The Effects of Maternal Characteristics on Adolescent Emotion Regulation

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Thesis submitted to the faculty of the Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of

Master of Science

In

Psychology

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April 29, 2021

Blacksburg, Virginia

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**ABSTRACT**

Emotion regulation is an important skill to acquire during childhood, as an inability to do so can lead to negative outcomes such as aggression, anxiety, eating disorders, and personality disorders during adolescence. Much research has demonstrated that maternal factors play a role in childhood emotion regulation; however, little research has looked at how these factors might predict emotion regulation during adolescence. Therefore, my thesis study assessed how maternal personality, parenting behaviors, and emotion regulation during middle childhood and adolescence predicted adolescent emotion regulation. Specifically, I hypothesized that maternal parenting behaviors during middle childhood would positively predict adolescent cognitive reappraisal, that this association would be moderated by maternal intrapersonal and interpersonal personality, and that maternal cognitive reappraisal during middle childhood would positively predict adolescent cognitive reappraisal. Participants included 122 mother-child dyads who provided data on parenting and maternal emotion regulation when the children were 9-years-old, in addition to data on child emotion regulation, maternal emotion regulation, and maternal personality when the children were adolescents. My initial hypotheses were not supported by the data, but post-hoc analyses revealed that maternal emotion suppression during middle childhood and adolescence predicts adolescent emotion suppression and that this association between maternal emotion suppression during middle childhood and adolescent emotion suppression was moderated by maternal intrapersonal personality. These results support the idea that maternal characteristics continue to play a role in shaping emotion regulation in children through adolescence, but not in the manner I had originally predicted.

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**GENERAL AUDIENCE ABSTRACT**

Emotion regulation refers to our ability to adjust to changes in our emotions. Difficulty with emotion regulation early in life can lead to negative outcomes such as aggression, anxiety, eating disorders, and personality disorders later in life. Maternal factors, like parenting, emotion regulation, and personality, affect emotion regulation during early childhood, but the research is lacking when it comes to looking at how these maternal factors might predict emotion regulation abilities during adolescence. This is important to consider, as adolescence is a time when we see some of these negative outcomes associated with difficulties in emotion regulation emerge. Therefore, my thesis study looked at how these maternal factors during middle childhood and adolescence predicted adolescent emotion regulation. Specifically, I hypothesized that optimal maternal parenting behaviors during middle childhood would predict better adolescent emotion regulation, that maternal personality during adolescence would moderate this association, and that better maternal emotion regulation during middle childhood would predict better emotion regulation during adolescence. Participants included 122 mother-child dyads. Mothers provided data on parenting and their own emotion regulation when their children were 9-years-old and data on their own personality and emotion regulation when the children were adolescents. Adolescents self-reported their own emotion regulation. My initial hypotheses were not supported, later analyses showed that maternal emotion regulation during middle childhood predicted adolescent emotion regulation and that this association was moderated by maternal personality. These results support the idea that maternal characteristics continue to play a role in shaping emotion regulation in children through adolescence.

**ACKNOWLEDGMENTS**

First, I would like to thank my mentor, Dr. Martha Ann Bell for her support and thoughtful feedback on this project. I also want to thank my committee members, Dr. Jungmeen Kim-Spoon and Dr. Cynthia Lea Smith for their suggestions and help with my thesis project. I also would like to thank Dr. Kim-Spoon for her help with my statistical methods and Dr. Smith and her lab for coding the parenting behaviors used for this project.

Additionally, I would like to thank the present and former CAP Lab members who helped with the data collection in this study- Leslie Patton for training us and for creating data sets for me; Tatiana Garcia Meza, Mohamed Zerrouk, and Dr. Ran Liu for helping with data collection. This project would not have been possible without your help!

Finally, I would like to thank my family and friends for their ongoing support throughout my graduate studies thus far. I would not have been driven to pursue my studies if it had not been for your support.

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## Introduction

Emotion regulation is a driving factor in the psychological growth and socioemotional development of individuals and is very important in setting the tone for the developmental course (Calkins & Keane, 2004). Therefore, it is crucial that effective emotion regulation is developed early in life, as deficits in emotion regulation are linked to negative psychological outcomes, such as anxiety (Buss, 2011) and externalizing problems (Calkins & Fox, 2002). Further, because children rely on the emotion regulation behaviors of their mothers in developing their own (Goldsmith et al., 2008), it is equally important to identify how maternal characteristics, such as personality, parenting, and emotion regulation, might predict child emotion regulation. However, much of the current research regarding maternal characteristics and child emotion regulation currently focuses on infancy and early childhood. The goal of my thesis study was to assess these associations during middle childhood and adolescence to see if and how maternal influence plays a role in effective emotion regulation later in life.

### Defining Emotion Regulation

Emotion regulation is a rapidly developing topic in the field of psychology (Gross, 2013, 2015), but researchers have yet to agree on a definition of emotion regulation (Cole, 2014). Some define emotion regulation as the ability to react to changes in evoked emotions (Cole et al., 2004), but others argue that it refers to either upregulating or downregulating emotional responses to be appropriate for an individual's current goals (Gross et al., 2011). In this latter sense, individuals can use cognitive reappraisal or suppression in adapting to these changes in

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their emotions. However, there does seem to be agreement within the field regarding the developmental progression of emotion regulation. Emotion regulation appears to move from extrinsic influences during infancy to more intrinsic influences during childhood and adolescence (Bell et al., 2018). These changes in how emotions are regulated across the lifespan may be due to the maturation of cognitive factors that are associated with emotion regulation, such as attention (Bell & Calkins, 2012), executive functions (Bell et al., 2019), and language (Eisenberg et al., 2014), as well as pubertal changes and social factors (Ridiger & Klipker, 2014) and neurobiological development (McRae et al., 2012a). With the idea of the developmental differences, as well as extrinsic and intrinsic methods of emotion regulation, varying with age, it might be argued that the definition of emotion regulation is dependent on the age of the individual.

Beginning with infancy and childhood, it appears that emotion regulation develops within the context of the mother-infant attachment relationship (Calkins, 2004). Infants rely heavily on their caregivers to learn how to regulate their own emotions (Goldsmith et al., 2008), thus indicating that their emotions are extrinsically regulated, or regulated by others. Because infants depend on others in developing emotion regulation, it may be that a more simplified definition, like that of Cole and colleagues (2004), is appropriate to describe emotion regulation during early development. Specifically, emotion regulation might be defined as simply reacting to changes in evoked emotions, including intensity and duration of the emotions, as well as the psychological processes that may result from the emotional expression (Thompson, 1994) during infancy and early childhood. It is possible that infants and young children rely on extrinsic sources of emotion regulation because they may not understand the goal that they are trying to achieve with emotion regulation; rather, they just notice that their emotions are changing.

Extrinsic emotion regulation is a positive aspect of development, as it helps teach infants and children how to eventually regulation through attentional control (Ruff & Rothbart, 1996).

Older children and adolescents are better able to regulate their own emotions intrinsically, or by themselves, with less input from others across development (Zimmer-Gemback & Skinner, 2011). By adulthood, individual emotions are largely intrinsically regulated, with changes in regulation resulting from different cognitive and social factors (Charles & Luong, 2013). Older children, adolescents, and adults who are more capable of intrinsic emotion regulation might be able to understand the goal that is associated with regulating emotions and therefore more closely align with the definition from Gross and colleagues (2011).

**The Importance of Emotion Regulation**

It is important for infants to develop healthy emotion regulation behaviors, as difficulty with regulating emotions early in life is linked to psychopathologic problems during later childhood and adolescence. For example, infants who have trouble with regulating anger are more likely to develop externalizing problems (Calkins & Fox, 2002) and aggression (Bohnert et al., 2003; McLaughlin et al., 2011) during childhood, with these problems persisting into adolescence (McLaughlin et al., 2011). Two-year-old children who have difficulty with emotion regulation are more aggressive towards their mothers, compared to others in their cohort who had healthier emotion regulation behaviors (Calkins & Dedmon, 2000). Additionally, 2-year-old girls who have trouble with emotion regulation tend to have higher levels of externalizing problems at ages 4- and 5-years (Hill et al., 2006). Further, trouble with regulating negative emotions, such as fear, during infancy might be predictive of childhood anxiety (Buss, 2011; Buss et al., 2013).

As mentioned, the problems associated with emotion regulation difficulties do not stop at childhood. These difficulties can persist into adolescence and adulthood and can manifest as aggression and anxiety, similar to what is seen in the childhood literature, as well as eating disorders (McLaughlin et al., 2011; Sim & Zeman, 2005) and personality disorders (Posner et al., 2003). It has also been demonstrated that problems with emotion regulation during adolescence are correlated with higher levels of depression, substance use, and suicidal ideations (Weinberg & Klonsky, 2009). Given that the negative outcomes associated with difficulties in early childhood can persist throughout the lifespan, it is important to ensure that healthy emotion regulation behaviors are developed early in life.

**The Effects of Maternal Characteristics on Child Emotion Regulation**

Researchers have long supported the idea that there are multiple factors at the parental level that play a role in child outcomes. The Determinants of Parenting Process Model (Belsky, 1984) supports this idea. As seen in Figure 1, Belsky's model proposes that parenting is multiply determined by several factors, including developmental history, personality, marital relations, social networks, work, and child characteristics. Specifically, this model includes the following considerations: Parenting is determined by multiple characteristics of the parent, as well as child outcomes. Parenting is influenced more so by parent factors and not child factors. Parent developmental history and personality shape parenting in an indirect way by affecting the broader context of things like marital relations and social networks in which relationships between children and parents exist. Researchers have used Belsky's model to guide their research on a variety of child outcomes related to parenting, including infant cognitive skills (e.g., Molfese et al., 2010), child behavioral problems (e.g., Neece et al., 2012), and adolescent externalizing and internalizing behaviors (e.g., Silinkas et al., 2020).

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As noted in the previous section, difficulties with child emotion regulation are predictive of many of these same negative outcomes (e.g., Bohnert et al., 2003; Buss et al., 2013). Thus, incorporating Belsky's determinants of parenting into research on child and adolescent emotion regulation may yield critical new information. Even though the Determinants of Parenting Process Model only proposes a direct relationship between parenting and child outcomes, there may be indirect associations, mediator effects, and moderator effects between various parental characteristics, such as personality and developmental history (which might include parent emotion regulation) and child outcomes (Belsky, 1984). With all of this in mind, it is important to assess how parental factors might work together in predicting child emotion regulation.

*Maternal Personality and Child Emotion Regulation*

Research has supported the notion that there are different maternal personality traits that can affect child emotion regulation. One of these traits is negative affect, a dominant personality dimension (Watson & Clark, 1992), defined as negative moods in individuals, such as sadness, anger, fear, anxiety, and guild (Clark & Watson, 1991). In terms of how negative affect in mothers predicts child emotion regulation, it has been suggested that high levels of maternal negative affect is related to poor regulation of fear in infants (Crokenberg & Leerkes, 2004) and young children (Liu et al., 2018). However, much of the research on maternal negative affect and child emotion regulation use maternal depressive symptoms and diagnoses of depressive disorders as measures of maternal negative affect, as the negative affect personality trait is a characteristic symptom of such (Depressive Disorders; APA, 2013). For instance, infants appear to be more likely to utilize more self-regulation of emotions when their mothers suffered from depression (Granat et al., 2017). This may seem positive, however, it might actually be detrimental in the long run, as infancy is a time when caregivers play a crucial role in helping

children learn to effectively regulate emotions (Goldsmith et al., 2008). It has also been found that 4-year-old children whose mothers have been diagnosed with major depressive disorder demonstrate ineffective emotion regulation, compared to children of the same age who are not consistently exposed to maternal negativity (Maughan et al., 2007). Additionally, Dagne and Snyder (2011) demonstrated that 5-year-old children of mothers with high levels of depressive symptoms exhibited ineffective anger regulation.

Another maternal personality trait that has been demonstrated to predict child emotion regulation is neuroticism, or the tendency to feel persistently worried and nervous (Costa & McCrae, 1987). However, like negative affect, maternal neuroticism tends to be researched in terms of psychopathology. Maternal neuroticism is typically assessed through diagnoses of borderline personality disorder when examining the effects that it has on child emotion regulation. This makes sense, as borderline personality disorder is a Cluster B personality disorder and neuroticism is a characteristic trait of such (Personality Disorders; APA, 2013). In general, mothers who report high levels of neuroticism, along with a diagnosis of borderline personality disorder, tend to be inhibited in their ability to form a secure attachment relationship with their infants (Conroy et al., 2010). Research has demonstrated that infants of mothers with borderline personality disorder tend to have difficulty with regulating fear and frustration, likely due to the difficulties with maternal emotion regulation that come along with a borderline personality disorder diagnosis. Specifically, as emotion regulation models for their infants, mothers with borderline personality disorder tend to underreact to emotions for fear and overreact to emotion of frustration in their infants (Gratz et al., 2014). Additionally, mothers with borderline personality disorder and high levels of neuroticism tend to respond to infant emotions of fear and frustration by minimizing them, therefore not allowing infants to appropriately

display their emotions which might predict poor emotion regulation capabilities during childhood (Kiel et al., 2017).

Maternal extraversion might also predict child emotion regulation. Extraversion is a personality trait that is defined as being warm, having positive affectivity, seeking excitement, and being assertive (McCrae & Costa, 1996). Unlike negative affect and neuroticism, extraversion is typically studied at the trait level and not in terms of psychopathology. However, the findings on how maternal extraversion affects child emotion regulation are contradictory. Some researchers have demonstrated that mothers who report high levels of extraversion in themselves when their children are aged 18-months are more warm and nurturing towards their toddlers aged 24-months, thus predicting positive emotion regulation in children (e.g., Smith et al., 2007). On the other hand, Clark and colleagues (2000) reported that mothers with higher levels of extraversion are controlling over their infants aged between 8- and 10-months-old, suggesting poorer emotion regulation abilities in their infants.

Overall, there appears to be promising research regarding how maternal personality traits my predict child emotion regulation, though it should be kept in mind that these traits are often studied in terms of mental illness. Even though this indicates that most of the maternal personality that has been assessed is trait personality, or characteristics that are relatively permanent and stable (Schöller et al., 2018), there are other traits, like negative affect, that may be state personality, or traits that are not permanent or consistent (Schöller et al., 2018), in a healthy sample (e.g., a sample that does not meet criteria of a depressive of borderline personality disorder diagnosis). There is little, if any, research that assesses maternal state and trait personality together in terms of how it predicts child emotion regulation, which should be kept in mind for future research.

There are other gaps in this literature base that are worth mentioning. First, the existing research on how maternal personality affects child emotion regulation focuses on personality that would be characterized as unhealthy or pathological, again measured by using trait personality traits. However, recent research has suggested that the health of one's personality might be able to be assessed by looking at levels of dysfunction in overall individual personality (Morey et al., 2015). Using a measure of maternal personality that looks at overall personality function might be useful in researching how maternal personality predicts child and adolescent emotion regulation, as it could get at a larger sample and assess personality from mothers who do not have disordered traits. It is important to keep in mind that a lack of personality disorder or negative personality traits does not necessarily indicate healthy personality function, so looking at personality as a whole may be very important in assessing overall health or dysfunction in personality. Second, the majority of this literature focuses on infants and children up to age 5-years, with very little focusing on middle childhood and adolescence. This could be due to the fact that older children tend to regulate their emotions intrinsically and do not rely as heavily on their mothers for emotion regulation as younger children do. Because of these gaps in the maternal personality research, this area may be worth further exploration.

***Maternal Parenting and Child/Adolescent Emotion Regulation***

Research has also indicated that parenting characteristics are important to child emotion regulation. Unlike the research base that looks at how maternal personality affects child emotion regulation, this research base places a lot of focus on early childhood and adolescence. This suggests that, even though adolescents are more capable of regulating their own emotions, they still look to their parents to do such. For example, when asked to report on whether they would ask a peer or a parent for assistance with a negative emotional problem, adolescents aged 13- to

17-years-old tended to report that they would be more likely to ask a parent (Waller et al., 2014). Other researchers have suggested that adolescents and children who are more securely attached to their parents tend to have better emotion regulation (i.e., they tend to use cognitive reappraisal rather than emotion suppression) compared to those who are less securely attached to their parents (Gresham & Gullone, 2012). Taken together, this research demonstrates that parents continue to shape child emotion regulation as children transition to adolescents and emerging adults.

Different styles of parenting seem to predict adolescent emotion regulation. To begin, authoritative parents appear to have a more positive effect on adolescent emotion regulation and permissive parents appear to have a more negative effect on adolescent emotion regulation (Jabeen et al., 2013). Further, Herzog and colleagues (2015) demonstrated similar findings to those of Jabeen and colleagues (2013), in addition to showing that authoritarian parenting styles can predict either positive or negative emotion regulation in adolescents, depending on whether or not there is a positive emotional climate within the family.

Researchers have also looked at how different parenting behaviors predict emotion regulation in children and adolescents. For instance, mothers with harsh parenting characteristics tend to play a negative role in the development of emotion regulation in children aged between 3- and 6-years-old, regardless of child gender and more so than harsh parenting behaviors in fathers (Chang et al., 2003). Other researchers have suggested that harsh parenting behaviors can lead to parents exerting a higher level of psychological control over their children, thus compromising child autonomy and leading to difficulties with emotion regulation in children (Morris et al., 2002). Specifically, when considering controlling versus lenient parenting

characteristics, mothers with high levels of psychological control tend to inhibit emotion regulation abilities in their adolescents (Manzeske & Stright, 2009).

Supportive and warm parenting have been demonstrated to foster child emotion regulation, starting early in a child's life and continuing through adolescence and early adulthood. To begin, infants whose mothers respond to their negative emotions in a warm and supportive way are better able to regulate their emotions (Moore et al., 2009; Perry et al., 2016). A recent study conducted by Perry and colleagues (2020) found that children of mothers who were more supportive of their negative emotional expression at age 5-years were better at emotion regulation at age 10-years and reported feeling higher levels of social competence at age 15-years. This research suggests that parents who support negative emotions in their children, as opposed to ignoring them or being unsupportive of them, set them up for better social adjustment and emotion regulation later in life.

*Maternal Emotion Regulation and Child Emotion Regulation*

Emotion regulation in children can be driven by a variety of child-related factors, such as temperament, biology, and cognitive development (Bell & Calkins, 2012; Bell et al., 2019; Eisenberg & Morris, 2002). However, because emotion regulation begins to develop during infancy within the context of the infant-mother attachment relationship (Calkins, 2000), it might be equally important to identify maternal emotion regulation characteristics that also influence child emotion regulation development.

To begin, it has been suggested that children imitate emotion regulation behaviors from their parents (Morris et al., 2007). It is also known that infants tend to rely heavily on the emotion regulation behaviors of their mothers in developing their own (Goldsmith et al., 2008) and that maternal emotion regulation predicts the emotion regulation abilities of young children

(Warren & Stifter, 2008). Given this research, there is indication that emotion regulation and researchers have begun to look at the transgenerational effects of emotion regulation. Specifically, parents may transmit emotion regulation behaviors to their children genetically and these behaviors are also influenced by the environment (Deater-Deckard, 2014). Further, emotion regulation behaviors of suppression and cognitive reappraisal appear to be genetically from parent to child, with indication that these behaviors become stable in adolescence and adulthood (Bridgett et al., 2015). This research supports the notion that there is genetic influence in the development of emotion regulation.

With the idea of infants imitating emotion regulation behaviors from their mothers and the apparent genetic transmission of emotion regulation in mind, it is important that mothers have effective strategies in place for regulating their own emotions. Overall, mothers who are better at regulating their emotions have children who are better at doing such (Bariola et al., 2011). For example, better maternal emotion regulation when children are 4- to 5-years-old is associated with better child emotion regulation by ages 8- 9-years-old. Research has also demonstrated that maternal emotion regulation is important for adolescent emotion regulation. For instance, better maternal emotion regulation during distressful events predicts better emotion regulation during similar situations, particularly in girls (Daughters et al., 2014).

As demonstrated above, there is evidence for the importance of maternal emotion regulation on child emotion regulation. However, there is little research on these direct associations in the adolescent literature. Beyond the understanding that emotion regulation has genetic influence, there is little understanding of how maternal emotion regulation plays a role on adolescent emotion regulation. Therefore, further examination of this association during this time period is warranted.

**Maternal Characteristics: Stability, Cause, and Effect**

Just like it is important to understand how different maternal characteristics predict child emotion regulation, it is also important to understand how maternal characteristics predict other maternal characteristics. A comprehension of these relationships helps us better understand how different maternal characteristics might interact with each other in predicting child and adolescent emotion regulation. Further, having insight into the development and stability of personality, parenting, and emotion regulation can help us to better understand how these characteristics in mothers can be detrimental to child development during different periods of childhood. Even though the research in the following section is not specific to mothers, it can help provide knowledge as to how these characteristics might look in mothers.

*Stability of Personality, Emotion Regulation, and Parenting During Adulthood*

To begin, personality traits are believed to remain stable over time, and when changes do occur, they are slow and not very noticeable (Roberts & Jackson, 2008). Regarding development, personality typically develops very early in life and tends to be stable throughout the lifespan. The origins of personality development are thought to begin with temperament during infancy and temperament is considered to be a large part of individual personality. However, personality is thought to extend beyond temperamental traits and include cognitions, beliefs, and values (Rothbart & Bates, 2006). These cognitions, beliefs, and values are gained through experience, and when combined with temperament, become the emerging personality that continues to develop through the lifespan (Rothbart, 2007). During adulthood, temperamental traits appear to be correlated with Costa and McCrae's (1997) Five Factor Model personality traits of conscientiousness, agreeableness, neuroticism, openness to experience, and extraversion (Evans

& Rothbart, 2007), providing further evidence that personality develops early in life and is stable across the lifespan.

As previously mentioned, emotion regulation begins to develop early in life, just like personality does. However, emotion regulation is thought to improve with age (Charles & Piazza, 2009), indicating that emotion regulation is not as stable as personality. Older adults tend to be better at regulating their emotions more so than younger adults, adolescents, and children, which is thought to be due to older adults having more cognitive control over their emotions and overall well-being (Kryla-Lighthall & Mather, 2009). By late adulthood (e.g., 61- to 81-years-old), emotion regulation appears to be more stable than it is during early adulthood (Ortega, 2009). Keeping in mind that this research is not specific to mothers, but instead adults in general, these findings may indicate that mothers of infants are more likely to experience fluctuations in their emotion regulation, compared to mothers of older children, depending on age of mother during these times in her child's life.

Finally, research suggests that parenting undergoes some development and stability, depending on the type of parenting. For example, optimal parenting behaviors, such as sensitivity, tend to remain stable across a child's first 6 years and less optimal parenting behaviors do not remain stable (Dallaire & Weinraub, 2005). Additionally, parental monitoring and warmth tend to remain stable between child ages 8-years to 12-years (Forehand & Jones, 2002). There is also evidence that parenting remains stable during adolescence. For example, a longitudinal study found that children at age 13 reported stability in parenting from ages 11 to 13, in addition to a decrease in strict parental control (Carrasco et al., 2011). Taken together, this research suggests that parents tend to remain stable in their parenting styles throughout

childhood and adolescence, with some minor development during adolescence, where parents may become less strict or controlling over their children.

Understanding whether or not maternal traits remain stable across adulthood has important implications. For example, because personality tends to remain stable (e.g., Roberts & Jackson, 2008), it can be implied that maternal personality measured at one time in a child's life will have the same effect on child outcomes later in development. On the other hand, because traits like emotion regulation and parenting tend to change with parent and child age, there are different implications for how those traits affect child development. In terms of emotion regulation, because emotion regulation continues to develop and improve with age (Charles & Piazza, 2009), mothers of adolescents might experience fewer fluctuations in emotion regulation behaviors than mothers of infants or young children, though this would depend on the age of the mother when their children are at these ages. In terms of parenting, if mothers become less strict in their parenting as they get older (e.g., Carrasco et al., 2011), adolescent outcomes, such as emotion regulation, may be impacted by parenting in a more positive way.

### *Maternal Personality and Maternal Parenting*

Research has demonstrated that maternal personality may be predictive of maternal parenting. For example, Costa and McCrae's (1997) Five Factor Model personality traits of conscientiousness, agreeableness, neuroticism, openness to experience, and extraversion appear to be related to the parenting dimensions of intrusiveness and sensitivity. Specifically, mothers who self-report higher levels of agreeableness and conscientiousness have a more sensitive style of parenting towards their toddlers (Smith et al., 2007). Further, controlling parenting styles appear to be related to higher levels of maternal extraversion and neuroticism (Smith, 2010). Additionally it has been demonstrated that mothers of infants who self-report higher levels of

openness to experience are more likely to exhibit more optimal parenting behaviors and mothers who self-report higher levels of neuroticism are more likely to exhibit less optimal parenting behaviors (Bornstein et al., 2011).

Other studies have also found relationships between the Five Factor Model personality traits and parenting behaviors. A meta-analysis demonstrated that higher levels of parental extraversion, agreeableness, conscientiousness, and openness to experience with lower levels of neuroticism were associated with more parental warmth and behavioral control, but higher levels of parental agreeableness and lower levels of neuroticism are associated with more autonomy support in children (Prinzie et al., 2009). These results strongly support the idea that personality plays a role in parenting. The same meta-analysis also revealed that the age of the parent might moderate the relationship between personality and parenting. Specifically, the association between personality parental warmth was less strong in older parents and older children than in younger parents and younger children (Prinzie et al., 2009). This moderation finding indicates that first, personality may be more of a moderator of child outcomes, instead of a mediator like Belsky proposed in his Determinants of Parenting Process Model (Belsky, 1984). Second, this result suggests that personality has more of an impact on some child outcomes than others.

There has also been some research that looked at how parental personality plays a role in parenting adolescents. To begin, maternal personality appears to be directly associated with maternal parenting behaviors of adolescent boys. Specifically, positive maternal personality traits are positively related to optimal parenting styles during the age (Latzman et al., 2009). Further, parents who are more agreeable and extraverted are more likely to exhibit an authoritative parenting style (Huver et al., 2010). Even though this latter research is not specific to just

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mothers, it does give some insight into how maternal personality might affect her parenting styles later in her child's life.

Overall, it appears that personality plays an important role in predicting parenting styles. However, there are still some gaps in this research that should be explored. To begin, it is important to assess how personality might moderate the association between maternal parenting and adolescent emotion regulation, as there is not sufficient evidence showing that personality moderates these types of relationships. There is a lot of research ground in Belsky's (1984) model as to how personality mediates these relationships, but because it appears that the way personality affects child outcomes changes dependent of parenting and age of parents and children, moderation analyses may be more appropriate in this older age group. Second, research should begin to focus on assessing how overall personality health affects parenting styles, rather than looking at specific traits in order to get a better picture of how personality and parenting predict adolescent outcomes.

*Maternal Personality and Maternal Emotion Regulation*

The research on how personality might affect emotion regulation is not necessarily specific to mothers, but is rather generalized to adults. Nevertheless, the adult literature on this topic helps give some insight into how the process might work in mothers. Much of the research in this area looks at how Costa and McCrae's (1997) Five Factor Model personality traits affect adult emotion regulation. To begin, previous work has demonstrated that individual differences in emotion regulation during adulthood are linked to adult personality traits. For example, young adults with higher levels of neuroticism are more likely to utilize poorer emotion regulation, such as suppression and those with higher levels of extraversion were more likely to use better emotion regulation, such as cognitive reappraisal (Ng & Diner, 2009). Further, it has been found

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that adults with higher levels of openness to experience, agreeableness, and extraversion together tend to have better emotion regulation (Purnamaningshi, 2017). Other researchers have demonstrated similar findings regarding the Five Factor Model traits and emotion regulation in adults, however, it has been suggested that these results are amplified in individuals who demonstrate psychopathology (Stanton et al., 2016).

Another trait that has been studied in terms of how it relates to emotion regulation is effortful control. Adults tend to demonstrate better emotion regulation if they had higher levels of effortful control during infancy (Rothbart et al., 2011). Specifically, Rothbart and colleagues (2011) define effortful control as the ability to wait for long-term goals to play out instead of acting upon immediate impulses. With this definition in mind, it makes sense that this personality trait plays a role in emotion regulation during adulthood.

Overall, it appears that personality plays an important role in adult emotion regulation. However, like the research on how maternal personality affects maternal parenting and child emotion regulation, much of the research in this area focuses on traits, rather than personality as a whole. As a result, it might be beneficial to look at maternal personality in terms of overall health by assessing overall function and dysfunction. Regardless, more research is needed in this area.

### *Maternal Emotion Regulation and Maternal Parenting*

Past research has indicated that maternal emotion regulation is related to parenting behaviors. For example, mothers who have poor emotion regulation are more likely to engage in the maltreatment of children more so than mothers who are better at regulating their emotions (Skowron et al., 2010). Further, it has been found that mothers of adolescents who utilize healthier emotion regulation behaviors, such as cognitive reappraisal, are more supportive of

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their adolescents emotional responses than mothers who use poorer emotion regulation behaviors, such as suppression (Hughes & Gullone, 2010).

Associations between maternal emotion regulation and particular parenting styles have also been demonstrated. In terms of parental warmth and rejection, mothers with poor emotion regulation are more likely to display lower parental warmth and more parental rejection towards their children (Saritas et al., 2013). Further, mothers who are more overreactive in their parenting styles might be more likely to utilize suppression as an emotion regulation behavior and better emotion regulation behaviors (e.g., cognitive reappraisal) are associated with a more lax parenting style (Lorber, 2012). Finally, more involved and sensitive parents are more likely to have better emotion regulation overall (Crandall et al., 2015).

It does appear that there are some associations between maternal emotion regulation and her parenting behaviors and styles. However, much of the research that is cited in this section focuses on early and middle childhood, so it might be important to assess these associations into later childhood and adolescence. As previous research has demonstrated, emotion regulation tends to get better with age (Charles & Piazza, 2009) and parenting tends to become less strict and controlling as children get older (Carrasco et al., 2011). Therefore, assessing these associations in older children and adolescents can help provide support for these notions about the stability of maternal traits, as well as provide more insight as to how these traits affect older children.

**The Present Study**

There is a substantial amount of literature that looks at the associations between maternal characteristics and child emotion regulation, however, there are limitations within this research base. To begin, much of the research focuses on infancy and early childhood, with little research

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looking at these associations during later childhood and adolescence. This might be due to age-related differences in emotion regulation and the impact of extrinsic influences. For example, the research on how maternal personality affects child emotion regulation is rooted in infancy and early childhood (e.g., Clark et al., 2000; Crockenberg & Leerkes, 2004; Granat et al., 2017; Kiel et al., 2017). Similarly, much of the research on how maternal emotion regulation affects child emotion regulation looks at associations in early childhood (e.g., Bariola et al., 2011; Tan & Smith, 2019). The only one of the three characteristics mentioned in the above review that appears to have sufficient support for how it affects adolescent emotion regulation is maternal parenting. Despite the lack of research on maternal characteristics and adolescent emotion regulation, it is important to examine whether these associations exist in older children and adolescents because of the associations that we see between parenting and child emotion during this later childhood and adolescent time in development.

Further, in terms of how maternal personality affects child emotion regulation, much of this research conceptualizes maternal personality in terms of mental illness, such as depression and borderline personality disorder. Recent research has suggested that overall personality health can be assessed in terms of function and dysfunction with self- and other-interactions (Morey et al., 2015). Assessing personality in this latter way gives researchers the flexibility to look at different levels of personality health (e.g., high, medium, low), which would then allow personality to be used as a moderator of these relationships, as opposed to the focus on maternal personality as a mediator in Belsky's (1984) model.

Finally, although most of these studies assess the links between maternal characteristics and child emotion regulation in a longitudinal manner, many (but not all) of them look at very short spans of time (e.g., several months). This research still gives a rich amount of information

regarding the developmental processes surrounding emotion regulation and the effects of maternal characteristics on such, but it is more beneficial to examine longer spans of time, or at least time that spans two developmental periods, especially during this period of older childhood and adolescence. Doing so might be beneficial in determining more long-term impacts of thee maternal characteristics on emotion regulation in later development.

Due to these limitations in the current literature base, the first goal of my thesis was to assess how maternal emotion regulation predicts adolescent emotion regulation. The second goal was to look at how maternal personality might moderate the relationship between maternal parenting and adolescent emotion regulation. Personality was used as a moderator in this study due to the lack of support as to how maternal personality affects child emotion regulation and because my thesis used a different measure of personality to assess overall personality functioning as a whole, as opposed to traits and mental illness. The maternal personality measure that I used in my thesis was the Level of Personality Functioning Scale- Brief Form (LPFS- BF 2.0; Hutsebaut et al., 2015), which assesses overall function in two dimensions of personality- *intrapersonal*, or within the self, and *interpersonal*, or between others. The LPFS- BF 2.0 differs from other personality measures because instead of assessing presence of individual personality traits, it gets at overall personality functioning in daily interactions with the self and with others. This could be beneficial to this area of research, as it could help us better understand the overall functioning of maternal personality which may give us more information about their interactions with their children than a measure that looks at just personality traits might. For these reasons, I wanted to incorporate the LPFS- BF 2.0 into my study. Emotion regulation for both mothers and adolescents was assessed using the model of suppression and cognitive reappraisal from the Gross and colleagues (2011) model. This definition of emotion regulation was chosen because

research supports the notion that older children and adults may more closely align with this definition, based on the switch from extrinsic to intrinsic emotion regulation that occurs around this time (Charles & Luong, 2013). Specifically, cognitive reappraisal was used as the measure of emotion regulation in both mothers and adolescents, as cognitive reappraisal is typically viewed as a more adaptive strategy of emotion regulation (Gross & John, 2003; Gross et al., 2011). Additionally, research has demonstrated links between maternal parenting and adolescent cognitive reappraisal (Gunzenhauser et al., 2014), as well as a genetic component of transmission of cognitive reappraisal from parents to children (Bridgett et al., 2015; Deater-Deckard, 2014). Further, associations between maternal parenting and personality and adolescent cognitive reappraisal could suggest the existence of protective factors in the development of optimal emotion regulation strategies. Maternal parenting behaviors were assessed and coded during interaction tasks between mothers and children. Using these behaviors, I created a composite score of optimal parenting, where higher scores reflected more optimal parenting and lower scores reflected less optimal parenting. My study was longitudinal in nature and looked at how maternal parenting and emotion regulation at child age 9-years predicted emotion regulation in adolescents, with maternal personality assessed during adolescence serving as a moderator of both of these relationships. In total, two models related to maternal personality, parenting, and adolescent emotion regulation were assessed. The first looked at how maternal *intrapersonal* personality functioning moderated both the relationship between maternal parenting and adolescent emotion regulation and maternal emotion regulation and adolescent emotion regulation. The second looked at how maternal *interpersonal* personality functioning moderated both the both the relationship between maternal parenting and adolescent emotion regulation and maternal emotion regulation and adolescent emotion regulation. Age and sex of the adolescents,

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as well as age of the mothers were controlled for in both of the models. The reason for controlling for age and gender was due to past research suggesting emotion regulation differences between genders (e.g., Hill et al., 2006), as well as other outcomes suggesting age differences for both mothers and children (e.g., Prinzie et al., 2009). See Figures 2 and 3 for a depiction of these two models.

*Hypotheses*

Based on the literature reviewed, I developed the following hypotheses for my study:

1. Maternal parenting behaviors at child age 9 were expected to predict adolescent self-reported cognitive reappraisal. If mothers exhibited more optimal parenting behaviors at the age 9 visit, I predicted that the association would be positive and adolescents would be more likely to self-report more cognitive reappraisal. If mothers demonstrated less optimal parenting, I predicted that the association would be negative and adolescents would be more likely to self-report more emotion suppression.

2. The association between maternal parenting at child age 9 and adolescent self-reported emotion regulation was expected to be moderated by maternal personality. Because personality develops very early in life, tends to remain stable across the lifespan, and appears to predict parenting, I predicted maternal personality to be an important moderator in predicting this parenting-child emotion regulation association. Specifically:

   a. If mothers demonstrated more optimal parenting and self-reported intrapersonal or interpersonal function, I predicted that adolescents would self-report more cognitive reappraisal.

b. If mothers demonstrated more optimal parenting but self-reported intrapersonal or interpersonal dysfunction, I predicted that adolescents would self-report less cognitive reappraisal.

c. If mothers demonstrated less optimal parenting but self-reported intrapersonal in interpersonal function, I predicted that adolescents would self-report more cognitive reappraisal.

d. If mothers demonstrated less optimal parenting and self-reported intrapersonal or interpersonal dysfunction, I predicted that adolescents would self-report less cognitive reappraisal.

3. Maternal self-reported emotion regulation at age 9-years was expected to positively predict adolescent self-reported emotion regulation. If mothers reported using more cognitive reappraisal, I predicted that adolescents would be more likely to also report using more cognitive reappraisal. If mothers reported using less cognitive reappraisal (e.g., more emotion suppression), I predicted that adolescents would be more likely to also report using more suppression. I did not expect this relationship to be moderated by personality, due to the genetic component of the development of emotion regulation (Bridgett et al., 2015; Deater-Deckard, 2014).

**Method**

The participants in the present study consisted of 2 cohorts representing 50% of child-mother dyads from a larger longitudinal study designed to examine the interaction of cognition and emotions across early development. The children in these 2 cohorts were recruited from Montgomery County, VA and surrounding areas. The children in the third cohort (not part of this present study) were recruited from Greensboro, NC. Children in all 3 cohorts were recruited at age 5-months for an NIH-funded study R03 HD043057 and R01 HD049879, which ended with data collection at age 9. Children in cohorts 1 and 2 were recruited for data collection during adolescence.

**Participants**

Focusing on the 2 local cohorts that were a part of my thesis project, Cohort 1 children are, in general, 3-4 years older than Cohort 2 children, with variability in age due to recruitment strategies. Thus, the youngest child in Cohort 2 turned 12 in January 2020 and the oldest child in Cohort 1 turned 18-years in April 2020. Due to the timing of the grant renewal and attrition associated with longitudinal studies, re-recruitment was accomplished for each cohort from approximately June 2013 to June 2014. Thus, of the 92 children from Cohort 1 who contributed data at age 9, 24 were new recruits. Of the 100 children from Cohort 2 who contributed data at age 9, 49 were newly recruited at the age 6 visit. Thus, for the age 9 visit and the adolescent visit, participants included Cohort 1 "old" and "new" (as of the age 9 visit) and Cohort 2 "old" and "new" (as of the age 6 visit) participants. In sum, at the age 9 visit, participants included 192 children ($M = 9.93$ years, $SD = 0.75$ years; 88 boys, 104 girls, 89.1% White) and their mothers. Age of mothers at the age 9 timepoint ranged from 28-years to 52-years ($M = 40.37$ years, $SD = 4.67$ years). The majority of the mothers in the age 9 sample had a college degree, Master's

degree, or doctoral degree (81.1%). These 192 children and their mothers were recruited for the adolescent time point.

The adolescent time point included 123 adolescents and their mothers who also visited the lab when the children were 9-years-old. The ages of the adolescents ranged from 11.82-years to 18.13 years ($M$ = 14.64 years, $SD$ = 1.94 years; 60 boys, 63 girls; 92.6% White). Age of mothers at the adolescent time point ranged from 31-years to 59-years ($M$ = 45.18 years, $SD$ = 4.89 years). The majority of mothers in the adolescent sample had either a college degree, a Master's degree, or a doctoral degree (86.4%). Of the 123 dyads from the adolescent time point, 79 participated prior to the COVID-19 pandemic between August 2019 and March 2020, referred to as the pre-COVID group. Of these 79 dyads, 78 participated via an in-person lab visit and 1 participated via paper questionnaires only. The remaining 44 dyads, participated between July 2020 and September 2020 via online questionnaires (the same ones that were given to the pre-COVID group) and is referred to as the during-COVID group. Because I had a pre-COVID and during-COVID group, I conducted a t-test to assess differences between groups in the variables of interest and intended to create a grouping variable if any of the variables significantly differed between groups.

The sample for my thesis project included the adolescents and their mothers who had both an age 9 and adolescent time point (N = 123). Of these participants, 1 dyad was excluded from the final analyses due to missing data from one parenting variable at the age 9 timepoint (lab records indicated that there was an error with data collection in this dyad). Therefore, the sample size for my thesis project was 122 adolescents (78 pre-COVID and 44 during-COVID). Table 1 contains the demographic information of the participants.

**Procedure**

As part of the ongoing longitudinal study with the children, mothers completed their own individual "mom study" lab visits after the child age 9 visit for Cohort 1 and between the child age 6 and age 9 visits for Cohort 2. For both the "mom study" and the current adolescent data collection periods, mothers completed questionnaires focused on their own personality and emotion regulation, as well as on their child's emotion regulation at the adolescent time point. The "mom study" visit was about 2 hours ling and the child's adolescent lab visit (pre-COVID) was about 2.5-3 hours long and included many cognition, emotion, electrophysiological, and academic tasks that were not included as a part of my thesis. During the age 9 lab visit, dyads participated in interaction tasks where specific parenting behaviors were coded and used as a measure of parenting behaviors in my thesis. Because the "mom study" visit occurred after the age 9 visit for Cohort 1 and between the ages 6 and 9 visits for Cohort 2, I refer to maternal data collected during the "mom study" as being association with the child age 9 data for simplicity and therefore refer to all data associated with the age 9 visit as the age 9 timepoint. Adolescents and mothers either visited the lab or participated via questionnaires only, and I therefore refer to this data as the adolescent time point.

**Measures**

*Maternal Parenting Behaviors at the Age 9 Time Point*

Maternal parenting behaviors were coded by our group's collaborator (Cynthia L. Smith) and her laboratory personnel from recordings of the age 9 lab visit using an interaction task called Marble Maze. During Marble Maze, mother and child were asked to move a marble along a path without allowing the marble to drop through a hole, each controlling a surface tilting knob and not touching the knob belonging to the other. The task lasted for 5 minutes and maternal

behaviors were coded in 30-second epochs. During this task, several maternal behaviors were assessed, and the behaviors of interest for my thesis were levels of negative affect, positive affect, and intrusiveness. Negative affect was defined as the amount of hostility and control that mothers exerted over their children during the task and was coded on a scale of 1 (none) to 4 (harsh control). Positive affect was defined as the amount of warmth and positivity that mothers exhibited towards their children during the task and was coded on a scale of 1 (none) to 4 (intense positive). Intrusiveness was defined as mothers becoming controlling and overly stimulating towards the child while the dyad maneuvered the task and was coded on a scale of 1 (none) to 4 (high). The behaviors were summed across epochs and then divided by the number of epochs to create a mean score prior to analyses. These behaviors were chosen as the measures of maternal parenting at the age 9 time point because they demonstrate some important aspects of parenting that appear to play an important role in child emotion regulation, as suggested by previous research (e.g., Chang et al., 2003; Jabeen et al., 2013; Manzeske & Stright, 2009; Perry et al., 2016).

For my thesis analyses, I had intended to reverse-score maternal negative affect and intrusiveness so that higher scores would reflect more positive parenting attributes (e.g., lower levels of negative affect and intrusiveness and combine these reverse-scored variables with maternal positive affect in order to create a composite score of "Optimal Parenting". However, prior to creating my composite score, I examined correlations between the three parenting variables, both before and after being reverse scored, which demonstrated that only maternal negative affect and intrusiveness were correlated each other (both before and after revers-scoring), but neither was related to maternal positive affect. These results, as well as the descriptive statistics for the parenting variables, are displayed in Table 2. Because the correlation

coefficient with the reverse-scored variables was slightly stronger than that with the original values, the reverse-scored maternal negative affect and intrusiveness were put into an exploratory factor analysis (EFA) with the original value for maternal positive affect. The results of this EFA, shown in Table 3, extracted one component using all three variables (therefore, the model was not rotated). However, maternal intrusiveness reverse-scored and maternal negative affect reverse-scored were more closely related to each other (according to their factor loadings) than positive affect was to either variable. Because of this, the Optimal Parenting score was created by adding together the reverse-scored maternal intrusiveness and the reverse-scored maternal negative affect and averaging the means.

***Maternal Emotion Regulation at the Age 9 Time Point and Adolescent Emotion Regulation***

Maternal emotion regulation was measured during the "mom study" and served as an independent variable in my analyses. The measure of maternal emotion regulation that was used was self-report on the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003). The ERQ consists of 10 items that measure emotion regulation from the perspective of Gross and colleagues (2011) definition, therefore getting at cognitive reappraisal and suppression of emotions, which are the two subscales of the ERQ. For the purposes of my analyses, I used the "Cognitive Reappraisal" subscale of the ERQ, where higher scores indicated that individuals were more likely to use cognitive reappraisal as an emotion regulation behavior. The same measure was used to assess emotion regulation in adolescents, though adolescent emotion regulation served as the dependent variable in my analyses. Like mothers, adolescents also completed the ERQ as a self-report measure. See Table 4 for descriptive statistics for mother and adolescent ERQ responses. See Appendix A for a copy of the ERQ.

*Maternal Personality at the Adolescent Time Point*

Maternal personality was served as a moderator for my thesis project and was measured during the adolescent visit using self-report on the LPFS- BF 2.0 (Hutesbaut et al., 2015). The LPFS- BF 2.0 is a 12-item measure that is based off of an earlier clinician measure of the LPFS, which was developed as a 12-item measure of personality assessment for the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) in an attempt to replace the categorical approach to such. The LPFS assesses personality in two domains- intrapersonal and interpersonal functioning- and there are four 3-item subscales; 2 that pertain to the intrapersonal domain- identity and self-direction- and 2 that pertain to the interpersonal domain- intimacy and empathy (LPFS; APA, 2013). The LPFS- BF 2.0 contains the same amount of items, subscales, and domains as the original LPFS, but is scored on a 1-4 point scale (different from the original LPFS, which is scored on a 0-4 point scale), with 1 indicating low to no levels of personality dysfunction (e.g., better functioning) and 4 indicating high, disordered levels of personality dysfunction (e.g., poorer functioning). The LPFS- BF 2.0 demonstrates acceptable reliability and validity when self-reported by individual members of clinical samples (Weekers et al., 2018). The LPFS- BF 2.0 has not yet been used to assess personality dysfunction in non-clinical samples, but research has demonstrated acceptable reliability and validity in non-clinical samples using the original version of the LPFS in the DSM-5 as a self-report measure (e.g., Roche et al., 2018). Further, when the items of the original version of the LPFS are used as a self-report measure in non-clinical samples, the items are correlated with Costa and McCrae's (1997) Five Factor Model personality traits (Hopwood et al., 2018; reproduced in Table 5). To date, I have no knowledge of any version of the LPFS being used in the developmental literature or to assess parent personality. I do, however, expect it to be an important measure of parent personality due

to the interpersonal domain. For my thesis analyses, I utilized both the intrapersonal and interpersonal domains of the LPFS- BF 2.0 as my measure of personality. This was done by creating composite scores of the first six items (intrapersonal items) and the last six items (intrapersonal items) of the LPFS- BF 2.0 and added them to my models. For both domains, an overall score closer to 6 indicated low to no personality dysfunction (e.g., better functioning) and an overall score closer to 24 indicated high or disordered levels of personality dysfunction (e.g., poorer functioning). Scores in the range of 12-18 in either domain indicated moderate levels of personality dysfunction. See Table 4 for the descriptive statistics for maternal responses on the LPFS- BF 2.0. See Appendix B for a copy of the LPFS- BF 2.0.

**Data Analysis Plan**

All analyses were conducted using SPSS version 26 (IBM, 2019). Because this was a longitudinal dataset, multiple imputation was used to assess patterns of missing data and create an imputed dataset with estimates for the missing values. Next, outliers in the variables were assessed and variables with outliers were winsorized. Then, an independent samples t-test was performed in order to see if there were significant differences in any of the variables between the pre-COVID and during-COVID groups. Finally, predictor variables were mean-centered and interaction terms were created for regression and moderator analyses.

For my analyses, the type one error rate was set to $p < 0.05$ for testing main effects in the correlation analyses and direct effects in the regression analyses. However, previous research has indicated that it is difficult to detect interaction effects in social science research due to issues with statistical powering, measurement error, and variable distribution (e.g., McClelland & Judd, 1993; Whisman & McClelland, 2005); thus, the type one error rate was raised to $p < 0.10$ for testing effects of the moderators on my associations. This method has been empirically supported

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as a way to increase power and detect moderation and has been used in recent research (Broomell et al., 2020; Diaz et al., 2019; Whisman & McClelland, 2005). There for, my interaction terms in each regression analysis were probed at $p = 0.10$ and below. The PROCESS macro for SPSS, version 3.5.3 (Hayes, 2017) was used to probe the interactions assess simple slopes.

## *Hypothesis 1*

The first hypothesis was that maternal optimal parenting at the age 9 time point would be related to adolescent cognitive reappraisal. This was tested by conducting a bivariate correlation. The relationship was expected to be positive and significant, so that higher levels of optimal parenting would predict higher levels of adolescent cognitive reappraisal. Direction and strength of the correlation coefficient was assessed in order to test this hypothesis.

## *Hypothesis 2*

The second hypothesis was that the relationship between maternal optimal parenting at the age 9 time point and adolescent cognitive reappraisal would be moderated by maternal personality (interpersonal and intrapersonal functioning) at the adolescent time point. This hypothesis was tested by conducting two hierarchical linear regression models. Each model contained three steps, controlling for maternal age at the age 9 time point, adolescent age, and adolescent sex, and used adolescent cognitive reappraisal as the dependent variable. Model 1 included the control variables in the first step, maternal optimal parenting at the age 9 time point and maternal intrapersonal personality functioning as individual predictors in the second step (to test for direct effects) and an interaction term of maternal optimal parenting and maternal intrapersonal personality functioning in the third step (to test for moderation effects). From here

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on out, Model 1 is referred to as the Maternal Intrapersonal/Parenting Model and Model 2 is referred to as the Maternal Interpersonal/Parenting Model.

*Hypothesis 3*

The third hypothesis was that maternal cognitive reappraisal at the age 9 time point would significantly predict adolescent cognitive reappraisal and that this association would not be moderated by maternal personality during the adolescent visit. This was rested by using a bivariate correlation to assess the direction and strength of the relationship. Additionally, two hierarchical linear regression models were used to assess whether or not the relationship was moderated by maternal personality. Model 1 included the above control variables in the first step, maternal cognitive reappraisal at the age 9 time point and maternal intrapersonal personality functioning during the adolescent time point as individual predictors in the second step (to test for direct effects), and an interaction term of maternal cognitive reappraisal and maternal intrapersonal personality functioning in the third step (to test for moderation effects). Model 2 included the above control variables in the first step, maternal cognitive reappraisal at the age 9 time point and maternal interpersonal personality functioning at the adolescent time point as individual predictors in the second step (to test for direct effects) and an interaction term of maternal cognitive reappraisal and maternal interpersonal personality functioning in the third step (to test for moderation effects). From here on out, Model 1 is referred to as the Maternal Intrapersonal/Cognitive Reappraisal Model and Model 2 is referred to as the Maternal Interpersonal/Cognitive Reappraisal Model.

## Results

### Preliminary Data Analyses

The results of the missing data analysis showed that 89% of all variables were missing at least one value and 59.84% of all cases were missing data for at least one variable. Because of this multiple imputation was used to estimate these missing variables and get a complete dataset. The imputed dataset was then used to average the values for each variable across the 5 imputations in order to create a single, pooled dataset to use for the rest of the analyses.

Next, the outliers of the variables were assessed. The results of these analyses showed that 5 variables had outliers and were winsorized. The outliers of these 5 variables had individual values that were replaced with either the next highest or next lowest value, depending on whether the outliers fell above or below the maximum or minimum value, respectively. These variables were *maternal cognitive reappraisal* at the age 9 time point (2 cases replaced with the next lowest value, 4 cases replaced with the next highest value); *maternal emotion suppression* at the age 9 time point (1 case replaced with the next lowest value); *maternal cognitive reappraisal* at the adolescent time point (3 cases replaced with the next lowest value); *maternal interpersonal personality functioning* at the adolescent time point (2 cases replaced with the next highest value); and *adolescent cognitive reappraisal* (2 cases replaced with the next highest value and 3 cases replaced with the next lowest value. Correlations of all variables, as well as their means, standard deviations, and minimum and maximum values (after winsorizing) are shown in Table 4.

Next, an independent samples t-test was performed to determine if there were differences in any of the variables between the pre-COVID and during-COVID groups, with the intention of controlling for group in Step 1 of my regression models if any group differences were found.

These results are shown in Table 6. Two variables differed between the pre-COVID and during-COVID groups. These were maternal cognitive reappraisal at the adolescent visit and maternal emotion suppression at the adolescent visit. It should be noted that these two variables were not used for the hypothesized analyses, but assessing group differences for these variables was deemed important for potential post-hoc analyses. For maternal cognitive reappraisal, the 78 mothers who participated pre-COVID (as previously noted, 1 dyad was dropped from the analyses because maternal negative affect had not been coded during the age 9 time point) were more likely to use more cognitive reappraisal as an emotion regulation strategy, compared to the 44 mothers who participated during-COVID. For maternal emotion suppression, the 44 mothers who participated during-COVID compared to the 78 mothers who participated pre-COVID used more emotion suppression as an emotion regulation strategy. This t-test indicated that mothers who participated during the COVID-19 pandemic tended to use more negative emotion regulation strategies than those who participated prior to the COVID-19 pandemic.

The mothers who participated in the during-COVID group also completed a 4-item questionnaire about how stressful the COVID-19 pandemic had been on their own physical health and mental well-being, as well as their family's finances and family life in general. The questionnaire used a 7-point Likert-scale with 1 indicating "not at all stressful" and 7 indicating "extremely stressful" (adapted from questionnaires created by Allen, 2020, Bickel, 2020, and Kim-Spoon, 2020). The results from this questionnaire demonstrated that more than half of the during-COVID mothers reported that the COVID-19 pandemic had cause moderate to extreme stress (ratings between 4-7) on their mental well-being (N = 27; 61.3%), physical health (N = 26; 59.1%), and family life (N = 27; 61/3%). This might partially explain the differences in emotion regulation strategies between the pre-COVID and during-COVID groups.

**Original Analyses**

*Hypothesis 1*

The results of the bivariate correlation used to test this hypothesis are shown in Table 4. There was no association between maternal optimal parenting during the age 9 time point and adolescent cognitive reappraisal. Therefore, the first hypothesis that maternal parenting behaviors would predict adolescent cognitive reappraisal was not supported.

*Hypothesis 2*

The results of the Maternal Intrapersonal/Optimal Parenting Model are shown in Table 7. No direct effects of parenting or intrapersonal personality functioning, nor an interaction effect, were found to play a role in predicting adolescent cognitive reappraisal. Likewise, in the Maternal Interpersonal/Optimal Parenting Model, no direct or interaction effects of parenting and interpersonal personality functioning were found to play a role in predicting adolescent cognitive reappraisal. These results are shown in Table 8. Thus, this second hypothesis that the association between maternal parenting at the age 9 time point and adolescent cognitive reappraisal would be moderated by both maternal intrapersonal and interpersonal personality functioning was not supported.

*Hypothesis 3*

The results of the bivariate correlation used to test the first part of this hypothesis are shown in Table 4. Maternal cognitive reappraisal at the age 9 time point did not predict adolescent cognitive reappraisal.

The results of the Maternal Intrapersonal/Cognitive Reappraisal Model are shown in Table 9. No direct effects or interaction effects of maternal cognitive reappraisal or maternal

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intrapersonal personality functioning were found to play a role in predicting adolescent cognitive reappraisal.

The results of the Maternal Interpersonal/Cognitive Reappraisal Model are shown in Table 10. Steps 1 and 2 of this model were not significant. However, Step 3 of this model, which included the interaction term of maternal cognitive reappraisal at the age 9 time point and maternal interpersonal personality functioning at the adolescent time point, was significant, with the interaction term also being significant (both at the 0.10 level). Because previous research has indicated that it is appropriate to probe interactions that are significant when $p < 0.10$ (e.g., McClelland & Judd, 1993; Whisman & McClelland, 2005), this interaction was probed and moderating effects were assessed. PROCESS (Hayes, 2017) was used to conduct a multiple regression analysis, where adolescent emotion suppression was the dependent variable, maternal emotion suppression at the age 9 time point was the independent variable, and maternal intrapersonal personality functioning was the moderating variable (Hayes & Rockwood, 2017). Significance for low and high levels of maternal interpersonal personality functioning interacting with maternal emotion suppression were calculated by subtracting 1 standard deviation from intrapersonal personality functioning and adding 1 standard deviation to intrapersonal personality functioning, respectively (Holmbeck, 2002). Finally, the simple slopes analysis was conducted to attempt to visually demonstrate the interaction. However, the results from this simple slopes analysis was not significant (High Interpersonal Personality: $B = -0.263$, $p = .174$; Low Interpersonal Personality: $B = 0.251$, $p = 0.259$), thus indicating that the interaction was not significant and that there is no moderating effect of maternal intrapersonal personality in the association between maternal and adolescent cognitive reappraisal. The third hypothesis that maternal cognitive reappraisal at the age 9 time point would predict adolescent cognitive

reappraisal and that this association would not be moderated by maternal intrapersonal and interpersonal personality functioning was not fully supported.

**Post-Hoc Analyses**

Because the data did not support any of my three hypotheses, a series of post-hoc analyses were conducted. I replaced cognitive reappraisal with emotion suppression in both mothers and adolescents in the following post-hoc analyses. The first set of post-hoc analyses involved retesting my original three hypotheses, but this time using emotion suppression instead of cognitive reappraisal for the emotion regulation variable in both mothers and adolescents. Hypothesis 1 was that maternal optimal parenting behaviors at child age 9 would negatively predict adolescent emotion suppression. Hypothesis 2 was that the association between maternal optimal parenting behaviors at the age 9 time point and adolescent emotion suppression would be moderated by maternal intrapersonal and interpersonal personality functioning. Hypothesis 3 was that maternal emotion suppression at the age 9 time point would positively predict adolescent emotion suppression and that this association would not be moderated by maternal personality.

*Post Hoc 1.1: Retesting Hypothesis 1 with Emotion Suppression*

The bivariate correlation was examined between maternal optimal parenting behaviors at the age 9 time point and adolescent emotion suppression. This correlation is shown in Table 4, indicating that maternal optimal parenting behaviors at the age 9 time point did not predict adolescent emotion suppression.

*Post Hoc 1.2: Retesting Hypothesis 2 with Emotion Suppression*

The second hypothesis in the post-hoc analysis was tested using the same two hierarchical linear regression models (Maternal Intrapersonal/Optimal Parenting and Maternal Interpersonal/Optimal Parenting) with the same three steps in each model that were used for the

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original hypotheses, except the dependent variable was adolescent emotion suppression instead of cognitive reappraisal. Here, Model 1 is referred to as the Maternal Intrapersonal/Optimal Parenting-2 Model and Model 2 is referred to as the Maternal Interpersonal/Optimal Parenting-2 Model.

The results of the Maternal Intrapersonal/Optimal Parenting-2 Model are shown in Table 11. No direct effects or interaction effects of maternal optimal parenting at the age 9 time point or maternal intrapersonal personality functioning were found to play a role in predicting adolescent emotion suppression. Likewise, in the Maternal Interpersonal/Optimal Parenting-2 Model, no direct effects or interaction effects of maternal optimal parenting at the age 9 time point or maternal interpersonal personality functioning were found to play a role in predicting adolescent emotion suppression. These results are shown in Table 12.

Despite none of the steps of the Maternal Interpersonal/Optimal Parenting-2 Model being non-significant, maternal interpersonal personality functioning appeared to positively predict adolescent emotion suppression in Step 2 of the model (Table 12), indicating that maternal interpersonal personality functioning significantly predicts adolescent emotion suppression. This association was further assessed by looking at the bivariate correlation coefficient between the two variables (Table 4). The correlation was significant and positive, suggesting that adolescents are more likely to use emotion suppression when their mothers report higher levels of interpersonal personality dysfunction.

### Post Hoc 1.3: Retesting Hypothesis 3 with Emotion Suppression

The third hypothesis was tested by first conducting a bivariate correlation and then two additional hierarchical linear regression models that were similar to those used to test Hypothesis

3 in the original analyses. The results of the correlation are shown in Table 4. Maternal emotion suppression at the age 9 time point was not related to adolescent emotion suppression.

The two additional regression models included the same three steps as those used in the original analyses, with the only difference being that adolescent emotion suppression was used as the dependent variable (instead of cognitive reappraisal) and maternal emotion suppression at the age 9 time point was used as predictor and in the interaction terms (instead of maternal cognitive reappraisal). Here, Model 1 is referred to as the Maternal Intrapersonal/Emotion Suppression Model and Model 2 is referred to as the Maternal Interpersonal/Emotion Suppression Model.

The results of the Maternal Intrapersonal/Emotion Suppression Model are shown in Table 13. Steps 1 and 2 of this model were not significant. However, Step 3 of this model, which included the interaction term of maternal emotion suppression at the age 9 time point and maternal intrapersonal personality functioning at the adolescent time point, was significant, with the interaction term also being significant (both at the 0.10 level). Because previous research has indicated that it is appropriate to probe interactions that are significant when $p < 0.10$ (e.g., McClelland & Judd, 1993; Whisman & McClelland, 2005), this interaction was probed and moderating effects were assessed. PROCESS (Hayes, 2017) was used to conduct a multiple regression analysis, where adolescent emotion suppression was the dependent variable, maternal emotion suppression at the age 9 time point was the independent variable, and maternal intrapersonal personality functioning was the moderating variable (Hayes & Rockwood, 2017). Significance for low and high levels of maternal intrapersonal personality functioning interacting with maternal emotion suppression were calculated by subtracting 1 standard deviation from intrapersonal personality functioning and adding 1 standard deviation to intrapersonal personality functioning, respectively (Holmbeck, 2002). Finally, the simple slopes analysis was conducted to

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visually demonstrate the interaction effect, which is shown in Figure 4. The results from this

simple slopes analysis demonstrated that maternal emotion suppression predicted adolescent

emotion suppression only for adolescents whose mothers reported lower levels or intrapersonal

personality dysfunction (i.e., better intrapersonal personality functioning). As seen in Figure 4,

when mothers self-report high levels of emotion suppression at the age 9 time point and also self-

report lower levels of intrapersonal personality dysfunction at the adolescent tie point,

adolescents tend to report lower levels of emotion suppression ($B = -0.305$, $p = 0.070$). This

suggests that even though maternal emotion suppression at the age 9 time point does not have a

direct effect on adolescent emotion suppression, healthy levels of maternal intrapersonal

personality functioning may buffer against adolescents developing unhealthy levels of emotion

suppression strategies of emotion regulation when their mothers demonstrate high levels of

emotion suppression. In other words, healthy levels of maternal intrapersonal personality

functioning may serve as protective factors against adolescents developing emotion suppression

as an emotion regulation strategy, even when their mothers self-report using high levels of

emotion suppression. Even though this result does not fully support the hypothesis in the sense

that it suggests a lack of complete genetic influence on the development of adolescent emotion

regulation, it does highlight the importance of considering biopsychosocial influences of the

development of emotion regulation.

In the Maternal Interpersonal/Emotion Suppression Model, Steps 1 and 3 were not

significant, but Step 2 was significant. In Step 2 of this model, maternal interpersonal personality

functioning positively predicted adolescent emotion suppression. This indicates that, even though

maternal interpersonal personality functioning does not appear to moderate the association

between maternal emotion suppression at child age 9 and adolescent emotion suppression, there

is a direct effect of maternal interpersonal functioning on adolescent emotion suppression. These results are shown in Table 14.

A final set of post-hoc analyses were conducted to see if maternal personality moderated the association between maternal cognitive reappraisal and adolescent cognitive reappraisal, and that between maternal emotion suppression and adolescent emotion suppression, but these analyses used maternal regulation that was self-reported at the adolescent time point. The original and previous post-hoc analyses focused on maternal emotion regulation that was self-reported at the age 9 time point. The purpose of these additional post-hoc analyses was to test maternal emotion regulation that was concurrent with the measures of maternal personality and adolescent emotion regulation since the longitudinal models, for the most part, did not yield significant effects. These analyses involved four hierarchical linear regression models: two that predicted adolescent cognitive reappraisal (using maternal cognitive reappraisal at the adolescent time point as a predictor) and two that predicted adolescent emotion suppression (using maternal emotion suppression at the adolescent time point as a predictor).

*Post Hoc 2.1: Retesting Hypothesis 3 with Concurrent Cognitive Reappraisal*

The first of the second post-hoc analyses used maternal and adolescent cognitive reappraisal. Each of the cognitive reappraisal models contained three steps. Step 1 of each model included the covariates, which were maternal cognitive reappraisal during the age 9 time point, maternal age during the adolescent time point, adolescent sex, and adolescent age. Additionally, because the previous t-test demonstrated that there were differences between the pre-COVID and during-COVID groups for maternal cognitive reappraisal during the adolescent time point (Table 6), a grouping variable (i.e., Group) was included as a covariate. Step 2 of each model included maternal cognitive reappraisal and either maternal intrapersonal personality functioning

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(Maternal Intrapersonal/Cognitive Reappraisal During Adolescence Model) or maternal

interpersonal personality functioning (Maternal Interpersonal/Cognitive Reappraisal During

Adolescence Model), both during the adolescent time point in order to test the direct effects of

these variables on adolescent cognitive reappraisal. Step 3 of each model included the interaction

term (either Maternal Cognitive Reappraisal X Maternal Intrapersonal Personality Functioning or

Maternal Cognitive Reappraisal X Maternal Interpersonal Personality Functioning) in order to

test for moderation.

None of the steps of the Maternal Intrapersonal/Cognitive Reappraisal During

Adolescence Model were significant. This indicates that there are no direct nor moderating

effects of maternal intrapersonal personality functioning or maternal cognitive reappraisal during

the adolescent time point on adolescent cognitive reappraisal. The results of this model are

shown in Table 15. Likewise, the results of the Maternal Interpersonal/Cognitive Reappraisal

During Adolescence Model were not significant, suggesting that maternal interpersonal

personality functioning and maternal cognitive reappraisal during the adolescent time point have

no direct or moderating effects on adolescent cognitive reappraisal. The results of this model are

shown in Table 16.

***Post Hoc 2.2: Retesting Hypothesis 3 with Concurrent Emotion Suppression.***

The second of the second post-hoc analyses used maternal and adolescent emotion

suppression. Each of the emotion suppression models contained three steps. Steps 1 of each

model included the covariates, which were maternal emotion suppression during the age 9 time

point, maternal age during the adolescent time point, adolescent sex, and adolescent age.

Additionally, because the previous t-test demonstrated that there were differences between the

pre-COVID and during-COVID participants for maternal emotion suppression during the

adolescent time point (Table 6), a grouping variable (i.e., Group) was included as a covariate. Step 2 of each model included maternal emotion suppression and either maternal intrapersonal personality functioning (Maternal Intrapersonal/Emotion Suppression During Adolescence Model) or maternal interpersonal personality functioning (Maternal Interpersonal/Emotion Suppression During Adolescence Model), both during the adolescent time point in order to test for direct effects of these variables on adolescent emotion suppression. Step 3 of each model included the interaction term (either Maternal Emotion Suppression X Maternal Intrapersonal Personality Functioning or Maternal Emotion Suppression X Maternal Interpersonal Personality Functioning in order to test for moderation).

Steps 1 and 3 of the Maternal Intrapersonal/Emotion Suppression During Adolescence Model were not significant, but Step 2 of this model was significant. In Step 2 of this model, maternal emotion suppression at the age 9 time point negatively predicted adolescent emotion suppression, suggesting that as mothers reported more emotion suppression at the age 9 time point, adolescents reported less emotion suppression. Additionally, maternal emotion suppression at the adolescent time point positively predicted adolescent emotion suppression, suggesting that as mothers reported more emotion suppression at the adolescent time point, adolescents also self-reported more emotion suppression. These results indicate that first, maternal emotion suppression directly effects adolescent emotion suppression, and second, only direct effects of maternal emotion suppression and no direct or moderating effects of maternal intrapersonal personality functioning predict adolescent emotion suppression when maternal emotion suppression at the adolescent time point is used to predict adolescent emotion suppression. These results are shown in Table 17.

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Steps 1 and 3 of the Maternal Interpersonal/Emotion Suppression During Adolescence

Model were not significant, but Step 2 of this model was significant. In Step 2 of this model,

maternal emotion suppression at the age 9 time point negatively predicted adolescent emotion

suppression, suggesting that as mothers reported more emotion suppression at the age 9 time

point, adolescents reported less emotion suppression. Additionally, maternal emotion

suppression at the adolescent time point positively predicted adolescent emotion suppression,

suggesting that as mothers reported higher levels of interpersonal personality dysfunction,

adolescents reported more emotion suppression. These three predictors remained significant in

Step 3 of the model, though Step 3 was not significant overall. These results indicate that

maternal emotion suppression and maternal interpersonal personality functioning both have main

effects on adolescent emotion suppression, with no moderation effects of maternal interpersonal

personality functioning on adolescent emotion suppression. These results are shown in Table 18.

**Discussion**

The aim of my thesis study was to assess the links between maternal characteristics and adolescent emotion regulation. Specifically, I sought to demonstrate that maternal parenting at child age 9 and maternal cognitive reappraisal at child age 9 would predict adolescent cognitive reappraisal at that maternal personality would moderate the association between maternal parenting and adolescent cognitive reappraisal, but not that between maternal cognitive reappraisal and adolescent cognitive reappraisal. However, the data did not support my hypothesis and I found no associations between maternal characteristics and adolescent cognitive reappraisal from a longitudinal perspective.

I then conducted post-hoc analyses and retested my original hypotheses, instead using maternal emotion suppression instead of cognitive reappraisal. The rationale for doing this was to see if these maternal characteristics were better at predicting less adaptive emotion regulation strategies, as opposed to the more adaptive strategies. I again found no associations between maternal parenting and adolescent emotion suppression, but the data yielded a moderating effect of maternal intrapersonal personality functioning on the association between maternal emotion suppression at the age 9 time point and adolescent emotion suppression, as well as a direct effect of maternal interpersonal personality functioning on adolescent emotion suppression.

I then conducted a second series of post-hoc analyses where I assessed the concurrent associations between maternal emotion regulation and adolescent emotion regulation by using maternal self-reported emotion regulation during the adolescent time point instead of such at the age 9 time point and I tested both cognitive reappraisal and emotion suppression. Again, I found no associations between maternal cognitive reappraisal and adolescent cognitive reappraisal, but

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there were associations between maternal emotion suppression and adolescent emotion suppression.

The results of my thesis study are discussed first in terms of maternal parenting and adolescent emotion regulation, then maternal personality and cognitive reappraisal on adolescent reappraisal, and then I turn to maternal personality and emotion suppression on adolescent emotion suppression.

**Maternal Parenting and Adolescent Emotion Regulation**

As previously mentioned, neither my original hypothesis involving the predictive effects of maternal optimal parenting behaviors on adolescent cognitive reappraisal, nor my post-hoc analysis of predictive effects of maternal optimal parenting behaviors on adolescent emotion suppression were supported by my data. In my original hypothesis, I predicted that higher levels of maternal optimal parenting behaviors during the age 9 time point would positively predict more adolescent reported cognitive reappraisal and in my post-hoc analysis, I predicted that higher levels of maternal optimal parenting behaviors during the age 9 time point would negatively predict less adolescent reported emotion suppression. These expectations were based on previous research that had suggested that mothers who are warm and more supportive of child emotional expressions tend to have children who are better at regulating their emotions (Moore et al., 2009; Perry et al., 2016; Perry et al., 2020). In turn, mothers who are harsh and controlling towards their children tend to be more negative influences on child and adolescent emotion regulation development (Chang et al., 2003; Manzeske & Stright, 2009; Morris et al., 2002). I had also predicted that the main effects between maternal optimal parenting would be moderated by maternal personality (as assessed via the LPFS- BF 2.0) in both my original hypothesis and in the post-hoc analysis. I had expected maternal personality to moderate this association, as

previous research had indicated that maternal personality predicted later parenting behaviors (e.g., Huver et al., 2010; Latzman et al., 2009; Smith et al., 2010; Prinzie et al., 2009) and parent personality appears to moderate child outcomes in older childhood and adolescent literature (Prinzie et al., 2009).

Despite the previous research, no longitudinal associations between maternal optimal parenting and adolescent cognitive reappraisal were found in my sample and there were no significant moderating effects of maternal personality. Previous research has tended to assess this association in early and middle childhood, but there is lacking evidence of direct and main effects of maternal parenting behaviors on adolescent cognitive reappraisal. Nevertheless, these findings are inconsistent with the research that does exist in middle and later childhood literatures. For example, children in grades 4 through 6 who report higher levels of optimal parental care (with parental care being defined as levels of warmth and intrusiveness, tend to use cognitive reappraisal as an emotion regulation strategy, compared to children who report lower levels of optimal parental care (Jaffe et al., 2010). Other research has looked at how parental reactions and parent emotion socialization to child emotions as a way to assess how parenting affects child emotion regulation. For instance, mothers who exhibit greater control over their children's emotions early in childhood tend to have children who do not regulate their emotions very well (Berlin & Cassidy, 2003).

Despite the findings in the present study being inconsistent with previous research, it should be noted that the previous research utilized different measures of parenting behaviors than what I used in the present study. For example, I used researcher coded parenting behaviors that included intrusiveness and negative affect during an interaction task, which were then reverse-scored to create a composite variable of optimal parenting. I did this because I thought that

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optimal parenting behaviors could be defined through these dimensions and serve as potential

protective factors against the development of poor emotion regulation strategies. Also, I only

used negative affect and intrusiveness (reverse-scored) and did not include positive affect

because positive affect did not have a related factor loading to the other two variables. These

researcher-coded variables were an attempt to see how mothers interact with their children.

However, other research used measures of parenting, including maternal warmth and control

(e.g., Moore et al., 2009; Chang et al., 2003), parenting styles (e.g., Herzog et al., 2015; Jabeen et

al., 2013), parental care (Jaffe et al., 2010), and parental emotion socialization (Berlin &

Cassidy, 2003). Further while some research has looked at the associations between parenting

and child emotion regulation in adolescents, the research is limited. These explanations help to

provide some insight as to why I did not find significant associations between maternal parenting

and adolescent emotion regulation, but more research is needed to fully understand the links

between maternal parenting and adolescent emotion regulation.

**Links Between Maternal Personality, Maternal Cognitive Reappraisal, and Adolescent**

**Cognitive Reappraisal**

In addition to not finding any significant associations between maternal optimal parenting

behaviors and adolescent emotion regulation, it should also be noted that maternal cognitive

reappraisal and maternal personality did not significantly predict adolescent cognitive reappraisal

and maternal personality did not significantly predict adolescent cognitive reappraisal, neither in

my original longitudinal analyses, nor in my post-hoc concurrent analyses. My rationale for

using cognitive reappraisal as my measure of emotion regulation in my original hypotheses was

because parents serve as models of emotion regulation for their children and because emotion

regulation, particularly cognitive reappraisal, has genetic components, suggesting that this

emotion regulation strategy is passed directly from parent to child biologically (Bridgett et al., 2015; Deater-Deckard, 2014). Additionally, cognitive reappraisal is associated with more positive outcomes (McRare et al., 2012b) and the use of cognitive reappraisal appears to be a more adaptive form of emotion regulation that helps protect against the development of negative outcomes, such as anxiety and depression (Carthy et al., 2010; Silk et al., 2007). Thus, I had hoped to be able to demonstrate that maternal factors, like personality, optimal parenting, and cognitive reappraisal could help to support the development of adolescent cognitive reappraisal and serve as protective factors in optimal adolescent development. Further, I had originally wanted to use a longitudinal design (my original hypotheses) so that I could see how maternal factors during late childhood predict adolescent outcomes in order to contribute to the research on stability and development of these factors. However, my efforts to find significant direct associations between maternal cognitive reappraisal and adolescent cognitive reappraisal, as well as moderating effects of maternal personality on this association were futile.

Upon reflection, there are a few reasons why my data did not yield any significant direct or moderating effects of maternal cognitive reappraisal and personality on adolescent cognitive reappraisal in my sample. In terms of maternal personality and adolescent cognitive reappraisal, much of the previous research assessing this association has been conducted in infancy and early childhood (e.g., Liu et al., 2018; Smith et al., 2007), with little research looking at these associations in later childhood and adolescence. Additionally, much of the previous research assessing these associations looked at specific personality traits, such as negative affect, neuroticism, and extraversion (e.g., Gratz et al., 2014; Liu et al., 2018; Smith et al., 2007). In an effort to fill these gaps in the previous research, I decided to not only assess these associations in adolescence, but also use the LPFS- BF 2.0 as my measure of maternal personality. The LPFS-

BF 2.0 assesses personality from a standpoint of overall personality health (Hutsebaut et al., 2015), rather than a focus on traits which are susceptible to fluctuation. However, based on the data, it appears that maternal personality functioning is not a predictor of adolescent cognitive reappraisal. Further, the previous research has assessed the links between maternal personality and child emotion regulation has not used cognitive reappraisal as the operational definition of such. Instead, because the majority of this research lies in infancy and early childhood literature, the operational definition of emotion regulation that previous research has tended to use is similar to that of Cole and colleagues (2004), where emotion regulation is defined as the ability to adjust to fluctuations in evoked emotions. This could indicate that the effect that maternal personality has on child emotion is contingent on the operationalization of emotion regulation in a given study, as well as the age of the children in the study.

Another reason as to why no significant results were found between maternal characteristics and adolescent cognitive reappraisal could have to do with the age of the adolescents in my sample. As previous research has indicated, emotion regulation continues to develop into adulthood and typically improves with age (Charles & Piazza, 2009). Thus, older adults tend to be better at regulating their emotions than adolescents and young adults (Kryla-Lighthall & Mather, 2009). Further, it has been found that cognitive reappraisal is a mode widely used emotion regulation strategy during adulthood (Gross & John, 2003), but adolescents use it less often (Garnefski et al., 200), suggesting that cognitive reappraisal is still developing during adolescence. Because the ages of adolescents in my sample ranged from almost 12-years to about 18-years, with the average age being around 14.6 years, it is possible that cognitive reappraisal was at least somewhat underdeveloped in these adolescents. There may be some genetic component of cognitive reappraisal that predicts the development of cognitive

reappraisal, but it may not be prevalent until children begin to emerge into adulthood. Even though some of the previous research relating to maternal personality and child emotion regulation and the development of cognitive reappraisal can help explain why my results did not yield any significant findings in terms of maternal and adolescent cognitive reappraisal, more research is needed to fully understand the links between maternal characteristics and adolescent cognitive reappraisal.

**Links Between Maternal Personality, Maternal Emotion Suppression, and Adolescent Emotion Suppression**

Because I did not find any significant associations using maternal and adolescent cognitive reappraisal, I conducted several post-hoc analyses using maternal and adolescent emotion suppression instead of cognitive reappraisal. First, I retested my original longitudinal hypotheses using emotion suppression and then I assessed concurrent associations. As previously discussed, I found no main, direct, or moderating effects between maternal optimal parenting and maternal personality on adolescent emotion suppression. I did find, however, some interesting findings related to maternal emotion suppression, maternal personality, and adolescent emotion suppression, both longitudinally and concurrently.

*Maternal Intrapersonal Personality and Adolescent Emotion Suppression*

To begin, my data demonstrated that there was not a direct effect of maternal intrapersonal personality functioning during the adolescent time point on adolescent emotion suppression, but it did not moderate the association between maternal emotion suppression, but it did moderate the association between maternal emotion suppression during the age 9 time point and adolescent emotion suppression. Specifically, mothers who reported higher levels of emotion suppression during the age 9 time point but also reported lower levels of intrapersonal

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personality dysfunction during the adolescent time point had adolescents who reported lower levels of emotion suppression. It should be noted that this moderating effect only worked for mothers who had low self-reported intrapersonal personality dysfunction and not for high self-reported personality dysfunction. Interestingly, the moderation effect disappeared in the concurrent model and thus maternal intrapersonal personality functioning did not moderate the association between maternal emotion suppression during the adolescent time point and adolescent emotion suppression, nor were there any direct effects of maternal intrapersonal personality functioning on adolescent emotion suppression.

These results suggest that healthy maternal intrapersonal personality functioning may be a protective factor against the development of emotion suppression as an emotion regulation strategy during adolescence. Conceptually, it makes sense that maternal intrapersonal personality functioning would moderate the association between maternal and adolescent emotion suppression, as intrapersonal personality functioning is defined as an individual's ability to function alone in their daily life (LPFS; APA, 2013; Hutsebaut et al., 2015). Because intrapersonal functioning does not involve functioning during interactions with other people, it makes sense that it would need to interact with another variable that might involve interactions with others (such as emotion regulation) in order to have an effect on development. However, it was surprising that this moderating effect only worked in the longitudinal model and not in the concurrent model, as it was expected to have the same effect for the same reason listed regarding the rationale for the longitudinal model. Despite this, this finding is among the first to show the effects of maternal intrapersonal personality functioning on adolescent development. While more research is needed to assess these associations, the finding serves as an intriguing starting point for future research.

*Maternal Interpersonal Personality and Adolescent Emotion Suppression*

My results demonstrated that maternal interpersonal personality functioning directly and positively predicted adolescent emotion suppression in both the longitudinal and concurrent models. Specifically, as mothers self-reported higher levels of interpersonal personality dysfunction, adolescents reported more emotion suppression. Interpersonal personality functioning did not moderate the association between maternal emotion suppression and adolescent emotion suppression in either model. The fact that maternal interpersonal personality functioning had a direct effect on adolescent emotion suppression but did not moderate the association between maternal and adolescent emotion suppression makes conceptual sense. Interpersonal functioning describes an individual's ability to form lasting and meaningful relationships with other people (LPFS; APA, 2013; Hutsebaut et al., 2015), so someone who exhibits high levels of interpersonal dysfunction would have difficulty doing such. These relationships would include that between a mother and her child, so the fact that maternal interpersonal dysfunction appeared to directly predict higher levels of adolescent emotion suppression without being a moderator suggests that the use of adolescent emotion suppression is influenced by a mother who lacks in her ability to create a meaningful and strong relationship with her adolescent. Because children tend to imitate emotion regulation strategies and behaviors from their parents (e.g., Morris et al., 2007), interpersonal dysfunction in a mother could indicate difficulties in emotion regulation, as personality dysfunction and function have been previously related to emotion regulation difficulties and strengths, respectively, in the adult literature (e.g., Ng & Diener, 2009; Purnamaningshi, 2017; Stanton et al., 2016). While more research is necessary in order to fully determine the cause of the association between maternal interpersonal

personality functioning and adolescent emotion suppression, these results serve as an important starting point for future research.

### *Maternal Emotion Suppression and Adolescent Emotion Suppression*

Maternal emotion suppression did not predict adolescent emotion suppression in either of the two longitudinal models. However, direct effects were found between maternal emotion suppression, both at the age 9 and adolescent time points, on adolescent emotion suppression. The relation between maternal emotion suppression at the adolescent time point and adolescent emotion suppression was positive, indicating that as mothers reported more emotion suppression, adolescents also reported more emotion suppression. This finding was expected, and it supports previous research stating that there is a genetic component of emotion regulation and that it is passed from parents to adolescents (Bridgett et al., 2015; Deater-Deckar, 2014), except the finding in the present study was only significant for emotion suppression and not cognitive reappraisal, like previous work has suggested.

Unexpectedly, the association between maternal emotion suppression at the age 9 time point and adolescent emotion suppression was negative, indicating that as mothers reported less emotion suppression during the age 9 time point, adolescents reported more emotion suppression. However, given that the concurrent association was positive, this finding was likely due to multicollinearity and statistical suppression, given that the concurrent association was positive, as indicated by previous research (MacKinnon et al., 2000).

### *Why Emotion Suppression Worked*

As previously mentioned, I postulate that the data did not support my original hypotheses surrounding cognitive reappraisal due to differences in operationalization of emotion regulation in my study and in previous research and the age of the adolescent in my sample. This had

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prompted me to conduct a series of post-hoc analyses using emotion suppression instead of cognitive reappraisal. There are a few reasons as to why emotion suppression might have yielded significant results when cognitive reappraisal did not. First, the use of emotion suppression during adolescence and adulthood is related to more negative outcomes (John & Gross, 2004), such as less positive emotions, low self-esteem, anxiety, and depression, compared to the use of cognitive reappraisal (Betts et al., 2009; Gross & John, 2003; Hughes et al., 2010). Further, it has been suggested that emotion suppression is more common in younger individuals than perhaps adults because it requires less maturation to be able to suppress rather than reappraise emotions (Gullone et al., 2010; John & Gross, 2004), thus indicating that emotion suppression might be more common in adolescence than cognitive reappraisal. Another reason why emotion suppression might have worked and cognitive reappraisal did not could be because the predictors in my analyses (with the exception of the optimal parenting variable) were negative traits being used to predict an outcome. In the case of cognitive reappraisal, I used negative traits to predict a positive outcome and in the case of emotion suppression, I used negative traits to predict a negative outcome. Given that research in the field tends to assess negative outcomes using negative predictors, instead of positive outcomes, this could be a possibility as to why I had significant findings when emotion suppression was used as a predictor and an outcome. Although these explanations may help to justify my results, more research is needed to fully understand why these analyses worked with emotion suppression and not with cognitive reappraisal.

**Strengths, Limitations, and Future Directions**

*Strengths and Limitations*

My thesis study had several strengths that make it an important contribution to the existing literature on the effects of maternal characteristics on adolescent emotion regulation. First, I had a relatively large number of participants from a community sample, which helps to apply the findings to a general population. Second, adolescents self-reported their own emotion regulation, which helped to eliminate bias that might result from parent responses of child emotion regulation. Finally, this study used the LPFS as a measure of maternal personality which not only helped add to the limited literature on the effects of maternal personality on adolescent emotion regulation, but also is the first study to my knowledge that assessed maternal personality in terms of function and dysfunction, as opposed to traits.

Despite my study's strengths, it is not without its limitations. First, no significant relations were found between maternal optimal parenting and adolescent emotion regulation (neither cognitive reappraisal nor emotion suppression). This could be due to several reasons. First, I only assessed parenting behaviors at the age 9 time point and not during the adolescent time point because I did not have parenting behavior data collected at the adolescent time point. This means that when I did not find any significant longitudinal effects, I was unable to assess the effect of optimal parenting on adolescent emotion regulation concurrently. Second, I only used a combination of two variables to create my optimal parenting variable. I attempted to do this in a way that would demonstrated the statistical association between my parenting variables, but it should be taken into consideration that maternal negative affect and intrusiveness (reverse-scored) are obviously not the only traits that account for optimal parenting characteristics. Previous research has assessed parenting in terms of warmth and control (e.g., Manzeske &

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Stright, 2009; Moore et al., 2009) or in terms of parenting styles (Jabeen et al., 2013). The fact that I only used observer-reports of parenting behaviors could help explain why I was not able to find any associations between maternal optimal parenting and adolescent emotion regulation. Third, it could be because the mothers in my sample had overall low levels of negative affect and intrusiveness, indicating that the optimal parenting variable that was created could have been skewed and perhaps did not actually measure optimal parenting in the way that I had intended.

Second, my only measure of maternal personality was the LPFS- BF 2.0. One of the goals of the present study was to examine how the LPFS- BF 2.0 could be used in developmental research, but it would have been optimal to have a second measure of maternal personality in order to compare the LPFS responses to see if it was accurately capturing personality in the same way as other measures. This may be assumed, based on previous research by Morey and colleagues (2015) demonstrating that the LPFS items are correlated with the Big Five personality traits, but it would have been best to provide future confirmation of this with my present study.

A third limitation is that part of data collection for the present study occurred in the midst of the COVID-19 pandemic. Taking into consideration that this was beyond my control, extra stress caused by the pandemic (as reported by mothers in my sample) could have swayed the results related to maternal self-reports of personality and emotion regulation. My earlier t-test did demonstrate that mothers who participated pre-COVID used more cognitive reappraisal and mothers who participated during-COVID used more emotion suppression. This may be a limitation in the sense that these results may not reflect a sample of mothers and adolescents during more normal times, but it can be noted that these results reflect a very unique subset of mothers and adolescents who endured the effects of the pandemic first-hand and should be considered in light of such.

*Future Directions*

Future research in this area should first address the above limitations. To begin, perhaps different measures of parenting should be used in addition to collecting a concurrent parenting measure in order to better assess concurrent effects of maternal parenting on adolescent emotion regulation. Second, the LPFS- BF 2.0 should be assessed in addition to other measures of adult personality that are already used in developmental psychology, such as the Adult Temperament Questionnaire (ATQ; Evans and Rothbart, 2007). The ATQ is also correlated with the Five Factor Model, like the LPFS, so it might be assumed that the LPFS is correlated with responses on the ATQ, but confirmation of this would be good moving forward with research on the LPFS in developmental psychology. Finally, future research might consider replicating this study once the current conditions related to the COVID-19 pandemic have eased up and returned to the normalcy that we saw in 2019. Doing so would allow these findings to be better applied to the general population when families are not facing extra financial, family, and physical and mental health stress.

In addition to addressing the limitations, future research might also consider collecting LPFS data from both adolescents and mothers in order to relate individual personality to the development of emotion regulation. As mentioned earlier, personality has been demonstrated to be a predictor of individual emotion regulation in children and adults (John & Gross, 2004). Further, personality also has a genetic component (Rothbart, 2007). Because the present study found that maternal interpersonal personality dysfunction has a direct effect on adolescent emotion regulation, it would be interesting to see if maternal personality predicts adolescent personality and if adolescent personality moderates the association between maternal personality and adolescent emotion regulation or if it has a direct effect on their own emotion regulation.

Finally, future research should explore some different factors, both maternal and adolescent, that might moderate associations between maternal characteristics and adolescent emotion regulation that were assessed in the present study. Because my study only found one significant moderating effect, it would be interesting to further assess traits that could potentially be moderators. It is important to remember that emotion regulation develops in a biopsychosocial context (e.g., Perry & Calkins, 2018), so further exploration on the underpinnings of the development of adolescent emotion regulation might be worthwhile.

**Conclusion**

Despite its limitations, my thesis study serves as an important contribution to existing literature on the effects of maternal characteristics on adolescent emotion regulation. Specifically, my study demonstrated that maternal personality is an important factor in predicting both adolescent emotion suppression strategies, particularly interpersonal personality dysfunction. Further, my study provides additional evidence that maternal emotion regulation is related to adolescent emotion regulation, particularly in terms of emotion suppression, thus demonstrating that emotion regulation is shaped at least somewhat by genetic underpinnings. Finally, this is the first study to my knowledge that uses the LPFS as a measure of personality in the parent-child developmental literature, which provides support for the idea that assessing maternal personality as a whole in terms of function versus dysfunction may be important in the developmental psychology literature. Future research is necessary for further examining these associations, however, my study helps support the idea that maternal characteristics are important to consider when studying the development of emotion regulation in adolescents.

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## 1. Sample Demographic Information

*Age 9 Demographics[1] (N = 191)*

| Child Sex | Boys | | Girls | |
|---|---|---|---|---|
| | 87 (45.5%) | | 104 (54.5%) | |
| Child Age (years) | Min | Max | Mean | SD |
| | 8.20 | 12.25 | 9.93 | 0.75 |
| Child Race | Asian | Black/African Am. | White | Multi-Racial/Other |
| | 3 (1.6%) | 1 (0.5%) | 170 (89.0%) | 17 (8.9%) |
| Mother Age (years) | Min | Max | Mean | SD |
| | 28.00 | 52.00 | 40.37 | 4.67 |
| Mother Education* | Some High School | High School Graduate | Some College[3] | College Graduate[4] | Master's Degree | Doctoral Degree |
| | 1 (0.5%) | 3 (1.6%) | 32 (16.8%) | 72 (37.7%) | 61 (31.9%) | 21 (11.0%) |

*Adolescence Demographics[2] (N = 122)*

| Child Sex | Boys | | Girls | |
|---|---|---|---|---|
| | 59 (48.4%) | | 63 (51.6%) | |
| Child Age (years) | Min | Max | Mean | SD |
| | 11.82 | 18.13 | 14.63 | 1.95 |
| Child Race | Asian | White | | Multi-Racial/Other |
| | 2 (1.6%) | 113 (92.6%) | | 7 (5.7%) |
| Mother Age (years) | Min | Max | Mean | SD |
| | 31.00 | 59.00 | 45.16 | 4.89 |
| Mother Education** | Some High School | Some College[3] | College Graduate[4] | Master's Degree | Doctoral Degree |
| | 1 (0.8%) | 15 (12.3%) | 41 (33.8%) | 46 (37.7%) | 18 (14.9%) |

*Note*. **Data is missing for 1 mother for mother education at the age 9 time point. **Data is missing for 1 mother for mother education at the adolescent time point. [1]Demographic data at the age 9 time point is on 191 mother-child dyads because one mother did not have negative affect coded at the age 9 time point. [2]Demographic data at the adolescent time point is on 122 mother-adolescent dyads because one mother did not have negative affect coded at the age 9 time point. [3]Some college includes having attended some 4-year university or having graduated with a 2-year degree. [4]College graduate means graduated from a 4-year college.

**2. Correlations Between and Descriptive Statistics of Maternal Parenting Behaviors**

**from the Age 9 Time Point**

|   |                        | 1    | 2     | 3       | 4        | 5        | 6        |
|---|------------------------|------|-------|---------|----------|----------|----------|
| 1 | Positive Affect        | 1    | -.157 | -.004   | **-.992**\*\* | .148     | .001     |
| 2 | Negative Affect        |      | 1     | **.287**\*\* | .169     | **-.993**\*\* | **-.293**\*\* |
| 3 | Intrusiveness          |      |       | 1       | .014     | **-.289**\*\* | **-.999**\*\* |
| 4 | Positive Affect (REV)  |      |       |         | 1        | -.171    | -0.14    |
| 5 | Negative Affect (REV)  |      |       |         |          | 1        | **.294**\*\* |
| 6 | Intrusiveness (REV)    |      |       |         |          |          | 1        |
|   | Mean                   | 2.52 | 1.02  | 1.01    | 2.49     | 3.98     | 3.99     |
|   | SD                     | 0.46 | 0.05  | 0.03    | 0.48     | 0.05     | 0.03     |
|   | Minimum                | 1.27 | 1.00  | 1.00    | 1.60     | 3.67     | 3.87     |
|   | Maximum                | 3.40 | 1.33  | 1.13    | 3.73     | 4.00     | 4.00     |

*Note*. \*\*Correlation is significant at the 0.01 level. REV = reverse scored parenting behavior. The parenting behaviors were summed across epochs and then divided by the number of epochs to create a mean score.

**3. Exploratory Factor Analysis of the Age 9 Parenting Behaviors**

|  | Factor Loading[1] | Communality | Eigenvalue | % Total Variance |
|---|---|---|---|---|
| Positive Affect | 0.368 | 0.135 | 1.330 | 44.324 |
| Negative Affect (REV) | **0.728** | 0.530 | 0.999 | 33.309 |
| Intrusiveness (REV) | **0.815** | 0.664 | 0.671 | 22.367 |

*Note*. Parenting behaviors assessed during the age 9 timepoint. Boldface = related factor loadings. [1]One factor was extracted, which is named "Optimal Parenting".

# 4.  Correlations and Descriptive Statistics After Winsorizing

|   |   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | mCR_9 | 1 | .082 | **.343**** | .127 | **-.331**** | .046 | .020 | -.023 | -.093 |
| 2 | mES_9 | | 1 | .008 | **.508**** | **-.193*** | .148 | .144 | -.105 | -.071 |
| 3 | mCR_A | | | 1 | .084 | -.270** | **-.187*** | -.042 | .064 | .004 |
| 4 | mES_A | | | | 1 | -.010 | .078 | .123 | .082 | **.183*** |
| 5 | Optimal Parenting | | | | | 1 | .011 | .007 | .117 | .016 |
| 6 | Intrapersonal | | | | | | 1 | **.579**** | .017 | .047 |
| 7 | Interpersonal | | | | | | | 1 | .130 | **.204*** |
| 8 | cCR_A | | | | | | | | 1 | -.019 |
| 9 | cES_A | | | | | | | | | 1 |
|   | Mean | 5.03 | 3.03 | 5.46 | 2.93 | 3.99 | 10.47 | 8.78 | 4.53 | 3.81 |
|   | SD | 0.64 | 0.97 | 0.90 | 1.09 | 0.03 | 3.05 | 2.68 | 0.99 | 1.22 |
|   | Minimum | 3.70 | 1.00 | 3.00 | 1.00 | 3.80 | 6.00 | 6.00 | 1.83 | 1.00 |
|   | Maximum | 6.43 | 5.31 | 7.00 | 6.00 | 4.00 | 18.00 | 16.00 | 7.00 | 6.75 |

*Note*. *Correlation is significant at the 0.05 level; **Correction is significant at the 0.01 level. mCR_9 = maternal cognitive reappraisal at the age 9 time point. mES_9 = maternal emotion suppression at the age 9 time point. mCR_A = maternal cognitive reappraisal at the adolescent time point. mES_A = maternal emotion suppression at the adolescent time point; Optimal Parenting was collected at the age 9 time point. Intrapersonal = maternal intrapersonal personality functioning (collected at the adolescent time point); Interpersonal = maternal interpersonal personality functioning (collected at the adolescent time point); cCR_A = adolescent cognitive reappraisal; cES_A = adolescent emotion suppression

**5. Correlations of the LPFS- SR with Five Factor Model Traits (Reproduced from**

**Hopwood et al., 2018)**

|  | Total | INTER | INTRA | ID | SD | EPY | INT |
|---|---|---|---|---|---|---|---|
| Neuroticism | 0.60 | 0.67* | 0.47 | 0.68* | 0.53 | 0.37 | 0.49 |
| Extraversion | -0.38 | -0.41* | -0.28 | -0.38 | -0.37 | -0.23 | -0.31 |
| Conscientiousness | -0.52 | -0.55* | -0.39 | -0.50 | -0.60* | -0.36 | -0.40 |
| Openness | -0.35 | -0.30 | -0.37 | -0.26 | -0.37 | -0.37 | -0.32 |
| Agreeableness | -0.55 | -0.48 | -0.58* | -0.46 | -0.46 | -0.55 | -0.56* |

*Note.* *Indicates a significant correlation. LPFS- SR scales = column labels and Five Factor Model traits = row labels. Total = total score on the LPFS- SR; INTER = interpersonal total score (EPY + INT); INTRA = intrapersonal score (ID + SD). ID = identity subscale; SD = self-direction subscale; EPY = empathy subscale; INT = intimacy subscale.

**6. Independent Samples t-Test between Pre-COVID and During-COVID Groups**

|  | M (SD) pre-COVID | M (SD) during-COVID | t | 95% CI |
|---|---|---|---|---|
| mCR_9 | 5.05 (0.59) | 5.01 (0.72) | 0.348 | -0.20,  0.28 |
| mES_9 | 3.05 (0.98) | 2.99 (0.96) | 0.354 | -0.30,  0.43 |
| **mCR_A** | **5.59 (0.90)** | **5.21 (0.84)** | **2.296*** | **0.05,  0.71** |
| **mES_A** | **2.78 (1.02)** | **3.31 (1.18)** | **-2.041*** | **-0.82, -0.01** |
| cCR_A | 4.57 (1.00) | 4.46 (0.99) | 0.625 | -0.25, 0.49 |
| cES_A | 3.80 (1.21) | 3.82 (1.24) | -0.092 | -0.48, 0.43 |
| Optimal Parenting | 3.99 (0.03) | 3.98 (0.03) | 0.679 | -0.01, 0.02 |
| Intrapersonal | 10.53 (2.82) | 10.36 (3.44) | 0.290 | -0.98, 1.31 |
| Interpersonal | 9.04 (2.62) | 8.32 (2.74) | 1.447 | -0.27, 1.72 |

*Note.* *Indicates significance at the 0.01 level. mCR_9 = maternal cognitive reappraisal at the age 9 time point; mES_9 = maternal emotion suppression at the age 9 time point. mCR_A = maternal cognitive reappraisal at the adolescent time point; mES_A = maternal emotion suppression at the adolescent time point; cCR_A = adolescent cognitive reappraisal; cES_A = adolescent emotion suppression. Optimal Parenting was collected at the age 9 time point. Intrapersonal = maternal intrapersonal personality functioning (collected at the adolescent time point; Interpersonal = maternal interpersonal personality functioning (collected at the adolescent time point).

**7. Maternal Intrapersonal/Optimal Parenting Hierarchical Linear Regression Model**

**Predicting Adolescent Cognitive Reappraisal**

| | B | SE | β | $p$ | 95% CI |
|---|---|---|---|---|---|
| Model 1 cAge_A | 0.025 | 0.048 | 0.049 | .599 | -0.069, 0.119 |
| cSex_A | 0.043 | 0.183 | 0.021 | .817 | -0.320, 0.405 |
| mAge_9 | 0.004 | 0.021 | 0.020 | .832 | -0.036, 0.045 |
| $F(3,118) = 0.130, R^2 = 0.003, p = .942$ | | | | | |
| | | | | | |
| Model 2 cAge_A | 0.019 | 0.048 | 0.038 | .690 | -0.076, 0.114 |
| cSex_A | 0.014 | 0.186 | 0.007 | .942 | -0.354, 0.381 |
| mAge_9 | 0.003 | 0.021 | 0.014 | .878 | -0.038, 0.044 |
| Optimal Parenting | 3.406 | 2.859 | 0.111 | .236 | -2.257, 9.069 |
| Intrapersonal | 0.005 | 0.030 | 0.016 | .859 | -0.054, 0.065 |
| $F(2,116) = 0.730, R^2 = 0.016, p = .484$ | | | | | |
| | | | | | |
| Model 3 cAge_A | 0.018 | 0.049 | 0.035 | .712 | -0.078, 0.114 |
| cSex_A | 0.010 | 0.187 | 0.005 | .959 | -0.361, 0.381 |
| mAge_9 | 0.004 | 0.021 | 0.016 | .863 | -0.038, 0.045 |
| Optimal Parenting | 3.234 | 2.993 | 0.106 | .282 | -2.695, 9.163 |
| Intrapersonal | 0.006 | 0.031 | 0.020 | .836 | -0.054, 0.067 |
| Optimal ParentingXIntrapersonal | -0.260 | 1.276 | -0.020 | .839 | -2.787, 2.268 |
| $F(1,115) = 0.041, R^2 = 0.016, p = .839$ | | | | | |

*Note*. cAge_A = adolescent age. cSex_A = adolescent sex. mAge_9 = maternal age at the age 9 time point. Optimal parenting was collected at the age 9 time point. Intrapersonal = maternal intrapersonal personality functioning (collected at the adolescent time point). Child sex was dummy coded as 0 = boy and 1 = girl.

**8. Maternal Interpersonal/Optimal Parenting Hierarchical Regression Model**

**Predicting Adolescent Cognitive Reappraisal**

|  | B | SE | β | *p* | 95% CI |
|---|---|---|---|---|---|
| Model 1 cAge_A | 0.025 | 0.048 | 0.049 | .599 | -0.069,  0.119 |
| cSex_A | 0.043 | 0.183 | 0.221 | .817 | -0.320,  0.405 |
| mAge_9 | 0.004 | 0.021 | 0.020 | .832 | -0.036,  0.045 |
| $F(3,118) = 0.130, R^2 = 0.003, p = .942$ | | | | | |
|  | | | | | |
| Model 2  cAge_A | 0.018 | 0.048 | 0.036 | .701 | -0.076,  0.113 |
| cSex_A | 0.022 | 0.184 | 0.011 | .904 | -0.342,  0.387 |
| mAge_9 | 0.004 | 0.020 | 0.017 | .856 | -0.037,  0.044 |
| Optimal Parenting | 3.366 | 2.835 | 0.110 | .238 | -2.249,  8.981 |
| Interpersonal | 0.048 | 0.034 | 0.129 | .160 | -0.019,  0.115 |
| $F(2,116) = 1.724, R^2 = 0.032, p = .183$ | | | | | |
|  | | | | | |
| Model 3  cAge_A | 0.014 | 0.048 | 0.028 | .765 | -0.080,  0.109 |
| cSex_A | 0.027 | 0.184 | 0.014 | .884 | -0.338,  0.392 |
| mAge_9 | 0.006 | 0.021 | 0.027 | .770 | -0.035,  0.047 |
| Optimal Parenting | 2.487 | 3.007 | 0.081 | .410 | -3.471,  8.444 |
| Interpersonal | 0.054 | 0.035 | 0.146 | .121 | -0.014,  0.123 |
| Optimal ParentingXInterpersonal | -1.340 | 1.518 | -0.088 | .379 | -4.346,  1.666 |
| $F(1,115) = 0.779, R^2 = 0.039, p = .379$ | | | | | |

*Note*. cAge_A = adolescent age. cSex_A = adolescent sex. mAge_9 = maternal age at the age 9 time point. Optimal parenting was collected at the age 9 time point. Interpersonal = maternal interpersonal personality functioning (collected at the adolescent time point). Child sex was dummy coded as 0 = boy and 1 = girl.

### 9. Maternal Intrapersonal/Cognitive Reappraisal Hierarchical Linear Regression

### Model Predicting Adolescent Cognitive Reappraisal

|  | B | SE | β | $p$ | 95% CI |
|---|---|---|---|---|---|
| Model 1 cAge_A | 0.025 | 0.048 | 0.049 | .599 | -0.069, 0.119 |
| cSex_A | 0.043 | 0.183 | 0.221 | .817 | -0.320, 0.405 |
| mAge_9 | 0.004 | 0.021 | 0.020 | .832 | -0.036, 0.045 |
| $F(3,118) = 0.130, R^2 = 0.003, p = .942$ | | | | | |
| | | | | | |
| Model 2 cAge_A | 0.026 | 0.048 | 0.050 | .595 | -0.070, 0.121 |
| cSex_A | 0.043 | 0.185 | 0.022 | .816 | -0.322, 0.409 |
| mAge_9 | 0.005 | 0.021 | 0.023 | .808 | -0.036, 0.046 |
| mCognitive Reappraisal_9 | -0.042 | 0.144 | -0.027 | .769 | -0.329, 0.244 |
| Intrapersonal | 0.007 | 0.030 | 0.020 | .829 | -0.053, 0.067 |
| $F(2,116) = 0.064, R^2 = 0.004, p = .938$ | | | | | |
| | | | | | |
| Model 3 cAge_A | 0.025 | 0.049 | 0.050 | .603 | -0.071, 0.122 |
| cSex_A | 0.043 | 0.186 | 0.022 | .817 | -0.325, 0.411 |
| mAge_9 | 0.005 | 0.021 | 0.023 | .808 | -0.036, 0.047 |
| mCognitive Reappraisal_9 | -0.042 | 0.146 | -0.027 | .774 | -0.331, 0.247 |
| Intrapersonal | 0.006 | 0.031 | 0.020 | .835 | -0.054, 0.067 |
| Cognitive ReappraisalXIntrapersonal | 0.001 | 0.048 | 0.003 | .977 | -0.094, 0.097 |
| $F(1,115) = 0.001, R^2 = 0.004, p = .977$ | | | | | |

*Note*. cAge_A = adolescent age. cSex_A = adolescent sex. mAge_9 = maternal age at the age 9 time point. mCognitive Reappraisal_9 = maternal cognitive reappraisal at the age 9 time point. Intrapersonal = maternal intrapersonal personality functioning (collected at the adolescent visit). Cognitive ReappraisalXIntrapersonal = interaction of maternal cognitive reappraisal at the age 9 time point and maternal intrapersonal personality functioning at the adolescent time point. Child sex was dummy coded as 0 = boy and 1 = girl.

**10. Maternal Interpersonal/Cognitive Reappraisal Hierarchical Linear Regression**

**Model Predicting Adolescent Cognitive Reappraisal**

|  | B | SE | β | $p$ | 95% CI |
|---|---|---|---|---|---|
| Model 1 cAge_A | 0.025 | 0.048 | 0.049 | .599 | -0.069, 0.119 |
| cSex_A | 0.043 | 0.183 | 0.183 | .817 | -0.320, 0.405 |
| mAge_9 | 0.004 | 0.021 | 0.021 | .832 | -0.036, 0.045 |
| $F(3,118) = 0.130, R^2 = 0.003, p = .942$ | | | | | |
|  | | | | | |
| Model 2 cAge_A | 0.025 | 0.048 | 0.049 | .604 | -0.070, 0.119 |
| cSex_A | 0.051 | 0.183 | 0.026 | .781 | -0.312, 0.414 |
| mAge_9 | 0.006 | 0.021 | 0.025 | .788 | -0.035, 0.046 |
| mCognitive Reappraisal_9 | -0.045 | 0.143 | -0.029 | .753 | -0.328, 0.238 |
| Interpersonal | 0.049 | 0.034 | 0.131 | .157 | -0.019, 0.116 |
| $F(2,116) = 0.018, R^2 = 0.021, p = .351$ | | | | | |
|  | | | | | |
| Model 3 cAge_A | 0.020 | 0.047 | 0.038 | .681 | -0.074, 0.113 |
| cSex_A | 0.034 | 0.182 | 0.017 | .850 | -0.326, 0.395 |
| mAge_9 | 0.009 | 0.021 | 0.039 | .673 | -0.032, 0.049 |
| mCognitive Reappraisal_9 | -0.001 | 0.144 | 0.000 | .997 | -0.287, 0.286 |
| Interpersonal | 0.057 | 0.034 | 0.154 | .098 | -0.011, 0.125 |
| **Cognitive ReappraisalXInterpersonal\*** | **0.097** | **0.058** | **0.158** | **.097** | **-0.018, 0.212** |
| $F(1,115) = 0.023, R^2 = 0.044, p = .097*$ | | | | | |

*Note*. *indicates significance at the 0.01 level. cAge_A = adolescent age. cSex_A = adolescent sex. mAge_9 = maternal age at the age 9 time point. mCognitive Reappraisal_9 = maternal cognitive reappraisal at the age 9 time point. Interpersonal = maternal interpersonal personality functioning (collected at the adolescent visit). Cognitive ReappraisalXInterpersonal = interaction of maternal cognitive reappraisal at the age 9 time point and maternal interpersonal personality functioning at the adolescent time point. Child sex was dummy coded as 0 = boy and 1 = girl.

**11. Maternal Intrapersonal/Optimal Parenting-2 Hierarchical Linear Regression**

**Model Predicting Adolescent Emotion Suppression**

|  | B | SE | β | $p$ | 95% CI |
|---|---|---|---|---|---|
| Model 1 cAge_A | 0.067 | 0.058 | 0.107 | .250 | -0.048, 0.181 |
| cSex_A | -0.089 | 0.223 | -0.037 | .690 | -0.530, 0.352 |
| mAge_9 | 0.008 | 0.025 | 0.031 | .738 | -0.041, 0.058 |
| $F(3,118) = 0.634, R^2 = 0.016, p = .594$ | | | | | |
| | | | | | |
| Model 2 cAge_A | 0.066 | 0.059 | 0.106 | .262 | -0.050, 0.182 |
| cSex_A | -0.086 | 0.227 | -0.035 | .706 | -0.535, 0.364 |
| mAge_9 | 0.009 | 0.025 | 0.034 | .718 | -0.041, 0.059 |
| Optimal Parenting | 0.274 | 3.495 | 0.007 | .938 | -6.647, 7.195 |
| Intrapersonal | 0.019 | 0.037 | 0.047 | .612 | -0.054, 0.092 |
| $F(2,116) = 0.133, R^2 = 0.018, p = .875$ | | | | | |
| | | | | | |
| Model 3 cAge_A | 0.071 | 0.059 | 0.114 | .233 | -0.046, 0.188 |
| cSex_A | -0.070 | 0.229 | -0.029 | .759 | -0.523, 0.383 |
| mAge_9 | 0.007 | 0.025 | 0.028 | .769 | -0.043, 0.058 |
| Optimal Parenting | 0.972 | 3.652 | 0.026 | .791 | -6.261, 8.206 |
| Intrapersonal | 0.015 | 0.037 | 0.037 | .697 | -0.059, 0.089 |
| Optimal ParentingXIntrapersonal | 1.053 | 1.557 | 0.067 | .500 | -2.031, 4.136 |
| $F(1,115) = 0.457, R^2 = 0.022, p = .500$ | | | | | |

*Note*. cAge_A = adolescent age. cSex_A = adolescent sex. mAge_9 = maternal age at the age 9 time point. Optimal parenting was collected at the age 9 time point. Intrapersonal = maternal intrapersonal personality functioning (collected at the adolescent time point). Child sex was dummy coded as 0 = boy and 1 = girl.

**12. Maternal Interpersonal/Optimal Parenting-2 Hierarchical Linear Regression**

**Model Predicting Adolescent Emotion Suppression**

|  | B | SE | β | p | 95% CI |
|---|---|---|---|---|---|
| Model 1 cAge | 0.067 | 0.058 | 0.107 | .250 | -0.048, 0.181 |
| cSex | -0.089 | 0.223 | -0.037 | .690 | -0.530, 0.352 |
| mAge | 0.008 | 0.025 | 0.031 | .738 | -0.041, 0.058 |
| $F(3,118) = 0.634, R^2 = 0.016, p = .595$ | | | | | |
| | | | | | |
| Model 2 cAge | 0.065 | 0.057 | 0.104 | .263 | -0.049, 0.178 |
| cSex | -0.072 | 0.222 | -0.030 | .747 | -0.512, 0.368 |
| mAge | 0.010 | 0.025 | 0.036 | .694 | -0.039, 0.059 |
| Optimal Parenting | 0.215 | 3.425 | 0.006 | .950 | -6.569, 6.999 |
| **Interpersonal*** | **0.092** | **0.041** | **0.202** | **.027** | **0.010, 0.173** |
| $F(2,116) = 2.496, R^2 = 0.056, p = .087$ | | | | | |
| | | | | | |
| Model 3 cAge | 0.070 | 0.058 | 0.112 | .230 | -0.045, 0.184 |
| cSex | -0.078 | 0.222 | -0.032 | .727 | -0.518, 0.363 |
| mAge | 0.007 | 0.025 | 0.025 | .787 | -0.043, 0.056 |
| Optimal Parenting | 1.337 | 3.632 | 0.036 | .713 | -5.857, 8.531 |
| **Interpersonal*** | **0.083** | **0.042** | **0.184** | **.049** | **0.000, 0.167** |
| Optimal ParentingXInterpersonal | 1.710 | 1.830 | 0.092 | .353 | -1.921, 5.341 |
| $F(1,115) = 0.870, R^2 = 0.064, p = .353$ | | | | | |

*Note*. *indicates significance at the 0.05 level. cAge_A = adolescent age. cSex_A = adolescent sex. mAge_9 = maternal age at the age 9 time point. Optimal parenting was collected at the age 9 time point. Interpersonal = maternal interpersonal personality functioning (collected at the adolescent time point). Child sex was dummy coded as 0 = boy and 1 = girl.

### 13. Maternal Intrapersonal/Emotion Suppression Hierarchical Linear Regression

### Model Predicting Adolescent Emotion Suppression

|  | B | SE | β | $p$ | 95% CI |
|---|---|---|---|---|---|
| Model 1 cAge_A | 0.067 | 0.058 | 0.107 | .250 | -0.048, 0.181 |
| cSex_A | -0.089 | 0.223 | -0.037 | .690 | -0.530, 0.352 |
| mAge_9 | 0.008 | 0.025 | 0.031 | .738 | -0.041, 0.058 |
| $F(3,118) = 0.634, R^2 = 0.016, p = .594$ | | | | | |
| | | | | | |
| Model 2 cAge_A | 0.065 | 0.058 | 0.104 | .270 | -0.051, 0.180 |
| cSex_A | -0.069 | 0.225 | -0.028 | .760 | -0.514, 0.376 |
| mAge_9 | 0.011 | 0.025 | 0.042 | .654 | -0.039, 0.062 |
| mEmotion Suppression_9 | -0.097 | 0.117 | -0.077 | .410 | -0.329, 0.135 |
| Intrapersonal | 0.024 | 0.037 | 0.059 | .525 | -0.050, 0.097 |
| $F(2,116) = 0.474, R^2 = 0.024, p = .624$ | | | | | |
| | | | | | |
| Model 3 cAge_A | 0.050 | 0.058 | 0.080 | .394 | -0.066, 0.165 |
| cSex_A | -0.103 | 0.224 | -0.042 | .647 | -0.545, 0.340 |
| mAge_9 | 0.018 | 0.025 | 0.065 | .488 | -0.033, 0.068 |
| mEmotion Suppression_9 | -0.070 | 0.117 | -0.056 | .551 | -0.302, 0.162 |
| Intrapersonal | 0.027 | 0.037 | 0.068 | .466 | -0.046, 0.100 |
| **Emotion SuppressionXIntrapersonal*** | **0.068** | **0.039** | **0.165** | **.081** | **-0.009, 0.145** |
| $F(1,115) = 3.090, R^2 = 0.049, p = .081*$ | | | | | |

*Note*. *indicates significance at the 0.10 level. cAge_A = adolescent age. cSex_A = adolescent sex. mAge_9 = maternal age at the age 9 time point. mEmotion Suppression_9 = maternal emotion suppression at the age 9 time point. Intrapersonal = maternal intrapersonal personality functioning (collected at the adolescent visit). Emotion SuppressionXIntrapersonal = interaction of maternal emotion suppression at the age 9 time point and maternal intrapersonal personality functioning at the adolescent time point. Child sex was dummy coded as 0 = boy and 1 = girl.

## 14. Maternal Interpersonal/Emotion Suppression Hierarchical Linear Regression

### Model Predicting Adolescent Emotion Suppression

|  | B | SE | β | p | 95% CI |
|---|---|---|---|---|---|
| **Model 1** cAge_A | 0.067 | 0.058 | 0.107 | .250 | -0.048, 0.181 |
| cSex_A | -0.089 | 0.223 | -0.037 | .690 | -0.530, 0.352 |
| mAge_9 | 0.008 | 0.025 | 0.031 | .738 | -0.041, 0.058 |
| $F(3,118) = 0.634, R^2 = 0.016, p = .594$ | | | | | |
| | | | | | |
| **Model 2** cAge_A | 0.062 | 0.057 | 0.100 | .276 | -0.050, 0.175 |
| cSex_A | -0.052 | 0.220 | -0.021 | .814 | -0.487, 0.383 |
| mAge_9 | 0.012 | 0.025 | 0.046 | .617 | -0.037, 0.061 |
| mEmotion Suppression_9 | -0.126 | 0.114 | -0.101 | .273 | -0.352, 0.100 |
| **Interpersonal*** | **0.098** | **0.041** | **0.217** | **.019** | **0.017, 0.180** |
| $F(2,116) = 3.128, R^2 = 0.066, p = .048*$ | | | | | |
| | | | | | |
| **Model 3** cAge_A | 0.057 | 0.057 | 0.092 | .318 | -0.056, 0.171 |
| cSex_A | -0.070 | 0.221 | -0.029 | .753 | -0.506, 0.367 |
| mAge_9 | 0.014 | 0.025 | 0.053 | .561 | -0.035, 0.064 |
| mEmotion Suppression_9 | -0.116 | 0.115 | -0.093 | .314 | -0.344, 0.111 |
| **Interpersonal*** | **0.095** | **0.041** | **0.210** | **.023** | **0.013, 0.177** |
| Emotion SuppressionXInterpersonal | 0.041 | 0.044 | 0.085 | .354 | -0.046, 0.128 |
| $F(1,115) = 0.866, R^2 = 0.073, p = .354$ | | | | | |

*Note.* *indicates significance at the 0.05 level. cAge_A = adolescent age. cSex_A = adolescent sex. mAge_9 = maternal age at the age 9 time point. mEmotion Suppression_9 = maternal emotion suppression at the age 9 time point. Interpersonal = maternal interpersonal personality functioning (collected at the adolescent visit). Emotion SuppressionXInterpersonal = interaction of maternal emotion suppression at the age 9 time point and maternal interpersonal personality functioning at the adolescent time point. Child sex was dummy coded as 0 = boy and 1 = girl. .

**15. Maternal Intrapersonal/Cognitive Reappraisal During Adolescence Hierarchical**

**Linear Regression Model Predicting Adolescent Cognitive Reappraisal**

| | B | SE | β | $p$ | 95% CI |
|---|---|---|---|---|---|
| Model 1 cAge_A | 0.047 | 0.055 | 0.092 | .392 | -0.061, 0.155 |
| cSex_A | 0.015 | 0.186 | 0.008 | .934 | -0.353, 0.384 |
| Group | -0.177 | 0.205 | -0.086 | .390 | -0.582, 0.229 |
| mAge_A | -0.006 | 0.201 | -0.030 | .770 | -0.047, 0.035 |
| mCognitive Reappraisal_9 | -0.042 | 0.144 | -0.027 | .770 | -0.328, 0.244 |
| $F(5,116) = 0.239, R^2 = 0.010, p = .944$ | | | | | |
| | | | | | |
| Model 2 cAge_A | 0.045 | 0.055 | 0.089 | .415 | -0.064, 0.154 |
| cSex_A | 0.031 | 0.188 | 0.016 | .869 | -0.342, 0.404 |
| Group | -0.138 | 0.212 | -0.067 | .516 | -0.559, 0.282 |
| mAge_A | -0.007 | 0.021 | -0.036 | .731 | -0.048, 0.034 |
| mCognitive Reappraisal_9 | -0.083 | 0.155 | -0.054 | .592 | -0.391, 0.224 |
| mCognitive Reappraisal_A | 0.087 | 0.117 | 0.078 | .458 | -0.144, 0.318 |
| Intrapersonal | 0.010 | 0.031 | 0.030 | .757 | -0.052, 0.072 |
| $F(2,114) = 0.288, R^2 = 0.015, p = .750$ | | | | | |
| | | | | | |
| Model 3 cAge_A | 0.055 | 0.055 | 0.107 | .324 | -0.055, 0.164 |
| cSex_A | 0.011 | 0.187 | 0.006 | .953 | -0.360, 0.383 |
| Group | -0.071 | 0.215 | -0.034 | .743 | -0.496, 0.355 |
| mAge_A | -0.009 | 0.021 | -0.045 | .666 | -0.050, 0.032 |
| mCognitive Reappraisal_9 | -0.101 | 0.154 | -0.065 | .514 | -0.407, 0.205 |
| mCognitive Reappraisal_A | 0.059 | 0.117 | 0.054 | .613 | -0.173, 0.291 |
| Intrapersonal | 0.006 | 0.031 | 0.019 | .841 | -0.055, 0.068 |
| CognitiveReappraisalXIntrapersonal | -0.063 | 0.039 | -0.160 | .108 | -0.139, 0.014 |
| $F(1,113) = 2.629, R^2 = 0.038, p = .108$ | | | | | |

*Note*. cAge_A = adolescent age. cSex_A = adolescent sex. Group = pre- or during-COVID signifier. mAge_A = maternal age at the adolescent time point. mCognitive Reppraisal_9 = maternal cognitive reappraisal at the age 9 time point. mCognitive Reappraisal_A = maternal cognitive reappraisal at the adolescent time point; Intrapersonal = maternal intrapersonal personality functioning (collected at the adolescent visit). Cognitive ReappraisalXIntrapersonal interaction of maternal cognitive reappraisal at the adolescent time point and maternal intrapersonal personality functioning at the adolescent time point. Child sex was dummy coded as 0 = boy and 1 = girl; Group was dummy coded as 0 = pre-COVID and 1 = during-COVID.

**16. Maternal Interpersonal/Cognitive Reappraisal During Adolescence Hierarchical**

**Linear Regression Model Predicting Adolescent Cognitive Reappraisal**

| | B | SE | β | p | 95% CI |
|---|---|---|---|---|---|
| Model 1 cAge_A | 0.047 | 0.055 | 0.092 | .392 | -0.061, 0.155 |
| cSex_A | 0.015 | 0.186 | 0.008 | .934 | -0.353, 0.384 |
| Group | -0.177 | 0.205 | -0.086 | .390 | -0.582, 0.229 |
| mAge_A | -0.006 | 0.021 | -0.030 | .770 | -0.047, 0.035 |
| mCognitive Reappraisal_9 | -0.042 | 0.144 | -0.027 | .770 | -0.328, 0.244 |
| $F(5,116) = 0.239$, $R^2 = 0.010$, $p = .944$ | | | | | |
| | | | | | |
| Model 2 cAge_A | 0.040 | 0.055 | 0.079 | .467 | -0.069, 0.149 |
| cSex_A | 0.044 | 0.187 | 0.022 | .814 | -0.326, 0.414 |
| Group | -0.095 | 0.213 | -0.046 | .656 | -0.517, 0.326 |
| mAge_A | -0.006 | 0.021 | -0.030 | .767 | -0.047, 0.035 |
| mCognitive Reappraisal_9 | -0.086 | 0.153 | -0.056 | .573 | -0.389, 0.216 |
| mCognitive Reappraisal_A | 0.092 | 0.113 | 0.083 | .417 | -0.132, 0.316 |
| Interpersonal | 0.047 | 0.035 | 0.127 | .179 | -0.022, 0.116 |
| $F(2,114) = 1.160$, $R^2 = 0.030$, $p = .317$ | | | | | |
| | | | | | |
| Model 3 cAge_A | 0.040 | 0.055 | 0.079 | .469 | -0.069, 0.149 |
| cSex_A | 0.044 | 0.188 | 0.022 | .816 | -0.328, 0.416 |
| Group | -0.095 | 0.214 | -0.046 | .659 | -0.518, 0.329 |
| mAge_A | -0.006 | 0.021 | -0.031 | .762 | -0.048, 0.035 |
| mCognitive Reappraisal_9 | -0.088 | 0.154 | -0.056 | .571 | -0.393, 0.217 |
| mCognitive Reappraisal_A | 0.091 | 0.114 | 0.083 | .423 | -0.134, 0.317 |
| Interpersonal* | 0.047 | 0.035 | 0.126 | .189 | -0.023, 0.117 |
| CognitiveReappraisalXInterpersonal | -0.004 | 0.034 | -0.010 | .918 | -0.071, 0.064 |
| $F(1,113) = 0.011$, $R^2 = 0.030$, $p = .918$ | | | | | |

*Note*. cAge_A = adolescent age. cSex_A = adolescent sex. Group = pre- or during-COVID signifier. mAge_A = maternal age at the adolescent time point. mCognitive Reppraisal_9 = maternal cognitive reappraisal at the age 9 time point. mCognitive Reappraisal_A = maternal cognitive reappraisal at the adolescent time point; Interpersonal = maternal interpersonal personality functioning (collected at the adolescent visit). Cognitive ReappraisalXInterpersonal interaction of maternal cognitive reappraisal at the adolescent time point and maternal intrapersonal personality functioning at the adolescent time point. Child sex was dummy coded as 0 = boy and 1 = girl; Group was dummy coded as 0 = pre-COVID and 1 = during-COVID.

**17. Maternal Intrapersonal/Emotion Suppression During Adolescence Hierarchical**

**Linear Regression Model Predicting Adolescent Emotion Suppression**

| | B | SE | β | p | 95% CI |
|---|---|---|---|---|---|
| Model 1 cAge_A | 0.075 | 0.067 | 0.120 | .265 | -0.057, 0.207 |
| cSex_A | -0.094 | 0.227 | -0.039 | .681 | -0.543, 0.356 |
| Group | -0.098 | 0.249 | -0.039 | .694 | -0.592, 0.395 |
| mAge_A | 0.002 | 0.025 | 0.006 | .949 | -0.048, 0.051 |
| mEmotionSuppression_9 | -0.082 | 0.116 | -0.066 | .479 | -0.311, 0.147 |
| $F(5,116) = 0.486, R^2 = 0.021, p = .786$ | | | | | |
| | | | | | |
| Model 2 cAge | 0.054 | 0.065 | 0.087 | .410 | -0.076, 0.184 |
| cSex | -0.100 | 0.222 | -0.041 | .651 | -0.540, 0.339 |
| Group | -0.219 | 0.248 | -0.087 | .378 | -0.709, 0.271 |
| mAge 13 | 0.000 | 0.024 | 0.000 | .997 | -0.049, 0.048 |
| **mEmotionSuppression_9*** | **-0.283** | 0.134 | **-0.226** | **.036** | **-0.548, -0.019** |
| **mEmotion Suppression_A*** | **0.330** | 0.120 | **0.297** | **.007** | **0.093, 0.568** |
| Intrapersonal | 0.021 | 0.036 | 0.053 | .564 | -0.051, 0.093 |
| $F(2,114) = 3.976, R^2 = 0.084, p = .021*$ | | | | | |
| | | | | | |
| Model 3 cAge | 0.054 | 0.066 | 0.086 | .415 | -0.076, 0.184 |
| cSex | -0.124 | 0.227 | -0.051 | .588 | -0.574, 0.327 |
| Group | -0.211 | 0.249 | -0.084 | .398 | -0.704, 0.282 |
| mAge 13 | 0.000 | 0.025 | 0.002 | .984 | -0.049, 0.048 |
| **mEmotionSuppression_9*** | **-0.274** | 0.135 | **-0.219** | **.045** | **-0.542, -0.006** |
| **mEmotion Suppression_13*** | **0.323** | 0.121 | **0.291** | **.009** | **0.083, 0.563** |
| Intrapersonal | 0.020 | 0.037 | 0.051 | .580 | -0.052, 0.093 |
| Emotion SuppressionXIntrapersonal | 0.015 | 0.031 | 0.046 | .622 | -0.046, 0.077 |
| $F(1,113) = 0.244, R^2 = 0.086, p = .622$ | | | | | |

*Note.* *indicates significance at the 0.05 level. cAge_A = adolescent age. cSex_A = adolescent sex. Group = pre- or during-COVID signifier. mAge_A = maternal age at the adolescent time point. mEmotion Suppression_9 = maternal emotion suppression at the age 9 time point. mEmotion Suppression_A = maternal emotion suppression at the adolescent time point; Intrapersonal = maternal intrapersonal personality functioning (collected at the adolescent visit). Emotion SuppressionXIntrapersonal interaction of maternal emotion suppression at the adolescent time point and maternal intrapersonal personality functioning at the adolescent time point. Child sex was dummy coded as 0 = boy and 1 = girl; Group was dummy coded as 0 = pre-COVID and 1 = during-COVID.
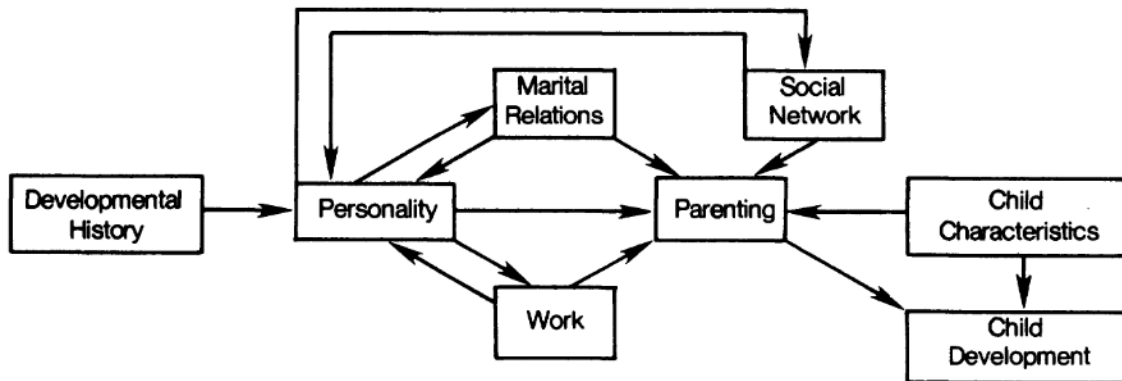
**18. Maternal Interpersonal/Emotion Suppression During Adolescence Hierarchical**

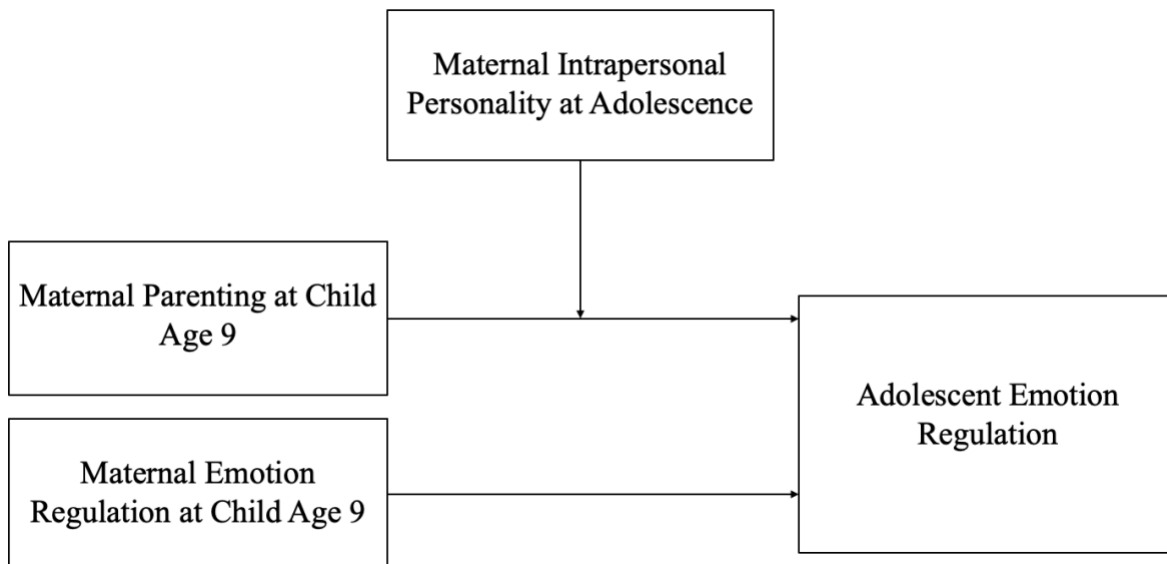**Linear Regression Model Predicting Adolescent Emotion Suppression**

| | B | SE | β | p | 95% CI |
|---|---|---|---|---|---|
| Model 1 cAge_A | 0.075 | 0.067 | 0.120 | .265 | -0.057, 0.207 |
| cSex_A | -0.094 | 0.227 | -0.039 | .681 | -0.543, 0.356 |
| Group | -0.098 | 0.249 | -0.039 | .694 | -0.592, 0.395 |
| mAge_A | 0.002 | 0.025 | 0.006 | .949 | -0.048, 0.395 |
| mEmotionSuppression_9 | -0.082 | 0.116 | -0.066 | .479 | -0.311, 0.051 |
| $F(5,116) = 0.486, R^2 = 0.021, p = .786$ | | | | | |
| | | | | | |
| Model 2 cAge_A | 0.045 | 0.064 | 0.073 | .482 | -0.082, 0.173 |
| cSex_A | -0.074 | 0.218 | -0.031 | .734 | -0.506, 0.357 |
| Group_9 | -0.135 | 0.246 | -0.054 | .585 | -0.623, 0.353 |
| mAge_A | 0.003 | 0.024 | 0.010 | .915 | -0.045, 0.050 |
| **mEmotionSuppression_9\*** | **-0.297** | **0.130** | **-0.238** | **.025** | **-0.556, -0.039** |
| **mEmotion Suppression_A\*** | **0.308** | **0.118** | **0.278** | **.010** | **0.074, 0.542** |
| **Interpersonal\*** | **0.088** | **0.041** | **0.195** | **.034** | **0.007, 0.170** |
| $F(2,114) = 6.256, R^2 = 0.117, p = .003$* | | | | | |
| | | | | | |
| Model 3 cAge | 0.045 | 0.065 | 0.073 | .485 | -0.083, 0.173 |
| cSex | -0.070 | 0.220 | -0.029 | .752 | -0.507, 0.367 |
| Group | -0.140 | 0.250 | -0.056 | .576 | -0.635, 0.354 |
| mAge 13 | 0.003 | 0.024 | 0.011 | .907 | -0.045, 0.051 |
| **mEmotionSuppression 9\*** | **-0.300** | **0.132** | **-0.240** | **.025** | **-0.561, -0.038** |
| **mEmotion Suppression_A\*** | **0.309** | **0.119** | **0.278** | **.011** | **0.074, 0.544** |
| **Interpersonal\*** | **0.090** | **0.042** | **0.197** | **.035** | **0.006, 0.173** |
| Emotion SuppressionXInterpersonal | -0.006 | 0.036 | -0.015 | .873 | -0.077, 0.066 |
| $F(1,113) = 0.026, R^2 = 0.118, p = .873$ | | | | | |

*Note*. *indicates significance at the 0.05 level. cAge_A = adolescent age. cSex_A = adolescent sex. Group = pre- or during-COVID signifier. mAge_A = maternal age at the adolescent time point. mEmotion Suppression_9 = maternal emotion suppression at the age 9 time point. mEmotion Suppression_A = maternal emotion suppression at the adolescent time point; Intrapersonal = maternal interpersonal personality functioning (collected at the adolescent visit). Emotion SuppressionXInterpersonal interaction of maternal emotion suppression at the adolescent time point and maternal intrapersonal personality functioning at the adolescent time point. Child sex was dummy coded as 0 = boy and 1 = girl; Group was dummy coded as 0 = pre-COVID and 1 = during-COVID.

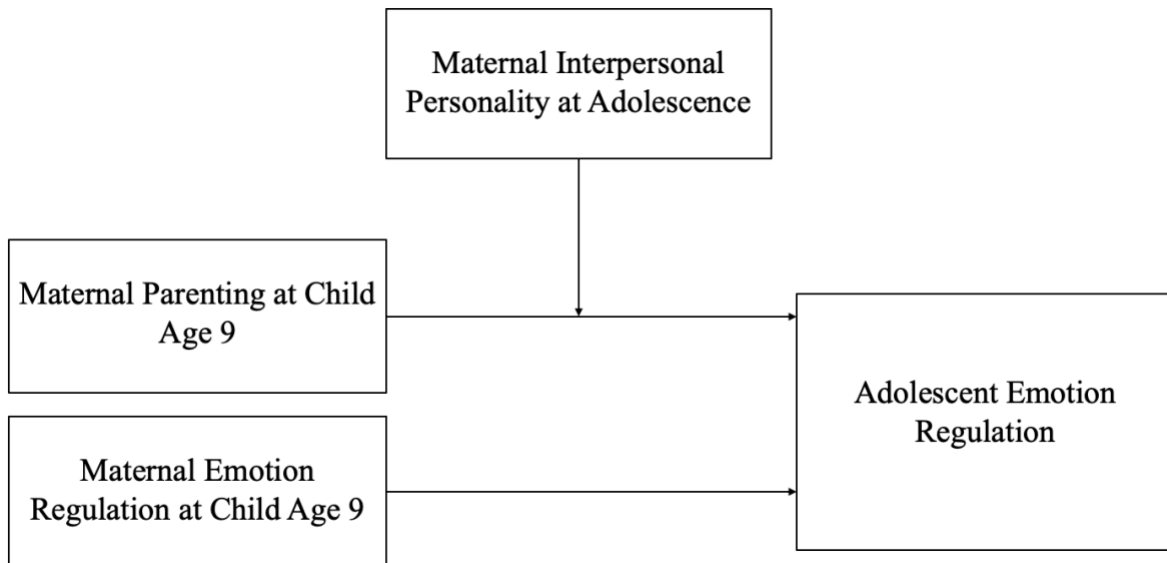1. **Belsky's Determinants of Parenting Process Model (copied from Belsky, 1984)**

2.  **Predicted Association Between Maternal Parenting (Controlling for Maternal Age) at Child Age 9 and Adolescent Emotion Regulation (Controlling for Sex and Age), Moderated by Maternal Intrapersonal Personality Functioning During Adolescence and the Predicted Association Between Maternal Emotion Regulation at Child Age 9 and Adolescent Emotion Regulation**



*Note.* Emotion regulation is defined here as "cognitive reappraisal" for the original hypotheses, but it is defined as "emotion suppression" in the post-hoc analyses.
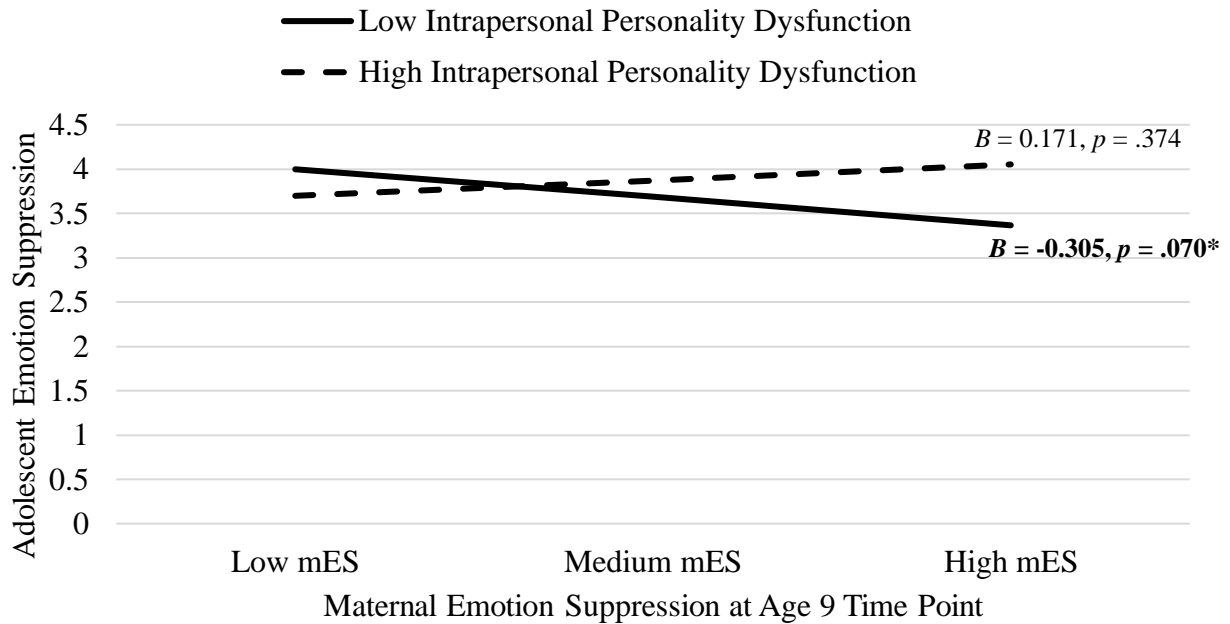
3. **Predicted Association Between Maternal Parenting (Controlling for Maternal Age) at Child Age 9 and Adolescent Emotion Regulation (Controlling for Sex and Age), Moderated by Maternal Interpersonal Personality Functioning During Adolescence and the Predicted Association Between Maternal Emotion Regulation at Child Age 9 and Adolescent Emotion Regulation**



*Note. Emotion regulation is defined here as "cognitive reappraisal" for the original hypotheses, but it is defined as "emotion suppression" in the post-hoc analyses*

4.  **Moderating Effect of Maternal Intrapersonal Personality Dysfunction on the**

    **Association Between Maternal Emotion Suppression and Adolescent Emotion**

    **Suppression**



*Note.* mES = maternal emotion suppression at the age 9 time point. Intrapersonal personality dysfunction was self-reported at the adolescent time point. Low interpersonal personality dysfunction indicates higher levels of intrapersonal functioning and high intrapersonal personality dysfunction indicates lower levels of intrapersonal functioning.

# Appendices

## Appendix A: Emotion Regulation Questionnaire

We would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your <u>emotional experience</u>, or what you feel like inside. The other is your <u>emotional expression</u>, or how you show your emotions in the way you talk, gesture, or behave. Although some of the follow questions may seem similar to one another, they differ in important ways, For each item, please answer using the following scale:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| **strongly <u>disagree</u>** | | | **neutral** | | | **strongly <u>agree</u>** |

1.  When I want to feel more *positive* emotion (such as joy or amusement), I *change what I'm thinking about.*

2.  I keep my emotions to myself.

3.  When I want to feel less *negative* emotion (such as sadness or anger), I *change what I'm thinking about.*

4.  When I am feeling *positive* emotions, I am careful not to express them.

5.  When I'm faced with a stressful situation, I make myself *think about it* in a way that helps me stay calm.

6.  I control my emotions by *not expressing them.*

7.  When I want to feel more *positive* emotion, I *change the way I'm thinking* about the situation.

8.  I control my emotions by *changing the way I think* about the situation I'm in.

9.  When I am feeling *negative* emotions, I make sure not to express them.

10. When I am feeling less *negative* emotion, I *change the way I'm thinking* about the situation.

**ERQ Scoring**

**Cognitive Reappraisal Subscale Items:**    1, 3, 5, 7, 8, 10
**Emotion Suppression Subscale Items:**    2, 4, 6, 9

Scoring of the ERQ is continuous and scoring on each subscale is separate from the other. Scores from each subscale are added together to create a composite score. Higher scores on each subscale indicate a greater use of that emotion regulation strategy.

**Appendix B: Levels of Personality Functioning Scale- Brief Form 2.0**

<u>**Directions**</u>

On the following pages, you will find a series of statements that people might use to describe their own personalities in their interpersonal (within themselves) and interpersonal (with others) relationships.

For each statement, please fill in the answer which best describes how true each statement is for <u>yourself</u>. There are no best answers. People are very different in how they feel about these statements. Please fill in the first answer that comes to you.

You will use the following scale to describe how true or false a statement is about yourself:

| **Number:** | **If the statement is:** |
|---|---|
| **1** | **Very false or often false of yourself** |
| **2** | **Sometimes or somewhat false of yourself** |
| **3** | **Sometimes or somewhat true of yourself** |
| **4** | **Very true or often true of yourself** |

1. I often do not know who I really am.

2. I often think very negatively about myself.

3. My emotions change without me having a grip on them.

4. I have no sense of where I want to go in my life.

5. I often do not understand my own thoughts and feelings.

6. I often make unrealistic demands on myself.

7. I often have difficulty understanding the thoughts and feelings of others.

8. I often find it hard to stand when others have a different opinion.

9. I often do not fully understand why my behavior has a certain effect on others.

10. My relationships and friendships never last long.

11. I often feel vulnerable when relations become more personal.

12. I often do not succeed in cooperating with others in a mutually satisfactory way.

**LPFS- BF 2.0 Scoring**

| | |
|---|---|
| **Identity Subscale Items:** | 1, 2, 3 |
| **Self-Direction Subscale Items:** | 4, 5, 6 |
| **Empathy Subscale Items:** | 7, 8, 9 |
| **Intimacy Subscale Items:** | 10, 11, 12 |
| | |
| **Intrapersonal Domain Items:** | 1, 2, 3, 4, 5, 6 |
| **Interpersonal Domain Items:** | 7, 8, 9, 10, 11, 12 |

The LPFS- BF 2.0 can be scored by either (a) getting an overall composite score of the measure, (b) getting composite scores of each subscale, or (c) getting a composite score of each domain. Higher scores in any scoring method indicates higher levels of personality dysfunction. For the purposes of my thesis, method (c) was used.

# Appendix C: IRB Approval Letters

**VIRGINIA TECH.**

Division of Scholarly Integrity and
Research Compliance
Institutional Review Board
North End Center, Suite 4120 (MC 0497)
300 Turner Street NW
Blacksburg, Virginia 24061
540/231-3732
irb@vt.edu
http://www.research.vt.edu/sirc/hrpp

**MEMORANDUM**

**DATE:** February 26, 2021

**TO:** Martha Ann Bell, Mohamed Zerrouk, Jennifer Julia Phillips, Thomas H Ollendick, Danhua Zhu, Sarah Radtke, Diana Michelle Devine, Tatiana Meza-Cervera, Leslie Ann Patton, Jungmeen Kim-Spoon, et. al.

**FROM:** Virginia Tech Institutional Review Board (FWA00000572, expires October 29, 2024)

**PROTOCOL TITLE:** Psychobiology of Cognitive Development in Middle Childhood

**IRB NUMBER:** 12-947

Effective February 26, 2021, the Virginia Tech Institution Review Board (IRB) approved the Amendment request for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report within 5 business days to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at:

https://secure.research.vt.edu/external/irb/responsibilities.htm

(Please review responsibilities before beginning your research.)

**PROTOCOL INFORMATION:**

Approved As: **Expedited, under 45 CFR 46.110 category(ies) 8(c)**
Protocol Approval Date: **October 10, 2020**
Protocol Expiration Date: **October 9, 2021**
Continuing Review Due Date*: **September 18, 2021**

*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

**ASSOCIATED FUNDING:**

The table on the following page indicates whether grant proposals are related to this protocol, and which of the listed proposals, if any, have been compared to this protocol, if required.

*Invent the Future*

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY
*An equal opportunity, affirmative action institution*

**SPECIAL INSTRUCTIONS:**

This amendment, submitted December 7, 2021, updates research protocol to post videos on a new (to be created) SharePoint site so that the Virginia Tech team can securely share videos of the lab visit with collaborator Dr. Julie Dunsmore at Univ of Houston for purposes of behavioral coding. Research protocol was updated to update the status of Univ of Houston to "engaged" in research to show Dr. Dunsmore's active engagement with these archival materials, to remove Erika Hernandez, Eunkyung Shin, and Ran Liu, and to add Dr. Dunsmore.

| Date* | OSP Number | Sponsor | Grant Comparison Conducted? |
|---|---|---|---|
| 07/03/2019 | 07008707 | National Institute of Child Health & Human Development (Title: Psychobiology of cognitive development) | Compared on 07/08/2019 |
| 11/12/2012 | 12054209 | NIH, Center for Scientific Review (Title: Copy of Psychobiology of Cognitive Development) | Compared on 11/12/2012 |
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|  |  |  |  |

\* Date this proposal number was compared, assessed as not requiring comparison, or comparison information was revised.

If this protocol is to cover any other grant proposals, please contact the HRPP office (irb@vt.edu) immediately.

**DATE:** 07/17/2020
**TO:** Martha Ann Bell, PhD
**CC:** commercialirb@vt.edu
**FROM:** Raffaella Hart, MS, CIP, BRANY SBER IRB (IRB00010793)

**SUBMISSION TYPE:** SBER-Modification (Event ID# 171439)
**PROTOCOL NUMBER:** 19-030-568 / VT# 19-352
**STUDY TITLE:** Psychobiology of Cognitive Development in Early Adolescence

**REVIEW TYPE:** Protocol (v. Jul.20200), Revised Parent Consent Form, Revised Assent Form, New COVID-119 Questionnaire, Revised Recruitment Emails and Phone Scripts, Survey and Recruitment Video Links, Thank you and Instructions Email, Video Scripts (05)

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Thank you for your submission.

BRANY SBER IRB has approved the following for the above-referenced research:

- **Protocol (v.2, Jul.20200)**
- **New COVID-119 Questionnaire (BRANY stamp 7/17/2020)**
- **Revised Recruitment Emails and Phone Scripts (BRANY stamp 7/17/2020)**
- **Survey and Recruitment Video Links (BRANY stamp 7/17/2020)**
- **Thank you and Instructions Email (BRANY stamp 7/17/2020)**
- **Video Scripts (BRANY stamp 7/17/2020)**
- **Revised Parent Questionnaire Only Group Consent Form (Version B)**
- **Revised Assent Form – Questionnaire Group (Version B)**
  - Re-consent Required: If the research remains open to accrual at your site, use the enclosed to obtain consent from new subjects. For previously consented subjects still active or in follow-up (not including subjects in long term survival follow-up for whom the revisions are not applicable), use the enclosed to re-consent.

**Non-Expiring IRB Approval Period:**
This study was reviewed under the Revised Common Rule (2018 requirements) and therefore **does not require continuing review in accordance with 45 CFR 46.109(f)(1)(i).**

However, BRANY SBER IRB requires you "check in" at least annually to ensure your study status is up to date and in compliance. **Your Annual Report to BRANY SBER IRB is due on 07/07/2021.** If your research is completed before then, you must submit a notification of study closure to BRANY SBER IRB (use the xForm called: SBER-Study Status Change (Closed/Enrollment Closed)).

If you have any questions or require any additional information, please call me at 516-470-6909 or send an email to me at rhart@brany.com.  Thank you.

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