Masteroppgave

NTNU
Norges teknisk-naturvitenskapelige universitet

Mona Risnes & Nina Foss Mikalsen

Does Mothers' Mental Health Predict Children's Emotion Regulation and School Performance?

Longitudinal Relations Through Ages 8, 10, 12 and 14

Masteroppgave i Master's thesis in Special Education
Veileder: Frode Stenseng
Mai 2021

NTNU
Kunnskap for en bedre verden

Mona Risnes & Nina Foss Mikalsen

Does Mothers' Mental Health Predict Children's Emotion Regulation and School Performance?

Longitudinal Relations Through Ages 8, 10, 12 and 14

Master's thesis in Special Education
Supervisor: Frode Stenseng
May 2021

Norwegian University of Science and Technology
Faculty of Social and Educational Sciences
Department of Education and Lifelong Learning

NTNU
Norwegian University of
Science and Technology

Does Mothers' Mental Health Predict Children's Emotion Regulation and School Performance? Longitudinal Relations Through Ages 8, 10, 12 and 14

Part 1: General Introduction

Preface

The work presented here was conducted as a study assignment for the Special Education master's programme at the Department of Education and Lifelong Learning, Faculty of Social and Education Science, NTNU, Trondheim. The article is written intentionally to be submitted to the journal *Child Development*, and therefore, follows the journal's technical and basic content requirements. Alongside, the scientific article, a more extensive review of theory and literature regarding maternal mental health, children's emotional regulation and academic achievements, methods and a concise description of main findings is included. The more extensive review is presented first, followed by the scientific article. Finally, the thesis is written by two authors, however, it is a thorough joint product.

Acknowledgements

Primarily, we would like to thank Professors Frode Stenseng and Vera Skalicka for providing the technical part of the statistical analyses presented in this longitudinal study. They have contributed with valuable feedback, inspiration and motivation through the writing of our thesis. Thank you!

In addition, it is with great gratitude that we had the opportunity to access data material from the Trondheim Early Secure Study in NTNU which is utilized in this study.

Mona Risnes

Nina Foss Mikalsen

Trondheim, May 2021

Table of Contents

Part 1: General Introduction

1.0 Introduction

Society's prosperity and life quality is conditional on the population's mental health. It is not surprising, then, that the vast majority of studies have explored the impact of the severeness of maternal depression or depressive symptoms and anxiety on children's health and development (Rogers et al. 2020; Cummings & Davis 1994; Wachs, Black & Engle, 2009). Overall, maternal health problems do not only affect the woman herself, but also the child's development and the family environment. Among diverse studies, bad maternal health can lead to a parenting style characterized by a reduced social interaction and involvement between the mother and child, less empathy, emotional support, and more withdrawnness and negativity (Downey and Coyne 1990; Mistry, Biesanz, Taylor, Burchinal & Cox, 2004; Foster, Garber & Durlak, 2008; Feldman et al., 2009; Comaskey et al. 2017). As a result of maternal depression and anxiety, and consequently their parenting styles, children's development is at risk. For long, research and documentations indicate that mother's maternal health problems contribute negatively to the child's health, development, cognitive abilities and behavior (Cummings & Davis 1994; Wachs, Black & Engle, 2009; Sohr-Preston & Scaramella, 2006; Yeung, Linver, & Brooks-Gunn, 2002; Rogers et al. 2020). Additionally, children's development is significantly influenced by their parent's behavior and how they interact and respond to their children. It is during those early years that these interactions and responses play an important role in children's development of emotional regulation (Kopp, 1989; Thomson, 1990). Moreover, it has been indicated that children's emotional and social skills are linked to their academic functioning (Gumora & Arsenio, 2002), which designates the importance of children's emotional control.

The World Health Organization highlights the importance of mental health in matters of accomplishing global development goals (World Health Organization, n. d.b), therefore a crucial international subject matter. Among many issues related to mental health, depression and anxiety are a substantial source of illness and dysfunction and contribute significantly to negative implications from a global perspective (World Health Organization, n. d.a). Among mothers, there are approximately 20% that suffer from either anxiety and, or depression postpartum (Walker et al. 2020). The Norwegian Directorate of Health applies that depression and anxiety is one of the most common mental health disorders among the Norwegian

population and emphasizes how the illness can influence both our psyche and our mental state (the Norwegian Directorate of Health, n. d.). This reveals that depression and anxiety, among many other mental health burdens, are highly relevant in today's society. Thus, it is important to study how this affects the child and its development as depression and anxiety can impact both mothers and families worldwide.

In the current study, our main purpose was to examine to what degree mothers' depressive symptoms and anxiety affect the child's emotional regulation and their academic development, from a longitudinal perspective. We will therefore be using a four-wave longitudinal design, inclusive of a great sample population of children at ages 8, 10, 12 and 14. The data used in this study are retrieved from the Trondheim Early Secure Study (TESS), established in 2007. The TESS research group has, through diagnostic interviews, observations, tests and standardized questionnaires, gathered information from the child, parents and teachers about various topics. Their aim is to disclose the full extent of factors affecting children's psychological and social development. Children born in 2003 or 2004, living in Trondheim, Norway, were asked to participate in the study. In total, the selection of respondents was 1250, where data was gathered from the age of 4 to the age of 14, and the study is currently ongoing (Steinsbekk & Wichstrøm, 2018).

Our aim was to investigate whether maternal health, whereas depression and anxiety, can predict young children's emotional regulation and therefore exert influence on their academic functioning. We hypothesize (1) Cross-sectional relationships between maternal mental health, child's emotional regulation and their academic achievement, (2) Maternal mental health affects the child's emotional regulation development over time, (3) Maternal mental health affects the child's academic development over time, (4) The child's emotional regulation predicts weaker academic success over time, and also (5) Mothers' mental health issues affect the child's academic achievement through a weakened emotional regulation. The motivation behind this study was to manifest a deeper explanation for children's difficulty with regulating emotions and their academic struggles. Previously, studies have gathered information on how maternal depression and anxiety is a risk factor for their offspring's emotional and behavioral problem (Walker et al., 2020). To our knowledge, there are no studies examining this exact matter in question, whether both maternal depression and anxiety affect the child's emotion regulation and consequently their academic performance. It will therefore contribute knowledge and new information to a large theoretical field.

Next, we will look upon the different terms: maternal depression and anxiety, emotion regulation and academic functioning from a theoretical and historical perspective.

Additionally, the scientific method used in this study will be presented, as well as its strengths and weaknesses, followed by our main findings and implications. Finally, the article will be introduced. The paper format, style and manuscript structure follow the guidelines of Society of Research in Child Development (2021).

2.0 Theoretical Foundation

In this chapter, we will present the theoretical framework for each subject: maternal depression and anxiety, and its impact on children; emotion regulation and academic functioning. Each subject will include various studies and enlighten relevant findings related to this assignment. The *Tripartite Model of the Impact of the Family on Children's Emotion Regulation and Adjustment* (Figure 1)*,* which originates from Morris, Silk, Steinberg, Myers & Robins (2007), will be employed as a theoretical foundation for the subject emotion regulation.

2.1 Maternal Depression and Anxiety; its impact on children

Mental health involves different symptoms and challenges. Through the multiaxial system there are six axes, based on WHO's ICD-10, which includes mental disorders, somatic conditions and specific development disorders etc. In this current study we will operate with *Axis 1: Clinical psychiatric syndrome,* where both depression and anxiety are incorporated (the Directorate for e-health, 2020). Depression and anxiety are referred to as the two most common mental health problems, which can lead to both physical and mental symptoms (the Norwegian Directorate of Health, n. d.). Depression is characterized by persistent sadness and lack of interest, and can also lead to disrupted sleep and appetite, tiredness and poor concentration (World Health Organization, n.d.a). Anxiety, on the other hand, is a collective designation where the primary symptom is irrational fear. This mental health problem and its symptoms can either be associated with specific situations or objects, or in a more indeterminate form characterized by persistent worries (the Norwegian Directorate of Health, n. d.). Solely focusing on either depression or anxiety is problematic because both anxiety and depression symptoms often co-occur, and the presence of comorbidity is an indicator of its severity (Gjerde et al., 2020). The current study will focus on mothers experiencing these mental health problems, and therefore the terms maternal depression and maternal anxiety will be utilized. Maternal depression is widely known but is used in different circumstances which can confuse its meaning. It can be utilized as an umbrella term that includes different

stages and timing of depression. More specific, maternal depression during pregnancy and shortly after is known as antenatal or prenatal depression, while maternal depression after childbirth is referred to as postpartum depression (Śliwerski, Kossakowska, Jarecka, Świtalska & Bielawska-Batorowicz, 2020). Therefore, our interpretation encompasses that maternal depression is not only associated with a specific time period but can occur during a mother's lifetime. This also applies to maternal anxiety. Throughout this assignment, the term maternal depression and anxiety will be employed with this definition.

2.1.1 Symptoms and Parenting Style

Researchers have come to an agreement that maternal depression and anxiety includes behavioral issues (Cummings & Davies, 1994; Downey & Coyne, 1990; Walker et al., 2020), that can affect the mother's capacity to parent beneficially. Both maternal depression and anxiety have been shown to affect the family functioning, which again negatively affects mother-child interactions (Walker et al., 2020). Maternal depression can reduce a mother's energy, motivation and enthusiasm of parenting, as well as lead to hopelessness, self-doubt, confusion and guilt (Mental Health America & Substance Abuse and Mental Health Services Administration, 2008). Depressed mothers' parenting has been characterized by either too much participation (intrusive and controlling) or too little (neglectful and distant) participation with their children. For instance, they can be less vocal with fewer explanations, suggestions and questions (Herrera, Reissland & Shepherd, 2004), as well as less encouragement around reading activities (Kiernan & Huerta, 2008; Paulson et al., 2009). In addition, maternal anxiety may also contribute to suboptimal parenting style which includes a reduced sensitivity (Nicol-Harper, Harvey & Stein, 2007) and over-control in a way that the family environment promotes less independence (Whaley, Pinto & Sigma, 1999).
Introductory, we briefly stated how these major mental health concerns could have adverse consequences for children and their development. Among these unfortunate consequences, children of depressed and anxious mothers, more specifically school-aged children, have shown to display both internalizing (e. g., anxiety, depression, somatic problems) and externalizing problems (e. g., attentional problems, hyperactivity, conduct problems) (Zahn-Waxler, Iannotti, Cummings & Denham, 1990; Dawson et al., 2003; Downey & Coyne, 1990; Turney, 2011; Stein et al., 2014). These outcomes affect the child in numerous ways and can have further impact throughout their lives. Despite these findings, there is room for specificity in genetic transmission in relation to internalizing and externalizing problems.

2.1.2 Maternal Mental Health and Children's Emotional and Behavior Problems

A recent study conducted by the Norwegian Institute of Public Health, with data collected from MoBa, included 17 724 children from 11 553 mothers, focused on the timing of maternal anxiety and consequences towards the child. The mother's anxiety symptoms were measured multiple times during the child's upcoming. In addition, mothers reported their anxiety level with the help from a short version of Symptom Checklist as well as their children's level of emotional- and behavior problems from questions from the Child Behavior Checklist. The study shows that mothers' anxiety during the children's preschool-age is more damaging to the child than anxiety during pregnancy (the Norwegian Institute of Public Health, 2019). Anxiety is often common during- and after pregnancy, and approximately 5 % of women in MoBa experience ailments that are so severe that they affect the functioning of everyday life. Further, the study indicates that children of anxious mothers during middle childhood had an increased risk for developing emotional problems. Examples of such emotional problems can be sadness, worriness, crying and abdominal pain. The Norwegian Institute of Public Health (2019) also emphasizes the importance of including depression when addressing anxiety, due to their close-related ties. Another significant finding researcher made was that the effect of mother's anxiety on the child's behavior problems became statistically non-significant when controlled for mother's depression. This signifies that mothers' depression is more dominant than mother's anxiety, regarding the child's behavior problems, which is supported by previous studies (Gjerde et al., 2020). However, the child's emotional problems were still present when controlling for mothers' depression. This indicates that mothers' anxiety involves a unique effect on children's emotional difficulties (the Norwegian Institute of Public Health, 2019).

Similar to the latter study, Goodman et al. (2011) have through their meta-analysis, where 193 studies were reviewed, provided evidence that children of depressed mothers struggle with behavior problems. Depressed mothers have a tendency to express hostile-, negative- or withdrawn behavior which, consequently, can lead to children's behavior problems (Downey & Coyne, 1990). In addition, a study conducted by Turney (2011), there seems to be a distinction regarding the degree of behavior problems and the intensity of the mother's depression. Children of mothers with chronic depression had worse behavior compared to children of mothers who only reported depressive symptoms once, but had similar behavior compared to those who reported depressive symptoms two points in time. The timing of maternal depression has also shown to affect the child's behavior, where researchers present a correlation between maternal depression after birth and the child's

antisocial behavior (Kim-Cohen, Moffitt, Taylor, Pawlby & Caspi, 2005). With maternal anxiety in mind, Gjerde et al. (2020) discuss how numerous studies report a correlation between maternal perinatal anxiety and child mental health problems. However, these studies have not controlled for maternal anxiety during a child's infancy and childhood. In fact, studies that control for maternal anxiety after birth find that the established correlation between maternal perinatal anxiety and child mental health problems, is no longer significant (e.g. Van Batenburg-Eddes et al., 2013). This shows that timing of mothers' depression and anxiety can lead to differences in the child's behavior and their mental health.

2.1.3 Maternal Mental Health and Children's Cognitive Difficulties

Furthermore, children of depressed mothers or mothers who show depressive symptoms have an increasing risk of poorer cognitive development compared to children of non-depressed mothers (Cummings & Davies, 1994). Rogers et al. (2020) address various studies where associations were found between perinatal depression and anxiety, and cognitive deficits, such as academic achievement and intelligence. Several studies propound that parents are "accurate estimators" of their children's cognitive development (Molina & Bulgarelli, 2012), and as a depressed or anxious mother, mental struggles may interfere with beneficial parenting towards the child's cognitive development. Equivalent to behavior problems as a consequence of mother's depression or anxiety, its intensity predicts the degree of a non-sufficient cognitive development. Campbell, Matestic, von Stauffenberg, Mohan & Kirchner (2007) learned in their study, that children of mothers with low level depressive symptoms achieved advantageous results in cognitive measures in first grade, compared to children of mothers with moderate or high levels (decreasing, chronic) of depressive symptoms. This indicates that higher levels of depression or depressive symptoms reported from the mother will contribute to a poorer cognitive development for the child. There is also a question regarding the timing of the mother's depression and the child's cognitive development, which have been shown to be an important impact on the child's progression (Kim-Cohen et al., 2005). To our knowledge, there are gaps in research regarding maternal depression at a later stage in life and its consequences for children, whereas the theoretical focus often circles pre-birth and the time shortly after. On the other hand, maternal anxiety lacks information regarding its intensity and timing towards the child's cognitive development. Thus, there is an insecurity revolving timing of mothers' depression or anxiety at a later period than directly after birth, and its contribution to the child's cognitive development.

2.1.4 Maternal Mental Health and Children's ER Development

Jointly with behavior problems and an interfered cognitive development, children of depressed and anxious mothers are at risk of an insufficient emotion regulation (ER) and emotional problems (Kim-Cohen et al., 2005; Walker et al., 2020). It is commonly known that a child shares 50% of its genes with its mother, thus, there is an increased chance that the child may develop mental health issues, consequently as a result of mother's genes (the Norwegian Institute of Public Health, 2019). A study conducted by Loevaas et al. (2018) found that anxiety and depressive symptoms in children aged 8 - 12 years, were related to their ER. It showed a negative correlation between children's symptoms of anxiety and depression, and ER, which were controlled for risk factors such as parental mental health, socioeconomic status, stress and the child's age and gender. This implies that mothers' anxiety may be transmitted genetically, and therefore affect the child's mental health, which again may lead to ER difficulties. Despite this indication, it may not be applicable to all situations. Regarding the child's ER, the timing of mother's anxiety is of importance. O'Connor, Heron, Golding, Beveridge & Glover (2002) found strong and significant associations between an elevation of anxiety in late pregnancy and hyperactivity/inattention in boys, and behavioral and emotional problems in both boys and girls. After these findings were controlled for certain risks and anxiety in the postnatal period, the effects were maintained. In addition, they found that postnatal maternal anxiety at 8 weeks, caused children's emotional problems at 6 years, however this was only significant for boys. Despite this finding, the effect of prenatal anxiety cannot be ruled out (O'Connor et al., 2002).

As shown earlier, children of depressed or anxious mothers show poorer cognitive development (Rogers et al., 2020; Campbell et al., 2007). Eisenberg & Morris (2002) demonstrate that among other things, their cognitive development is a salient aspect concerning their development of ER, which is an important role in children's everyday social functioning (Compas et al., 2017). There is a theoretical implicit connection between a child's cognitive development and the development of ER, as an outcome of their mother's depression or anxiety. Therefore, one may convey that a child's poor cognitive skills might predict inadequate emotion regulation. Further, Wu, Feng, Gerhart & Wang (2019) state that depressed mothers show an insufficient emotion regulation themselves. No such information regarding mothers with anxiety were found, but one may draw a similar conclusion because of the connections and comorbidity between depression and anxiety. As claimed earlier, parents are referred to children's "accurate estimators" with regard to their development

(Molina & Bulgarelli, 2012), which then can explain children's struggles with managing their emotions as their own mother shows deficits in their own emotion regulation.

2.2 Emotional Regulation

Attachment builds a relation where the child evolves a systematic behavioral system which will, later in life, influence the child's relationship with others and in different circumstances (Bowlby, 1997). Through the report to the World Health Organization, "Maternal Care and Mental Health", J. Bowlby stated that attention was to be brought to children and their development, and its need of a steady and secure relationship with its mother or caregiver. In order to facilitate the child's development, the child needs a dependable caregiver, which again creates a secure base for the child to explore and learn (Bowlby & Ainsworth, 1951). This was the start of his work towards Bowlby's attachment theory where he emphasizes the significance of a stable and safe environment during the child's early years. His attachment theory concerns the child and its development towards a closeness to another person, typically the mother, and forms a type of attachment. This theory is connected to the general development of children, including emotion regulation. However, as we will discover subsequently, the attachment theory is a central part of a child's emotional regulation (Morris et al., 2007). N. Eisenberg is a well-recognized researcher within the field of emotional regulation with her many peer reviewed studies regarding the socialization of ER. She, and her colleagues, have contributed to an enormous amount of publications to the ER field. The aim of her work, among many, has been to look into parents' reaction to their children's experience and expression of emotion, as well as the relations of regulation and emotionality to problem behavior in elementary school (Eisenberg, Cumberland & Spinrad, 1998; Eisenberg & Fabes, 1994; Eisenberg & Morris, 2002).

2.2.1 Definition

Over the years, the term emotion regulation and its definition has been widely debated, and numerous researchers have provided the theoretical field with their own interpretations. First of all, we would like to establish the term *emotion*, before moving on to the more complex phenomenon, emotion regulation. Broadly speaking, emotions aid as fundamental functions to our communication and ways of expressions, and additionally contributes to adaptive functioning (Thompson, 1990). Cole, Martin & Dennis (2004) explain emotion as "[...] a kind of radar and rapid response-system, constructing, carrying, meaning

across the flow of experience. Emotions are the tools by which we appraise experience and prepare to act on situations." (p. 319). It can therefore be seen as a singular reaction to the individual human experience, towards a surrounding event, which means that the individual is simply assessing a situation and preparing a course of action. Simply put, emotions and emotional response can therefore be seen as an independent process, that includes the offer of being orientated, poised or inclined toward action. It is also referred to as a product and a process of social relationship (Cole, et al., 2004). Further, emotion regulation is a more complex and discussed construct. ER has often been defined as the ability to initiate, maintain, and modulate emotional change of state in order to accomplish individual goals and facilitate adaptation to the social environment (Thompson, 1994; Feng et al., 2008). Cole et al., (2004) refer to ER as changes linked with triggered emotions, which include changes in the emotions itself or in other psychological processes. It is not defined by the only triggered emotion itself, but ER is referred to the systematic changes linked to that specific triggered emotion. Although, it is important to establish that even though two people show a different level of an emotion, for instance, anger, there is no foundation to determine that the person with the highest level of anger has a lower emotional competence. It simply shows that different levels of anger, does not show different ways of regulating their emotions. ER balances the demonstration and strength of emotions, and it involves what Thompson (1990) calls *emotional tone*, the emotion experienced, and *emotional dynamics*, its duration and severity. Lastly, ER involves both internal and external processes, whereas internal processes contain emotional cognitions, attention shifting and the ability of physiological responses. External processes, on the other hand, refers to parents or others, who support or model emotions (Morris et al., 2007), and for children, a substantial part of ER occurs through the external processes (Thompson, 1994). As they evolve, their dependency on their parents regarding their own ER, often redirects towards their peers (Eisenberg & Morris, 2002).

2.2.2 Contextual Predictors of The Development of Emotion Regulation

The social aspect of ER is an important construct as regards to the child's development of ER, which means that parents or caregiver is the main person accountable for the child's progression. Morris et al., (2007) have developed a model called *Tripartite Model of the Impact of the Family on Children's Emotion Regulation and Adjustment* which explains the process of the familial socialization of ER, the role of characteristics from parent and child in the socialization of ER, and the reciprocal effects of these processes and characteristics in general. In this model the child's socialization of ER arises through three processes:

observation/modeling, parenting practices and the emotional climate of the family, which will be presented in the following sections. Within the emotional climate of the family, parenting style is included, but differentiated from parenting practices. Parenting practices are regarded as certain parental behaviors, and parenting style as parents' attitudes toward their child. During the children's first years, they learn about ER first through observation and modeling, which have been described as an essential instrument where they learn necessary behavior features (Bandura, 1977). Children observe their parents' display of emotion and their emotional interplay, which in turn influence their ER (Parke, 1994). The Tripartite model proposes that children learn, implicitly, which emotions are tolerable or not, and how to control these emotions, through their parent's emotional foundation. It is therefore important to remember that parents are role models for their children as to how they react in certain situations (Denham, Mitchell-Copeland, Strandberg, Auerbach & Blair, 1997), which is also referred to as social referencing (Sarni, Mumme & Campos, 1998). For instance, if parents often get irritated or angry when encountering emotional resistance, children may observe and model such behavior and therefore develop the inappropriate way of handling frustrated settings. Parents' way of showing emotions and their emotional range may affect the child's observation and modeling. A practical example could be if a parent only shows few emotions to certain situations that require a broader range of emotions, children may not learn which emotions would be most suitable across situations. In addition, Parke (1994) has established evidence that children model parents' ER strategies. This can be seen with children of depressed mothers. They have a restricted range of ER strategies, and the strategies they use are not as effective compared to children of non-depressed mothers' strategies (Silk, Shaw, Skuban, Oland & Kovacs, 2006).

In addition to observation and modeling, parents' practices and behaviors are considered an important role in children's ER. Gottman, Katz & Hooven (1997) have examined how parenting practices are connected to children's ER. They use the term emotion-coaching, which involves a typical parental behavior such as: awareness of their child's emotions, look at emotions as a teaching opportunity as they help with emotional labeling and problem-solving, validation and sensitivity toward the child's emotion. Speaking of teaching opportunities, parents may intentionally teach ER strategies. For example, parents can come with suggestions when children are experiencing a negative emotion, such as "count to 10", "think about something else/nice" (Morris et al., 2007). In contradiction to emotion-coaching, Gottman et al. (1997) introduce emotion-dismissing parenting. This type of parenting involves an absent behavior towards emotional expression and who also tends to

ignore others emotional expressivity. Parents' practices also involve their reactions to emotions, which we have formerly addressed. These reactions are crucial as to children's own ER development. Eisenberg et al. (1998) have provided evidence that negative parental response to children's emotions, teaches children to abstain from negative emotions, rather than acknowledging how to express them. Negative emotions, like positive ones, are important to learn how to express appropriately. In addition, negative parental responses to children's emotion are associated with ER difficulties, as well as reduced social functioning (Eisenberg et al., 1998).

Lastly, children learn about ER through the emotional climate of the family. The emotional climate of the family can be explained as the family dynamics and the relationship quality within the family. Morris et al. (2007) describes four significant elements of the emotional environment that influences the development of ER: "[...] the overall predictability and emotional stability of the environment; parental expectations and maturity demands; the degree of positive emotionality expressed in the family; and the degree of negative emotionality expressed in the family." (p. 369). Moreover, parent-child attachment is intertwined with the emotional climate within the family, and it is during the child's first year that this attachment concept is partially accountable for children's ER development (Morris et al., 2007). It has been claimed that early attachments lay a foundation for later ER development (Gilliom, Shawn, Beck, Schonberg & Lukon, 2002; Bowlby, 1997). As mentioned earlier, parenting style is included in the emotional climate of the family in this model. Darling & Steinberg (1993) explain that in order to establish what an emotional climate of the family concerns, parenting styles such as attitudes and behaviors toward children must be taken into consideration. There are various studies regarding how different parenting styles are connected to children's ER development. Network (2004) conducted a longitudinal study where mothers' depressive symptoms and their absence of susceptibility and stimulation towards their child, exerted negative consequences to the child's ER development.

Remarkably, both children and families reciprocally have an impact on one another throughout the development of ER, as children's ER and familial influences are bidirectional processes that intertwine. Morris et al., (2007) claim that parental traits, such as parental reactivity and ER, mental health and familial history, are the foundation as to what the child observes. Additionally, it exerts influence on their upbringing, the emotional environment of the family, as well as their child attributes. It is important to emphasize the fact that children themselves own character traits which can influence their ability to regulate their emotions,

and some of these traits may be inherited from parents or family (Eisenberg & Morris, 2002). For instance, a child's vulnerability to the exposure of negative emotions may lead to a higher risk of evolving ER difficulties when the environment around is considered to be negative (Morris et al., 2007).

2.3 Academic Functioning

What contributes to children's academic function has been, and still is, the main focus of attention for myriad researchers. Among many findings, children's family environment and level of support, stand as one of the main contributions to children's academic success (Wentzel, 1999). There is a growing awareness around these contributions, withal in mind, our focus in this theoretical chapter will lay on mothers' influence, the cognitive aspect in context of academic functioning and children's ER skills.

2.3.1 The Familial Context

Earlier, we have established that the familial context, especially the influence of mothers, is important when it comes to the child's development (Morris et al., 2007). As mentioned, symptoms of maternal depression could be, amidst numerous, lack of energy, tiredness, little (neglectful and distant) participation with their children, less vocal with fewer explanations, suggestions and questions (Herrera, Reissland & Shepherd, 2004). Symptoms of maternal anxiety, on the other hand, could be lack of sensitivity and over-control towards their child, which can consequently lead the child to become less independent (Nicol-Harper, Harvey & Stein, 2007; Whaley, Pinto & Sigma, 1999). Alongside their depressive symptoms, mothers have a tendency to contribute less with both emotional and instrumental support as children cope with academic tasks. In addition, anxious mothers have a tendency to interact with their children in a more controlling way and display significantly less warmth and positivity (Herrera, Reissland & Shepherd, 2004; Whaley, Pinto & Sigma, 1999), which in turn can be associated with poor academic functioning. In addition to children's poorer academic functioning, studies show that their cognitive development is interfered as a result of maternal depression and anxiety (Campbell et al., 2007; Rogers et al., 2020), which can lead to their reduced academic success. An ongoing topic surrounding maternal depression and anxiety is its intensity and timing. Campbell et al. (2007) found that children of mothers who reported moderate symptoms of depression that steadily increased throughout the child's first year at school, performed worse academically. Children of mothers that reported

moderate, stable or sporadic symptoms, on the other hand, did not show fewer academic skills compared to children of mothers that never reported an expansion of depressive symptoms, indicating that the intensity and timing of mother's depression are of importance. Further, Rogers et al. (2020) refers to different studies that emphasize that both perinatal depression and anxiety are associated with child's cognitive deficits, for instance reduced academic performance, intelligence, executive functioning and memory. In conjunction with this matter, children at school are in need of extra support and encouragement from their mother, and an increase of mother's depressive symptoms and anxiety may complicate this period (Campbell et al., 2007).

2.3.2 Academic Functioning in conjunction with ER

There is a growing perception that emotional factors are of importance to children's academic functioning (Wentzel, 1999). The persistence and capacity to focus on a school-relevant task and more generally to perform academically, has shown to be dependent on the child's ER, in the sense of cognitive functioning (Gumora & Arsenio, 2002). It is therefore a bridge between children's ability to direct and control their emotions, and to how they perform academically. Other studies point out that children's ER skills are in fact essential for successful academic achievement (Eisenberg & Morris, 2002; Grolnick & Kurowski, 1999). Moreover, MacCann et al. (2020) state that if children perform better academically, their self-confidence could improve, along with their social and emotional development as well as a heightened expectation for social skills and ER. In addition, high academic success may function as a security web for children's future. On the other hand, low academic success may throw a spanner in the works of the child's social and emotional development. Complimentary, it may function as a barricade for future education, as well as goals and hopes. In spite of this, reality is complex and academic and emotional development are closely intertwined, especially during the child's years in school (MacCann et al., 2020).

Before we end this theoretical chapter, there is still, to our knowledge, an existing gap of research when it comes to emotion regulation and its direct effect on academic performance of school-aged children. As shown, ER is an essential skill for academic success, but to what degree has not yet been established.

3.0 The Current Study

In the following chapter, the research method will be presented and discussed. Our aim was to investigate whether maternal depression and, or anxiety predict young children's emotion regulation and consequently their school functioning, over a period of six years. As mentioned, we hypothesized cross-sectional relationships between maternal mental health, child's emotional regulation and their academic achievement; maternal mental health affects both the child's emotional regulation and academic development over time; the child's emotional regulation predicts weaker academic success over time; and also, that mothers' mental health issues affect the child's academic achievement through a weakened emotional regulation. Further, we will look into longitudinal study, its weaknesses and strengths as a method. The model used to explore our hypothesis is structural equation modelling (SEM), which gives us the opportunity to determine relationships among the observed variables. We will then evaluate reliability and validity and discuss how it impacts the study. Finally, our main findings will be presented, as well as its implications.

3.1 Longitudinal Study

Quantitative research is a scientific method which includes both experiments and other systematic methods that focuses on control and quantifies measures of performance (Proctor & Capalidi, 2006, cited in Hoy, 2010). Two keywords, *measurements* and *statistics*, are closely associated with the quantitative research method. Within this research method, longitudinal designs could be used to explore change and stability over time. It is characterized by measuring identical or comparable variables on many occasions at different times (Field, 2018; Ringdal, 2018). It has been declared that a longitudinal study resembles a "dynamic movie", compared to a "still image" (Ringdal, 2018). The design is also referred to as panel studies, cohort studies or follow-up studies. We can separate between prospective and retrospective longitudinal designs, whereas a prospective approach starts to observe at a specific time and follows the observation unit forwards in time. A retrospective approach, on the other hand, collects data ahead of the first point of observation, and can often ask questions about the past (e.g., "How many times a week do you help your child with homework?", "When was the last time you felt miserable?" etc.) (Skog, 2004). This study utilizes a prospective approach, with three stages of collected data.

There are several advantages of using a longitudinal research design, whereas one of them is the possibility to explore and enlighten the connections between multiple social phenomena over a broad spectrum of time. Another advantage is the fact that a longitudinal

study gives the opportunity to look at the growth and changes within the group, but also at the individual level. Longitudinal design has also the benefit of approaching questions and hypotheses regarding reciprocal causality, with a chance of enlightening the truth in a credible way. This because the time sequence between variables can be determined unambiguously, at least for the limited time period. Is it so that X can affect Y, or the other way around, or is it a reciprocally impact between the variables? (Skog, 2004; Ringdal, 2018).

As we know, different designs have different limitations. One of the limitations within a prospective longitudinal research design is connected to one of the advantages, multiple observations over several points of time. The limitation is connected to the fact that, over time, the respondents can drop-out, which will leave missing data. Regardless, this is a common challenge in longitudinal studies. The problem comes to light when we have irregular amounts of dropouts, distributed over several points of time when collecting data. This could easily lead to skewness in the result. Nevertheless, if the dropouts are evenly divided, it may not necessarily have a severe impact on the result of the study (Skog, 2004). Even though longitudinal design has a number of advantages and also some severe limitations, the main limitation is perhaps the demanding temporal work. To produce a trustworthy longitudinal study takes multiple years, both to collect and construct data.

In the current study, a longitudinal research method was necessary. The effects of maternal depression and anxiety, that the child may experience, can come gradually and therefore, longitudinal research was utilized with data collected from the TESS research group. TESS contributes to the theoretical field as a longitudinal community study of mental health difficulties in children, which provides essential findings. They have retrieved information on various variables such as social skills, self-esteem, parents' mental health and language development etc. (Steinsbekk & Wichstrøm, 2018). Among these, our study will employ mother's depressive symptoms and anxiety, the child's ER and academic achievement. The different variables obtained data reported from different sources, whereas mothers' depressive symptoms and anxiety and child's ER are reported from the mother or the parent itself, while academic performance is reported from the teacher.

3.2 Structural Equation Modeling

Structural Equation Modeling (SEM) is a widely used statistical technique for investigating the plausibility of theoretical models that might explain their interrelations among a set of variables. It represents a series of hypotheses about how the different variables in the analysis are generated and related (Hu & Bentler, 1999). It is mainly used to confirm

rather than explore different models and determine whether a specific model is valid. Further, SEM provides the opportunity to combine multiple regression and factor analysis procedures into a single method (Bentler, 1995). According to Novikova, Richman, Superkar, Bernard-Brak & Hall (2013), there are three great advantages of using SEM, whereas one of them is the possibility to explicitly evaluate measurement error. Additionally, it makes it possible to estimate the latent and unobserved variables through the observed variables, and lastly SEM is a technique which involves model testing where a structure can be imposed and evaluated to fit the data. Another advantage of this technique is that it makes it easier to study a large number of independent, mediator and dependent factors, while examining their direct and indirect relations (Burkholder & Harlow, 2003).

In the current study, we defined a cross-lagged model with auto-regressed repeated measures at ages 8, 10, 12 and 14 in Mplus 8.1 (Muthén & Muthén, 1998-2017) in order to test potential bi-directional effects of maternal depression and anxiety, children's emotion regulation and academic performance. Burkholder & Harlow (2003) describe this as a commonly used SEM-analysis for longitudinal design, which analyzes information for each variable assessed at each time point. When using cross-lagged analysis we are primarily interested in examining the causal influences between variables. It compares the relationship between variable X at time 1 and variable Y at time 2 with the relationship between variable Y at time 1 and X at time 2, which makes it possible to investigate the stability and relationships between variables over time (Kearney, 2017).

Despite the fact that SEM is a highly validated statistical technique with numerous advantages, it can involve certain uncertainties, regarding processes both before and during the analysis (Bentler, 1995). For this reason, it is necessary to be able to make essential choices with regards to achieving the best possible result, in addition to a high degree of reliability and validity. This section is followed by a more detailed chapter about reliability and validity. When conducting a longitudinal SEM approach, there are several approaches for studying reciprocal influence, and in this study the random intercepts cross-lagged panel model (RI-CLPM) was utilized. RI-CLPM as proposed by Hamaker, Kuiper & Grasman (2015) is a model that decomposes each observed score into a between-person part and a within-person part. It makes an attempt to extricate the within-person process from stable between-person differences. In addition, the model accounts for temporal stability, time-invariant and trait-like stability through the incorporation of a random intercept.

3.3 Reliability and Validity of Measures in the Current Study

Reliability and validity are features that can be used to assess the quality of a measure, for instance how the presence of maternal depressive symptoms and anxiety are evaluated. In order to ensure that measurement-error is as limited as possible, reliability and validity are two important aspects. Firstly, reliability involves to which extent a measuring instrument provides the same result, regardless of dissimilar time periods (Field, 2018; Ringdal, 2018). There are different techniques in order to estimate the reliability, but the most common are internal consistency, whereas Cronbach's alpha is frequently utilized (Field, 2018). In addition, test-retest reliability is also a technique which measures the stability of scores across time by testing the same group of people twice. If the scores are consistent at both test periods, the instrument is reliable (Mollica, Wyshak, Demarneffe, Khuon & Lavelle, 1987; Field, 2018). Interrater reliability, on the other hand, refers to the extent to which two or more individuals (observers) agree, and addresses the matter of the implementation of a rating system (Lange, 2011). In the following sections we will look at three chosen measurements employed in this current study: HSCL, ERC and TRF.

The Hopkins Symptoms Checklist (HSCL) is a well acknowledged and commonly used screening instrument, established in the 1950s. Parloff, Cellman & Frank, from John Hopkins University, established HSCL in order to measure change in the clinical status of psychotherapy patience. Further, one of the developers and colleagues have established that a 25-item version of the HSCL (HSCL- 25) is useful when it comes to family practice, family planning and familial settings. The HSCL-25 uses 10 items from the HSCL-58 anxiety cluster and 13 items from the depression cluster, additionally two somatic symptoms. Examples of items included from the anxiety-cluster include statements like: "being suddenly scared for no reason", "trembling", "hard pounding and raising" etc. From the depression-cluster, on the other hand: "feeling low in energy", "crying easily", "feeling no interest in things" etc. Lastly, examples of somatic symptoms: "poor appetite" and "difficulty falling asleep or staying asleep" (Mollica et al., 1987, p. 498). Respondents are directed to rate these statements with one of four categories (*not at all, a little, quite a bit* or *extremely*). The HSCL-25 has been proven to be a highly validated and reliable screening instrument. As this instrument has been translated to other languages, it was assessed for test-retest reliability and interrater reliability. The results from the test-retest reliability, for three language groups combined, the total score was 0.89, and 0.82 for anxiety and depression. Mollica et al. (1987) refers to other test-retest evaluations of the HSCL, and comparably, they are consistent. Additionally, the interrater

reliability, in total (including both anxiety and depression, and the three language groups) was higher than 0.98.

The Emotional Regulation Checklist (ERC) was conducted to measure the child's ER and is a 24-item checklist. It is created as a purpose of disclosing information about how children regulate their emotions and more generally their emotional expression reported from parents. ERC consists of two subscales: Emotion Regulation (ER) and Emotional Lability/Negativity (L/N). The subscale L/N consist of items which represent lack of flexibility, mood lability, and dysregulated negative affect. For example, items included phrases such as "Exhibits wide mood swings", and "Is prone to angry outburst". The Emotion Regulation subscale, on the other hand, includes items reporting situationally appropriate affective displays, empathy, and emotional self-awareness. Examples of items included in the ER subscale: "Is empathic toward others", and "Can say when s/he is feeling sad, angry or mad, fearful or afraid" (Shields & Cicchetti, 1997, p. 910). Shields & Cicchetti (1997) further explains how the checklist is rated on a 4-point Likert scale, and includes both negatively- and positively weighted items. The respondents rate each item on the scale from 1 (*never*) to 4 (*almost always*). Both of the subscales, ER and L/N have shown to be sufficient (ER a = .83; L/N a = .96) regarding its internal consistency, and they are significantly correlated ($r = -.50$, $p < .001$). In addition to the separate internal consistency of the two subscales, Shields & Cicchetti (1997) conducted a composite ERC score. This because a single emotion regulation criterion measure was necessary to confirm the factor analysis, and it was essential that the composite ERC seized the processes of both regulation and dysregulation. Overall, the internal consistency of the composite ERC landed on a=.89 (Shields & Cicchetti, 1997).

The Teacher Report Form (TRF) is incorporated in The Achenbach System of Empirically Based Assessment (ASEBA). It assesses children's (ages of 6-18) competence, adaptive functioning and their social, emotional and behavioral problems. ASEBA was established by Achenbach & Edelbroch back in 1986 and has since then been an influence towards the TRF used today. The current version of TRF was established in 2001 and is commonly used in Norway, as well as other countries like the USA among other 70 countries. It is applied in clinical work as well as research, and is a thoroughly developed, validated and standardized instrument (Kornør & Drugli, 2011). Items used in the form are carefully selected to map academic functioning, adaptation and problem areas of children in a school-related age. Test-specific training is required, as well as specific occupational titles or a certain level of relevant education (e. g. pedagogue, psychologist or medical education) to administer and score TRF. The teacher who reports must take into account the student's

functioning during the last two months regarding the child's performance in three school subjects: reading proficiency, writing proficiency and mathematical proficiency. The first items contain information regarding demographics, followed by 120 specific problem-related questions and three open-ended questions which shall provide information about the student's academic functioning and adaptation at school. For instance, items included statements such as: “Poor school work”, “Difficulty following directions”, “Fails to finish task” and “Can’t concentrate” (Ivanova et al., 2007). The questions have three options: 0 = not true, 1 = somewhat or sometimes true, 2 = very true or often true. An average of the student's level in different subjects is calculated. Each subject is scored on a scale from 1-5: 1 (*far below grade*), 2 (*somewhat below grade*), 3 (*at grade level*), 4 (*somewhat above grade*) or 5 (*far above grade*). The students' proficiency in the three different subjects is compared with an average performance in the class, and consequently a total average score is calculated. Among the studies Kornør & Drugli (2011) reviewed, the Cronbach’s alpha ranged from 0.84 to 0.97, but data for criterion validity and test-retest reliability were not reported in any of the studies.

Overall, the used measurements HSCL and ERC have high internal consistency when it comes to both interrater reliability and test-retest reliability, ranging from .82 to .96 (Shields & Cicchetti, 1997; Mollica et al., 1997). To our knowledge, TRF did not have any data regarding test-retest reliability, but its internal consistency showed to be satisfactory (Kornør & Drugli, 2011). In addition, it is important to be cautious as to who is responding to the questionnaire, regarding to what extent the result is depending on the respondent (Kleven & Hjardemaal, 2018). As shown, HSCL and ERC are answered from the parent, and TRF by the teacher. In order to strengthen the reliability, there should be several people, for example the parent or teacher and the child itself, to outline the situation. Regarding ERC and TRF, children who are being measured are at a young age, which can be an argument as to why they cannot answer for themselves because of the lack of self-insight. Therefore, the parent or teacher, who observes them daily, could make a good description of the children's ER or academic functioning, and thus increase the reliability. Moreover, a general source criticism was taken into account, which Ringdal (2018) refers to as important when assessing reliability, for instance assessing how data was collected.

Higher levels of reliability are a prerequisite of high validity (Field, 2018). Skog (2004) compares the term validity as a research pitfall, or rather the ability to avoid pitfalls. High validity expresses that one actually measures what it is designed to measure (Ringdal, 2018; Field, 2018). Oppose to reliability, which can be looked at as an empirical question,

validity demands a theoretical assessment as well (Ringdal, 2018). There are different types of validity that have to be taken into account: construct validity, statistical conclusion validity, internal validity and external validity. These four types of validity will be discussed in the context of this study.

3.3.1 Construct Validity

Construct validity refers to whether the theoretical term that we aim to measure, is actually being measured, in a sufficient and reliable way. While reliability involves the measured indicators and its qualities, construct validity revolves around the relation between the indicators and the theoretical term (Skog, 2004). When constructing an indicator in conjunction with the theoretical field, Ringdal (2018) explains the difficulty to preserve the full theoretical aspect when constructing, which often results in a limitation in the theoretical term. This as a result to make the term empirical manageable. Therefore, it is important to keep in mind that each instrument (ERC, HSCL, TRF) can be affected by this reduction. One often speaks of systematic measurement errors and random measurement errors, when discussing construct validity (Kleven & Hjardemaal, 2018). Systematic measurement and random measurement errors could be the result of the inconsistency between the true and observed variable value. Random measurement errors will provide different results in a measurement compared to the next and cannot be abolished. For example, random errors could arise from the respondent's current state of mind, mood, ability to concentration etc. Random measurements errors have its way of sneaking into the study, thus, inescapable. Therefore, we cannot claim that HSCL, ERC and TRF do not contain such errors. With systematic measurement errors, the theoretical term may be, to a degree, affected by skewness as a result of the operationalization. Systematic measurement errors can also arise because of memory loss, the respondent misinterprets the question or has consciously or unconsciously a desire to appear in a positive way, therefore exaggerate or do the opposite (Skog, 2004). Podsakoff, MacKenzie, Lee & Podsakoff (2003) refer to the respondent's tendency to present themselves in a favorable light as a social desirability bias. HSCL is reported by the parent itself and social desirability could therefore be a potential bias. In this case, the mother could rate herself in a more positive way, a desire to camouflage the actual truth. ERC is also reported by the parent, which can create a bias such as the parent wanting to evaluate the child in a positive light or does not want to see the severeness of the situation. TRF, which is reported by the teacher, can also contain systematic measurement errors. For instance, a teacher could assess the student's academic performances in a way that benefits herself and

her teaching practice. Nevertheless, all of the instruments mentioned above, have proven to be validated, and therefore the assignment will not discuss this further (Mollica et al., 1987; Shields & Cicchetti, 1997; Kornør & Drugli, 2011).

3.3.2 Statistical Conclusion Validity

The statistical conclusion validity refers to whether a tendency is substantial enough to be worthy of an interpretation. It revolves around the question regarding if there is a correlation or not, and how reliable a conclusion is (Kleven, 2008). The appropriate and most commonly statistical tests are significant test and effect size. Sullivan & Feinn (2012) explain statistical significance as the likelihood that the observed difference between two different groups, is due to coincidence. This involves that if the *P* value is greater than the chosen alpha level, the difference found is assumed to be explained by sampling variability. However, there are some weaknesses using only significant tests. For instance, statistical differences are almost unavoidable when working with a large sample. Effect size, contrary, is the "magnitude of the difference between groups" (Sullivan & Feinn, 2012, p. 279). The absolute effect size is the dissimilarity in the mean and outcomes in two different groups. Both of these values are important to one's studies because it informs the reader whether an effect exists and the magnitude of this effect.

3.3.3 Internal Validity

Internal validity is explained as the relationship between variables, and good internal validity concerns whether one can trust the interpretation which is presented. The main goal of internal validity is to evaluate the probability of, and exclude alternative causal interpretation (Kleven, 2008). One might find a positive correlation between two variables, but that itself is not a credible evidence to determine a causation (Kleven & Hjardemaal, 2018). In the current study, cross-sectional findings between mothers' depressive symptoms and anxiety, the child's ER and academic functioning is found. In addition, a longitudinal design was utilized in order to look at the relations between mothers' depressive symptoms and anxiety, child's ER and their academic functioning over a six-year period. It is important to be critical to one's own findings, and as to how this longitudinal result can be reliable. First and foremost, when using a longitudinal design, which scrutinizes relations over time, it increases the probability to get a result which is not affected by serendipity at the time of measurement. Further, the statistical technique used in this study, SEM is considered to be

exceptional when it comes to examining the relations between latent variables over a certain period of time. In addition, the statistical approach is an analysis considered with less bias and more flexibility in modeling, thus providing the technique with advantages regarding testing complex theoretical structures (Burkholder & Harlow, 2003).

3.3.4 External Validity

Finally, external validity regards the validity of the results, and can be explained through two questions: "To whom are the results valid for?" and "In which situations are the results valid in?" (Kleven & Hjardemaal, 2018, p. 133). In the current study, the children participating, were born in either 2003 or 2004, with their parents living in Trondheim, Norway. All who met these criteria, were invited to participate in the study. To increase statistical power, children with emotional and behavior problems were overrepresented; participants were distributed to four strata on the report of their EDQ scores (Steinsbekk & Wichstrøm, 2018). This resulted in a subsample of 1,250 participants. Based on this subsample, 997 participated the first time of measurement (T1) (See Attachment 1; Steinsbekk & Wichstrøm, 2018, for further information about the recruiting process). Because of the systematic recruiting process, it qualifies as a stratified sample which is one of several sampling methods, subordinate to a probability sample. This provides the opportunity for statistical generalization (Kleven & Hjardemaal, 2018). In the present study, the results could be generalized to all children born in 2003 or 2004 in Trondheim. Nevertheless, a desire is to generalize to the whole population. There will always be circumstances that can interfere with the possibility to generalize further. For instance, we can imagine that the geographics play an important role in transferability. More specifically explained, children born in 2003 and 2004, living in Trondheim, may be dissimilar to other children in regard to both *when* they were born, and *where* they live. The social environment can affect the child's upbringing, which can differ across cities in Norway. Additionally, this research project may affect the children participating, and therefore interfere with their character and how they appear. Despite the fact that generalization is challenging and sometimes unattainable, this study, in addition to being supported by other researchers, has a large population sample, which gives great evidence towards a generalization of the population in Norway.

3.4 Main findings

In the current study we have tried to investigate the interaction between the three phenomena; maternal mental health, children's ER and academic achievement over time. In addition, we look at the impact maternal depression or anxiety have on a child's development, hence ER and academic success, over time. The findings showed that there were cross-sectional relationships between maternal mental health, child's emotional regulation and their academic achievement, which concurred with our first hypothesis (1). Further, we hypothesized that (2) maternal mental health affects the child's emotional regulation development over time, which stands in contrast to our findings. In addition, our hypothesis that maternal mental health did affect the child's academic development from age 8 - 14 (3), showed to be accurate regarding maternal anxiety, but not maternal depression. Alongside, we hypothesized that (4) the child's emotional regulation predicted weaker academic success over time, which, through this study, lacks evidence of. Finally, our study did not reveal that (5) mothers' mental health issues affected the child's academic achievement through a weakened emotional regulation.

3.5 Implications

Through a general perspective, there are numerous implications of the current study. Foremost, the current study showed that maternal depression and anxiety affect the child's ER and academic functioning through cross sectional analysis. In addition, this study has illustrated the substantial effect maternal anxiety has on children's academic development through a period of six years. To our knowledge, these findings are the first to show this association between maternal anxiety and the child's weakened academic performance from the ages 8 - 14, using a large population sample. Thus, the work of this study will provide a realistic and accurate description and contribute to the research that focuses on maternal mental health and child development.

Furthermore, the current study emphasizes the importance of a steady and secure familial environment in order to achieve optimal academically. Bowlby & Ainsworth (1951) emphasizes this as well when conveying that the child's development depends on a secure and stable caregiver during childhood. This shows continuity in the fact that the familial environment impacts the child's development over a great period of time. In addition, the current study presents findings that underline the importance of working towards good maternal mental health in the goal of working preventively regarding children's academic development. There has been continuous working towards an elevated teacher education in

order to increase the child's academic success, but a stable familial environment has shown to be vital and should therefore be paid attention to.

Through a special education perspective, this study provides relevant findings to the special education field. For instance, findings accentuate the importance of paying attention to the child's familial environment in order to help the child with academic struggles. Often, in situations where children do not perform optimally during academic tasks, it only concentrates on the child's deficits and to lesser extent the familial context. This underlines the importance of having a good school-home collaboration, which is characterized by honesty and transparency, and provides the teacher knowledge about the child's familial environment in order to help academically. Furthermore, in the work of identifying and helping children who struggle academically, knowing how important the familial context is toward a child's academic development may make it easier to establish the reason towards the child's struggles. In addition, the faster one acknowledges the child's struggles and its reason, the faster one can insert necessary instances in form of pedagogue support, which plays an essential role in Norwegian schools and refers to as *early intervention*.

References

Bandura, A. (1977). Social learning theory. Englewood Cliffs, NJ: Prentice-Hall

Batenburg-Eddes, T., Brion, M., Henrichs, J., Jaddoe, V., Hofman, A., Verhulst, F., . . . Tiemeier, H. (2013). Parental depressive and anxiety symptoms during pregnancy and attention problems in children: A cross-cohort consistency study. *Journal of Child Psychology and Psychiatry, 54*(5), 591-600. https://doi.org/10.1111/jcpp.12023

Bentler, P. M. (1995). *EQS structural equations program manual* (Vol. 6). Encino, CA: Multivariate software.

Bowlby, J. (1997). *Attachment and loss : Vol. 1 : Attachment* (Vol. 254, Pimlico). London: Pimlico.

Bowlby, J. & Ainsworth, M. D. S. (1951). *Maternal care and mental health* (Vol. 2). Geneva: World Health Organization

Burkholder, G. J. & Harlow, L. L. (2003). An Illustration of a Longitudinal Cross-Lagged Design for Larger Structural Equation Models. *Structural Equation Modeling*, *10*(3), 465–486. https://doi.org/10.1207/S15328007SEM1003_8

Campbell, S. B., Matestic, P., Von Stauffenberg, C., Mohan, R. & Kirchner, T. (2007). Trajectories of Maternal Depressive Symptoms, Maternal Sensitivity, and Children's Functioning at School Entry. *Developmental Psychology,43*(5), 1202-1215. https://doi.org/10.1037/0012-1649.43.5.1202

Cole, P. M., Martin, S. E. & Dennis, T. A. (2004). Emotion Regulation as a Scientific Construct: Methodological Challenges and Directions for Child Development Research. *Child Development, 75*(2), 317-333. https://doi.org/10.1111/j.1467-8624.2004.00673.x

Comaskey, B., Roos, N. P., Brownell, M., Enns, M. W., Chateau, D., Ruth, C. A. & Ekuma, O. (2017). Maternal depression and anxiety disorders (MDAD) and child development: A Manitoba population-based study. *Plos One, 12*(5), 0177065. https://doi.org/10.1371/journal.pone.0177065

Compas, B. E., Jaser, S. S., Bettis, A. H., Watson, K. H., Gruhn, M. A., Dunbar, J. P., Thigpen, J. C.(2017). Coping, Emotion Regulation, and Psychopathology in Childhood and Adolescence: A Meta-analysis and Narrative Review. *Psychological Bulletin*, *143*(9), 939-991.https://doi.org/10.1037/bul0000110

Cummings, E. M. & Davies, P. T. (1994). Maternal depression and child development. *Journal of Child Psychology and Psychiatry*, *35*(1), 73–112.

https://doi.org/10.1111/j.1469-7610.1994.tb01133.x

Darling, N. & Steinberg, L. (1993). Parenting style as context: An integrative model. *Psychological Bulletin,113*(3), 487. https://doi.org/10.1037/0033-2909.113.3.487

Dawson, G., Ashman, S.B., Panagiotides, H., Hessl, D., Self, J., Yamada, E. & Embry, L. (2003). Preschool Outcomes of Children of Depressed Mothers: Role of Maternal Behavior, Contextual Risk, and Childrens Brain Activity. *Child Development, 74*(4), 1158-1175. https://doi.org/10.1111/1467-8624.00599

Denham, S. A., Mitchell-Copeland, J., Strandberg, K., Auerbach, S. & Blair, K. (1997). Parental contributions to preschoolers' emotional competence: Direct and indirect effects. *Motivation and Emotion*, *21*(1), 65–86. https://doi.org/10.1023/A:1024426431247

Downey, G. & Coyne, J. C. (1990). Children of depressed parents: an integrative review. *Psychological bulletin*, *108*(1), 50. https://doi.org/10.1037/0033-2909.108.1.50

Eisenberg, N. & Fabes, R. (1994). Mothers' Reactions to Children's Negative Emotions: Relations to Children's Temperament and Anger Behavior. *Merrill-Palmer Quarterly, 40*(1), 138-156. Retrieved from http://www.jstor.org/stable/23087912

Eisenberg, N. & Morris, A. S. (2002). Children's emotion-related regulation. In H. Reese & R. Kail (Eds.), *Advances in child development and behavior* (pp. 189–229). San Diego, CA: Academic Press.

Eisenberg, N., Cumberland, A. & Spinrad, T. L. (1998). Parental Socialization of Emotion, *Psychological Inquiry, 9*(4), 241-273. https://doi.org/10.1207/s15327965pli0904_1

Feldman, R., Granat, A., Pariente, C., Kanety, H., Kuint, J. & Gilboa-Schechtman, E. (2009). Maternal depression and anxiety across the postpartum year and infant social engagement, fear regulation, and stress reactivity. *Journal of the American Academy of Child and Adolescent Psychiatry, 48*(9), 919-927. https://doi.org/10.1097/CHI.0b013e3181b21651

Feng, X., Shaw, D. S., Kovacs, M., Lane, T., O'Rourke, F. E. & Alarcon, J. H. (2008). Emotion regulation in preschoolers: The roles of behavioral inhibition, maternal affective behavior, and maternal depression. *Journal of Child Psychology and Psychiatry,49*(2), 132-141. https://doi.org/10.1111/j.1469-7610.2007.01828.x

Field, A. (2017). *Discovering statistics using IBM SPSS Statistics* (5th ed.). Los Angeles: SAGE.

Foster, C. J. E., Garber, J. & Durlak, J. A. (2008). Current and Past Maternal Depression, Maternal Interaction Behaviors, and Children's Externalizing and Internalizing

Symptoms. *Journal of Abnormal Child Psychology, 36*(4), 527-537. https://doi.org/10.1007/s10802-007-9197-1

Gilliom, M., Shaw, D., Beck, J., Schonberg, M. & Lukon, J. (2002). Anger regulation in disadvantaged preschool boys: Strategies, antecedents, and the development of self-control. *Developmental Psychology, 38*(2), 222-235. https://doi.org/10.1037/0012-1649.38.2.222

Gjerde, L. C., Eilertsen, E. M., Eley, T. C., McAdams, T. A., Reichborn-Kjennerud, T., Røysamb, E. & Ystrom, E. (2020). Maternal Perinatal and Concurrent Anxiety and Mental Health Problems in Early Childhood: A Sibling-Comparison Study. *Child Development, 91*(2), 456-470. https://doi.org/10.1111/cdev.13192

Goodman, S., Rouse, M., Connell, A., Broth, M., Hall, C. & Heyward, D. (2011). Maternal Depression and Child Psychopathology: A Meta-Analytic Review. *Clinical Child and Family Psychology Review, 14*(1), 1-27.https://doi.org/10.1007/s10567-010-0080-1

Gottman, J. M., Katz, L. F. & Hooven, C. (1997). *Meta-emotion: How Families Communicate Emotionally*. Mahwah, New Jersey: Lawrence Erlbaum.

Grolnick, W.S. & Kurowski, C.O. (1999). Family processes and the development of children's self-regulation. *Educational Psychologist, 34*(1), 3-14. https://doi.org/10.1207/s15326985ep3401_1

Hamaker, E. L., Kuiper, R. M. & Grasman, R. P. P. P. (2015). A critique of the cross-lagged panel model. *Psychological Methods, 20*(1), 102–116. https://doi.org/10.1037/a0038889

Herrera, E., Reissland, N. & Shepherd, J. (2004). Maternal touch and maternal child-directed speech: Effects of depressed mood in the postnatal period. *Journal of Affective Disorders, 81*(1), 29-39. https://doi.org/10.1016/j.jad.2003.07.001

Hoy, W. K. (2010). *Quantitative research in education: a primer*. California: SAGE Publications

Hu, L. T. & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Ivanova, Masha Y, Achenbach, Thomas M, Rescorla, Leslie A, Dumenci, Levent, Almqvist, Fredrik, Bathiche, Marie, . . . Verhulst, Frank C. (2007). Testing the Teacher's Report Form Syndromes in 20 Societies. *School Psychology Review,36*(3), 468-483. http://dx.doi.org/10.1080/02796015.2007.12087934

Kearney, M. W. (2017). Cross-lagged panel analysis. In M. Allen (Ed.), *The sage*

encyclopedia of communication research methods (Vol. 1, pp. 313-314). SAGE Publications, Inc, https://www.doi.org/10.4135/9781483381411.n117

Kieman, K., & Huerta, M. C. (2008). Economic deprivation, maternal depression, parenting, and children's cognitive and emotional development in early childhood. *British Journal of Sociology*, *59*(4), 783-806. https://doi.org/10.1111/j.1468-4446.2008.00219.x

Kim-Cohen, J., Moffitt, T. E., Taylor. A., Pawlby, S. J. & Caspi, A. (2005). Maternal Depression and Children's Antisocial Behavior: Nature and Nurture Effects. *Arch Gen Psychiatry, 62*(2),173–181. https://doi.org/10.1001/archpsyc.62.2.173

Kleven, T. & Hjardemaal, F. (2018). *Innføring i pedagogisk forskningsmetode : En hjelp til kritisk tolking og vurdering* (3rd Ed.). Bergen: Fagbokforlag.

Kleven, T. A. (2008). Validity and validation in qualitative and quantitative research. *Nordic Studies in Education, 28*(3), 219-233. Retrieved from https://www.idunn.no/np/2008/03/validity_and_validation_in_qualitative_and_quantitative_research

Kopp, C. B. (1989). Regulation of distress and negative emotions: A developmental review. *Developmental Psychology*, *25*(3), 343. http://dx.doi.org/10.1037/0012-1649.25.3.343

Kornør, H. & Drugli, M. B. (2011). Måleegenskaper ved den norske versjonen av Teacher's Report Form (TRF). PsykTestBarn, 1:7. http://dx.doi.org/10.21337/0007

Lange R. T. (2011) Inter-rater Reliability. In: Kreutzer J. S., DeLuca J., Caplan B. (Eds.) Encyclopedia of Clinical Neuropsychology. Springer, New York, NY. https://doi.org/10.1007/978-0-387-79948-3_1203

Løvaas, M. E. S., Sund, A. M., Patras, J., Martinsen, K. D., Hjemdal, O., Neumer, S-P, . . . Reinfjell, T. (2018). Emotion regulation and its relation to symptoms of anxiety and depression in children aged 8–12 years: Does parental gender play a differentiating role? https://doi.org/10.1186/s40359-018-0255-y

MacCann, C., Jiang, Y., Brown, L. E. R., Double, K. S., Bucich, M. & Minbashian, A. (2020). Emotional intelligence predicts academic performance: A meta-analysis. *Psychological Bulletin, 146*(2), 150-186. http://dx.doi.org/10.1037/bul0000219

Mental Health America & Substance Abuse and Mental Health Services Administration. (2008, December.). Maternal Depression. Making a Difference Through Community Actions: A Planning Guide. Retrieved from https://www.mhanational.org/sites/default/files/maternal_depression_guide.pdf

Mistry, R. S., Biesanz, J. C., Taylor, L. C., Burchinal, M. & Cox, M. J. (2004). Family

Income and its Relation to Pre-School Children's Adjustment for Families in the NICHD Study of Early Child Care. *Developmental Psychology 40*(5), 727. https://doi.org/10.1037/0012-1649.40.5.727

Molina, P., & Bulgarelli, D. (2012).The contribution of parents in the evaluation of children's early communication competence. *Today's Children are Tomorrow's Parents*, TCTP (32),21–34.

Mollica, R. F., Wyshak, G., de Marneffe, D., Khuon, F. & Lavelle, J. (1987). Indochinese versions of the Hopkins Symptom Checklist-25: a screening instrument for the psychiatric care of refugees. *The American Journal of Psychiatry, 144*(4), 497–500. https://doi.org/10.1176/ajp.144.4.497

Morris, A. S., Silk, J. S., Steinberg, L., Myers, S. S. & Robinson, L. R. (2007). The Role of the Family Context in the Development of Emotion Regulation. *Social Development (Oxford, England), 16*(2), 361-388. https://doi.org/10.1111/j.1467-9507.2007.00389.x

Muthén, L. K., & Muthén, B. O. (1998-2017). Mplus user´s guide. Eighth Edition. Los Angeles, CA: Muthén & Muthén.

Network, N. E.(2004). Affect dysregulation in the mother-child relationship in the toddler years: Antecedents and consequences. *Development and Psychopathology, 16*(1), 43-68. https://doi.org/10.1017/S0954579404044402

Nicol-Harper, R., Harvey, A. G. & Stein, A. (2007). Interactions between mothers and infants: Impact of maternal anxiety. *Infant Behavior & Development, 30*(1), 161-167. https://doi.org/10.1016/j.infbeh.2006.08.005

Novikova, S. I., Richman, D. M., Supekar, K., Barnard-Brak, L. & Hall, D. (2013). NDAR: A Model Federal System for Secondary Analysis in Developmental Disabilities Research. In R. C. Urbano (Ed.), *Using secondary datasets to understand persons with developmental disabilities and their families* (1st ed., Vol. 45, pp. 123–153). Amsterdam: Elsevier. https://doi.org/10.1016/B978-0-12-407760-7.00003-7

O'Connor, T. G., Heron, J., Golding, J., Beveridge, M. & Glover, V. (2002). Maternal antenatal anxiety and children's behavioural/emotional problems at 4 years: Report from the Avon Longitudinal Study of Parents and Children. *British Journal of Psychiatry, 180*(6), 502-508. https://doi.org/10.1192/bjp.180.6.502

Parke, R. D. (1994). Progress, Paradigms, and Unresolved Problems: A Commentary on Recent Advances in Our Understanding of Children's Emotions. *Merrill-Palmer Quarterly, 40*(1), 157-169. Retrieved from http://www.jstor.org/stable/23087913

Paulson, J. F., Keefe, H. A. & Leiferman, J. A. (2009). Early parental depression and child

language development. *Journal of Child Psychology and Psychiatry, 50*(3), 254-262. https://doi.org/10.1111/j.1469-7610.2008.01973.x

Podsakoff, P. M., MacKenzie, S. B., Lee, Jeong-Yeon & Podsakoff, N. P. (2003). Common Method Biases in Behavioral Research. *Journal of Applied Psychology, 88*(5), 879-903. https://doi.org/10.1037/0021-9010.88.5.879

Ringdal, K. (2018). *Enhet og mangfold : Samfunnsvitenskapelig forskning og kvantitativ metode* (4th ed.). Bergen: Fagbokforlag.

Rogers, A., Obst, S., Teague, S. J., Rossen, L., Spry, E. A., Macdonald, J. A., . . . Hutchinson, D. (2020). Association Between Maternal Perinatal Depression and Anxiety and Child and Adolescent Development: A Meta-analysis. *JAMA Pediatrics, 174*(11), 1082-1092. https://doi.org/10.1001/jamapediatrics.2020.2910

Saarni, C., Mumme, D. & Campos, J. J. (1998). Emotional development: Action, communication, and understanding. In N. Eisenberg (Ed.), *Handbook of child psychology: Vol. 3 Social, emotional and personality development* (5th ed., pp. 237–309). New York: Wiley.

Shields, A. & Cicchetti, D. (1997). Emotion regulation among school-age children: The development and validation of a new criterion Q-sort scale. *Developmental Psychology, 33*(6), 906-916. http://dx.doi.org/10.1037/0012-1649.33.6.906

Silk, J. S., Shaw, D. S., Forbes, E. E., Lane, T. & Kovacs, M. (2006). Maternal depression and child internalizing: the Moderating role of child emotion regulation. *Journal of Clinical Child and Adolescent Psychology*, *35*(1), 116-126. https://doi.org/10.1207/s15374424jccp3501_10

Skog, O. J. (2004). *Å forklare sosiale fenomener: En regresjonsbasert tilnærming.* Oslo: Gyldendal Akademisk

Śliwerski, A., Kossakowska, K., Jarecka, K., Świtalska, J. & Bielawska-Batorowicz, E. (2020). The effect of maternal depression on infant attachment: A systematic review. *International Journal of Environmental Research and Public Health, 17*(8), 2675.http://dx.doi.org/10.3390/ijerph17082675

Sohr-Preston, S. L. & Scaramella, L. V. (2006). Implications of timing of maternal depressive symptoms for early cognitive and language development. *Clinical Child and Family Psychology Review*, *9*(1), 65-83. https://doi.org/10.1007/s10567-006-0004-2

Stein, A., Pearson, R. M., Goodman, S. H., Rapa, E., Rahman, A., McCallum, M., ... Pariante, C. M. (2014). Effects of perinatal mental disorders on the fetus and child. *The Lancet*, *384*(9956), 1800-1819. https://doi.org/10.1016/S0140-6736(14)61277-0

Steinsbekk, S. & Wichstrøm, L. (2018). Cohort Profile: The Trondheim Early Secure Study (TESS)-a study of mental health, psychosocial development and health behaviour from preschool to adolescence. *International Journal of Epidemiology, 47*(5), 1401-1401i. https://doi.org/10.1093/ije/dyy190

Sullivan, G. M. & Feinn, R. (2012). Using Effect Size-or Why the P Value Is Not Enough. *Journal of Graduate Medical Education, 4*(3), 279-282. https://doi.org/10.4300/JGME-D-12-00156.1

The Directorate for e-health. (2020, November 19.). Multiaksial klassifikasjon i psykisk helsevern for barn og unge (PHBU). Retrieved from https://ehelse.no/kodeverk/multiaksial-klassifikasjon-i-psykisk-helsevern-for-barn-og-unge-phbu

The Norwegian Directorate of Health. (n.d). Angst og depresjon. Retrieved from https://www.helsedirektoratet.no/tema/angst-og-depresjon

The Norwegian Institute of Public Health. (2019, January 31.). Mors angst kan gi psykiske problemer hos barna. Retrieved from https://www.fhi.no/nyheter/2019/mors-angst-kan-gi-psykiske-problemer-hos-barna/

Thompson, R. A. (1990). Emotion and self-regulation. In R. A. Thompson (Ed.), *Socioemotional development* (pp. 367-467). Lincoln: University of Nebraska Press.

Thompson, R. A. (1994). Emotion Regulation: A Theme in Search of Definition. *Monographs of the Society for Research in Child Development, 59*(2/3), 25-52. https://doi.org/10.1111/j.1540-5834.1994.tb01276.x

Turney, K. (2011). Chronic and Proximate Depression Among Mothers: Implications for Child Well-Being. *Journal of Marriage and Family, 73*(1), 149-163. https://doi.org/10.1111/j.1741-3737.2010.00795.x

Wachs, T. D., Black, M. M. & Engle, P. L. (2009). Maternal Depression: A Global Threat to Children's Health, Development, and Behavior and to Human Rights. Child Development Perspectives, *3*(1), 51-59. https://doi.org/10.1111/j.1750-8606.2008.00077.x

Walker, A. L., Peters, P. H., De Rooij, S. R., Henrichs, J., Witteveen, A. B., Verhoeven, C. J. M., . . . De Jonge, A. (2020). The Long-Term Impact of Maternal Anxiety and Depression Postpartum and in Early Childhood on Child and Paternal Mental Health at 11–12 Years Follow-Up. *Frontiers in Psychiatry, 11*, 562237. https://doi.org/10.3389/fpsyt.2020.562237

Wentzel, K. R. (1999). Social-motivational processes and interpersonal relationships: implications for understanding motivation at school. *Journal of Educational Psychology, 91*(1), 76-97. https://doi.org/10.1037/0022-0663.91.1.76

Whaley, S. E., Pinto, A. & Sigman, M. (1999). Characterizing Interactions Between Anxious Mothers and Their Children. *Journal of Consulting and Clinical Psychology, 67*(6), 826-836. https://doi.org/10.1037/0022-006X.67.6.826

World Health Organization. (n.d.a). Depression. Retrieved from https://www.who.int/health-topics/depression#tab=tab_1

World Health Organization. (n.d.b). Mental health. Retrieved from https://www.who.int/health-topics/mental-health#tab=tab_1

Wu, Q., Feng, X., Gerhardt, M. & Wang, L. (2020). Maternal depressive symptoms, rumination, and child emotion regulation. *European Child & Adolescent Psychiatry, 29*(8), 1125-1134. https://doi.org/10.1007/s00787-019-01430-5

Yeung, W. J., Linver, M. R. & Brooks-Gunn, J. (2002). How money matters for young children's development: Parental investment and family processes. *Child Development*, *73*(6), 1861-1879. https://doi.org/10.1111/1467-8624.t01-1-00511

Zahn-Waxler, C., Iannotti, R. J., Cummings, E. M. & Denham, S. (1990). Antecedents of problem behaviors in children of depressed mothers. *Development and Psychopathology*, *2*(3), 271-291. https://doi.org/10.1017/S0954579400000778

Does Mothers' Mental Health Predict Children's Emotion Regulation and School Performance? Longitudinal Relations Through Ages 8, 10, 12 and 14

Part 2: The Empirical Study

Abstract

Children need a secure and stable childhood in order for an optimal development across all stages. It is known that the mother or caregiver, the familial environment and the level of support stand as main mediators towards the child's emotion regulation (ER), as well as their academic success. The motivation behind this study was to manifest a deeper explanation for children's difficulty with regulating emotions and their academic struggles. In the current study, using data from a community sample of 752 Norwegian children at ages 8, 10, 12 and 14, we tested the bi-directional relationship of maternal- depression and anxiety, emotion regulation and academic functioning. First, cross-sectional analyses showed that both maternal- depression and anxiety affected the child's ER and their academic performance. Second, longitudinal analyses showed that maternal anxiety predicted the child's weakened academic functioning from the ages 8 to 14, but not mediated through the child's worsened emotional regulation. These findings emphasize the importance of focusing on maternal mental health, in the works of preventing children's academic difficulties.

Keywords: academic functioning, mother's depression, mother's anxiety, maternal mental health, emotion regulation, child development

1.0 Introduction

Academic success is an important prerequisite towards cultivating and achieving personal goals, and the underlying factors of academic achievement is important to both understand and develop resilient students who can cope with society's expectations. Children who are at risk for developing insufficient academic development because of underlying factors should therefore be devoted attention to in the large theoretical field. Over the years, emotional regulation has been viewed as a powerful component towards academic development. Researchers have established that children with emotion regulation difficulties tend to perform worse academically (Gumora & Arsenio, 2002; Eisenberg & Morris, 2002), which emphasize the substantial impact ER has on academic functioning. During the early years, the parent or caregiver is the main person accountable for the child's ER development, through interactions and responses to their child. The socialization of ER is an important aspect to this development, and through observation and modeling, parenting practices and

the emotional climate of the family, the foundations of ER skills are laid (Morris, Silk, Steinberg, Myers & Robinson, 2007). As responsible for a child's ER development, it is then important that parents or a potential caregiver provide the support and stability needed to develop appropriate ER skills. Previous studies have shown that a deficient guidance of ER strategies are associated with the upbringing of a depressed mother, as a result of their own ER skills deficiencies (Parke, 1994). It is also shown that anxiety is a result of difficulty in regulating emotions (Mennin, Holoway, Fresco, Moore & Heimberg, 2007), and mother's with anxiety may also struggle with their own ER skills. Further, children of depressed mothers have a limited range of ER strategies, and it has been shown that the strategies they utilize are less effective compared to children of non-depressed mothers' strategies (Silk, Shaw, Skuban, Lane & Kovacs, 2006). The familial socialization of ER is of importance regarding the child's ER, which leads us to the question whether children who experience maternal depression and anxiety, if their deficient ER skills function as a restrain to their academic functioning, and for that reason are unable to perform optimally at school.

1.2 Emotion Regulation

Emotion regulation refers to "the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goals" (Thompson, 1994, pp. 27–28). ER is defined by both an internal and an external process. The internal process is defined by the complexity in human cognitions and the ability of physiological responses among others, while the external process refers to the surroundings who actively participate in modeling and supporting the emotions, often parents or other caregiving adults. Thompson (1994) states the importance of the external process, and claims it is a substantial part of ER. However, what is one of the main contributors to a child's development of ER? Finding an answer to that question may be crucial in helping a substantial group of children at risk of developing inadequate ER skills. According to Denham, Bassett & Wyatt (2010), one of the main factors that contributes to the ER development is maternal disposition or behavior. Maternal positive disposition is actually one of the most important factors in order to shape children's ER skills. This because mothers are believed to be "emotional gatekeepers" for their children, and they play an important role in the socialization of ER towards their children. Mothers with higher levels of emotional stability and self-regulation may display more positive behavior and create a climate which supports and encourages the child's ER development (Cumberland-Li, Eisenberg, Champion, Gershoff & Fabes, 2003). Further, it has been discussed that supportive maternal factors

provide important features to the child's ER development and ER skills, while unsupportive maternal factors, contrary, may actually debilitate the child's ER development (Bronfenbrenner & Morris, 2006). As children grow, their understanding broadens as well as their social interactions increases, thus their middle childhood becomes a predominant period for sophisticated ER skills. Additionally, Eisenberg, Fabes & Murphy (1996) address how parental practices, characterized by support and encouragement to deal with difficult emotions, in fact, provide the child with important aids when regulating their emotions. In contrast, if the child is met with negative reactions from their parents, Eisenberg with colleagues (1996) explains how it is likely to increase the children's emotional arousal around the situation, which may shape future and similar situations in a negative way. Such situations may undermine learning, and in a long-term perspective put a spanner in the works for the children's ER skills. When children encounter difficult emotions, they may turn to their parents for guidance, which emphasizes the importance of supportive caregiving adults.

Parents refer to role models regarding their children's ER development, and as such it is argued that the family context influences the children's development of ER through three fundamental ways. Based on *The Tripartite Model of the Impact of the Family on Children's Emotion Regulation and Adjustment* (Figure 1)*,* Morris, Silk, Steinberg, Myers & Robinson (2007) explain how children obtain knowledge about ER through *observation*, *parenting practices and behaviors,* and *the emotional climate of the family*. These three factors vary to a certain extent, but arise from the parent's overall characteristics, which is preordained, thus unavoidable. The environment can therefore be considered as a foundation for the child's overall growth and development, in addition to the children's families, schools, neighborhoods, peers, and culture all play an important role in the child's emotional development. In this article, we will address the familial socialization of ER, and use the *Tripartite Model* as a basis to how children obtain ER knowledge.

1.3 Maternal Depression, Anxiety and what it entails

Many children experience the lack of parental support and engagement as a result of parent's depressive symptoms and anxiety. Maternal depression and anxiety are both highly prevalent in the population and can affect mood or feelings. These diagnosable health conditions ought to be separated from the normal sadness, stress or fear that anyone can experience during a lifetime (World Health Organization, 2017). In addition to their similarity, depression and anxiety include symptoms and characteristics that clearly

distinguish the two disorders. According to Clark & Watson (1991) and their tripartite model, anxiety includes specific characteristics such as physiological hyperarousal, hence tension, nervousness, shakiness and panic symptoms. Depression, on the other hand, includes anhedonia, which is the absence of positive affect that may be loss of interest and joy, hopelessness, loneliness or lethargy. Through a global perspective, there are estimated to be 3.6% people with anxiety disorders, while 4.4% with depression. Moreover, these disorders are more common among females than men; with 4.6% compared to 2.6% (anxiety) and 5.1% compared to 3.6% (depression) (World Health Organization, 2017). Among these females, many are mothers or soon to be, and therefore our main focus in this article will be directed towards maternal depression and anxiety. However, this must not be misinterpreted that a father's contribution to the child's ER development is of less value. It simply refers to our theoretical focus.

Commonly known, depressive symptoms include lack of energy and motivation, as well as an increased feeling of hopelessness, self-doubt, confusion and guilt. Anxiety disorder symptoms are often characterized as a persistent feeling of anxiety or worry towards normal and daily activities, which can worsen over time if left untreated. Other symptoms are easily irritable, feeling restless, difficulty controlling feelings of worry, difficulty concentrating etc. (the National Institution for Mental Health, 2018). It is also known that mothers' depression affects their parenting and can often be characterized by either too much participation (intrusive and controlling) or too little (neglectful and distant) participation with their children (Herrera, Reissland & Shepherd, 2004). Maternal anxiety may also contribute to dysfunctional parenting behaviors such as over-controlling and being less sensitive towards the child, which again may influence the child to become less independent (Nicol-Harper, Harvey & Stein, 2007; Whaley, Pinto & Sigma, 1999). Other studies have concluded that maternal depression can lead to reduced social interaction and involvement with their child, less empathy, more withdrawnness and suffers from more negative thoughts (Downey and Coyne 1990; Mistry, Biesanz, Taylor, Burchinal & Cox, 2004; Foster, Garber & Durlak, 2008; Feldman et al., 2009). Similarly, maternal anxiety may contribute to parenting behavior such as catastrophic thinking, criticality, less warmth and positivity as well as less granting of autonomy (Whaley, Pinto & Sigma, 1999). Thus, children exposed to a family environment defined by maternal depression and anxiety, hence a suboptimal parenting style, may lead to a deficient ER development.

1.4 Impact on Child's Development

Alongside the symptoms that follow a mental health disorder, and its consequences towards parenting style, children in these situations may experience difficulties across all developmental stages. Studies have proven that mother's depression and anxiety contribute negatively to the child's health, development, cognitive abilities and behavior (Cummings & Davis 1994; Wachs, Black & Engle, 2009; Sohr-Preston & Scaramella, 2006; Gjerde et al., 2020; Rogers et al., 2020). However, Gjerde et al. (2020) emphasizes that maternal depression is more prominent than maternal anxiety when it comes to the child's behavior problems. Children's emotional difficulties, on the other hand, may be a result of maternal anxiety rather than maternal depression, indicating the unique effect mother's anxiety has towards the emotional aspect (Norwegian Institute of Public Health, 2019). To our knowledge, there are gaps in research regarding the timing of maternal depression and anxiety at a later period than directly after birth, and its consequences for children, especially their ER development which may consequently affect their academic functioning.

Previous studies have examined the associations between maternal depression and anxiety and the child's cognitive functioning. Van der Waerden et al. (2016) found that the severity of maternal depression rather than the timing, is essential regarding children's cognitive development. When they compared children of non-depressed mothers with children of highly depressed mothers, the latter had a decrease in their IQ. Notable, this result differed across gender, whereas boys had a higher decrease comparable to girls. Maternal anxiety, hence prenatal, has proven to be linked to a child's deficits in cognitive functioning, in particular their working memory (Pearson et al., 2016). In addition, Van den Bergh et al. (2005) studied how maternal anxiety during pregnancy week 12 to 22 highly affected the child's cognitive functioning at age 14 and 15. Through their study, they model the child's pattern of impulsivity during performance on cognitive tasks which resulted in higher levels of error. To our knowledge, there are limited studies regarding maternal anxiety later than directly after birth and the child's outcome.

Alongside children's cognitive functioning, several researchers have demonstrated that children's behavioral aspects are affected by the familial context, hence the presence of mother's depressive symptoms and anxiety (Dawsen et al., 2003; Downey & Coyne, 1990; Silk et al., 2006; Rogers et al., 2020). Villodas, Bagner & Thompson (2015) examined, among other things, the child's behavior problems in a high-risk familial environment. One of the main findings illustrates that higher levels of maternal depressive symptoms that occur during the child's infancy, lead to higher levels of the child's externalizing behavior problems

during middle childhood. In addition, a study by Kim-Cohen, Moffitt, Taylor, Pawlby & Caspi (2005) show that when maternal depressive symptoms occur during the child's first five years, children had a tendency to develop antisocial behavior at age seven. Postnatal anxiety has also shown to affect the child's overall behavior. Specifically, Rogers et al. (2020) have found that mothers with postnatal anxiety influence both the children's externalizing and internalizing behavior. Based on these studies, one may draw conclusion to the fact that children of depressed and anxious mothers may develop either internalized or externalized behavior problems, when maternal depressive and anxiety symptoms occur during the early years of childhood.

It has been established that the familial environment is the primary source to the child's ER development (Denham, Bassett & Wyatt, 2010; Cumberland-Li et al., 2003; Bronfenbrenner & Morris, 2006; Eisenberg, Fabes & Murphy, 1996; Morris et al., 2007), and whereas children living with mothers with depressive tendencies and anxiety, can further lead to a deficient cognitive functioning, emotional and behavior problems (Campbell, Matestic, von Stauffenberg, Mohan & Kirschner, 2007; Bagner & Thompson, 2015; Rogers et al., 2020; Van den Bergh et al., 2005). Such deficiencies in a child's development may lead to difficulties regarding their academic performance. Gumora & Arsenio (2002) have shown how children perform academically is dependent on children's ER skills, which involves the ability to assess a situation followed by the capability to control and direct their emotions properly. Moreover, both the timing and severity of mother's depressive symptoms have been shown to be of importance when it comes to the child's development and can serve as a direct effect at the time being, as well as a gradual impact (Kim-Cohen, et al., 2005; Van der Waerden et al., 2016). Rogers et al. (2020) elaborate how perinatal depression and anxiety (combined) was negatively associated with the child's development of the social- and emotional aspect. This finding was significant through the child's infancy to adolescence, with no signs of weakening associations with age. The theoretical field indicates that mothers' depressive symptoms and anxiety negatively affect the child's ER development because of their own deficits in ER skills and a suboptimal parenting style (Feng, Gerhart & Wang, 2019; Nicol-Harper, Harvey & Stein, 2007; Whaley, Pinto & Sigma, 1999; Downey and Coyne 1990). However, can mothers' mental health stand as the main contribution that prevents the child's ER development and then consequently interrupt the academic functioning of school-aged children?

1.5 Predictors of Academic Performance

In addition to the latter factors, it is important to establish important predictors towards an optimal academic functioning. Already confirmed, maternal mental health and family environment play an important role towards children's cognitive development, hence academic performance. More specifically, Evans (2006) concluded in his study that children who come from an organized home with predictable routine, perform better academically, regardless of the family's socioeconomic status. Alongside, Brown & Low (2008) found in their study that children living in such circumstances (unorganized home without predictable routines) have lower expectations, lack of persistence and a tendency to withdraw from academic challenge. However, another study (Hanscombe, Haworth, Davis, Jaffee & Plomin, 2011) proved that genetic factors play an important role regarding how children perform academically. More specifically, Hanscombe et al. (2011) reported that shared environmental factors explained 63%, whereas genetic factors explained as much as 37% of the association between children's experience of familial environmental chaos and their academic performance. Furthermore, it is well established that parental school involvement is consistently found to have a positive influence towards children's academic performance (Topor, Keane, Shelton & Calcins, 2011). Studies have illustrated that the higher levels of parental school involvement are associated with children's academic success, both cross-sectional (Grolnick & Slowiaczek, 1994) and longitudinal (Miedel & Reynolds, 1999). Additionally to parental school involvement, family structure and stability have proven to predict children's academic development. Children living in non-disrupted families with two caregivers performed better in math and reading, compared to children living in non-disrupted single-parent or disrupted families (Sun & Li, 2011). Further on, there is a clear connection between parents' education level and children's academic performance. According to Norwegian Directorate for Education and Training (2016), children of parents with higher levels of education perform statistically better at school than children of parents with low levels of education. Children's skills in both english and math are strongly connected to their parents level of education. In recent years not only have parents' education level been devoted attention to, but their income seems to be of importance as well (Bakken & Elstad, 2012). It is also inevitable to discuss predictors for academic performance without taking into account children's own beliefs about intelligence and self-confidence regarding academic achievements. Stipek & Gralinski (1996) claim that children's beliefs about their own intelligence and performance is associated with their actual academic outcomes, stating that

mental factors like confidence and faith to own skills, is significant regarding academic achievements.

1.6 The Present Study

The present study utilizes the terms maternal depression and maternal anxiety, and with their broad meaning these concepts are hard to derifne in a precise way. Previous researchers refer to maternal depression and anxiety differently when it comes to the timing and the stages of the illness. However, used throughout this study, maternal depression, alongside maternal anxiety, refers to any time periods during a mother's lifetime. The primary purpose of this study was to investigate whether maternal depression and anxiety can predict young children's emotional regulation and therefore exert influence on their academic functioning over a period of six years. Our four-wave longitudinal study includes a large sample population with mothers and their children followed from ages 8 to 14 years. Further, our main hypothesis of the study were as follows: (1) Cross-sectional relationships between maternal mental health, child's emotional regulation and their academic achievement, (2) Maternal mental health affects the child's emotional regulation development over time, (3) Maternal mental health affects the child's academic development over time, (4) The child's emotional regulation predicts weaker academic success over time, and also (5) Mothers' mental health issues affect the child's academic achievement through a weakened emotional regulation. And finally, we proposed a model in which the effect of maternal mental health on a child's academic achievement is mediated through the child's emotional regulation. However, our hypotheses do not include a possibility regarding whether the child's weak ER can be responsible for the mother's poor mental health, a situation which may also be plausible.

2.0 Method

2.1 Participants and Procedure

The first wave of the Trondheim Early Secure Study (TESS) took place in 2007 and 2008 (T1) and included children born in 2003 or 2004. A criterion was that their parents had to live in Trondheim, Norway. The current study uses data from the fourth, fifth and sixth wave of data collection. The children were 8, 10, 12 and 14 years old, and went to third, fifth, seventh and ninth grade. A total of 1250 children were recruited to participate in the study,

whereas 997 children were tested at the time of study enrolment (Mage = 4.55 years; 50.6% boys). Among these participants, 81% of the children were accompanied by their mothers to the clinic, more than 99% of the children were of Western ethnic origin (e.g., Europe, United States), and 86% of the children's parents lived together. In addition, children with emotional or behavior problems were oversampled in order to increase statistical power, and the sample is comparable to the Norwegian population with regard to the parents' education and family situation (parents married, one-parent household etc.). If desired, a more detailed description of the procedure and recruitment process and sample can be found in Steinsbekk & Wichstrøm (2018). The drop-out rate after consent, did not vary in terms of the child's emotional or behavioral problems, according to their Strengths and Difficulty Questionnaire (SDQ) score (P=0.86) or gender (P=0.31) (Steinsbekk & Wichstrøm, 2018). As shown in Attachment 1, 704 children (51.3% girls) participated in the second follow-up assessment (T3, Mage = 8.8 years). Further, 703 children (52.3% girls) participated in the third follow-up assessment (T4, Mage = 10.51 years). At the fourth follow-up assessment (T5, Mage = 12.49 years) 666 (51.9 % girls) children participated, and lastly, in the fifth follow-up assessment (T6, Mage = 14.33 years), 636 children (53.0% girls) participated. Parents provided information about their own mental health (HSCL), as well as their child's emotion regulation (ERC). Further, the teacher reported the child's school performance (TRF). All data was gathered by means of questionnaire. The questionnaires were sent to the schools at T3 (age 8), T4 (age 10), T5 (age 12) and T6 (age 14), and the response rate among teachers were 85.8% at T3, 85.8% at T4, 82.3% at T5 and 80.7% at T6. The project has been approved for each wave of data collection, by the Regional Committee for Research Ethics, Mid-Norway (www.etikkom.no; REK 4.2008.2632).

2.2 Measures

The Hopkins Symptoms Checklist (HSCL) is a well-known and commonly used screening instrument in order to measure change in the clinical status of psychotherapy patience. Further, a 25-item version of HSCL (HSCL-25) was established, and is utilized in family practice and planning, and familial settings. 10 items are included in HSCL-25 from the HSCL-58 anxiety cluster, 13 items from the depression cluster, as well as two somatic symptoms. Items from the anxiety cluster incorporate statements like: "being suddenly scared for no reason", "trembling", "hard pounding and raising", whereas items from the depression cluster: "feeling low in energy", "crying easily", "feeling no interest in things". Additionally, items regarding somatic symptoms: "poor appetite" and "difficulty falling asleep or staying

asleep" (Mollica, Wyshak, Marneffe, Khuon & Lavelle, 1987, p. 498). The respondents, themselves, rate these statements from *not at all, a little, quite a bit* or *extremely.* The result of the internal structure of this construct was shown to be sufficient, with Cronbach's alpha ranging from .79 to .84 (anxiety), and .83 to .86 (depression).

The Emotional Regulation Checklist (ERC) is a 24-item checklist in order to measure the child's ER. It is designed as a purpose to assess how children regulate their emotions and their emotions expression report from parents. It is an effective tool for longitudinal research, because of its relevance across a wide age range (Shields & Cicchetti, 1997). The ERC checklist is a 4-point Likert scale with both negatively and positively weighted items, which is evaluated by the respondent themselves on a scale from 1 (*never*) to 4 (*almost always*). ERC consists of two subscales: Emotion Regulation (ER) and Emotional Lability/Negativity (L/N). In the current study, our aim is to measure weakened emotional regulation and the subscale L/N is thus, best suited and therefore utilized. The items in the L/N subscale represents lack of flexibility, mood lability, and dysregulated negative affect, and is assessed through statements like "Exhibits wide mood swings", and "Is prone to angry outburst" (Shields & Cicchetti, 1997, p. 910). Cronbach's alpha ranged from .81 at T3, .81 at T4, .79 at T5 and .82 at T6, which is an acceptable internal consistency coefficient.

The Teacher Report Form (TRF) is incorporated in The Achenbach System of Empirically Based Assessment (ASEBA) and is utilized to evaluate children between 6 - 18 years and their academic achievements. The teacher report form assesses children's competence, adaptive functioning and their social, emotional and behavioral problems using 120 specific problem-related questions and three open-ended questions. Examples of statements used to evaluate the children's academic achievements: "Poor school work", "Difficulty following directions", "Fails to finish task" and "Can't concentrate". The statements are rated 0 (*not true*), 1 (*somewhat or sometimes true*) or 2 (*very true/often true*) (Ivanova et al., 2007). The child's performance in reading, writing and mathematics is reported by the teacher at T4, T5 and T6 with a 5-point scale, 1 (*far below grade*), 2 (*somewhat below grade*), 3 (*at grade level*), 4 (*somewhat above grade*) or 5 (*far above grade*). TRF reflects a long-term development of the child's academic functioning as opposed to e.g., standardized tests which only provide an evaluation of the child's proficiency at a single point in time. Acceptable internal consistency coefficients were found for the construct, with Cronbach's alpha ranging from .76 to .89.

3.0 Results

In this chapter, we will present descriptive analyses first, including mean-level differences between times of measurement, as well as bivariate correlations. Then, through conducting Structural Equation Modeling (SEM) in Mplus 8.1 (Muthén & Muthén, 1998-2017), we determined stability over time and cross-legged effects of maternal depression and anxiety, children's ER and academic achievement, from age 8 to 10, 10 to 12, and 12 to 14.

3.1 Descriptive Statistics

First, descriptive statistics showed a negative correlation between maternal anxiety and children's academic performance at age 8 (t = -.055*),* 10 (t = -.004), 12 (t = -0.53) and 14 (t = -.099). In addition, a negative correlation between the children's academic performance and emotional regulation was found at age 8, (t = -.237), 10 (t = -.246), 12 (t = -.239) and 14 (t = -.313). Furthermore, when comparing mean values of maternal anxiety at T3 (M = 9.103), T4 (M = 9.186), T5 (M = 9.339) and T6 (M= 9.588), it showed an increase as the child aged from 8 to 14 years. The child's academic achievement showed to be stable over time T3 (M = 3.350), T4 (M = 3.32), T5 (M =3.36) and T6 (M= 3.34), as well as their emotional regulation T3 (M = 1.356), T4 (M = 1.391) T5 (M =1.351) and T6 (M = 1.352).

Table 1

3.2 Statistical Analysis

We employed random intercept cross-lagged panel model (RI-CLPM; Hamaker, Kuiper & Grasham, 2015), which allows to estimate within-person effects while controlling for time-invariant between-person effects. The analyses were run in Mplus (8.1), employing a robust maximum likelihood estimator which yields robust standard errors. Missing data were handled using a full information maximum likelihood (FIML) procedure. Due to sampling stratification of the dataset, the data were weighted with a factor corresponding to the number of children in the population divided by the number of participating children in the stratum, thereby arriving at correct population estimates.

We fitted two RI-CLPM models, one involving maternal anxiety symptoms and the other one involving maternal depression symptoms (Figure 2 and 3). Each model consisted of cross-sectional, autoregressive and cross-lagged paths between maternal anxiety / depression

symptoms, and child emotional lability/negativity and academic performance from age 8 to age 14. The RI-CLPM extends the traditional auto-regressive cross-lagged panel model by dividing variance into a stable between-person part (i.e. random intercept, here represented by 3 random intercepts of emotional lability/negativity, academic performance and maternal anxiety / depression symptoms in each model) and a within-person part. The within-person component is captured by a latent factor of each variable at each wave and represents changes from one's own mean level in the respective variable (here from age 8 to age 14). For example, the within-person component of academic performance is assessed as a function of changes in the other variables (e.g., emotional lability/negativity and maternal anxiety or depression symptoms, respectively) and the autoregressive effect (e.g. academic performance at the previous measurement point).

3.3 Results from RI-CLPM

The RI-CLPM fitted the data well (the anxiety model: χ^2 (21) = 51.45, $p < .001$, RMSEA= 0.044, SRMR = 0.044, CFI = 0.987, TLI = 0.958, the depression model: χ^2 (21) = 45.63, $p < .001$, RMSEA= 0.039, SRMR = 0.031, CFI = 0.987, TLI = 0.959).

At the between-person level, more emotional lability/negativity was associated with lower levels of academic performance (r =-.50, $p < .001$), whereas maternal anxiety was not related to either academic performance (r =.01, p = .87), nor emotional lability/negativity (r =.04, p = .56). The same pattern was observed in the maternal depression model, wherein more emotional lability/negativity was associated with lower levels of academic performance (r =-.50, $p < .001$), whereas maternal depression was not related to either academic performance (r =.03, p = .63), nor emotional lability/negativity (r =.01, p = .99).
At the within-person level, increased maternal anxiety at age 10 predicted decreased academic performance at age 12 (β = -.12, p = .044), and the same pattern was also observed two years later, wherein increased maternal anxiety at age 12 predicted decreased academic performance at age 14 (β = -.16, p = .047). The respective paths from maternal depression to decreased academic performance did not reach statistical significance, although the maternal depression estimate at age 12 predicting academic performance at age 14 was just bordering significance (β = -.16, p = .052). No significant prospective cross-lagged paths were detected between maternal anxiety/depression and emotional lability/negativity, or between emotional lability/negativity and academic performance in either model.

Cross-sectional correlations at the within-person level revealed that higher maternal anxiety was correlated with higher lability/negativity at age 12 (r =.13, p =.03) and at age 14 (r =.13, p =.02). At age 14, lower academic performance was correlated with higher maternal anxiety (r =-.18, p =.01) as well as with higher lability/negativity (r =-.15, p =.045). Higher maternal depression was correlated with lower academic performance at age 10 (r =-.16, p =.03). Higher maternal depression was correlated with higher lability/negativity at age 12 (r =.18, p =.001) and age 14 (r =.14, p =.01). At age 14, lower academic performance was correlated with higher lability/negativity (r=-.15, p =.049).

In sum, the analyses showed that an increased maternal anxiety affected children's academic performance negativly, from age 8 - 14. Maternal depression, on the other hand, does not affect the children's school performance over time. In our models, no significant prospective cross-lagged paths were found between maternal anxiety/depression and emotional lability/negativity, or between emotional lability/negativity and academic performance. Furthermore, cross-sectional correlations at the within-person level revealed that maternal depression or anxiety were related to child's ER, however evidence for causality was not established.

4.0 Discussion

In the current study we investigated the associations between maternal depression and anxiety and the child's ER skills and academic performance, using a longitudinal panels design spanning over six years. Our main hypotheses were; (1) Cross-sectional relationships between maternal mental health, child's emotional regulation and their academic achievement, (2) Maternal mental health affects the child's emotional regulation development over time, (3) Maternal mental health affects the child's academic development over time, (4) The child's emotional regulation predicts weaker academic success over time, and also (5) Mothers' mental health issues affect the child's academic achievement through a weakened emotional regulation. The results revealed a correlation between maternal mental health, the child's emotional lability and a weakness in academic performance, however, there is limited causality (cause-effect) over time in the sample. This indicates that at the same measurement time, mothers with suboptimal mental health have children who are more emotionally unstable, as well as a weaker academical performance. Further, through autoregressive cross-lagged analysis, with a random intercept approach controlling for unmeasured confounders,

there was no significant evidence that showed maternal anxiety or depression had a direct effect on the child's emotional regulation. However, the most remarkable finding in this study was that maternal anxiety showed to be an important predictor of child's academic performance. The higher level of maternal anxiety, the more negatively it will affect the child's school performance over time, in this case from 8 - 14 years. Another controversial finding was that this result was not valid regarding maternal depression, meaning that maternal anxiety has a greater impact on the child's academic performance than maternal depression.

The current study adds critical insights with its controversial findings that contributes to a better understanding around the impact maternal mental health has on children's emotional regulation and their academic performance.

4.1 Cross-sectional findings

To understand why mothers' mental health directly affects the child's emotional lability and academic achievement we have to look deeper into what we already know about the familial socialization of ER. As known, the emotional climate of the family involves family dynamics and the relationship quality within the family (Morris et al., 2007). Further, Morris et al. (2007) explain how emotional stability in the environment, expectations and demands and the degree of positive and negative emotionality affect the child's development of ER. As a foundation, this may contribute towards an explanation of this exact result. It is proven that the child's cognitive development is interfered as a result of maternal depression and anxiety (Campbell et al., 2007; Rogers et al., 2020), which may lead to their reduced academic success. As a consequence of a depressed or anxious mother, an insufficient emotional climate in the family may appear, which can affect in different ways. One may convey that having a mother who shows symptoms of either depression or anxiety, weakens the mother's ability to support and encounter the child's academic learning and provide a poor follow-up on assignments and homework. Besides, when the mother shows lack of interest to both the child or other family members or activities in general, it may negatively affect the overall family climate, which again may exert influence on the child's attitudes towards school in a negative way. This is in line with previous research on what affects children's academic development, whereas a supporting familial environment, organized home and predictable routines are important towards how children perform academically (Evans, 2006; Hanscombe et al., 2011).

Reasons towards why children of anxious and depressed mothers perform worse academically compared to children of mothers without a mental illness, could among many reasons be that they lack confidence or faith in their own performance. Maternal depression and anxiety are associated with less social interaction towards their child, more negativity and reduced sensitivity (Downey and Coyne 1990; Foster, Garber & Durlak, 2008; Nicol-Harper, Harvey & Stein, 2007). Knowing the various negative symptoms of maternal depression and anxiety, mothers may not provide their child with encouraging and supportive comments, both personally and academically. This may lead to children's lack of confidence and beliefs in their own achievements, which have been proven to negatively affect their academic performance (Stipek & Gralinski, 1996).

Another explanation as to why mothers' mental health directly accepts the children's ER and academic performance is; when children are in school, they are in need of extra support and encouragement and a depressed or anxious mother may not be able to provide such care, which may challenge the children's learning (Campbell et al., 2007). The current study reported a significant correlation between mothers' mental health, the child's emotional regulation and academic performance at one time of measurement. This indicates that mothers' inadequate mental health affects the child's emotional regulation, which also affects the child's academic achievement at the same time. This stands in line with previous studies which stated that ER was, in fact, essential for successful academic achievement (Eisenberg & Morris, 2002; Gumora & Arsenio, 2002; Grolnick & Kurowski, 1999).

4.2 The consequences of Maternal Health towards Child Development - a Longitudinal Perspective

Our hypotheses involved that the child's ER and academic performance would decrease over time as a result of their mother's poor mental health, however, this was not the case in this study. In the current study, we found that maternal anxiety was an important mediator to the child's academic performance, but we did not, however, find that maternal anxiety mediated the child's poorer emotion regulation. The result of this study indicates that an anxious mother may weaken the child's academic functioning, but not as a result of inadequate ER skills. This exact finding stands in line with previous research, where it has been proven that prenatal maternal anxiety is associated with a child's deficits in cognitive functioning (Pearson et al., 2016; Van den Bergh et al., 2005). However, these studies are in contrast to ours regarding the timing of maternal anxiety, whereas researchers above address prenatal maternal anxiety, while this study focuses on maternal anxiety during the child's

middle childhood. Maternal depression did not show the same result as maternal anxiety; our analysis showed no associations between maternal depression and child's ER or academic performance. These results provide questions as to why maternal anxiety stands as a predictor to the child's academic success, and not maternal depression, and how come neither maternal-depression or anxiety impacts the child's ER over time, when the theoretical field claims otherwise.

Firstly, we will look into possible reasons as to why maternal anxiety is significant to children's academic performance, while maternal depression is not. It is a difficult task trying to determine the reasons behind this result, because of the lack of research and the close related ties between anxiety and depression; comorbidity. To our knowledge, no studies have investigated the duration of maternal anxiety and depression and looked at the stability of mental illnesses over time. However, there are several reasons one may imagine, based on the symptoms and characterization of depression and anxiety. Based on our results, maternal anxiety is more severe than maternal depression towards the child's development, hence academic performance. This may be because of distinguishing features in symptoms and characterization. As mentioned, anxiety includes symptoms such as physiological hyperarousal, while depression includes anhedonia (Clark & Watson, 1991), which may separate the stability of these two disorders. For instance, the symptoms of depression; lack of interest and joy and hopelessness are more common in everyday life, due to normal certain circumstances such as seasonal changes, changes and stressful situations, economic issues, loss of a family member etc. These symptoms, which are considered more normal in the sense that several people experience it, may indicate that children are more likely to be surrounded by situations characterized by these depressive symptoms. Because depression includes symptoms that may occur often, the chances that the child will experience its mother with some of the symptoms related to an everyday situation, is high. Though, it is the persistence of depressive symptoms that determine whether the mother is depressed or just experiencing normal feelings that pulls like the wind (Glasofer, 2020). Thus, maternal depression may not affect the child's everyday life, hence their academic performance, because of the normality. Whereas maternal anxiety and its symptoms such as physiological hyperarousal (Clark & Watson, 1991), may not be something the children have experienced before and therefore not as common, which may explain the great impact it has on children's focus at school. This explanation is supported by the percentage of how many experience depression and anxiety, from a global perspective. With 5.1% females experiencing depressive symptoms stand in contrast to anxiety, which 4.6% experience (World Health Organization, 2017). Thus,

depressive symptoms may be looked at as a more normal state of mind which naturally comes and goes throughout life, compared to anxiety which may be more stable over six years.

Depression may affect the concerned in a more intense way and over a shorter period of time, compared to anxiety which is triggered by certain situations or objects, and may not appear at all hours, like depressive symptoms often do. This leads to a dilemma regarding the child's development, especially the academic aspect. Depressed mothers are, as mentioned, constantly feeling depressed, which entails an emotionally absent mother in that moment. Fathers, siblings, neighbors, grandparents, teachers, after-school activity adults etc., could be viewed as an important replacement to the lack of support, attention and motivation from a depressed mother. These temporary replacements may create important relations to the child, in a way that a depressed mother is unable to, and then compensate for the consequences of maternal depression. We can thus argue that this may contribute as a stability for the child; a stable person that positively influences the child's academic performance. Anxious symptoms, as mentioned, may not emerge as often as depressive symptoms, and an anxious mother will not necessarily be anxious all the time. From an outside perspective, people may not detect the signs of an absent emotional mother, and therefore do not feel the need to step in, in order to contribute with needs the child may have. However, sometimes anxiety contributes to difficulties where the mother shows insufficient support (Herrera, Reissland & Shepherd, 2004; Whaley, Pinto & Sigma, 1999), thus, significant others may have to step in. This may create a certain unpredictability for the child; sometimes the mother is present, while sometimes she is not. This can be perceived as a disrupted family with one stable and supportive caregiver, which Sun & Li (2011) proved to be destructive towards children's academic development. Unpredictability may be more damaging towards the child's development, than a consistent replacement for the depressed mother, which may explain why anxious mothers are a significant moderator of the child's academic performance. Supported by Bowlby's attachment theory, a child needs stability and a dependable caregiver in order to feel secure and therefore be able to learn through exploring (Bowlby & Ainsworth, 1951). In addition, children are dependent on predictable routines and organized environments in order to perform optimally at school (Evans, 2006), which supports the view on how important predictability is.

Furthermore, anxiety may be viewed as a disorder that affects the family more explicitly, which could be easier to acknowledge, while depression may be viewed as more of an internalizing disorder. Both maternal depression and anxiety have an internalizing aspect (Achenbach, Ivanova, Rescorla, Turner & Althoff, 2016), however, anxiety may affect the

family climate, hence the child, in a more direct and explicit way. Maternal depression may affect the family climate and the child's development indirectly. Anxiety emerges through obvious fear of situations or objects (direct), while depression emerges through mood and atmosphere (indirect). This indicates that maternal anxiety may cost more for the child, than what it would do if the mother were depressed. Another reason as to why anxious mothers affect children's academic function, could be due to the child's behavioral and emotional aspect. In accordance with Walker et al. (2020) children of anxious mothers are at risk for developing behavioral and emotional problems, which can then be related to their academic functioning. For instance, children who are unable to control emotions or certain behaviors, may not have the preconditions to meet the high expectations in school.

Secondly, the question regarding why no causality were found between maternal depression or anxiety and the child's ER, will now be discussed. In previous research, the family environment has been known as the primary source to the child's ER development (Denham, Bassett & Wyatt, 2010; Cumberland-Li et al., 2003; Bronfenbrenner & Morris, 2006; Eisenberg, Fabes & Murphy, 1996; Morris et al., 2007). Our findings show that neither maternal depression or anxiety did affect the child's ER over time. This stands in contrast to the Norwegian Institute of Public Health (2019) findings where they established that mother's anxiety had an unique effect on children's emotional difficulties, while Kim-Cohen et al. (2005) found that children of depressed mothers are at risk of an insufficient ER. Respectively, due to our high-quality method and design, high participation rate with 752 children and a low drop-out rate, this makes us question previous research findings regarding the impact maternal mental health issues have towards the child's ER development. However, the fact that neither maternal depression or anxiety affects the child's ER over time, could be explained by different reasons. Bandura (1977) emphasized that during the children's first years, they learn about ER through observation and modeling, similar, Kopp (1989) and Thompson (1990) state that an important role in children's development of ER is parental interactions and responses during the children's early years. In this case, these theoretical claims can support our non-significant findings. For instance, during the children's early years, their mother may not have suffered from a mental illness, and therefore provided the child with a solid ER foundation. It is also conceivable that during the child's first year, when the mother was healthy without mental disorders, a secure attachment was built. An early, secure attachment is said to be a foundation for later ER development (Gilliom, Shawn, Beck, Schonberg & Lukon, 2002; Bowlby, 1997), and may therefore have functioned as a safety net towards the child's ER skills. However, when the mother did suffer from maternal depression

or anxiety, it did not influence the children's ER development because of an already solid ER foundation or secure attachment. This is in line with the theoretical foundation; that the child' early years are essential for children's ER development (Bandura, 1977; Kopp, 1989; Thompson, 1990).

According to the *Tripartite Model of the Impact of the Family on Children's Emotion Regulation and Adjustment* (Morris et al., 2007), parental practices and behaviors are in fact, essential to children's ER. Anxious and depressed mothers have proven to execute a parenting style which can be categorized as emotion-dismissing-parenting, which involves absent behavior towards emotional expression and who also tends to ignore others emotional expressivity (Gottman, Katz & Hooven, 1997). Knowing this, how come there are no causality between maternal depression and anxiety and the child's ER development? Firstly, the mother's depressive symptoms and anxiety may not have been as severe, and therefore not affecting the child's ER so harshly. Secondly, another significant person, for instance a father or grandparent, may have been present in order to compensate for the mother's absence. In contrast to the mother's emotion-dismissing parenting, this significant other, may have provided with emotion-coaching, which involves making the children aware of their own emotions and looking at emotions like a teaching opportunity (Gottman et al., 1997), and therefore the child's ER development was not interfered.

4.3 Limitations and Future Research

The present study adds an important contribution to the growing literature on child development and maternal mental health, offering a six-year longitudinal investigation to why children may develop poor academic skills on evidence of familial environment, hence maternal mental health. However, several limitations must be acknowledged for. First, all measures in the present study were reported by one singular person, ERC and HSCL reported by the mother while TRF was reported by the teacher. Podsakoff, MacKenzie & Podsakoff (2012) emphasizes how situations like this may lead to shared method variance. Therefore, in order to reduce the risk of relying on a single informant, multiple informants should be utilized. For instance, ERC should be, in addition to the mother, reported by the child itself and the teacher, and TRF should be reported by more than one teacher to obtain a clear and truthful canvas, hence avoiding the common methodological problems. Mothers reporting their own mental health through HSCL, may not provide a realistic representation due to understatement or exaggerations. Nevertheless, we believe this study indicates a significant

connection between maternal mental health, the child's ER and academic performance, even though it is possible to discuss sources of error in the reported measurements.

Secondly, depression and anxiety assessment scales are often significantly intercorrelated (Clark & Watson, 1991). This may lead to difficulties regarding distinguishing depression and anxiety as two different mental disorders, during the analysis. Such difficulties may provide an erroneous representation of the mother's mental health and question the gap between depression and anxiety in this study.

Lastly, using a longitudinal approach, challenges will always follow. Since this study addresses children's academic performance over a six-year period, one may then question the uncertainties regarding the teacher reported measurement. Throughout these six years, the children may have changed either teachers or schools, which affects the overall academic assessment. In this current study, these sources of error have not been paid attention to, and we do not believe that there would be a significant difference if they were taken into consideration.

In future research, there is a need for studies regarding other contextual factors, such as peers, school, culture, neighborhood, and how they affect the child's ER development. In addition, there is a lot of research regarding the mother-child relationship, however, research on the father-child relationship and how they affect the child's ER and academic development, should be prioritized. Both cross sectional and longitudinal studies will provide the theoretical fields with valuable information. Many studies examine the prenatal period of maternal depression and anxiety, however, there is a need for more research examining the maternal mental health during the children's school years, and its impact.

4.4 Implications and Conclusions

Why children experience academic difficulties may be a combination of many factors, both within the familial environment and person dependent. A secure and stable caregiver during the child's childhood has shown to be of importance regarding the child's development (Bowlby & Ainsworth, 1951), and especially towards academic functioning (Rogers et al., 2020). In the current study, findings illustrate the great influence of mothers' mental health on children's academic performance. An elevated education for teachers and rules on teacher density is often a subject of matter in order to improve children's academic success. However, this study emphasizes the importance of focusing on maternal mental health, in the works of preventing children's academic difficulties. Although a thorough teacher education is important towards children's academic development, a greater commitment to maternal

mental health, as this study implies, will consequently help children and their academic functioning.

In a large theoretical field, maternal depression has been acknowledged as a main contribution to children's difficulties regarding behavior, school, cognitive (Cummings & Davis, 1994; Downey & Coyne, 1990), maternal anxiety, one the other hand, has not been allocated equal attention. However, the current study contributes with significant findings regarding maternal anxiety and children's academic development. Over a six-year long period, maternal anxiety showed to weaken the child's academic performance from ages 8 - 14, while maternal depression did not. This contradicts the idea that maternal depression stands as a main mediator towards child's development, when in fact maternal anxiety has proven to be of greater impact regarding the child's academic development.

In conclusion, the findings presented in the current study provide valuable additions and contradictions to the theoretical field regarding the hypothesis (3) that bad maternal mental health would be associated with children's weakened academic functioning, over time. However, our hypothesis (2) regarding maternal mental health and its impact on children's ER over time, were not significant, despite previous research (Denham, Bassett & Wyatt, 2010; Cumberland-Li et al., 2003; Bronfenbrenner & Morris, 2006; Eisenberg, Fabes & Murphy, 1996; Morris et al., 2007), and also, that (4) the child's ER would predict a weaker academic success over time. For that reason, we can therefore not conclude that hypothesis (5) is significant; mothers' mental health issues affect the child's academic achievement through a weakened emotional regulation. However, (1) cross-sectional relationships between maternal mental health, child's emotional regulation and their academic achievement were significant, which emphasizes the importance of maternal mental health. In the current study, we focus on the familial environment and its impact on children's ER and academic development. However, we have not come to a conclusion as to why children of anxious mothers perform worse academically than children of non-anxious mothers. Despite this, possible explanations have been discussed in light of previous research. Future research is necessary in order to determine the underlying causes as to why children of mothers with anxiety perform worse academically.

References

Achenbach, T. M., Ivanova, M. Y., Rescorla, L. A., Turner, L. V. & Althoff, R. R. (2016). Internalizing/externalizing problems: Review and recommendations for clinical and research applications. *Journal of the American Academy of Child & Adolescent Psychiatry, 55*(8), 647-656. https://doi.org/10.1016/j.jaac.2016.05.012

Bakken, A. & Elstad, J. I. (2012). *For store forventninger? Kunnskapsløftet og ulikheter i grunnskolekarakterer.* (NOVA Report 7). Oslo: Norsk institutt for forskning på oppvekst, velferd og aldring.

Bandura, A. (1977). Social learning theory. Englewood Cliffs, NJ: Prentice-Hall

Bowlby, J. (1997). *Attachment and loss : Vol. 1 : Attachment* (Vol. 254, Pimlico). London: Pimlico.

Bowlby, J. & Ainsworth, M. D. S. (1951). *Maternal care and mental health* (Vol. 2). Geneva: World Health Organization.

Bronfenbrenner, U., & Morris, P. (2006). The bioecological model of human development. In *Handbook of Child Psychology*. Hoboken: John Wiley & Sons, Inc. https://doi.org/10.1002/9780470147658.chpsy0114

Brown, E. D. & Low, C. M. (2008). Chaotic Living Conditions and Sleep Problems Associated With Children's Responses to Academic Challenge. *Journal of Family Psychology*, *22*(6), 920–923. https://doi.org/10.1037/a0013652

Campbell, S. B., Matestic, P., von Stauffenberg, C., Mohan, R. & Kirchner, T. (2007). Trajectories of maternal depressive symptoms, maternal sensitivity, and children's functioning at school entry. *Developmental psychology*, *43*(5), 1202. https://doi.org/10.1037/0012-1649.43.5.1202

Carter, A. S., Garrity-Rokous, F. E., Chazan-Cohen, R., Little, C. & Briggs-Gowan, M. J. (2001). Maternal depression and comorbidity: predicting early parenting, attachment security, and toddler social-emotional problems and competencies. *Journal of the American Academy of Child & Adolescent Psychiatry*, *40*(1), 18-26. https://doi.org/10.1097/00004583-200101000-00012

Clark, L. A. & Watson, D. (1991). Tripartite model of anxiety and depression: Psychometric evidence and taxonomic implications. *Journal of Abnormal Psychology, 100*(3), 316-336. http://dx.doi.org/10.1037/0021-843X.100.3.316

Cumberland-Li, A., Eisenberg, N., Champion, C., Gershoff, E. & Fabes, R. A. (2003). The relation of parental emotionality and related dispositional traits to parental expression

of emotion and children's social functioning. *Motivation and emotion*, *27*(1), 27-56. https://doi.org/10.1023/A:1023674308969

Cummings, E. M. & Davies, P. T. (1994). Maternal depression and child development. *Journal of Child Psychology and Psychiatry*, *35*(1), 73–112. https://doi.org/10.1111/j.1469-7610.1994.tb01133.x

Dawson, G., Ashman, S. B. & Embry L. (2003). Preschool Outcomes of Children of Depressed Mothers: Role of Maternal Behavior, Contextual Risk, and Childrens Brain Activity. *Child Development*, *74*(4), 1158-1175. https://doi.org/10.1111/1467-8624.00599

Denham, S. A., Bassett, H. H. & Wyatt, T. M. (2010). Gender differences in the socialization of preschoolers' emotional competence. *New Directions for Child and Adolescent Development, 2010*(128), 29-49. https://doi.org/10.1002/cd.267

Downey, G. & Coyne, J. C. (1990). Children of depressed parents: an integrative review. *Psychological bulletin*, *108*(1), 50. https://doi.org/10.1037/0033-2909.108.1.50

Eisenberg, N. & Morris, A. S. (2002). Children's emotion-related regulation. In H. Reese & R. Kail (Eds.), *Advances in child development and behavior* (pp. 189–229). San Diego, CA: Academic Press.

Eisenberg, N., Fabes, R., A. & Murphy, B., C. (1996). Parents' Reactions to Children's Negative Emotions: Relations to Children's Social Competence and Comforting Behavior. *Child Development, 67*(5), 2227-2247. https://doi.org/10.1111/j.1467-8624.1996.tb01854.x

Evans, G. W. (2006). Child development and the physical environment. *Annual Review of Psychology, 57*(1), 423-451. https://doi.org/10.1146/annurev.psych.57.102904.190057

Feldman, R., Granat, A., Pariente, C., Kanety, H., Kuint, J. & Gilboa-Schechtman, E. (2009). Maternal depression and anxiety across the postpartum year and infant social engagement, fear regulation, and stress reactivity. *Journal of the American Academy of Child and Adolescent Psychiatry, 48*(9), 919-927. https://doi.org/10.1097/CHI.0b013e3181b21651

Foster, C. J. E., Garber, J. & Durlak, J. A. (2008). Current and Past Maternal Depression, Maternal Interaction Behaviors, and Children's Externalizing and Internalizing Symptoms. *Journal of Abnormal Child Psychology, 36*(4), 527-537. https://doi.org/10.1007/s10802-007-9197-1

Gilliom, M., Shaw, D., Beck, J., Schonberg, M. & Lukon, J. (2002). Anger regulation in

disadvantaged preschool boys: Strategies, antecedents, and the development of self-control. *Developmental Psychology, 38*(2), 222-235. https://doi.org/10.1037/0012-1649.38.2.222

Glasofer, D. R. (2020, July 7.). Anxiety vs. Depression Symptoms and Treatment Overlapping and distinguishing features of anxiety and depression. Retrieved from https://www.verywellmind.com/am-i-anxious-4045683

Gottman, J. M., Katz, L. F. & Hooven, C. (1997). *Meta-emotion: How Families Communicate Emotionally*. Mahwah, New Jersey: Lawrence Erlbaum.

Grolnick, W. S. & Kurowski, C.O. (1999). Family processes and the development of children's self-regulation. *Educational Psychologist, 34*(1), 3-14. https://doi.org/10.1207/s15326985ep3401_1

Grolnick, W. S. & Slowiaczek, M. L. (1994). Parents' involvement in children's schooling: A multidimensional conceptualization and motivation model. *Child Development*, *65*(1), 237–252. https://doi.org/10.1111/j.1467-8624.1994.tb00747.x

Gumora, G. & Arsenio, W. F. (2002). Emotionality, Emotion Regulation, and School Performance in Middle School Children. *Journal of School Psychology,40*(5), 395-413. https://doi.org/10.1016/S0022-4405(02)00108-5

Hamaker, E. L., Kuiper, R. M.,& Grasman, R. P. P. P. (2015). A critique of the cross-lagged panel model. *Psychological Methods, 20*(1), 102–116. https://doi.org/10.1037/a0038889

Hanscombe, K. B., Haworth, C. M., Davis, O. S., Jaffee, S. R. & Plomin, R. (2011). Chaotic homes and school achievement: a twin study. *Journal of Child Psychology and Psychiatry*, *52*(11), 1212-1220. https://doi.org/10.1111/j.1469-7610.2011.02421.x

Herrera, E., Reissland, N. & Shepherd, J. (2004). Maternal touch and maternal child-directed speech: Effects of depressed mood in the postnatal period. *Journal of Affective Disorders, 81*(1), 29-39. https://doi.org/10.1016/j.jad.2003.07.001

Ivanova, Masha Y, Achenbach, Thomas M, Rescorla, Leslie A, Dumenci, Levent, Almqvist, Fredrik, Bathiche, Marie, . . . Verhulst, Frank C. (2007). Testing the Teacher's Report Form Syndromes in 20 Societies. *School Psychology Review,36*(3), 468-483. http://dx.doi.org/10.1080/02796015.2007.12087934

Kim-Cohen, J., Moffitt, T. E., Taylor, A., Pawlby, S. J. & Caspi, A. (2005). Maternal depression and children's antisocial behavior: nature and nurture effects. *Archives of general psychiatry*, *62*(2), 173-181. https://doi.org/10.1111/cfs.12247

Kopp, C. B. (1989). Regulation of distress and negative emotions: A developmental review.

Developmental Psychology, *25*(3), 343. http://dx.doi.org/10.1037/0012-1649.25.3.343

Mennin, D. S., Holaway, R. M., Fresco, D. M., Moore, M. T. & Heimberg, R. G. (2007). Delineating Components of Emotion and its Dysregulation in Anxiety and Mood Psychopathology. *Behavior Therapy*, *38*(3), 284–302. https://doi.org/10.1016/j.beth.2006.09.001

Miedel, W. T. & Reynolds, A. J. (1999). Parent involvement in early intervention for disadvantaged children: Does it matter? *Journal of School psychology*, *37*(4), 379-402. https://doi.org/10.1016/S0022-4405(99)00023-0

Mistry, R. S., Biesanz, J. C., Taylor, L. C., Burchinal, M. & Cox, M. J. (2004). Family Income and its Relation to Pre-School Children's Adjustment for Families in the NICHD Study of Early Child Care. *Developmental Psychology 40*(5), 727. https://doi.org/10.1037/0012-1649.40.5.727

Mollica, R. F., Wyshak, G., de Marneffe, D., Khuon, F. & Lavelle, J. (1987). Indochinese versions of the Hopkins Symptom Checklist-25: a screening instrument for the psychiatric care of refugees. *The American Journal of Psychiatry, 144*(4), 497–500. https://doi.org/10.1176/ajp.144.4.497

Morris, A. S., Silk, J. S., Steinberg, L., Myers, S. S. & Robinson, L. R. (2007). The Role of the Family Context in the Development of Emotion Regulation. *Social Development (Oxford, England), 16*(2), 361-388. https://doi.org/10.1111/j.1467-9507.2007.00389.x

Muthén, L. K., & Muthén, B. O. (1998-2017). Mplus user´s guide (8th). Los Angeles, CA: Muthén & Muthén.

Nicol-Harper, R., Harvey, A. G. & Stein, A. (2007). Interactions between mothers and infants: Impact of maternal anxiety. *Infant Behavior & Development, 30*(1), 161-167. https://doi.org/10.1016/j.infbeh.2006.08.005

Norwegian Directorate for Education and Training. (2016). *Utdanningsspeilet 2016. Tall og analyse av barnehager og grunnopplæringen i Norge*. Oslo: Utdanningsdirektoratet. Retrieved from: http://utdanningsspeilet.udir.no/2016/wp-content/uploads/2016/06/Utdanningsspeilet_2016.pdf

Parke, R. D. (1994). Progress, Paradigms, and Unresolved Problems: A Commentary on Recent Advances in Our Understanding of Children's Emotions. *Merrill-Palmer Quarterly, 40*(1), 157-169. Retrieved from http://www.jstor.org/stable/23087913

Pearson, R. M., Bornstein, M. H., Cordero, M., Scerif, G., Mahedy, L., Evans, J., ... Stein, A. (2016). Maternal perinatal mental health and offspring academic achievement at age 16: the mediating role of childhood executive function. *Journal of Child Psychology*

and Psychiatry, *57*(4), 491–501. https://doi.org/10.1111/jcpp.12483

Podsakoff, P. M., MacKenzie, S. B. & Podsakoff, N. P. (2012). Sources of Method Bias in Social Science Research and Recommendations on How to Control It. *Annual Review of Psychology, 63*(1), 539-569. https://doi.org/10.1146/annurev-psych-120710-100452

Rogers, A., Obst, S., Teague, S. J., Rossen, L., Spry, E. A., Macdonald, J. A., . . . Hutchinson, D. (2020). Association Between Maternal Perinatal Depression and Anxiety and Child and Adolescent Development: A Meta-analysis. *JAMA Pediatrics, 174*(11), 1082-1092. https://doi.org/10.1001/jamapediatrics.2020.2910

Shields, A. & Cicchetti, D. (1997). Emotion regulation among school-age children: The development and validation of a new criterion Q-sort scale. *Developmental Psychology, 33*(6), 906-916. http://dx.doi.org/10.1037/0012-1649.33.6.906

Silk, J. S., Shaw, D. S., Forbes, E. E., Lane, T. & Kovacs, M. (2006). Maternal depression and child internalizing: the Moderating role of child emotion regulation. *Journal of Clinical Child and Adolescent Psychology*, *35*(1), 116-126. https://doi.org/10.1207/s15374424jccp3501_10

Sohr-Preston, S. L. & Scaramella, L. V. (2006). Implications of timing of maternal depressive symptoms for early cognitive and language development. *Clinical Child and Family Psychology Review*, *9*(1), 65-83. https://doi.org/10.1007/s10567-006-0004-2

Steinsbekk, S. & Wichstrøm, L. (2018). Cohort Profile: The Trondheim Early Secure Study (TESS)-a study of mental health, psychosocial development and health behavior from preschool to adolescence. *International Journal of Epidemiology, 47*(5), 1401-1401i. https://doi.org/10.1093/ije/dyy190

Stipek, D. & Gralinski, J. H. (1996). Children's Beliefs About Intelligence and School Performance. *Journal of Educational Psychology, 88*(3), 397–407. https://doi.org/10.1037/0022-0663.88.3.397

Sun, Y. & Li, Y. (2011). Effects of Family Structure Type and Stability on Children's Academic Performance Trajectories. *Journal of Marriage and Family*, *73*(3), 541–556. https://doi.org/10.1111/j.1741-3737.2011.00825.x

The National Institution of Mental Health. (2018, July). Anxiety Disorders. Retrieved from https://www.nimh.nih.gov/health/topics/anxiety-disorders/index.shtml

The Norwegian Directorate of Health. (n.d). Angst og depresjon. Retrieved from https://www.helsedirektoratet.no/tema/angst-og-depresjon

The Norwegian Institute of Public Health. (2019, January 31.). Mors angst kan gi psykiske problemer hos barna. Retrieved from https://www.fhi.no/nyheter/2019/mors-angst-

kan-gi-psykiske-problemer-hos-barna/

Thompson, R. A. (1990). Emotion and self-regulation. In R. A. Thompson (Ed.), *Socioemotional development* (pp. 367-467). Lincoln: University of Nebraska Press.

Thompson, R. A. (1994). Emotion Regulation: A Theme in Search of Definition. *Monographs of the Society for Research in Child Development, 59*(2/3), 25-52. https://doi.org/10.1111/j.1540-5834.1994.tb01276.x

Topor, D. R., Keane, S. P., Shelton, T. L. & Calkins, S. D. (2010). Parent involvement and student academic performance: a multiple mediational analysis. *Journal of prevention & intervention in the community*, *38*(3), 183–197. https://doi.org/10.1080/10852352.2010.486297

Van den Bergh, B. R. H., Mennes, M., Oosterlaan, J., Stevens, V., Stiers, P., Marcoen, A. & Lagae, L. (2005). High antenatal maternal anxiety is related to impulsivity during performance on cognitive tasks in 14- and 15-year-olds. *Neuroscience and Biobehavioral Reviews, 29*(2), 259–269. https://doi.org/10.1016/j.neubiorev.2004.10.010

Van der Waerden, J., Bernard, J. Y, De Agostini, M., Saurel-Cubizolles, M-J., Peyre, H., Heude, B. & Melchior, M. (2017). Persistent maternal depressive symptoms trajectories influence children's IQ: The EDEN mother–child cohort. *Depression and Anxiety*, *34*(2), 105–117. https://doi.org/10.1002/da.22552

Villodas, M. T., Bagner, D. M. & Thompson, R. (2018). A Step Beyond Maternal Depression and Child Behavior Problems: The Role of Mother-Child Aggression. J*ournal of Clinical Child and Adolescent Psychology*, *47*(4), 634-641. https://doi.org/10.1080/15374416.2015.1094740

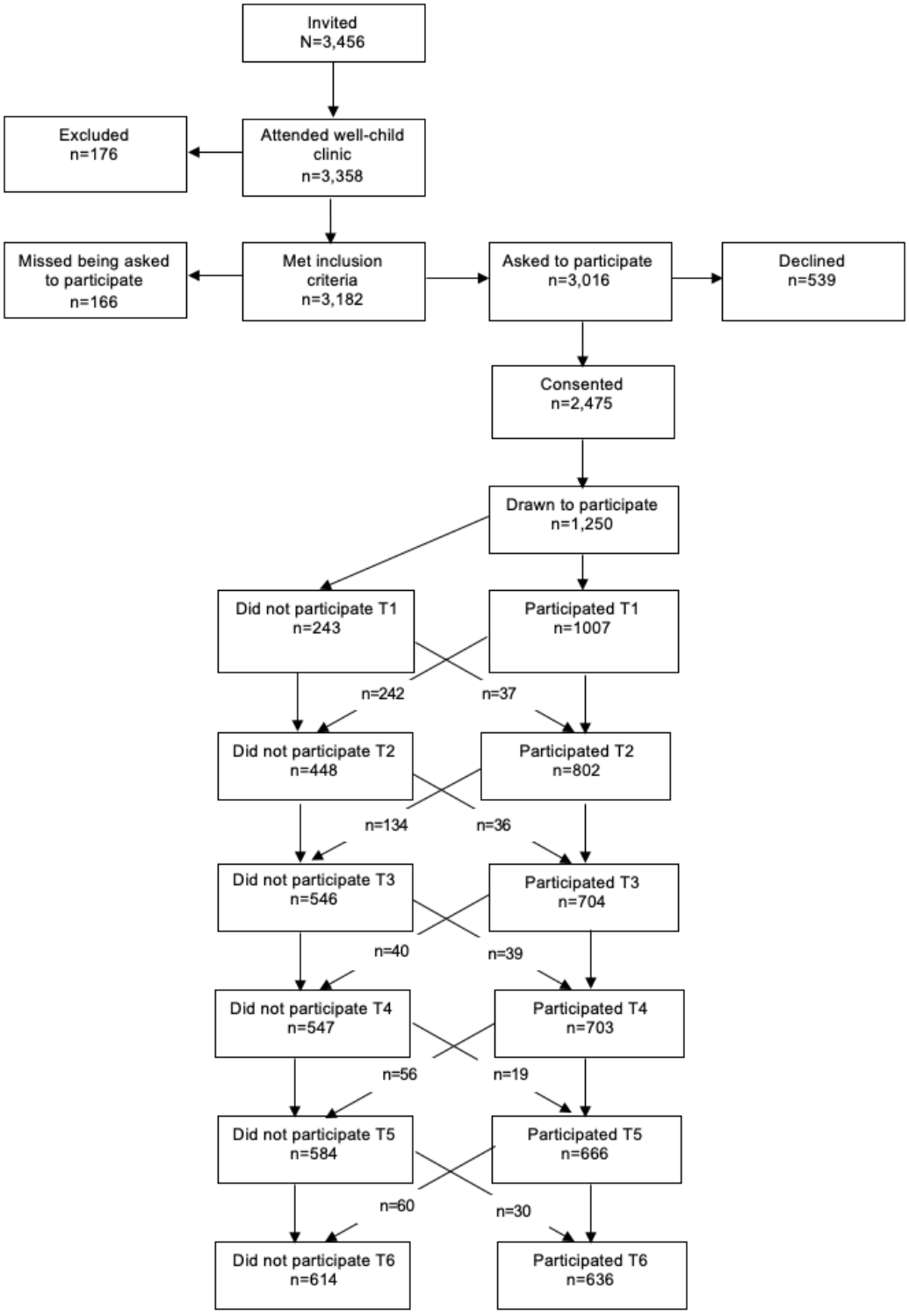
Wachs, T. D., Black, M. M. & Engle, P. L. (2009). Maternal Depression: A Global Threat to Children's Health, Development, and Behavior and to Human Rights. Child Development Perspectives, *3*(1), 51-59. https://doi.org/10.1111/j.1750-8606.2008.00077.x

Whaley, S. E., Pinto, A. & Sigman, M. (1999). Characterizing Interactions Between Anxious Mothers and Their Children. *Journal of Consulting and Clinical Psychology, 67*(6), 826-836. https://doi.org/10.1037/0022-006X.67.6.826

World Health Organization. (2017). Depression and Other Common Mental Disorders: Global Health Estimates. Retrieved form https://apps.who.int/iris/bitstream/handle/10665/254610/WHO-MSD-MER-2017.2-eng.pdf

Wu, Q., Feng, X., Gerhardt, M. & Wang, L. (2020). Maternal depressive symptoms, rumination, and child emotion regulation. *European Child & Adolescent Psychiatry, 29*(8), 1125-1134. https://doi.org/10.1007/s00787-019-01430-5

Attachment 1: Recruitment Process



Note. Number of participants at the various assessment points is based on the number of participants invited to participate (n=1250) minus those who did not participate at the respective measurement point (i.e., T1, T2).

Table and Figures

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
(1) Maternal anxiety T3	9.103	1.760	1.000															
(2) Maternal anxiety T4	9.186	1.932	.607**	1.000														
(3) Maternal anxiety T5	9.339	1.974	.608**	.535**	1.000													
(4) Maternal anxiety T6	9.588	2.186	.652**	.543**	.647**	1.000												
(5) Maternal depression T3	15.050	3.750	.627**	.388**	.430**	.441**	1.000											
(6) Maternal depression T4	14.901	3.604	.455**	.531**	.420**	.464**	.627**	1.000										
(7) Maternal depression T5	15.198	4.090	.426**	.376*	.633**	.513**	.568**	.645**	1.000									
(8) Maternal depression T6	15.690	4.299	.464**	.352**	.464**	.656**	.551**	.556**	.671**	1.000								
(9) Emotion regulation – Teacher report T3	1.356	.302	.048	.051	.073	.011	.062	.071	.085	-.004	1.000							
(10) Emotion regulation – Teacher report T4	1.391	.318	.027	.018	.078	.002	.052	.045	.053	-.024	.563**	1.000						
(11) Emotion regulation – Teacher report T5	1.351	.326	-.038	-.031	.079	.016	-.026	.042	.106**	.015	.461**	.514**	1.000					
(12) Emotion regulation – Teacher report T6	1.352	.268	.065	.044	.037	.112	.012	.045	.030	.084*	.274**	.361**	.359**	1.000				
(13) Academic achievement T3	3.350	.824	-.055	.022	-.065	-.099	.002	-.048	-.021	-.004	-.237*	-.182*	-.110*	-.200*	1.000			
(14) Academic achievement T4	3.316	.860	-.056	-.004	-.067	-.096*	-.008	-.070*	-.060	.004	-.249**	-.246*	-.183*	-.227*	.732**	1.000		
(15) Academic achievement T5	3.364	.820	.004	-.035	-.053	-.067	.035	-.044	-.032	.025	-.270**	-.269*	-.239*	-.282**	.646**	.749**	1.000	
(16) Academic achievement T6	3.342	.739	.028	.035	-.062	-.099	.045	-.055	-.069	-.043	-.240**	-.286**	-.220*	-.313**	.541**	.626**	.665**	1.000

Table 1: Descriptive statistics between study variables
*<.05, **<.01

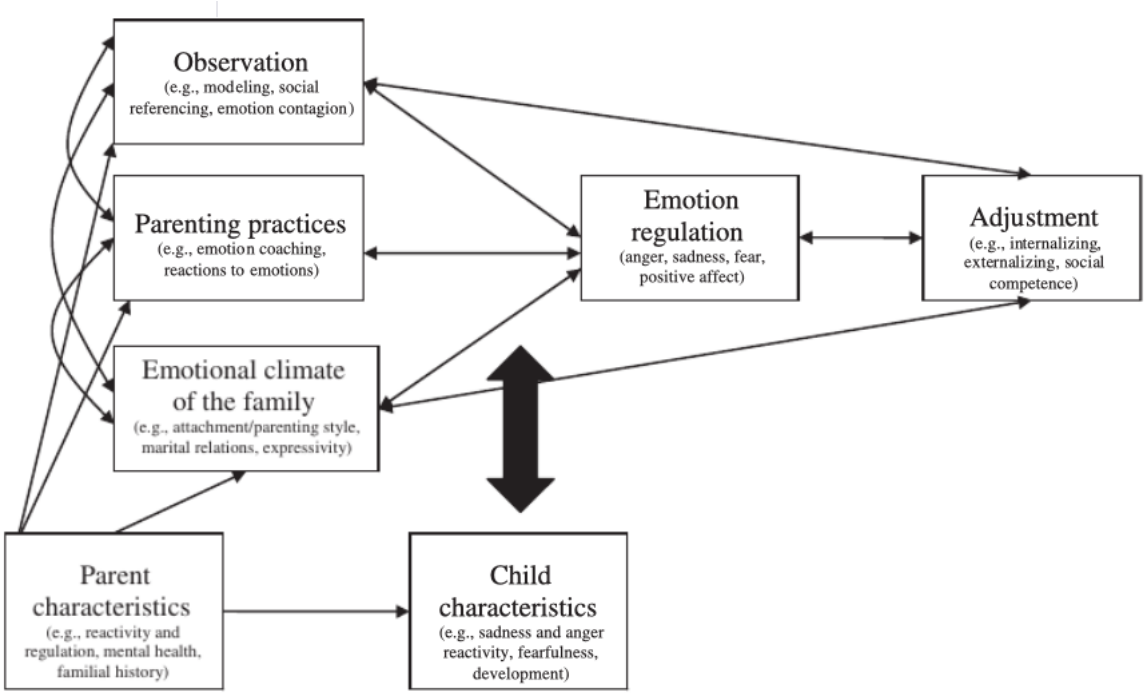


Figure 1: Tripartite Model of the Impact of the Family on Children's Emotion Regulation and Adjustment

(Morris et al., 2007, p. 362)

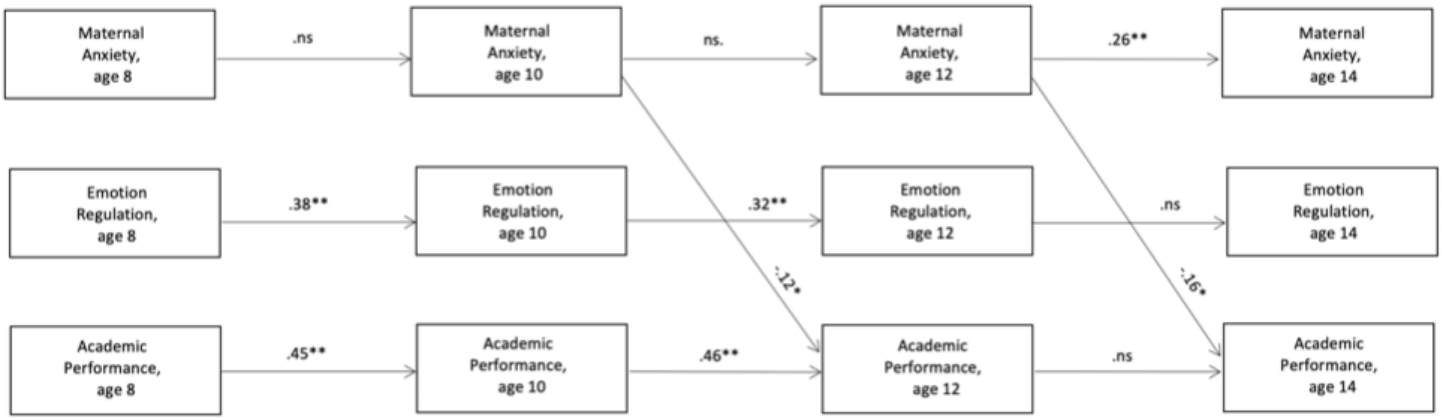


Figure 2: Cross-lagged from structural equation modeling (maternal anxiety).

Within-subjects cross-lagged effects of Maternal anxiety, Child emotion regulation, and Academic achievement from random intercepts modelling for the total sample, age 8, 10, 12 and 14. Path coefficients are standardized regression weights. Only significant paths are shown (* < .05, ** < .01).

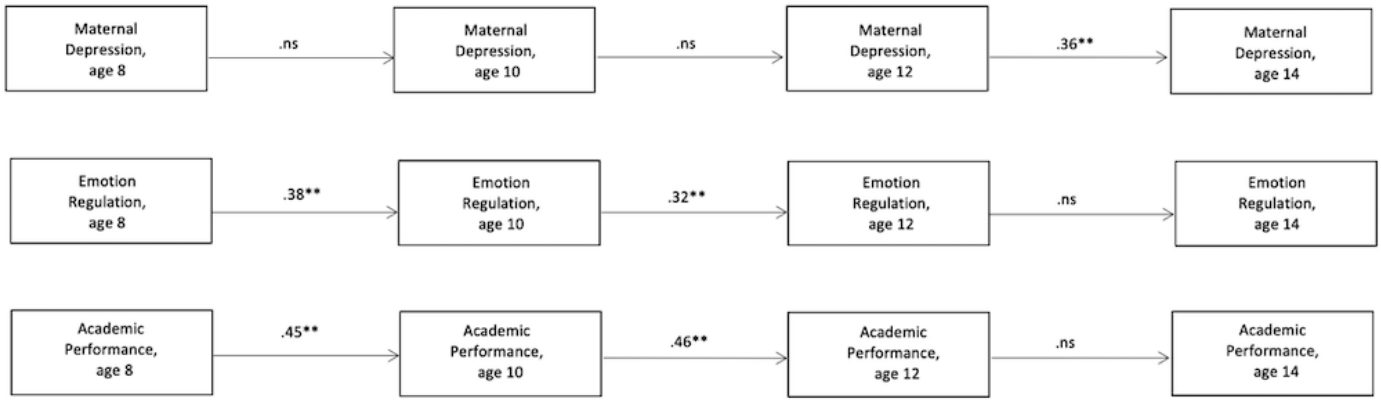
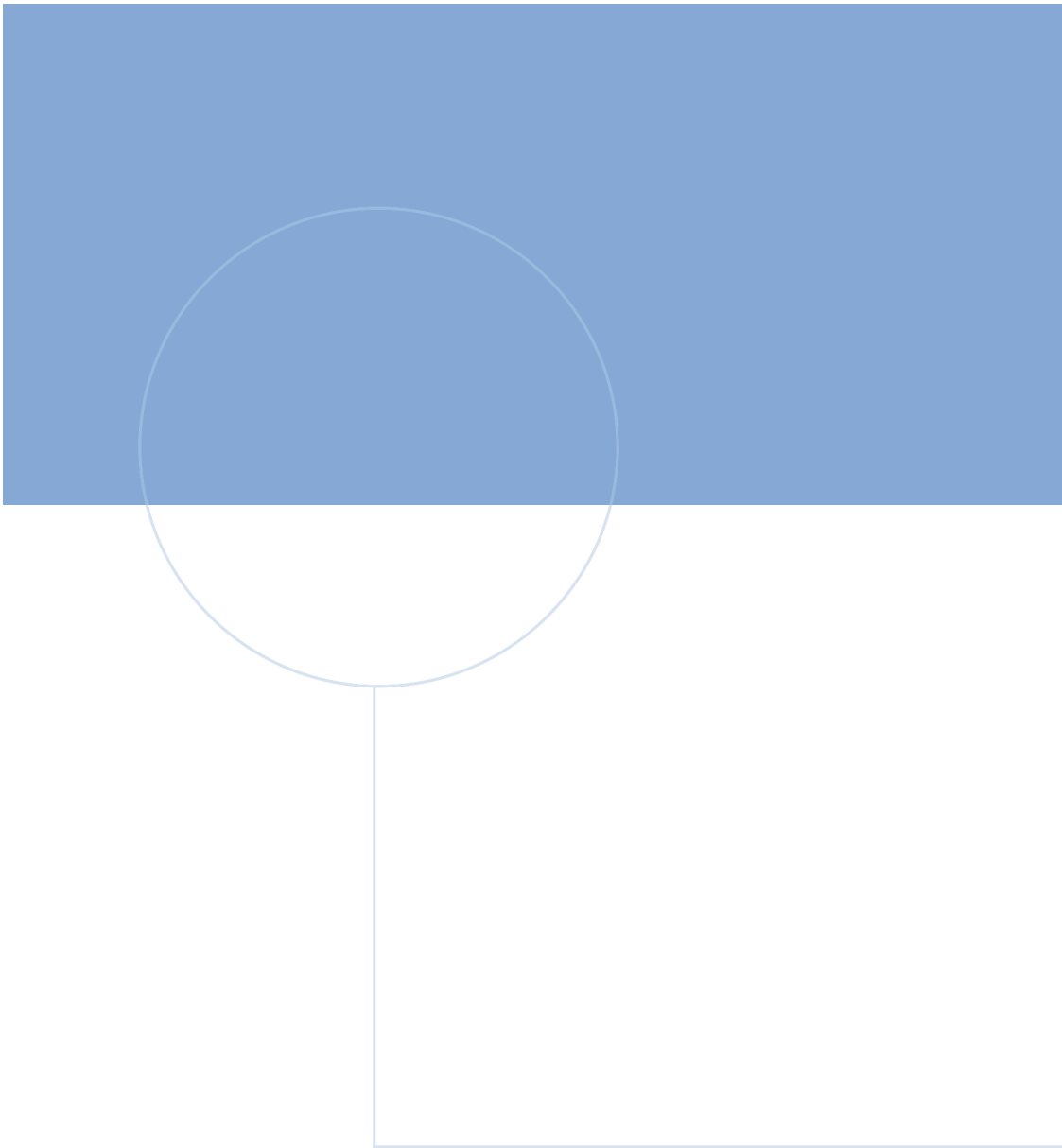


Figure 3: Cross-lagged from structural equation modeling (maternal depression)

Within-subjects cross-lagged effects of Maternal depression, Child emotion regulation, and Academic achievement from random intercepts modelling for the total sample, age 8, 10, 12 and 14. Path coefficients are standardized regression weights. Only significant paths are shown (* < .05, ** < .01).



NTNU

Norwegian University of
Science and Technology