



Smartphone Addiction, Executive Function, and Mother-Child Relationships in Early Childhood Emotion Dysregulation

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ABSTRACT: Early childhood emotional dysregulation is critical in recognizing and preventing psychological well-being disorders, laying the groundwork for developing healthy emotional behaviors early on. This study aims to determine the direct influence of smartphone addiction, executive function, and the mother-child relationship on emotional dysregulation in early childhood in West Sumatra. This research method is a quantitative survey. The data collection technique in this research uses a questionnaire design on 309 parents who were selected using a simple random sampling method. This data processing tool uses the SmartPLS software. The results of the study indicate that smartphone addiction has a significant impact on emotional dysregulation in early childhood, executive function has a positive and significant effect on emotional dysregulation in early childhood, and the mother-child relationship has a positive and significant influence on emotional dysregulation in early childhood. The findings of this research can offer valuable insights into improving the understanding of the factors that influence emotional dysregulation in early childhood and intervention strategies to address the issues that arise as a result.

Keywords: smartphone addiction, executive function, mother-child relationship, emotional dysregulation, early childhood

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1 INTRODUCTION

Early childhood is characterized by rapid growth and development, with all growth aspects occurring during a crucial period (Kusuma, 2015; Nisak et al., 2022; Wulandani & Putri, 2022). Each time a young child learns something new, there is a remarkable developmental leap (Priyanti & Warmansyah, 2021; Siskawati & Herawati, 2021). Early childhood is known as a sensitive phase, a golden period, or a sensitive period (Safitri et al., 2023; Warmansyah et al., 2021). Every child goes through stages of development (Mu'min, 2013). Children in the pre-concrete operational stage do not possess complete maturity, known as centration, where they tend to focus on one aspect of a situation and neglect others because they cannot assess issues from others' perspectives (Vgontzas et al., 2008). This results in children's inability to manage their emotions, wanting to win alone, and being unconcerned about others.

The issue of a child's emotional problems is one of the aspects of a child's social-emotional development known as emotional dysregulation (Allison, 2023; Ashari & Anwar, 2022; Rubinsztein et al., 2007; Sari et al., 2023). Emotional dysregulation problems in children, especially their slow emotional regulation development at their age, the causes of emotional dysregulation, and others, have been widely researched. These issues include behaviors such as shouting, demanding that all their desires be met, impatience, destruction, hurting, hitting, inability to sit still, and more (Joormann & Quinn, 2014; Rachmat et al., 2021a). Such issues are distressing and concerning, which has led to a call to promote character education from kindergarten onwards so that children not only become knowledgeable but can also manage their emotions effectively (Salsabilafitri & Izzati, 2022). This concern arises from the fear that future generations may be populated by highly knowledgeable individuals but with low moral qualities.

Numerous longitudinal studies provide evidence that early executive function can equip children with better emotional regulation skills as they grow older. For instance, poorer performance on early executive function composites is associated with lower emotional regulation at 6 months of age (Martins et al., 2018), continuing until 1 year of age (Denham et al., 2016). Similarly, poorer performance in aspects of executive function, specifically attention control assessed at 18 months, is associated with more observed negative emotions at one year (Ferrier et al., 2018). Moreover, parents with limited knowledge of attention control in preschool-age children are associated with poorer emotional knowledge in first grade (Zelazo et al., 2016). Another study based on parent reports also revealed that excessive attention and control at 18 months were associated with more separation stress and negative emotionality measured a year later (Groves et al., 2022). Overall, these studies suggest that early executive function problems can put children at risk of emotional dysregulation.

Currently, there are a significant number of smartphone users, not only among parents but also among children. This is due to smartphones becoming an integral part of daily

life, which means that smartphones are also exposed to young children. According to Kabali et al., (2015), children begin to be exposed to smartphones at the age of two. Furthermore, research by Roberts et al., (2022) found that approximately 72 percent of children aged 2 to 6 have direct contact with smartphones, with 27 percent of children being introduced to smartphones before the age of 2 by people in their immediate environment. Additionally, the duration of smartphone use among young children is relatively high.

Several studies have found that smartphone content can also influence children's cognitive and motor skills (Sundus, 2017). However, many studies suggest that the negative impact of high-intensity smartphone use among young children can have negative effects on their social and emotional development (Imron, 2017) and result in low social interaction (Novitasari & Khotimah, 2013). Moreover, Flannery et al., (2021) found that parents who provide smartphones to irritable children are at high risk of experiencing social-emotional development issues. Deviant behaviors that often occur at a later age are predicted to arise due to disturbances in social-emotional development during early childhood. This is in line with research by Guswani and Kawuryan (2011) and Annisavitry and Budiani (2006), which found that "the lower the emotional maturity, the higher the aggressive behavior." Other research suggests that "half of the children as smartphone users are more inclined to be solitary and have low interaction, while early social interaction plays a significant role in social-emotional development, especially interactions with mothers (Martí et al., 2016; Sucipto & Huda, 2016).

In summary, there are only a few longitudinal studies that provide some support for the impact of smartphone addiction, executive function, and the mother-child relationship on early childhood emotional dysregulation, and these studies remain correlational, hence failing to establish a definite causal link. It remains unclear whether smartphone addiction, executive function, and the mother-child relationship may separately and jointly predict emotional dysregulation in the future. Therefore, this study aims to test the following hypotheses, H1: to examine the influence of executive function on emotional dysregulation in early childhood. H2: to examine the impact of smartphone addiction on emotional dysregulation in early childhood. H3: to test the mother-child relationship's influence on emotional dysregulation in early childhood.

2 THEORETICAL STUDY

2.1 *Emotional Dysregulation in Early Childhood*

Every child tends to have problematic emotional development, which depends on the psychosocial stimulation they receive from their environment. The issue of a child's inability to regulate their emotions effectively is known as emotional dysregulation. Emotional dysregulation in children refers to the inability to control or regulate emotional responses to stimulating events (Turk et al., 2005). These stimuli pertain to a child's capacity to recognize, understand, and manage their emotions. This involves a child's awareness of their feelings, understanding the causes of their emotions, and the child's

ability to express and control emotions in a healthy manner (Hadi, 2013). Unde et al., (2023) stated that emotional dysregulation in children can impact various aspects of a child's life, including interpersonal relationships, mental health, and general well-being, including; 1) Emotion Recognition: Children need to learn to recognize and understand various types of emotions, such as happiness, sadness, anger, fear, and disappointment; 2) Emotional Instability: Individuals with emotional dysregulation often experience rapid and intense fluctuations in their emotions. Children have sudden mood changes and struggle to calm down after incidents that trigger their emotions; 3) Excessive Emotional Responses: Children with emotional dysregulation often respond excessively to emotional stimuli. They exhibit strong and intense reactions in situations that do not warrant such responses.

Emotional dysregulation in children is related to social withdrawal during childhood (C. I. H. Putri & Primana, 2018). Common signs include a tendency to isolate themselves, increased anxiety, refusal to speak, shouting, poor eye contact, crying, and more (Putri & Rahmasari, 2021), as well as aggression (Putri & Rahmasari, 2021) and a decline in the quality of interpersonal relationships (Handayani et al., 2017). Parents play a crucial role in addressing emotional dysregulation in children from an early age. Parents who are neglectful and inattentive, failing to provide adequate care and attention to children during their formative years, may lead to a myriad of issues as the child enters adolescence and adulthood (Aisyah et al., 2021; Hermawati & Sugito, 2021). For example, an array of criminal cases committed by delinquent youth in their childhood and adolescence may emerge. Online data from the National Commission for Child Protection (KPAI) indicates a worrying increase in juvenile delinquency cases year after year. In 2018, there was a 26% increase from the previous year, and in 2019, around 2,879 children aged 6-14 were involved in acts of violence, both physical and non-physical (KPAI, 2022).

According to Bachtiar and Faletahan (2021), types of emotional dysregulation in early childhood include; 1) emotional outbursts; 2) difficulty managing anger; 3) excessive anxiety; 4) dysphoria; 5) sleep and eating disorders. Emotional dysregulation in children is a trait or behavior that indicates a child's inability to control and manage their emotions (Hadi, 2011). Early childhood children struggling with emotional dysregulation may exhibit irregular behavioral patterns when responding to and expressing their emotions, as well as controlling their emotional responses in specific situations. Signs of emotional dysregulation may include 1) Frequent feelings of anxiety and fear; 2) Impatience and frustration; 3) Difficulty in communicating with others; 4) Inability to express feelings appropriately; 5) Vulnerability to stress, making it difficult to regain composure (Umaroh, 2021).

Furthermore, children with emotional dysregulation often exhibit characteristics such as: 1) Aggressiveness: Children with emotional dysregulation display aggressive behavior involving intentions or actions to harm or hurt others; 2) Anxiety: Children who struggle to control their emotional dysregulation show excessive anxiety. This anxiety is akin to regular anxiety, but it is more intense, significantly affecting the child; 3) Sensory

Sensitivity: These children are impatient and exhibit feelings of anger, jealousy, and easy frustration; 4) Lack of Focus: Children with emotional dysregulation have difficulty concentrating on one or more activities (Sandoval & Echandia, 1994). These characteristics and behaviors are indicative of emotional dysregulation in children, and addressing these issues is essential for their emotional well-being and healthy development.

2.2 *Executive Function*

Emotional dysregulation in children is caused by various factors, both internal and external. One such factor is children's executive function, which serves as the foundation for children to control their actions. Executive function refers to high-level cognitive processes responsible for regulating thinking and actions (Zelazo et al., 2016). Executive function is conceptualized to encompass several subcomponents, including response inhibition, working memory, flexible attention, and delay of gratification (Solfiah et al., 2020). In recent decades, researchers have suggested that good emotional regulation is likely dependent on adequate executive function (Holley et al., 2015; Shaffer, 2017). In some cases, emotional regulation has been determined by executive function. Schmeichel & Tang (2015) have stated that good emotional regulation requires an individual to "inhibit inappropriate behavior" (i.e., response inhibition) and "refocus attention" (i.e., attention control). Furthermore, other research has reported that executive function impairments may lead to secondary issues in emotional regulation (Martin & Ochsner, 2016).

Executive function in early childhood refers to the developing brain's ability to control and direct a child's behavior to achieve specific goals (Lintuuran, 2015). In early childhood, executive function encompasses various crucial processes such as self-control, working memory, planning, decision-making, and mental flexibility. These abilities are crucial for a child's social and academic development in the future (Susanti & Hasmira, 2023). However, it is important to note that every child has different developmental levels influenced by genetic and environmental factors. Fatwikiningsih (2016) states that executive function is responsible for regulating one's own behavior to be directed and purposeful, such as planning, organization, and problem-solving skills, self-monitoring skills, and self-regulation (self-control). According to Wilson & Gross (2018), the brain's ability to store millions of pieces of information functions like having an air traffic control system at a busy airport, managing the arrivals and departures of dozens of planes on various runways.

Ayomi et al., (2021) mention that characteristics of executive function development include: 1) Working Memory; 2) Inhibitory Control; 3) Cognitive Flexibility. According to Baptista et al., (2016), executive function is a set of top-down processes that enable conscious and goal-directed control of thoughts and actions. Executive function (EF) allows for mental brainstorming, taking time to think before acting, discovering new and unexpected challenges, resisting temptation, and maintaining focus. The core components of Executive Function are response inhibition (self-control, resisting temptation, and

refraining from impulsive actions), attention control (selective attention and cognitive inhibition), working memory, and cognitive flexibility (including thinking creatively "outside the box," viewing things from different perspectives, and quickly and flexibly adapting to changing circumstances).

One way to measure these functions, including executive function, is using the Behavior Rating Inventory of Executive Function-Preschool Version (BRIEF), which has recently been revised as BRIEF-2. The BRIEF and BRIEF-2 forms are behavior checklists completed by parents, teachers, and self-reports for children and adolescents. The BRIEF-2's executive function subscales assess areas including inhibition, self-monitoring, shifting, emotional control, initiation, task completion, working memory, planning/organization, task monitoring, and organization of materials (Pérez-Salas et al., 2016).

2.3 *Emotional Dysregulation in Early Childhood*

Every child has a tendency for problematic emotional development, which depends on the psychosocial stimulation they receive from their environment. The issue of a child's inability to regulate their emotions effectively is known as emotional dysregulation. Emotional dysregulation in children refers to the inability to control or regulate emotional responses to stimulating events (Turk et al., 2005). These stimuli pertain to a child's capacity to recognize, understand, and manage their emotions. This involves a child's awareness of their feelings, understanding the causes of their emotions, and the child's ability to express and control emotions in a healthy manner (Hadi, 2013). Unde et al. (2023) stated that emotional dysregulation in children can impact various aspects of a child's life, including interpersonal relationships, mental health, and general well-being, including; 1) Emotion Recognition: Children need to learn to recognize and understand various types of emotions, such as happiness, sadness, anger, fear, and disappointment; 2) Emotional Instability: Individuals with emotional dysregulation often experience rapid and intense fluctuations in their emotions. Children have sudden mood changes and struggle to calm down after incidents that trigger their emotions; 3) Excessive Emotional Responses: Children with emotional dysregulation often respond excessively to emotional stimuli. They exhibit strong and intense reactions in situations that do not warrant such responses.

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3 METHOD

3.1 *Research Method*

The research method employed in this study utilizes an associative quantitative approach, employing Structural Equation Modeling (SEM) as the analytical technique. Structural Equation Modeling (SEM) represents a second-generation multivariate analysis method designed to examine complex relationships between variables. SEM is capable of testing both structural and measurement models, assessing measurement errors, and conducting factor analysis in addition to hypothesis testing.

This research investigates or analyzes the interrelations among the variables under investigation based on factual and pre-existing data, measuring the influence of one variable on the dependent variable. The examined variables consist of independent and dependent variables. The independent variables include Smartphone addiction (X1), Executive Function (X2), Mother-Child Relationship (X3), and Early Childhood Emotion Dysregulation (Y) as the dependent variable.

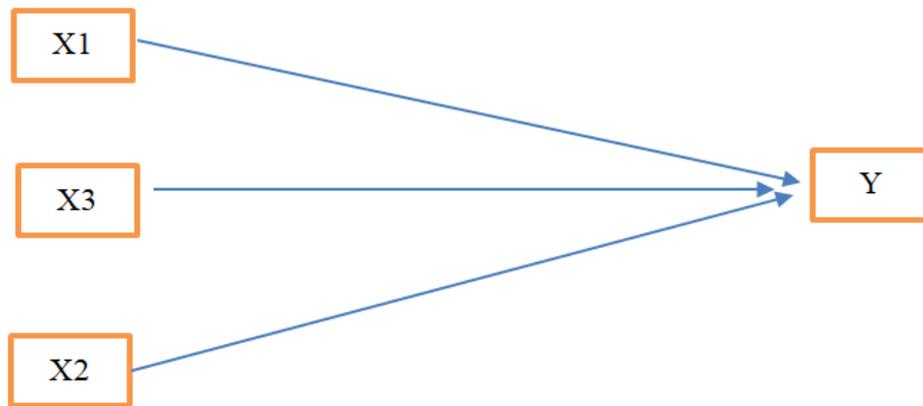


Figure 1. Research Constellation

3.2 Participant

The population of this study comprises all preschool children in the West Sumatra Province. The sampling technique employed in this research is probability stratified cluster random sampling. This means that from the available population, a sample will be drawn randomly in a stratified manner, taking equal portions. The selected regions are the cities of Padang and Pariaman, and the district of Tanah Datar. The population of early childhood in Sumatra Barat is composed of 1856 children. To determine the sample size for this research, the number of samples can be calculated based on the strata and cluster levels using the Slovin's formula.

3.3 Data Collection Technique

Data collection is done using a self-report method, where parents assist in completing questionnaires for variables related to early childhood, which are part of the research sample. The questionnaires are designed in a Likert Type Scale format. This Likert scale consists of statements with four answer options, each with assigned weights for each alternative. The researcher uses only four levels to allow respondents to assess each option neutrally, whether they agree or disagree, strongly agree, or strongly disagree.

3.4 Research Instruments

The measurement of child addiction to smartphones is done using a questionnaire adapted from Lauricella et al., (Lauricella et al., 2015) and Nikken & Schols (Nikken & Schols, 2015), Consists of aspects, 1) daily life disturbance; 2) positive anticipation; 3) social withdrawal; 4) cyberspace-oriented relationship; 5) excess, and 6) tolerance and comprising 22 questions and measured using a Likert scale with four options: 1=never,

2=sometimes, 3=often, and 4=always. The mother-child relationship is measured through a questionnaire assessing dimensions of closeness and conflict, modified from the Child-Parents Relationship Scales-Short Form (Pianta, 2001). The questionnaire consists of 15 questions with modifications from five answer options to four answer options. The four answer options include 1=never, 2=sometimes, 3=often, and 4=always.

Executive function is measured using a questionnaire assessing the ability to control oneself, think flexibly, and working memory, modified from the BRIEF P instrument (Gioia et al., 2000). The questionnaire consists of 28 questions with modifications from five answer options to four answer options. The four answer options include 1=never, 2=sometimes, 3=often, and 4=always.

Emotional dysregulation in children is measured by assessing the child's inability to regulate negative emotions such as aggression, anxiety, sensory sensitivity, and lack of focus. This assessment was developed by the researcher and is based on the Behavior Assessment System for Children, Second Edition (BASC-2) (Sandoval & Echandia, 1994). It comprises 18 questions and is measured using a Likert scale with four options: 1=never, 2=sometimes, 3=often, and 4=always.

3.5 *Data Analysis Technique*

In this research, the data analysis method employed is Structural Equation Modeling-Partial Least Squares (SEM-PLS), utilizing SmartPLS software. The SEM technique was chosen because it can conduct comprehensive analyses with accurate results, combining factor analysis, measurement modeling, and structural modeling. SEM allows researchers to assess complex relationships between variables, both in terms of measurement models (how variables are measured) and structural models (how variables are related to each other).

It's a powerful statistical method that provides a holistic view of the interrelationships between different factors in a research study, making it particularly suitable for your research involving multiple variables and their associations. SEM can help test hypotheses and provide a deeper understanding of the underlying structures and relationships within your research data.

4 RESULT AND DISCUSSION

4.1 *Result*

In this research, the chosen data analysis approach was Structural Equation Modeling with Partial Least Squares (SEM-PLS), and the analysis was carried out utilizing SmartPLS software.

4.1.1 Evaluation of the Outer Model (Measurement Model)

Convergent validity is a component of the measurement model, which is typically referred to as the outer model in SEM-PLS, whereas in covariance-based SEM, it's known as confirmatory factor analysis (CFA).

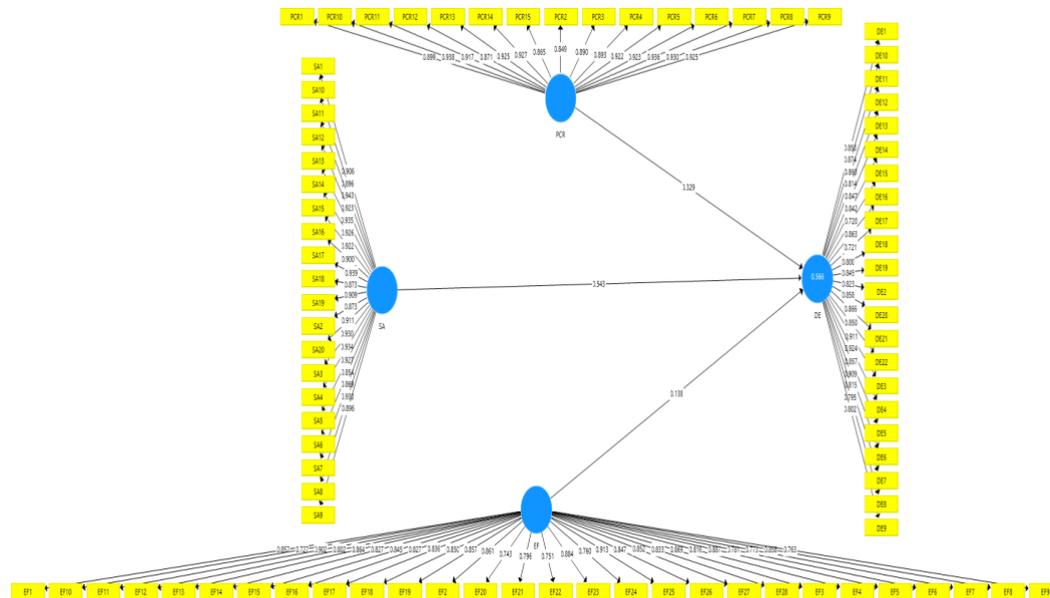


Fig 2. Validity Testing Based on Outer Loading

Based on the validity testing of outer loading in Table 1 and Figure 2, it is evident that all outer loading values are > 0.7 , indicating that they meet the validity criteria based on loading values. Subsequently, validity testing is conducted based on the average variance extracted (AVE).

Table 2. Validity Testing Based on Average Variance Extracted (AVE)

| Average Variance Extracted (AVE) | |
|----------------------------------|-------|
| DE | 0.706 |
| EF | 0.688 |
| PCR | 0.824 |
| SA | 0.828 |

The recommended AVE value is above 0.5 (Gio, 2019). It is noted that all AVE values are > 0.5 , indicating that they meet the validity criteria based on AVE. Next, reliability testing is performed based on the composite reliability (CR) values.

Table 3. Reliability Testing Based on Composite Reliability (CR) and Cronbach's Alpha (CA)

| | Composite Reliability | Cronbach's Alpha |
|-----|-----------------------|------------------|
| DE | 0.981 | 0.980 |
| EF | 0.984 | 0.983 |
| PCR | 0.986 | 0.985 |
| SA | 0.990 | 0.989 |

The recommended CR and CA value is above 0.7 (Gio, 2019). It is observed that all CR and CA values are > 0.7 , signifying that they meet the reliability criteria based on CR. Subsequently, reliability testing is conducted based on the Composite Reliability (CR) and Cronbach's alpha (CA) values.

Table 4. Discriminant Validity Testing: Fornell & Larcker

| | DE | EF | PCR | SA |
|-----|---------|---------|---------|---------|
| DE | (0.840) | | | |
| EF | 0.489 | (0.829) | | |
| PCR | 0.462 | 0.449 | (0.908) | |
| SA | 0.638 | 0.374 | 0.131 | (0.910) |

Note: Values within "()" represent the square root of AVE

In the discriminant validity testing, the square root of AVE for a latent variable is compared with the correlation value between that latent variable and other latent variables. It is observed that the square root of AVE for each latent variable is greater than the correlation value with other latent variables. Therefore, it is concluded that discriminant validity criteria have been met.

4.1.2 Significance Test of Influence (Bootstrapping) (Hypothesis Testing) (Inner Model)

Table 6 presents the results of the significance test of influence. Based on the results in Table 6, the following outcomes were obtained, SA significantly influences DE, with a P-Values value of $0.000 < 0.05$ (Hypothesis Accepted). EF significantly influences DE, with a P-Values value of $0.006 < 0.05$ (Hypothesis Accepted). PCR significantly influences DE, with a P-Values value of $0.000 < 0.05$ (Hypothesis Accepted).

Table 6. Path Coefficient & Significance of Direct Influence Testing

| | Original Sample (O) | Sample Mean (M) | Standard Deviation (STDEV) | T Statistics (O/STDEV) | P-Values |
|----------|---------------------|-----------------|----------------------------|------------------------|--------------|
| SA -> DE | 0.543 | 0.547 | 0.042 | 12.970 | 0.000 |
| EF -> DE | 0.138 | 0.139 | 0.051 | 2.738 | 0.006 |
| PCR->DE | 0.329 | 0.326 | 0.065 | 5.042 | 0.000 |

It is known that based on the SRMR goodness of fit testing results, the SRMR value is 0.074, which is < 0.1 . Thus, it is concluded that the model fits well.

Table 7. Model Goodness of Fit Testing

| Estimated Model | |
|-----------------|-------|
| SRMR | 0.074 |

4.2 Discussion

4.2.1 Smartphone Addiction in Children Has a Significant Influence on Early Childhood Emotional Dysregulation.

SA significantly influences DE, with a P-Values value of $0.000 < 0.05$ (Hypothesis Accepted). Numerous previous studies have examined the impact of smartphone

addiction on children's emotional dysregulation. For example, Hasanah (2017) found that smartphone addiction can have both positive and negative effects. The negative impacts include the rapid growth of the brain and hindered development. Moreover, it can lead to issues such as obesity, sleep disturbances, aggressiveness, digital dementia, mental illness, and radiation. Research conducted by Chusna (2017) and Imron (2017) found that excessive smartphone use in children can make it challenging for them to socialize, affect their motor skills, and lead to behavioral changes. In line with Saputra et al., (2017), the impact of information technology affects children's intellectual, spiritual, and emotional well-being. Excessive smartphone use is also linked to the psychosocial well-being of children (Trinika, 2015). Using smartphones for more than five to six hours a day can affect a child's mental development.

Similar points are made by Setianingsih et al., (2018), who mentioned that smartphone use in kindergarten-aged children can lead to attention deficit and hyperactivity disorder. According to Wahyuni et al., (2019), the duration of smartphone play significantly affects a child's emotional well-being. Furthermore, Pangastuti (2017) in her research stated that smartphones have a considerable impact on children's behavioral development and social interactions. Therefore, it can be concluded that smartphone addiction affects emotional and social development.

Managing the emotional well-being of early childhood, such as redirecting stress in children due to excessive smartphone addiction (Rachmat et al., 2021b). This stress diversion occurs in early childhood. It has been proven that when a young child is using their smartphone or gadget, and their activity is suddenly stopped by their parents, the child becomes stressed, experiences negative emotions, loses self-control, and is disrupted from their enjoyment (Chang et al., 2019; Chiu, 2014). Furthermore, it can be concluded from the study by Park and Park (2014) that smartphone addiction in children has consequences for mental development, including emotional instability, depression, ADHD, anxiety, and lack of attention. In addition to physical fatigue such as declining visual acuity, smartphone addiction can also trigger other emotional problems. Therefore, many previous studies have investigated the behavioral issues associated with smartphone use in early childhood. Based on the above explanation, it can be inferred that smartphone addiction directly influences early childhood emotional dysregulation. The higher the level of dependence and addiction to smartphones in children, the higher the level of emotional dysregulation displayed in early childhood.

4.2.2 Executive Function of Children Has a Positive Influence on Early Childhood Emotional Dysregulation.

EF significantly influences DE, with a P-Values value of $0.006 < 0.05$ (Hypothesis Accepted). Executive function and the ability to regulate emotions in children have received considerable attention not only because of their relationship with children's social-emotional functioning but also for their suggested critical role in cognitive functioning (Bassett et al., 2012; Ferrier et al., 2014). Both executive function and emotional regulation are considered aspects of self-regulation, which encompass an

individual's ability to control their emotional, behavioral, and cognitive actions and responses (Jahromi & Stifter, 2008; Smith-Donald et al., 2007).

Executive function is seen as a set of high-level brain functions, generally viewed as incorporating working memory, attention shifting, and inhibitory control (Miyake et al., 2020). Riggs et al. (Riggs et al., 2016) conducted a study on the relationship between EF and the correlation of social-emotional functions, such as theory of mind and delay of gratification. Furthermore, positive academic performance has also been associated with greater executive function abilities (Shah et al., 2018; Ursache et al., 2012). Research has shown that children who have difficulty regulating their emotions in the classroom are more vulnerable to displaying psychopathology (Cole et al., 2004), aggression (Calkins & Marcovitch, 2015), and suffering from peer rejection, increased school anhedonia, and poor academic outcomes (Ursache et al., 2012). Furthermore, there is empirical support for the role of emotional regulation in promoting more positive attributes, such as social competence and school adjustment (Herndon et al., 2013; Valiente et al., 2012).

In the last decade, it has been suggested that cognition and emotions are dynamically interconnected, and early indicators of a child's ability to regulate emotions positively predict executive function abilities at the age of four, especially in children with high emotional reactivity (Bell & Wolfe, 2004; Ursache et al., 2013). Other research also provides support for the assessment of behavior and parental assessment of early childhood emotional regulation (Carlson, 2005). This relationship is also in line with neuroscience research, which also suggests a deeper connection between cognition and the brain's emotional centers (Cacioppo & Berntson, 2019). Based on the above explanation, it can be inferred that the executive function present in a child directly influences early childhood emotional dysregulation. The higher a child's executive function, the lower the emotional dysregulation displayed by the child.

4.2.3 The Mother-Child Relationship Has a Direct Influence on Early Childhood Emotional Dysregulation.

PCR significantly influences DE, with a P-Values value of $0.000 < 0.05$ (Hypothesis Accepted). The emotional development of children is significantly influenced by the interaction between mothers and children. This is consistent with ecological theory, which posits that the social-emotional development of children is influenced by their environment (Hapsari, 2016). Other research results indicate that the interaction between parents and children can predict children's social and emotional abilities positively (Khoshgoftar et al., 2022). This can occur because through interaction, children learn how to understand how to manage their emotions and socialize.

Furthermore, through this interaction process, children develop closeness and learn to handle conflicts, allowing them to adapt to their environment. Social-emotional development is the process of an individual's emotional and social growth. Emotions are a crucial aspect in stimulating action, and social skills are the ability to adapt to a social environment (Goleman, 2015; Soetjijingsih, 2018). Social-emotional development in

kindergarten-aged children is essential for shaping emotional maturity and social skills so that they can adapt to any environment (Nurjannah, 2017). This is because at this age, children will begin to experience various emotions, and as they grow older, they will recognize more emotions. In kindergarten-aged children, they start to understand emotions like happiness and sadness, although they may not yet grasp subtler emotions such as pride, shame, guilt, and embarrassment. Nonetheless, children are not fully aware of experiencing these emotions and understanding their meanings (Santrock, 2008).

According to Erikson's psychosocial theory, children of kindergarten age are in the stage of autonomy vs. shame/doubt, where they start to learn self-control but still accept the control of others, and the initiative vs. guilt stage, where they develop a sense of purpose and a desire to take action, typically between the ages of one to five years (Kujawa et al., 2020; Smith-Etxeberria & Eceiza, 2021; Yansyah et al., 2021). Therefore, children should be given many opportunities to engage in activities or actions independently, and parents should help children build self-confidence and positive emotions.

Parents, especially mothers as the primary caregivers or main caregivers of their children, can play a significant role in developing positive emotions. Mothers who interact more with their children and build a good relationship with them can help children develop positive emotions because children see their mothers as reliable and safe (Yan et al., 2019). Conversely, if children have limited positive interactions and parents primarily provide negative emotions, children may develop negative emotions (Brock & Kochanska, 2019). Based on the above explanation, it can be inferred that the mother-child relationship directly influences early childhood emotional dysregulation. The closer the relationship and the lower the conflict and dependence of a child on their mother, the better the emotional regulation observed in early childhood.

5 CONCLUSION

In this study, it was found that smartphone addiction in children has a significant impact on their early emotional dysregulation. The higher the level of smartphone dependence in children, the higher the level of emotional dysregulation observed in their early developmental stages. Additionally, children's executive function also has a significant influence on early emotional dysregulation. The better a child's executive function, the lower the emotional dysregulation observed in them. Furthermore, the mother-child relationship directly affects early childhood emotional dysregulation. The closer the relationship and the lower the conflicts and dependence of a child on their mother, the better the emotional regulation observed in early childhood. Therefore, the results of this study underscore the importance of the role of parents, especially mothers, in supporting the emotional well-being of children from an early age, while also highlighting that smartphone addiction and children's executive abilities play significant roles in their emotional regulation.

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