encinger et al., 2020). Aligned with previous conceptualizations, all the task scores were standardized and averaged to get composite self-regulation scores. The interrater reliability between coders was calculated using intraclass correlations and Cohen's kappa analyses. Intraclass correlations and Cohen's kappa values ranged from .86 to 1, indicating good to excellent agreement for %16 of the collected data in self-regulation measurements (Fleiss & Cohen, 1973).

**Table 2**  
*Descriptive Statistics of Study Variables (N = 231)*

| <b>Fall</b>                    | <i>Internal Consistency</i> | <i>Missing (%)</i> | <i>Min-Max</i> | <i>M</i> | <i>SD</i> | <i>Skewness</i> | <i>Kurtosis</i> |
|--------------------------------|-----------------------------|--------------------|----------------|----------|-----------|-----------------|-----------------|
| <b>Emotional Eating*</b>       |                             |                    |                |          |           |                 |                 |
| Emotional Overeating           | .78                         | 0.4                | 1.00 - 3.50    | 1.40     | 0.42      | 1.62            | 4.40            |
| Emotional Undereating          | .66                         | 0.4                | 1.00 - 5.00    | 2.88     | 0.72      | 0.13            | 0.20            |
| <b>Parental Feeding Styles</b> |                             |                    |                |          |           |                 |                 |
| Emotional Feeding              | .88                         | 0.4                | 1.00 - 5.00    | 2.33     | 0.79      | 0.34            | 0.10            |
| Control feeding                | .77                         | 0.4                | 1.40 - 4.70    | 3.43     | 0.49      | -0.40           | 1.45            |
| <b>Mealtime Technoference</b>  | .93                         | 0.4                | 1.00 - 5.00    | 1.96     | 0.81      | 0.84            | 0.77            |
| <b>Self-Regulation</b>         |                             | 0.4                | -2.30 - 1.20   | -0.05    | 0.59      | -0.86           | 1.00            |
| <b>Spring</b>                  | <i>Internal Consistency</i> | <i>Missing (%)</i> | <i>Min-Max</i> | <i>M</i> | <i>SD</i> | <i>Skewness</i> | <i>Kurtosis</i> |
| <b>Emotional Eating</b>        |                             |                    |                |          |           |                 |                 |
| Emotional Overeating           | .88                         | 0.4                | 1.00 - 4.50    | 0.28     | 0.21      | 0.02            | -0.75           |
| Emotional Undereating          | .67                         | 0.4                | 1.00 - 5.00    | 2.84     | 0.66      | 0.39            | 0.79            |
| <b>Parental Feeding Styles</b> |                             |                    |                |          |           |                 |                 |
| Emotional Feeding              | .90                         | 0.4                | 1.00 - 4.00    | 2.24     | 0.68      | 0.19            | -0.31           |
| Control feeding                | .73                         | 0.4                | 1.50 - 4.88    | 3.53     | 0.50      | -0.67           | 1.85            |
| <b>Mealtime Technoference</b>  | .89                         | 0.4                | 1.00 - 4.80    | 2.05     | 0.73      | 0.65            | 0.70            |
| <b>Self-Regulation</b>         |                             | 0.4                | -2.54 - 1.58   | -0.05    | 0.60      | -1.07           | 2.36            |

*Note.* Min = Minimum, Max = Maximum, M = Mean, SD = Standard Deviation. \*Transformed variable was used. All the values here reported from imputed final data.

### 3.3. Data Collection Procedures

The study was approved by the Human Research Ethics Committee of Özyeğin University. We collected data from children who were preschool children at public and private schools during the fall and spring semesters of 2021-2022 academic year. All the procedures were the same for the fall and spring semesters. Firstly, we contacted the school administration and asked for approval to collect data. After their approval, we reached parents through teachers and sent them the consent forms and questionnaires (i.e., children's eating behaviors, parental feeding styles, mealtime technoference questionnaires and demographic form). We also indicated that participation in this study is voluntary. If the parents agreed to participate in study, they completed the questionnaires and returned the forms via teachers. Following, we measured children's self-regulation skills in school settings by experimenters using Preschool Self-Regulation Assessment (PSRA; Smith-Donald et al., 2007) and each assessment lasted 15 to 20 minutes. The procedures of this assessment tool were the same with previous research (Smith-Donald et al., 2007; Acar et al., 2019; Acar et al., 2022). Experimenters were trained by experienced researchers on PSRA (Smith-Donald et al., 2007) tool before the data collection procedures. They participated in training of PSRA tool to understand the measurement techniques. Experimenters who participated in the training practiced this assessment tool on children. After these steps, we tested their competency of using PSRA. For checkout, we paired two experimenters. The dyads performed the assessment tool in the presence of experienced researchers. If they successfully completed these steps, they participated in this research study as an experimenter.

### 3.4. Data Analytical Approach

#### 3.4.1. Data Screening

Data were screened before the main analyses to identify the accuracy of data entering, the missingness of the values, and the multivariate analysis assumptions using the SPSS 27.0 software program. The composite and average scores were calculated after the data screening. Missing value patterns of variables were analyzed with the Missing Completely at Random (MCAR) test (Little, 1988). The results were not significant, indicating that missing values were completely random ( $\chi^2 (255) = 278.30, p > .05$ ). Moreover, Mahalanobis Distance method is used to distinguish multivariate outliers, and no outliers were detected (De Maesschalck et al., 2000; Tabachnick & Fidell, 2007). Thus, none of the participants were removed for further analysis. See Missing Data Treatment section below for details regarding how missing data were handled in the analysis.

Regarding the normality assumption, values were tested with the suggested criterion of  $\pm 2$  for the skewness and  $\pm 3$  for the kurtosis (Hopkins & Weeks, 1990; Kline, 2005). Results showed that all the variables are between the skewness and kurtosis criterion values except for the emotional overeating variable in spring. The skewness and kurtosis values were beyond the criterion scores for this variable (Skewness = 2.65 and kurtosis = 8.79), and the normality assumption was not met. Hence, Box-Cox transformation analyses were run to acquire normal distribution for emotional overeating variable (Box & Cox, 1964). Data transformation methods are used if the violation of assumptions occurs. The Box-Cox transformation method is used when the

normal distribution method is violated. This method transforms the non-normally distributed data into normally distributed data (Vélez et al., 2015). In this transformation method, data are calibrated toward normal distribution most efficiently and help to improve the suggested model (Pek et al., 2018). Among the generated distributions, the most optimal values which are in between the criterion values, are created as 0.02 for skewness and -0.75 for kurtosis values. (See Osborne, 2010, for the procedures of Box-Cox analysis).

### **3.4.2. Missing Data Treatment**

First, we examined the patterns of missingness over time across variables. Missingness across main study variables was found to be completely at random as a result of Little's MCAR test ( $\chi^2(255) = 278.30, p > .05$ ), indicating probability of missingness does not depend on either observed or missing data (Rubin, 1976). Second, we tested whether demographic variables predicted missingness. Only family SES predicted missingness, indicating that parents with low SES were highly likely to drop out of the study. No other demographic difference existed between parents who remained in the study and those who dropped out. See Table 3 for complete results. Considering the missingness was completely at random, both utilizing full information maximum likelihood (FIML) and multiple imputation (MI) for handling missing data could yield same results (Enders, 2011). In detail, "FIML uses all of the available data to generate parameter estimates; the estimator does not discard incomplete cases, nor does it impute missing values" (p. 270), and "multiple imputation fills in the missing values before analysis" (Enders, 2011, p. 271). We ran the same statistical models using FIML

and MI to provide sensitivity for the results. We used SPSS 27 to impute the missing data on focal variables. All variables, except for demographics, were included in the imputation phase under the assumption that missing values are missing at random (Allison, 2002; Schafer & Graham, 2002). We generated five datasets and pooled them according to Rubin's (1987) rules. Analysis run on the *Mplus* 8.7 (Muthen & Muthen, 2017) yielded the same results with both imputed data and using FIML.

Correspondingly, we reported results from imputed data in our final models.

In line with Kline's (2011) recommendations, comparative fit index (CFI) and Tucker-Lewis index (TLI) values greater than .90, root mean square error of approximation (RMSEA) values of .08 or below, and standardized root mean square residual (SRMR) values of .08 or below are employed to indicate a good fit. As all the models were saturated, models fit the data perfectly; therefore, we did not provide model fit information for each model for brevity.

**Table 3.**  
*Prediction of Missingness from Demographic Variables*

|                | <b>Estimate</b> | <b>SE</b> | <b>Odds Ratio</b> | <b>Wald Statistic</b> | <b><i>p</i></b> | <b>%95 CI [LL, UL]</b> |
|----------------|-----------------|-----------|-------------------|-----------------------|-----------------|------------------------|
| (Intercept)    | .92             | 1.63      | 2.51              | 0.317                 | .574            | [0.12, 61.36]          |
| Child Age (F)  | -.02            | 0.02      | 0.98              | 0.528                 | .467            | [0.94, 1.03]           |
| Child Sex      | .59             | 0.35      | 1.80              | 2.804                 | .094            | [0.90, 3.59]           |
| Mother Age (F) | .06             | 0.06      | 1.07              | 1.202                 | .273            | [0.95, 1.20]           |
| Father Age (F) | -.07            | 0.06      | 0.93              | 1.477                 | .224            | [0.83, 1.05]           |
| SES (F)        | -.91            | 0.33      | 0.40              | 7.416                 | .006**          | [0.21, 0.78]           |

*Note.* \*\* $p < .01$ . %95 CI = 95% Confidence Interval, LL = lower limits, UL = upper limits. Child Sex (Girl= 1, Boy = 0).

## CHAPTER 4

### RESULTS

#### 4.1. Preliminary Analyses

Descriptive statistics of all variables were presented in Table 2. Children's overeating scores ranged from 1.00 to 3.50 ( $M = 1.40$ ,  $SD = 0.42$ ) and undereating scores were ranged 1.00 to 5.00 ( $M = 2.88$ ,  $SD = 0.72$ ) in fall. Moreover, children's overeating scores ranged from 1.00 to 4.50 ( $M = 0.28$ ,  $SD = 0.21$ ) and undereating scores ranged 1.00 to 5.00 ( $M = 2.84$ ,  $SD = 0.66$ ) in spring.

#### 4.2. Bivariate Associations Among the Study Variables

Bivariate Pearson correlation analyses were conducted among the emotional eating (overeating and under eating), parental feeding styles (emotional feeding and parental control feeding), mealtime technofence and self-regulation variables both in fall and spring. Also, demographic variables (e.g., age, sex, and SES) were included to correlation analyses (See Table 4).

Consistent with our hypothesis 2A, emotional overeating ( $r(230) = .34$ ,  $p < .001$ ) and undereating ( $r(230) = .16$ ,  $p = .016$ ) in fall was positively related with emotional feeding in spring. Also, as we hypothesized (2A), self regulation in spring was negatively related with emotional overeating ( $r(230) = -.14$ ,  $p = .031$ ) and undereating ( $r(230) = -.15$ ,  $p = .024$ ) in fall. However inconsistently, emotional over and undereating were not related with control feeding in spring. On the other hand, mealtime technofence in spring was negatively related with emotional overeating ( $r(230) = .15$ ,  $p = .028$ ) but not related with undereating (hypothesis 3A) in fall.

As we expected (hypothesis 2B), emotional feeding in fall was positively related with emotional overeating ( $r(230) = .29, p < .001$ ) and undereating ( $r(230) = .19, p = .004$ ) in spring. However control feeding (hypothesis 2B) and self-regulation (hypothesis 2C) in fall was not related with emotional overeating and undereating in spring. Furthermore, mealtime technoference (hypothesis 3b) in fall was positively related with emotional overeating in spring,  $r(230) = .30, p < .001$ , but was not related with emotional undereating.

**Table 4**  
*Pearson Correlations Among the Variables*

| Variables                       | 1     | 2     | 3     | 4     | 5      | 6     | 7      | 8     | 9     | 10   | 11    | 12    | 13    | 14   |
|---------------------------------|-------|-------|-------|-------|--------|-------|--------|-------|-------|------|-------|-------|-------|------|
| 1. Emotional Overeating (F)     | -     |       |       |       |        |       |        |       |       |      |       |       |       |      |
| 2. Emotional Under Eating (F)   | .11   | -     |       |       |        |       |        |       |       |      |       |       |       |      |
| 3. Emotional Overeating (S)     | .41** | .06   | -     |       |        |       |        |       |       |      |       |       |       |      |
| 4. Emotional Under Eating (S)   | .08   | .57** | .08   | -     |        |       |        |       |       |      |       |       |       |      |
| 5. Emotional Feeding (F)        | .44** | .13*  | .29** | .19** | -      |       |        |       |       |      |       |       |       |      |
| 6. Parental Control Feeding (F) | -.01  | -.14* | -.04  | -.04  | -.18** | -     |        |       |       |      |       |       |       |      |
| 7. Emotional Feeding (S)        | .34** | .16*  | .47** | .37** | .71**  | -.12  | -      |       |       |      |       |       |       |      |
| 8. Parental Control Feeding (S) | -.03  | .08   | -.16* | .11   | -.14*  | .63** | -.16*  | -     |       |      |       |       |       |      |
| 9. Mealtime Technoference (F)   | .13*  | .19** | .30** | .05   | .17*   | .04   | .33**  | -.09  | -     |      |       |       |       |      |
| 10. Mealtime Technoference (S)  | -.15* | .04   | .18** | -.07  | .06    | -.08  | .16*   | -.05  | .50** | -    |       |       |       |      |
| 11. Self-Regulation (F)         | -.13  | -.08  | .08   | -.03  | -.27** | .08   | -.22** | .22** | -.08  | .04  | -     |       |       |      |
| 12. Self-Regulation (S)         | -.14* | -.15* | -.03  | -.04  | -.26** | .09   | -.19** | .19** | .03   | -.07 | .58** | -     |       |      |
| 13. Child Age (F)               | .03   | -.08  | .04   | -.10  | -.08   | .10   | -.06   | .05   | .08   | .01  | .37** | .22** | -     |      |
| 14. Child Age (S)               | -.01  | -.04  | .04   | -.10  | -.02   | -.02  | -.01   | -.01  | .01   | .08  | .29** | .09   | .43** | -    |
| 15. Sex                         | -.06  | .02   | .05   | -.08  | -.01   | .05   | .02    | .08   | .03   | .13  | .12   | .12   | -.05  | .05  |
| 16. Family SES                  | .01   | .08   | -.03  | .15*  | -.08   | -.06  | .04    | .05   | .003  | -.02 | .08   | .08   | -.11  | -.02 |

Note. \* $p < .05$  (2-tailed), \*\* $p < .01$  (2-tailed). (F) = Fall, (S) = Spring, Sex (Girl = 1, Boy = 0). All the values here are reported from imputed final data.

### 4.3. Cross-lagged Path Analyses

Based on the conceptualized models, cross-lagged path analyses were conducted for a total of six different models using *Mplus* 8.7 (Muthén & Muthén, 2017). We analyzed parental emotional feeding, control feeding and mealtime technoference separately to disaggregate their unique contributions in predicting children's emotional eating. Additionally, we tested these parent-driven factors separately for emotional over and under eating based on CFA results, which indicated 2-factor solution. Therefore in total, we had six different models. All the models, including children's emotional eating behaviors (overeating and under eating), parental feeding styles (emotional feeding and control feeding), mealtime technoference and self-regulation perfectly fit to model (CFI = 1.0, TLI = 1.0, RMSEA= 0.00 [90% CI: 0.00–0.00], SRMR = 0.00). We utilized the top-down model building where we included all possible covariates, including age, child sex, family SES in the model. We then removed the non-significant covariates to save up power.

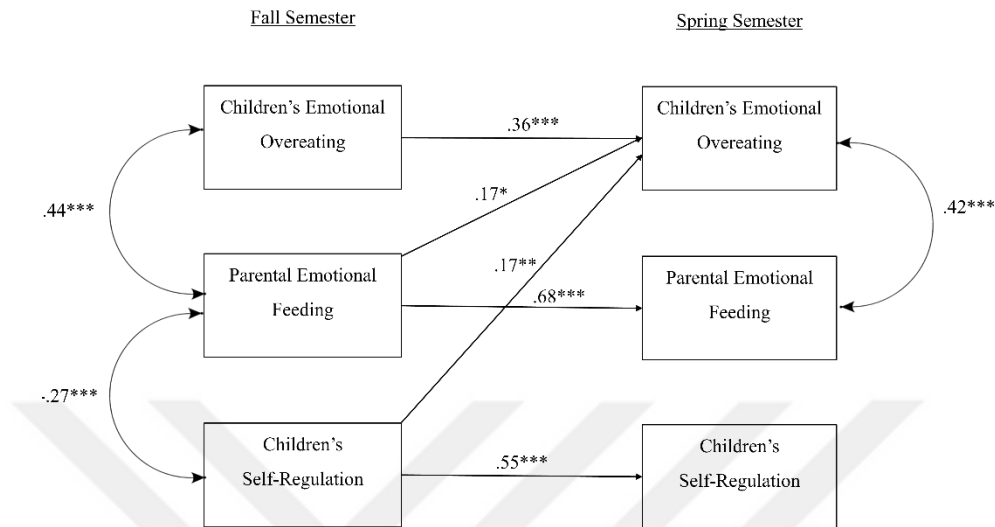


**Figure 3**

*Model 1: Parental Emotional Feeding, Children's Self-Regulation Predicting Children's Emotional Overeating*

Note. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ . Standardized coefficients are presented to reflect effect sizes. Only significant paths are depicted for brevity.

In the first model (see Figure 3), Children's emotional overeating behaviors in spring were predicted by emotional feeding in fall ( $\beta = 0.17$ ,  $SE = 0.07$ ) and self-regulation in fall ( $\beta = 0.17$ ,  $SE = 0.06$ ). Furthermore, emotional overeating in spring was concurrently related with parental emotional feeding in spring ( $\beta = 0.42$ ,  $SE = 0.06$ ). Significant concurrent relations were also found between parental emotional feeding in fall with children emotional overeating in fall ( $\beta = 0.44$ ,  $SE = 0.06$ ) and children self-regulation in fall ( $\beta = 0.27$ ,  $SE = 0.07$ ). Also, all the autoregressive relations were significant, emotional overeating ( $\beta = 0.36$ ,  $SE = 0.06$ ), parental emotional feeding ( $\beta = 0.68$ ,  $SE = 0.05$ ) and self-regulation ( $\beta = 0.55$ ,  $SE = 0.06$ ) from fall to spring.

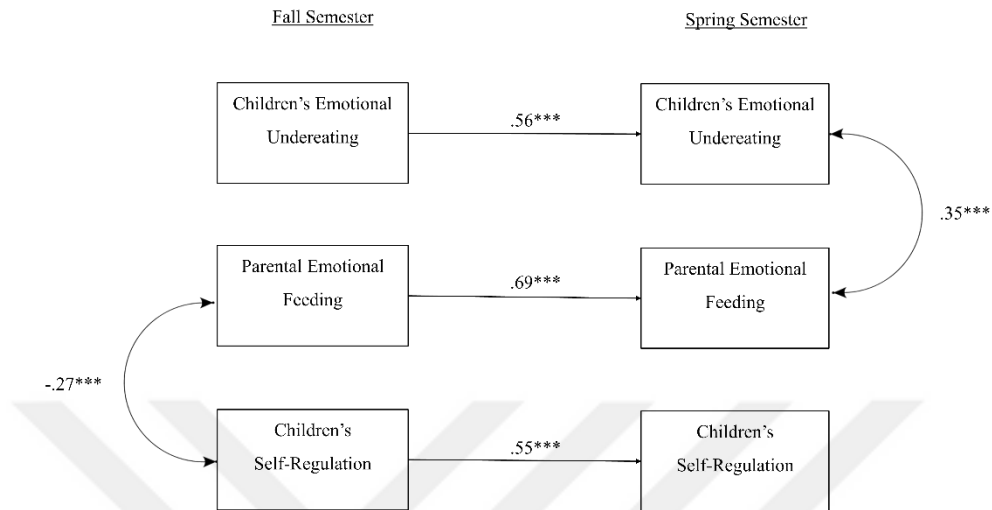


**Figure 4**

*Model 2: Parental Emotional Feeding, Children's Self-Regulation Predicting Children's Emotional Undereating*

Note.  $*p < 0.05$ ,  $**p < 0.01$ ,  $***p < 0.001$ . Standardized coefficients are presented to reflect effect sizes. Only significant paths are depicted for brevity.

In the second model (see Figure 4), Children's emotional undereating behaviors in fall was not predicted by parental emotional feeding and self-regulation. However, it was concurrently related with parental emotional feeding in spring ( $\beta = 0.35$ ,  $SE = 0.06$ ). Parental emotional feeding in fall was concurrently negatively related with children's self-regulation in fall ( $\beta = -0.27$ ,  $SE = 0.07$ ). Additionally, all the autoregressive relations were significant, emotional undereating ( $\beta = 0.56$ ,  $SE = 0.05$ ), parental emotional feeding ( $\beta = 0.69$ ,  $SE = 0.04$ ) and self-regulation ( $\beta = 0.55$ ,  $SE = 0.06$ ) from fall to spring.

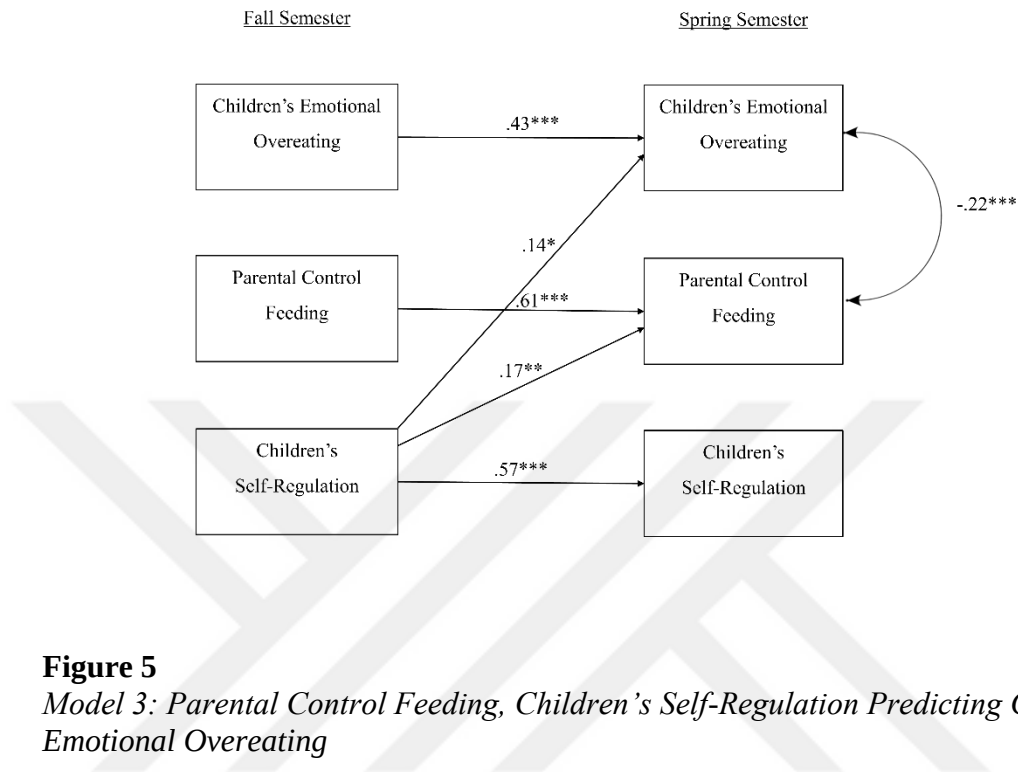
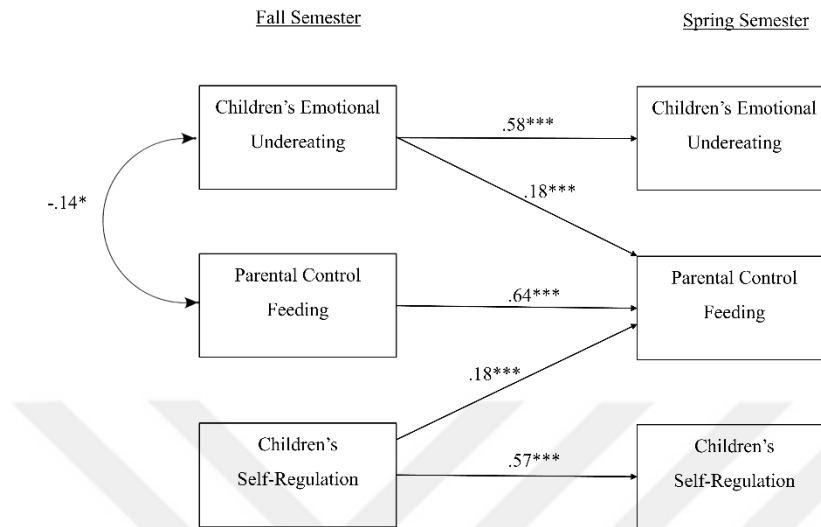


**Figure 5**

*Model 3: Parental Control Feeding, Children's Self-Regulation Predicting Children's Emotional Overeating*

*Note.* \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ . Standardized coefficients are presented to reflect effect sizes. Only significant paths are depicted for brevity.

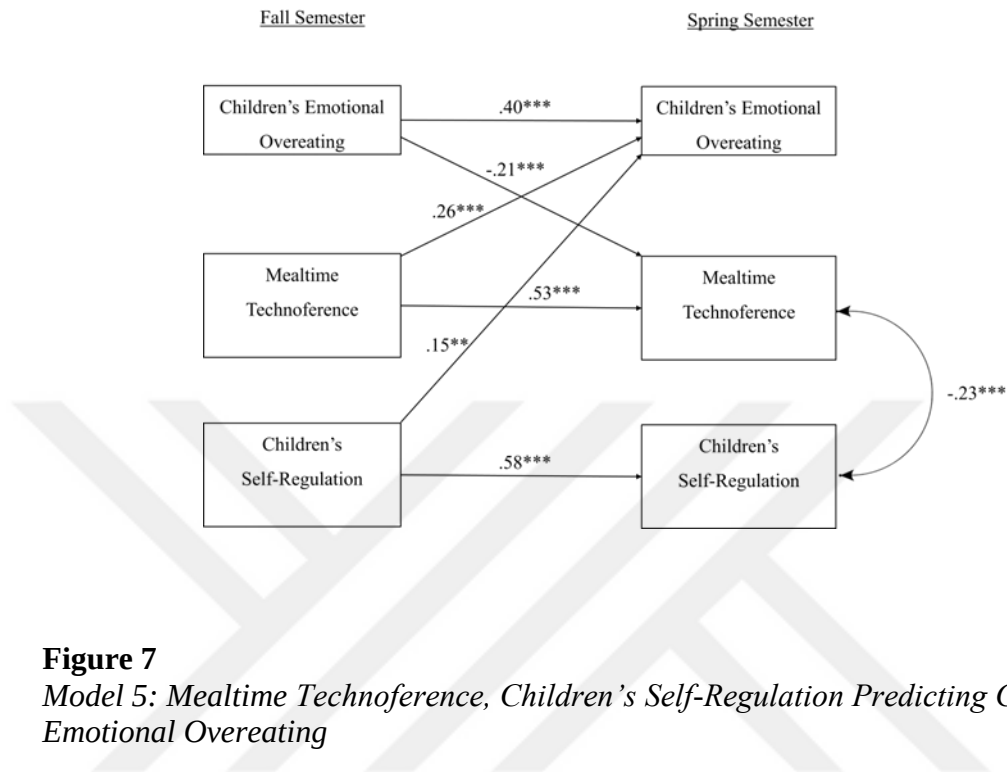
In the third model (see Figure 5) we tested the relations among children emotional overeating, parental control feeding and self-regulation in fall and spring. Children's self-regulation in fall predicted children emotional overeating behaviors in spring ( $\beta = 0.14$ ,  $SE = 0.06$ ) and parental control feeding in spring ( $\beta = 0.17$ ,  $SE = 0.05$ ). Also, children's emotional overeating in spring and parental control feeding in spring were negatively related ( $\beta = -0.22$ ,  $SE = 0.07$ ). All the autoregressive relations were significant, emotional overeating ( $\beta = 0.43$ ,  $SE = 0.06$ ), parental control feeding ( $\beta = 0.61$ ,  $SE = 0.05$ ) and self-regulation ( $\beta = 0.57$ ,  $SE = 0.06$ ) from fall to spring.

**Figure 6**

*Model 4: Parental Control Feeding, Children's Self-Regulation Predicting Children's Emotional Undereating*

Note.  $*p < 0.05$ ,  $**p < 0.01$ ,  $***p < 0.001$ . Standardized coefficients are presented to reflect effect sizes. Only significant paths are depicted for brevity.

In the fourth model (see Figure 6) we tested the relations among children emotional undereating, parental control feeding and self-regulation in fall and spring. Parental control feeding in spring was predicted by children's emotional undereating in fall ( $\beta = 0.18$ ,  $SE = 0.05$ ) and children's self-regulation in fall ( $\beta = 0.18$ ,  $SE = 0.05$ ). Children's emotional undereating in fall were significantly negatively related with parental control feeding in fall ( $\beta = -0.14$ ,  $SE = 0.07$ ). All the autoregressive relations were also significant, emotional undereating behaviors ( $\beta = 0.58$ ,  $SE = 0.06$ ), parental control feeding ( $\beta = 0.64$ ,  $SE = 0.05$ ) and self-regulation ( $\beta = 0.57$ ,  $SE = 0.06$ ) from fall to spring.



Note.  $*p < 0.05$ ,  $**p < 0.01$ ,  $***p < 0.001$ . Standardized coefficients are presented to reflect effect sizes. Only significant paths are depicted for brevity.

Further analyses were conducted with the children emotional eating, mealtime technoference and self-regulation in fall and spring. In the fifth model (see Figure 7) we tested the relations among children emotional overeating, mealtime technoference and self-regulation in fall and spring. Children's emotional overeating in spring was predicted by mealtime technoference in fall ( $\beta = 0.26$ ,  $SE = 0.07$ ) and self-regulation in fall ( $\beta = 0.15$ ,  $SE = 0.05$ ). On the other hand, mealtime technoference in spring was predicted by emotional over eating in fall ( $\beta = -0.21$ ,  $SE = 0.06$ ) and it was concurrently related with children's self-regulation in spring ( $\beta = -0.23$ ,  $SE = 0.06$ ). Besides, all the autoregressive relations were significant, emotional overeating ( $\beta = 0.40$ ,  $SE = 0.05$ ),

mealtime technoference ( $\beta = 0.53$ ,  $SE = 0.06$ ) and self-regulation ( $\beta = 0.58$ ,  $SE = 0.06$ ) from fall to spring.

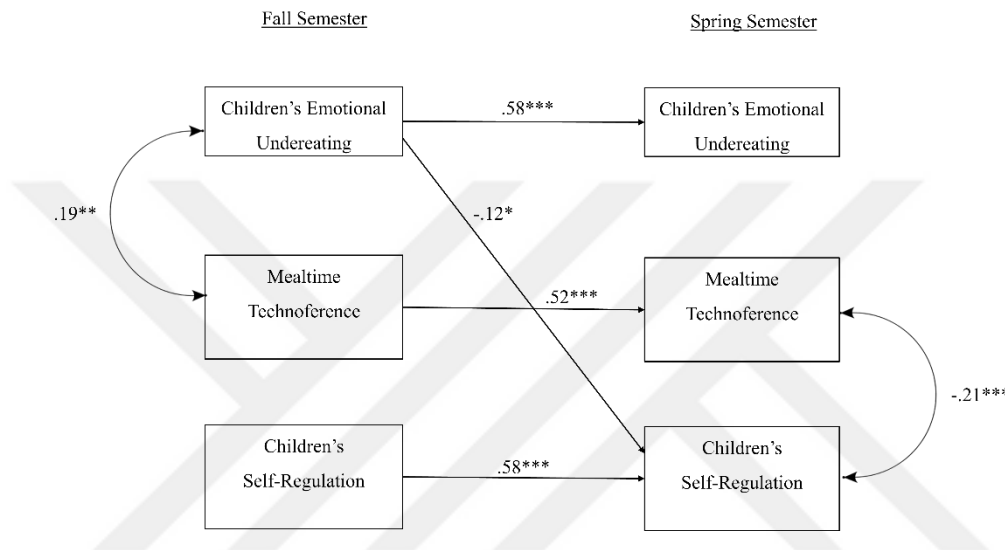


**Figure 8**

*Model 6: Mealtime Technoference, Children's Self-Regulation Predicting Children's Emotional Undereating*

Note.  $*p < 0.05$ ,  $**p < 0.01$ ,  $***p < 0.001$ . Standardized coefficients are presented to reflect effect sizes. Only significant paths are depicted for brevity.

For the final model (see Figure 8) we tested the relations among children emotional undereating, mealtime technoference and self-regulation in fall and spring. Children's self-regulation in spring was predicted by children's emotional undereating ( $\beta = -0.12$ ,  $SE = 0.06$ ) and it was concurrently related with mealtime technoference in spring ( $\beta = -0.21$ ,  $SE = 0.06$ ). In addition to this, children's emotional undereating in fall was related to technoference in fall ( $\beta = 0.19$ ,  $SE = 0.07$ ). All the autoregressive relations were also significant, emotional undereating ( $\beta = 0.58$ ,  $SE = 0.05$ ), mealtime

technoference ( $\beta = 0.52$ ,  $SE = 0.07$ ) and self-regulation ( $\beta = 0.58$ ,  $SE = 0.06$ ), from fall to spring.

#### **4.4. Exploratory Analysis**

We conducted hierarchical multiple regression analysis to understand the unique contributions of each predictor variable for explaining their variance in emotional eating using the SPSS 27.0 software program. Since we separately analyzed emotional overeating and undereating in previous analyses for fall and spring, we conducted four different 3-step hierarchical multiple regression. For each analysis, we focused on a specific dependent variable, respectively, fall emotional overeating and undereating and spring emotional overeating and undereating. In each analysis, we followed a specific stepwise approach. Demographic variables were entered at the first step, self-regulation at the second step, and parent-driven factors (i.e., emotional feeding, control feeding, and mealtime technoference) at the third step.

In the first analysis, the third step significantly accounted for %19 variance in fall emotional overeating,  $F(9, 136) = 4.12$ ,  $p < .001$ ,  $R^2 = 0.22$ . Only emotional feeding in the fall significantly predicted ( $b = .24$ ,  $\beta = .45$ ,  $t = 5.49$ ,  $p < .001$ ) emotional overeating in the fall. In the second analysis, none of the three steps significantly account for variance in fall emotional undereating. In the third analysis, the third step significantly accounted for %25 variance in spring emotional overeating,  $F(9, 136) = 5.55$ ,  $p < .001$ ,  $R^2 = 0.27$ . Only emotional feeding in spring significantly predicted ( $b = .34$ ,  $\beta = .46$ ,  $t = 6.04$ ,  $p < .001$ ) emotional overeating in spring. In the last analysis, the third step significantly accounted for %18 variance in spring emotional undereating,  $F$

(9, 136) = 3.76,  $p < .001$ ,  $R^2 = 0.20$ . The emotional feeding in spring ( $b = .41$ ,  $\beta = .42$ ,  $t = 5.27$ ,  $p < .001$ ) and the control feeding in spring ( $b = .24$ ,  $\beta = .18$ ,  $t = -1.22$ ,  $p = .029$ ) significantly predicted the emotional undereating in spring. Overall, these findings suggest that parent-driven factors, particularly emotional feeding, plays a significant role in predicting emotional eating behaviors.



## CHAPTER 5

### DISCUSSION

In this study, we aimed to examine child- and parent-driven factors in predicting children's emotional eating behaviors. For this purpose, we investigated the bidirectional relationships among children's emotional eating behaviors and parent-driven factors (i.e., parental feeding styles and mealtime technoference) and child-driven factors (i.e., self-regulation). Although previous studies found that parent-driven factors are linked to emotional eating, no study so far investigated the bidirectional associations between parental control feeding and mealtime technoference (Farrow et al., 2015; Fisher & Birch, 2002; Steinsbekk et al., 2016). Additionally, previous studies focused on self-regulation of eating or single aspects of self-regulation (Cross et al., 2014; Giuliani & Kelley, 2021; Hughes et al., 2015; Pieper & Laugero, 2013). To fill this gap, we investigated bidirectional relations of emotional eating and general self-regulation, including several aspects of regulatory skills. Cross-lagged path analyses were conducted across six models to understand their bidirectional associations. In the following sections, we will discuss the results of each model in detail.

#### **5.1. Stability of Children's Emotional Eating, Child Self-Regulation, Parental Feeding Styles, and Mealtime Technoference**

The study's first aim was to explore the study variables' stability from the fall to spring semesters. Consistent with previous research, we expected emotional eating behaviors to persist from fall to spring (Ashcroft et al., 2008; Steinsbekk et al., 2018; Wardle et al., 2001). In all the models, emotional eating behaviors in the fall predicted

emotional eating behaviors in spring. This finding was consistent with previous work literature (Ashcroft et al., 2008; Wardle et al., 2001). Children's emotional eating behaviors were stable over time. However, we did not find a correlation between emotional overeating and undereating concurrently and across the semesters. This finding is inconsistent with previous research (Wardle et al., 2001). This result may show that Turkish parents have different perceptions for over and under eating. They could be more sensitive to undereating behaviors than overeating. These parents may see undereating as problematic behavior but tolerate or be unaware of the overeating behaviors. Accordingly, a survey study conducted with Turkish parents showed that 73.3% of parents whose children were overweight based on objective measurements did not report their children as overweight (Esenay et al., 2010). Considering previous finding and our results, Turkish parents may not consider the children's overeating as a maladaptive form of eating. The significant difference between emotional over- and undereating in this study may come from differences in parental approaches to over- and undereating. Indeed, emotional overeating and undereating are two different forms of response to emotionally aroused situations (Jansen et al., 2012; Macht, 2008; Wardle et al., 2001). Considering emotional eating as a single construct and testing the emotional over and undereating interchangeably or simultaneously can be misleading. Testing them separately may provide to distinguish differences in their underlying mechanisms. For example, in the current study parental emotional feeding predicted emotional overeating but did not predict emotional undereating. On the other hand, emotional undereating predicted control feeding, but emotional overeating did not predict control

feeding. These different findings display that emotional over and undereating behaviors can be related to different parent-driven factors. Consequently, investigating the relations of emotional over- and undereating with parent- and child-driven factors provided us the opportunity to identify the different factors that contributed to or anticipated them.

We also predicted that parent-driven factors, including parental feeding styles and mealtime technoference, would be stable across fall to spring. All six models confirmed our hypothesis. Parental emotional feeding, parental control feeding, and mealtime technoference in the fall predicted the spring findings. There are findings on emotional feeding behaviors' stability (Steinsbekk et al., 2018). However, to our knowledge, no study investigated the stability of parental control feeding and mealtime technoference. These results show that parental feeding styles are goal-directed strategies of parents. Parents may think that their feeding strategies match their child's needs, so they do not need change their behavior for feeding. For example, parents with an emotional feeding style may gain short-term positive outcomes, such as their child may stop crying, whining, or being calm. Similarly, when parents control their children's eating environment, they may believe that they provide better and healthier diets for the children. These short-term benefits favoring parenting feeding practices may sustain parents to stay in the same strategy. Moreover, parents display similar and repetitive behaviors to their children during early childhood and establish daily routines for their children (Wildenger et al., 2008). Daily routines are positively associated with children's developmental outcomes and increase family functioning (Crespo et al., 2013;

Helton et al., 2018; Spagnola & Fiese, 2007). Responsive parents adopt parenting strategies according to their children's changing needs (Landry et al., 2001). However, the time interval in this study can be short to observe any drastic change in children's needs and parental behaviors.

On the other hand, mealtime technoference can be a coping strategy for parents rather than a feeding strategy (McDaniel et al., 2012; McDaniel & Radesky 2018a, b). This behavior can be related to several factors, such as parental boredom during feeding and challenges in feeding (e.g., the child's neglect of food). The stability of mealtime technoference may also be linked to increased parental technology use and the high frequency of mobile device checking because more screen time is related to problematic technology use and technoference (Newsham et al., 2020; Radesky et al., 2014; Yuan et al., 2019). Additionally, previous research investigating the bidirectional relations of technoference, parenting stress, and behavior problems found stability of technoference over time (McDaniel & Radesky, 2018b). Although this previous study does not refer to mealtime technological interferences, it provides evidence that those parental distractions due to technological devices are stable across time. Still, this is the first study investigating the mealtime technoference longitudinally. Therefore, more studies are needed to understand the mealtime technoference notion.

Self-regulation was also stable across fall to spring; self-regulation in fall predicted spring findings, as expected and parallel with the previous research (Kochanska et al., 2001; Raffaelli et al., 2005). Self-regulation starts to develop at the end of infancy, and abilities gradually increase with age (Kochanska et al., 2000). The

increase is especially apparent and rapid during early childhood (Rafaelli et al., 2005).

Persistent with previous studies, self-regulation abilities were consistent over time, and fall self-regulation predicted higher spring self-regulation.

## **5.2. Transactional Associations Among Parental Feeding Styles, Self-Regulation and Emotional Eating**

### **5.2.1. Parental Emotional Feeding, Self-Regulation, and Emotional Eating**

The second aim of this study was to examine the transactional associations among parental feeding styles, self-regulation, and emotional eating. To achieve this purpose, we tested four different models. We investigated emotional feeding in the first and second models (see Figure 3-4). We hypothesized that parental emotional feeding predicts more emotional eating and emotional eating predicts more parental emotional feeding (See Figure 3). According to the results, the greater amount of parental emotional feeding predicted higher emotional overeating, but emotional overeating did not predict emotional feeding. The significant relation was consistent with the literature; parental emotional feeding teaches children to deal with negative emotions using food, and emotional overeating increases (Blissett et al., 2010; Farrow et al., 2015; Steinsbekk et al., 2018). Due to parental emotional feeding, children may associate comfort and food. However, the emotional overeating of children did not predict emotional feeding. We can speculate that emotional overeating arises from parental emotional feeding, but children's tendency to emotionally overeat does not provoke the emotional feeding style. However, this result is contrary to the literature. Steinsbekk et al. (2018) found significant bidirectional relations between emotional overeating and parental emotional

feeding by measuring these factors when children aged 6,8, and 10 years old. This inconsistency with previous research shows the existence of a complex relationship between emotional feeding and emotional overeating. This relationship may be related to other parent-related factors such as parental emotional responsiveness, parent-child relationship, and family dynamics (Saltzman et al., 2019). The emotional overeating behaviors of children may not drive parents who already have lower responsiveness and low-qualified relationships with their children. Since emotional feeding is a response to children's needs for regulation, unresponsive parents may not have the urge to regulate their children's emotions, such as using food. Future studies should investigate this bidirectional relation considering the parental differences. Additionally, children's food responsiveness, high sensitivity to external food signals, can be related to parental emotional feeding (Steinsbekk et al., 2018). Food-responsive children may be more likely to increase parental emotional feeding. In our study, children could have lower food responsiveness which is not able to increase the likelihood of parental emotional feeding. Thus, when investigating this link, individual differences between children should also be considered.

We also expected that lower self-regulation predicts higher emotional overeating and emotional eating predicts lower self-regulation (see Figure 3). Contrary to our expectations, higher self-regulation predicted higher emotional overeating and emotional overeating did not predict self-regulation. These findings were surprising that previous studies found a negative relationship between self-regulation and emotional eating behaviors (Francis et al., 2022; Stone et al., 2022; Tan & Lumeng, 2018; Pieper

& Laugero, 2013). We expected that higher self-regulation could hinder children from showing emotional overeating, but self-regulatory problems might prompt children's emotional overeating. This is because emotional overeating behaviors could be an outcome of self-regulatory problems. This result shows that emotional overeating can be a self-regulation strategy for children to control their behaviors (Steinsbekk et al., 2020). Items from the emotional overeating scale (e.g., "*my child eats more when annoyed,*" "*my child eats more when anxious*") somewhat represent that children overeat to modulate their negative emotions, which could indicate the lack of effective self-regulatory strategies. Further, emotional overeating did not predict self-regulation in our study; correspondingly, these two constructs were not correlated in bivariate analyses. This non-significant result could be explained by children's low levels of emotional overeating scores ( $M = 1.40$ ). Based on Yerkes and Dodson's (1908) principle, a U shape relationship exists between stress level and self-regulation (Blair, 2010). Accordingly, high and low stress levels are related to lower performance in self-regulation tests (i.e., executive function), whereas moderate stress levels are linked to increased performance in self-regulation tests. We could extend this notion to the current finding and suggest that a certain amount of stress or emotional arousal could enhance self-regulatory skills. (Blair, 2010). Due to children's low emotional overeating scores, children may not need to use their self-regulatory skills. Thus, low levels of emotional overeating did not induce self-regulation, and non-significant relations occur. Different levels of emotional overeating might predict self-regulation, such that higher emotional overeating might activate children to use self-regulatory skills. Additionally,

self-regulation is an umbrella construct that includes several aspects of control (Baumeister & Heatherton, 1996). Emotional overeating can be more related to emotional self-regulation than composite self-regulation scores (Barnhart et al., 2021; Giuliani & Kelly, 2021). More fine-grained measurements of emotional self-regulation, like "*The impossibly perfect circles task*" (IPC, Goldsmith & Rothbart, 1996), might be better for testing the bidirectional relations of self-regulation and emotional overeating.

Furthermore, emotional overeating in spring is predicted by both emotional feeding and self-regulation in fall (See Figure 3). Results show that emotional overeating is related to both child- and parent-driven factors, in accordance with the Transactional Human Development Model (THDM) framework. These findings support THDM and show the ongoing interaction between children's characteristics and the environment in predicting emotional overeating (Sameroff, 1975). These findings confirm the previous studies indicating that children's eating behaviors could be driven by children's characteristics and environmental factors (Russell & Russell, 2018). Children with low self-regulatory skills may challenge parents during meals, so parents may be more prone to use food to regulate children's emotions (Steinsbekk et al., 2018). Due to emotional feeding, children's understanding of internal cues for hunger may reduce while becoming more responsive to external cues, resulting in an increase in emotional overeating. In line with these findings, prevention and intervention studies should target both children and parents to promote healthy dietary habits for the children.

On the other hand, we also tested the same model using emotional undereating as an outcome (See Figure 4). However, in this model, no significant direct or cross-lagged associations existed between emotional undereating, emotional feeding, and self-regulation. In spring, a significant cross-sectional relationship was found between emotional undereating and parental emotional feeding. Emotional undereating is a part of food avoidance; children's understanding of internal satiety decreases because of emotional arousal (Wardle et al., 2001). The decrease in children's internal satiety cues may create a concern for parents for their child's health; thus, parental emotional feeding behaviors may increase (Qiu et al., 2023). Moreover, withdrawn children (e.g., shy) show more emotional undereating, and these children may need more emotional support from their parents for regulation (Powell et al., 2011). Parents of these children showing avoidant behaviors in stressful situations may have fewer options to regulate their children. Therefore, parents may be more prone to use emotional feeding when their children show undereating behavior to regulate their children's emotions and behaviors.

### **5.2.2. Parental Control Feeding, Self-Regulation, and Emotional Eating**

In our second aim, we expected similar patterns with emotional feeding for parental control feeding. In the third and fourth models (See figure 5-6), we tested the transactional associations among emotional eating, parental control feeding, and self-regulation. We hypothesized that more control feeding predicts higher emotional eating, and emotional eating predicts more control emotional feeding. However, in our third model (See Figure 5), these relations were non-significant. Previous studies, however,

found significant associations among those constructs (Haycraft et al., 2012; Orrell-Valente et al., 2007; Farrow et al., 2015; Puhl & Schwartz, 2003; Rodgers et al., 2013). The notion behind our non-significant associations could come from the cultural relevance of feeding practices such that parental feeding styles and approaches may differ depending on cultural context. For example, Hispanic parents have more controlled feeding behaviors compared to African American parents, and French parents are more restrictive than American parents (Hughes et al., 2006; Musher-Eizenman et al., 2009). From this point of view, we can interpret that Turkish parents may have different controlling methods compared to other cultural contexts that have been examined. Hence, firstly we should understand the Turkish parents' control feeding behavior patterns since differences in parental approaches to feeding are linked to children's eating behavior outcomes (Hughes et al., 2006; Musher-Eizenman et al., 2009). For example, a correlational study conducted with Turkish parents showed that parental control feeding is not related to children's eating behaviors and weight status in contrast to studies conducted with different cultures (Erkorkmaz et al., 2012; Orrell-Valente et al., 2007; Farrow et al., 2015).

Unexpectedly, higher self-regulation predicted higher parental control feeding. This result contradicts the literature and previously it has been found a negative relationship between parental control feeding and children's self-regulation (for a review, Rollins et al., 2016). The positive relationship between parental control feeding and self-regulation in this study can be explained by the measurement of the parental feeding styles since it is based on parental reports. Social desirability bias may occur,

and parents may over-report their controlling behaviors. Additionally, children's perceptions of parental behaviors should be considered. A longitudinal study conducted with twins showed that twins' perceptions of their environment could differentiate from each other even though they grow exactly in the same environment and their perceptions of parenting behaviors predicted differences of self-regulatory skills (Mueller et al., 2023). In accordance with this finding, children's perceptions regarding parental control behaviors during feeding can differ from parental reports of controlling behaviors. For example, children with higher self-regulatory skills may perceive control feeding behaviors as supportive and helpful but children with low regulatory skills may perceive it hostile and limiting. Therefore, parents may adopt their control feeding behaviors according to children's responses to those control behaviors. However, this research's methodological limitations should be considered, like low sample size and limited time points. This surprising finding should be investigated in future research by considering these limitations.

In the fourth model (see Figure 6), we examined the transactional associations among emotional undereating, parental control feeding, and self-regulation. According to the results, children's emotional undereating behaviors in the fall predicted more control feeding in spring, similar to previous research (Kröller et al., 2013; Schuetzmann et al., 2008). Parents of children displaying more maladaptive forms of eating like emotional eating, increase their control feeding practices for providing a better healthy diet. However, the cross-sectional relationship between undereating and parental control feeding was negative. This concurrent relationship was surprising and inconsistent with

existing literature (Kröller et al., 2013; Topham et al., 2011). Also, these two different relationships were contradictory such that emotional undereating predicted higher control feeding behaviors, but concurrent relationship was negative. This contradiction shows that the relationship between control feeding, and emotional undereating is complex and may be linked to other factors like individual differences of parents and children. For example, family functioning indicating better communication and interactions among family members is a predictor of emotional undereating (Bjørklund et al., 2019). On the other hand, parents may not be able to recognize the children's undereating behaviors since it is less visible and apparent compared to overeating. However, over time, parents may be concerned about whether the child is getting enough nutrients and increase their control over their children's eating. In addition, in this model, parental control feeding was predicted by emotional undereating and self-regulation equally, showing that children's characteristics predict parental feeding behaviors. Parents may establish their behaviors according to the children's behaviors and needs. Since this research is framed by Transactional Human Development Model (THDM), this finding is not surprising. Children are not passive receivers of their environment they also shape their environment such as parental behaviors (Sameroff, 1975). There is an ongoing interaction between children's characteristics (i.e., emotional undereating and self-regulation) and parental control feeding.

### **5.3. Transactional Associations Among Mealtime Technoference, Self-Regulation, and Emotional Eating**

The study's third aim was to examine the transactional associations among emotional eating, mealtime technoference, and self-regulation. For this purpose, we tested two different models separately with emotional over and undereating. We hypothesized that more parental mealtime technoference predicts more emotional eating and emotional eating predicts less parental mealtime technoference. The results were consistent with our expectations. Emotional overeating in the fall predicted less mealtime technoference in spring, and mealtime technoference in the fall predicted more emotional overeating in spring (see Figure 7). Since parent-child interactions are distracted by technological devices, they may show less attention to children's eating behaviors. Existing literature was also in a similar line, parental technology use during mealtimes decreases parental responsiveness and attention to children's eating behaviors (Radesky et al., 2014, 2015). Children may feel ignored and stressed; thus, they may alleviate these unpleasant emotions by turning into food. Moreover, mealtimes are prominent for families where they can communicate and connect with each other (Kiefner-Burmeister et al., 2020). Due to mealtime technoference, children might have less opportunity to communicate and bond with their parents. They may feel neglected, and their stress level may increase, resulting in emotional overeating. Thus, children may use the food to escape from negative emotions when they experience stress because of mealtime technoference. Additionally, parents are role models for their children, and they may inadvertently teach their children to distract themselves from negative

emotions using external objects (Coto et al., 2019). Nevertheless, regarding the results of emotional overeating predict less mealtime technoference, when parents observe emotional overeating behaviors of their children, they might increase their attention to their children. They might need more control over children's eating behaviors if they show maladaptive eating patterns like emotional overeating, this decrease their technology use during mealtimes (Kröller et al., 2013; Schuetzmann et al., 2008).

Furthermore, self-regulation and mealtime technoference in spring was negatively related. Although this association has not been studied previously in the mealtime context, previous studies found similar findings regarding the negative relationship between technoference and self-regulation (Carson & Kuzik, 2021; McQuillan & Bates, 2017). Poorer self-regulation abilities of children may challenge parents during meals. They might stressed and need to escape from these negative emotions. Technological devices may serve as coping tools for parents during meals. McDaniel and Radesky (2018b) also found similar findings that children's behavior problems predict parental technoference. Although the literature is consistent with our findings, more research is required in the context of mealtimes because of the complexity of eating behaviors and parental feeding patterns.

We tested the same model by predicting emotional undereating behaviors, mealtime technoference, and self-regulation (See Figure 8). Consistent with our hypothesis, emotional undereating predicted lower self-regulation. Although self-regulation includes several components of control and comprehensive ability of different developmental aspects, we can interpret that emotional undereating negatively

contributes to children's self-regulatory skills (Baumeister & Heatherton 1996).

Emotional undereating can be maladaptive form emotion regulation in which children lose appetite and understanding of internal satiety cues decreases because of emotional arousal (Bjørklund et al., 2019; Wardle et al., 2001). This dysfunctional regulation strategy may hinder children to improve effective self-regulatory strategies. Our results show that children displaying emotional undereating behaviors have risk for developing lower self-regulatory abilities. On the other hand, we expected that lower self-regulation would predict more emotional undereating, but results were non-significant. This finding show that emotional undereating behavior is multifaced outcome that can be related to another factors like family functioning, parent-child relationship, parental hostility (Bjørklund et al., 2019; Haycraft & Blissett, 2009)

In terms of cross-sectional relations, we found that children's emotional undereating in fall was negatively related to mealtime technoference. Similar to the previous model (See Figure 7), children's emotional undereating may alarm parents about maladaptive patterns of their children's eating behaviors (Kröller et al., 2013; Schuetzmann et al., 2008). Thereof, mealtime technoference and emotional undereating were negatively related. Additionally, the negative relationship between mealtime technoference in spring and self-regulation in spring was consistent with the previous model (See Figure 7). Showing that decreased self-regulation abilities can increase parental negative emotions, in turn, mealtime technoference occurs. To sum up, research on mealtime technoference is limited in literature; therefore, these relations should be

investigated with different samples and methods for better interpretations (Gramm et al., 2020).

#### **5.4. Making Sense of The Results in The Context of Transactional Human Development Model (THDM) Framework**

The present study investigating the transactional associations of the child- and parent-driven factors predicting emotional eating is conceptualized in the Transactional Human Development Model (THDM) framework (Sameroff, 1975). As the results from models suggested, we found that child characteristics (i.e., self-regulation) and parent-driven factors (i.e., parental feeding styles and mealtime technoference) have ongoing interactions (Sameroff, 2009). Children's emotional overeating is predicted by parental emotional feeding, mealtime technoference, self-regulation, and cross-sectionally related to control feeding. These results show that emotional overeating is an outcome of both child- and parent-driven factors. In accordance with THDM, emotional overeating is not solely related to either child-driven factors or parent-driven factors. There is a dynamic interaction between these factors with emotional overeating. These findings suggest that child characteristics and environment are crucial in shaping emotional overeating.

On the other hand, emotional undereating was predicted by mealtime technoference and cross-sectionally related to parental emotional and control feeding. However, self-regulation was not found to be related to emotional undereating. Although the model suggests that child characteristics (i.e., self-regulation) and parent-driven factors (i.e., parental feeding styles and mealtime technoference) have ongoing interactions with child outcomes (Sameroff, 2009), this study shows that emotional

undereating could be more dependent to environmental factors compared to child characteristics. Moreover, emotional undereating was found to be more significantly related to parent-driven factors, while emotional overeating was predicted by both child- and parent-driven factors. These different findings between emotional over and undereating reveal that these two different forms of response to emotionally aroused situations may have different underlying mechanisms. Therefore, considering emotional eating as a single construct and testing the emotional over and undereating interchangeably or simultaneously can be misleading.

### **5.5. Implications**

The present study examined the interrelations between emotional eating behaviors of children and potential child- and parent-driven factors. Since the emotional eating behaviors of children are an essential factor related to the optimal development of emotional and physical outcomes, this study may inspire parents, child development professionals, and researchers (Goossens et al., 2009; Tanofsky-Kraff et al., 2004; Sultson et al., 2017). The current study provides an understanding the children's eating behaviors from the Transactional Human Development Model (THDM), wherein ongoing interactions between children's characteristics (child-driven factors) and the environment (e.g., parent-driven factors) influence the developmental trajectory of children (Sameroff, 2009). Accordingly, children's emotional and physical development are interconnected and have bidirectional relations with children's characteristics and parent-related factors.

Mealtimes are the fundamental routines of families; hence parents may not give the necessary attention to mealtimes. They also may not take into account it as a context where they can support their children's development. Based on our results, parental behaviors play a crucial role in the development of children's emotional eating behaviors. This research may provide perspective to parents reconsidering their approaches to mealtimes and their feeding behaviors. Since emotional eating behaviors are prominent factors related to short-term and long-term physical and emotional outcomes, they might establish their behaviors according to their children's needs (Goossens et al., 2009; Tanofsky-Kraff et al., 2004; Sultson et al., 2017). The results of this study may also inspire child development professionals to give importance to mealtime interactions and communications during mealtimes. They may help parents to identify their feeding behaviors and whether they experience mealtime technofence. Hereby, they may evaluate and reorganize parental behaviors during mealtimes.

This study may give insights to researchers for establishing comprehensive prevention and intervention programs to improve children's positive behaviors in eating. Brantley et al. (2023) reviewed the interventions aimed at reducing emotional eating behaviors. They revealed that interventions mainly focus on the parental feeding styles and their approaches to mealtimes. These interventions are effective in decreasing children's emotional eating behaviors. However, we found that emotional overeating is both related to the child- and parent-driven factors. Therefore, future interventions aiming to reduce emotional overeating should also focus on the child's characteristics as well as parent-related factors. For instance, children showing emotional eating are more

sensitive to environmental cue than internal satiety cues, therefore psychoeducation on mindful eating could be helpful (Knol et al., 2016). Being mindfully aware of the physical and emotional cues during eating is defined as mindful eating (Framson et al., 2009). Mindful eating would help children to control their eating behaviors. Also children having self-regulatory problems can benefit from mindful eating to improve their controlling behaviors. To improve children's controlling behaviors and decrease emotional eating, researchers may also focus on increasing the physical activity levels of children (Jalo et al., 2019).

Furthermore, we found that emotional undereating is more related to parent-driven factors compared to child characteristics. Therefore, future intervention studies should focus more on environmental factors for decreasing the emotional undereating such as promoting positive parental feeding style and raising awareness regarding parental technology use during mealtimes.

This study also provides a perspective to researchers that the development of emotional over and undereating are related to different underlying mechanisms. Interventions targeting reducing emotional eating should consider them as different constructs and develop different intervention methods for emotional over- and undereating. This study reveals that a healthy diet is not only about what and how much nutrients children take but also interconnected with children's individual differences, parental behaviors, and mealtime routines.

## 5.6 Limitations and Future Directions

To our knowledge, the current study is the first study that investigates the relations between child- and parent-driven factors in emotional eating behaviors. The cross-lagged design of this study is a primary strength of this study, but the time interval was limited to only six months and two time points corresponding to fall and spring. Having more than two time points provides better understanding in cross-lagged path analyses to see bidirectional relations among study variables (McDaniel & Radesky, 2018b; Steinsbekk et al., 2018). Due to these limitations, we may be unable to find significant bidirectional relationships between some of the study variables. Future studies should investigate those relations with at least three time points. Another limitation regarding to methodology of this study was the low sample size. We tested study variables in different models and were unable to unify all the variables in a single model because of the low sample size. Due to this limitation, the type I error rate might be increased, and we might have found a significant relationship among variables by chance. Future studies with a larger sample sizes and correction tests (e.g., increasing the significance level) are required for testing the focal variables in a single model and for decreasing the type I error rate. Another limitation of this study was the high percentage of missing data. To overcome this missingness, we conducted data imputation. Data imputation allowed us to retain valuable data.

Furthermore, we relied on parent-report measures to assess child emotional eating, parental feeding style and mealtime technoference. Thus, their reports can be biased. Utilizing different measurement methods could provide objective results. On the

other hand, although we conducted confirmatory factor analyses for the emotional undereating behavior subscale in spring, the internal consistency (.67) was under the acceptable rate for Cronbach alpha value, 0.7 and higher values considered as accepted (Cortina, 1993). Additionally, studies showed mothers and fathers may have different feeding styles and approaches to children's eating behaviors (Benjamin-Neelon & Neelon, 2020; Haycraft & Blissett, 2012). Measuring paternal and maternal feeding styles differently may provide to differentiate their relations with children's emotional eating. For this reason, future studies should investigate both maternal and paternal feeding styles and their relations with the emotional eating behaviors of children.

Although this study contributes to the literature how the parent- and child-driven factors predicting emotional eating some limitations regarding the conceptualization of this study should be considered. Mealtime technofence considered as a parent-driven factor predicting emotional eating. On the other hand, the children's screen media use could be accounted for as a child-driven factor in the model since the statistics shows that children expose to screens during meals frequently (Frata et al., 2021; Jusiene et al., 2019; Litterbach et al., 2023). Screens are used as comforting tool that help parents to feed their children especially for those who have difficulties with eating (i.e., refusing to eat) (Litterbach et al., 2023; Marshall et al., 2015). Moreover, caregivers may frequently place their children having self-regulatory problems in front of screens, particularly during mealtime (Thompson et al., 2013; Radesky et al., 2014). Screen media exposure during meals may make children to more susceptible to environmental cue instead of internal cues, as a result emotional eating behaviors may be observed. Future research

should investigate how children's screen media exposure is related to emotional eating, self-regulation and parental feeding styles.

Finally, since the outcome variable of this study is emotional eating and emotional eating is complex and multifaceted behavior based on biopsychosocial origins (Puder & Munsch, 2010; Russell & Russell, 2018), we should take into account the children's biological influences and screen their health-related behaviors. For example, the level of physical activity, children's eating habits, whether they have any physical health problems.

## APPENDICES

### APPENDIX A. Demographic Questionnaire

Lütfen anaokulu yaşındaki çocuğunuzu düşünerek aşağıdaki soruları cevaplandırınız.

1. Formu dolduran kişi : ( ) Anne ( ) Baba

2. Çocuğunuzun yaşı: ..... (ay olarak) Cinsiyeti: ( ) Kız ( ) Erkek

3. Toplam çocuk sayınız: ..... Yaşları: .....

4. Çocuğunuzun boyu: ..... (cm olarak) Kilosu: ..... (kg olarak)

5. Çocuğunuza ne kadar süre anne sütü emzirdiniz\emzirildi? ..... (ay olarak)

6. Anne Yaş: ..... Baba Yaş: .....

İlk çocuğunuz doğduğunda, Anne Yaşı ..... Baba Yaşı.....

7. Mesleğiniz: ..... 8. Şu anda çalışıyor musunuz? ( ) Evet ( ) Hayır

9. Eğitim durumunuz: ...İlkokul...Ortaokul...Lise...Üniversite...Y. Lisans...Doktora

10. Şu ana kadar almış olduğunuz eğitimin toplam süresi: ..... (Yıl olarak)

11. Toplam Aylık (anne baba toplam) geliriniz:

( ) 1000-3000 ( ) 3001-5000 ( ) 5001-7000 ( ) 7001-9000 ( ) 9000 ve üstü

12. İlişki durumunuz nedir?

1=Bekâr 2=Evli 3=Boşanmış 4=Ayrı 5=Tekrar evlenme 6=Dul 7=Birlikte yaşamak

13. Normal bir günde, çocuğunuz kaç öğün yemek yer? .....

14. Normal bir günde, kaç öğünde çocuğunuzla birlikte yemek yiyorsunuz? .....

15. Evde olduğunuz zamanlarda aşağıdaki cihazlarla ortalama ne kadar zaman geçirirsiniz?

Akıllı telefon

(...)0-1 saat    (...)1-2 saat    (...)2-3 saat    (...)3-4 saat    (...)4-5 saat    (...)5-6 saat  
 (...)6 saat ve üzeri    (...)Hiç kullanmam

Tablet

(...)0-1 saat    (...)1-2 saat    (...)2-3 saat    (...)3-4 saat    (...)4-5 saat    (...)5-6 saat  
 (...)6 saat ve üzeri    (...)Hiç kullanmam

Televizyon

(...)0-1 saat    (...)1-2 saat    (...)2-3 saat    (...)3-4 saat    (...)4-5 saat    (...)5-6 saat  
 (...)6 saat ve üzeri    (...)Hiç kullanmam

Bilgisayar

(...)0-1 saat    (...)1-2 saat    (...)2-3 saat    (...)3-4 saat    (...)4-5 saat    (...)5-6 saat  
 (...)6 saat ve üzeri    (...)Hiç kullanmam

**16. Herhangi bir ihtiyaç halinde (örn., maddi ihtiyaç, psikolojik, sosyal) en fazla****kimse başvurursunuz? (Birden fazla işaretleme yapılabilir)**

( ) Uzman ( ) Arkadaş ( ) Komşu ( ) Akraba ( ) Aile Büyüğü ( ) Öğretmen

Yukarıda belirttiğiniz kişi ya da kişilere ne sıklıkla başvurusunuz?

( ) Neredeyse Hiç ( ) Nadiren ( ) Bazen ( ) Sıklıkla ( ) Her Zaman

**17. Mevcut ikametgâhınızı aşağıdakilerden hangisi en iyi tanımlamaktadır.**

a) Müstakil Ev - Kira ( ) Kendimizin ( )

b) Apartman dairesi - Kira ( ) Kendimizin ( )

## APPENDIX B. Children's Eating Behavior Questionnaire

### ÇOCUKLARDA BESLENME DAVRANIŞI ANKETİ (örnek maddeler)

Aşağıdaki ifadeleri lütfen okuyunuz ve çocuğunuzun beslenme davranışına en uygun olan seçeneği işaretleyiniz.

(1) Asla, (2) Nadiren, (3) Bazen, (4) Sıklıkla, (5) Her zaman

|                                                                        | Asla | Nadiren | Bazen | Sıklıkla | Her zaman |
|------------------------------------------------------------------------|------|---------|-------|----------|-----------|
| 1. Çocuğum daha önce tatmadığı yiyecekleri tatmaktan zevk alır.        | 1    | 2       | 3     | 4        | 5         |
| 2. Çocuğum kolayca doyar.                                              | 1    | 2       | 3     | 4        | 5         |
| 8. Çocuğum rahatsız edildiğinde\ kızdırıldığında daha fazla yemek yer. | 1    | 2       | 3     | 4        | 5         |
| 10. Çocuğum kaygılı hissettiği zaman daha fazla yemek yer.             | 1    | 2       | 3     | 4        | 5         |
| 25. Çocuğum kızgın olduğunda daha az yemek yer.                        | 1    | 2       | 3     | 4        | 5         |

## APPENDIX C. Parental Feeding Style Questionnaire

### Anne-Baba (Ebeveyn) Besleme Tarzı Anketi (örnek maddeler)

Lütfen aşağıdaki ifadeleri okuyunuz ve çocuğunuzun beslenmesi konusuna nasıl yaklaştığınızı en iyi gösteren seçeneği işaretleyiniz. Bu soruların cevaplandırılmasında doğru veya yanlış cevapların olmadığını bilmeniz (hatırlamanız) önemlidir, biz ebeveynlerin gerçekte ne hissettiği ve yaptığıyla ilgileniyoruz.

(1) Asla, (2) Nadiren, (3) Bazen, (4) Sıklıkla, (5) Her zaman

| Ebeveyn Besleme Tarzı Anketi                                                                   | Asla | Nadiren | Bazen | Sıklıkla | Her zaman |
|------------------------------------------------------------------------------------------------|------|---------|-------|----------|-----------|
| 1. Çocuğuma öğünlerde yemek istediklerini seçmesine izin veririm.                              | 1    | 2       | 3     | 4        | 5         |
| 2. Çocuğum üzgün hissettiğinde, kendisini daha iyi hissetmesi için yiyecek bir şeyler veririm. | 1    | 2       | 3     | 4        | 5         |
| 3. Çocuğumu yemeği istekli bir şekilde beklemesi için desteklerim.                             | 1    | 2       | 3     | 4        | 5         |
| 5. Çocuğumun ne kadar atıştırma hakkı yiyeceğine karar veren benimdir.                         | 1    | 2       | 3     | 4        | 5         |
| 6. Çocuğumu çeşitli yiyecekler yemesi için teşvik ederim.                                      | 1    | 2       | 3     | 4        | 5         |

### APPENDIX D. Revised Version of DISRUPT Scale

#### YEMEK ZAMANI TEKNOLOJİ KAYNAKLI KESİNTİLER ANKETİ

Lütfen aşağıdaki soruları yemek zamanlarında çocuğunuzla kurduğunuz etkileşimi ve teknolojik cihaz kullanımınızı göz önünde bulundurarak cevaplayınız.

|                                                                                                                                                    | Keskinlikle katılmıyorum | Katılmıyorum | Biraz katılmıyorum | Biraz katılıyorum | Katılıyorum | Keskinlikle katılıyorum |
|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------|--------------------|-------------------|-------------|-------------------------|
| 1. Çocuğumla birlikte yemekten, kendimi telefonumda veya tablette ne yapabileceğimi veya alabileceğim mesajları\bildirimleri düşünürken buluyorum. |                          |              |                    |                   |             |                         |
| 2. Çocuğumla birlikte yemekten, telefonumu veya tabletimi kontrol etmekten kendimi alıkoyamıyorum.                                                 |                          |              |                    |                   |             |                         |
| 3. Çocuğumla birlikte yemekten, telefonumu veya tabletimi çok kullandığımı düşünüyorum.                                                            |                          |              |                    |                   |             |                         |
| 4. Çocuğumla birlikte yemekten, onunla oynamak veya etkileşime geçmek yerine telefonumda veya tabletimde vakit geçirdiğim olur.                    |                          |              |                    |                   |             |                         |
| 5. Çocuğumla birlikte yemekten, telefon veya tabletim ile ilgilendiğim için çocuğum dikkatimi çekmeye çalışır.                                     |                          |              |                    |                   |             |                         |

## APPENDIX E. The Correlations Among Emotional Eating and Self-Regulation

### Tasks

#### *Correlations Between Emotional Eating and Self-Regulation Tasks at Fall*

|                          | 1    | 2    | 3      | 4      | 5      | 6      | 7 |
|--------------------------|------|------|--------|--------|--------|--------|---|
| 1. Emotional Overeating  | -    |      |        |        |        |        |   |
| 2. Emotional Undereating | .13* | -    |        |        |        |        |   |
| 3. Balance Beam          | .01  | -.03 | -      |        |        |        |   |
| 4. Pencil Tap            | -.06 | -.02 | .31*** | -      |        |        |   |
| 5. Tower Task            | -.07 | -.06 | .19*** | .28*** | -      |        |   |
| 6. Snack Delay           | .01  | .05  | .11*   | .16**  | .23*** | -      |   |
| 7. Gift Wrap             | -.03 | .04  | .26*** | .21*** | .25*** | .25*** | - |

*Note.* Kendall's tau values, two-tailed; \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

#### *Correlations Between Emotional Eating and Self-Regulation Tasks at Spring*

|                          | 1     | 2    | 3      | 4      | 5     | 6   | 7 |
|--------------------------|-------|------|--------|--------|-------|-----|---|
| 1. Emotional Overeating  | -     |      |        |        |       |     |   |
| 2. Emotional Undereating | .14   | -    |        |        |       |     |   |
| 3. Balance Beam          | .04   | .001 | -      |        |       |     |   |
| 4. Pencil Tap            | -.09  | -.01 | .33*** | -      |       |     |   |
| 5. Tower Task            | -.03  | -.07 | .14*   | .32*** | -     |     |   |
| 6. Snack Delay           | .02   | -.03 | .19*** | .17**  | .20** | -   |   |
| 7. Gift Wrap             | -.17* | -.10 | .08    | .17**  | .13   | .12 | - |

*Note.* Kendall's tau values, two-tailed; \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

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