

THE DEVELOPMENT OF EMOTIONAL INTELLIGENCE:
IDENTIFYING COMPONENTS AND CORRELATES
IN PRESCHOOL-AGED CHILDREN

A Thesis

Presented to

The Faculty of the Department of Psychology
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In Partial Fulfillment

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by

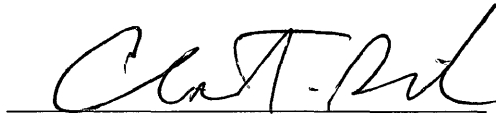
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APPROVAL SHEET

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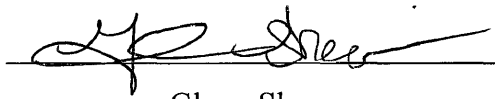


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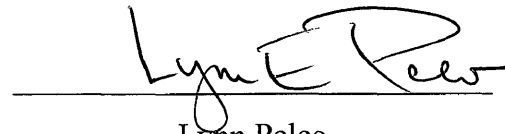
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DEDICATION

I would like to dedicate this to my parents, who have given me the freedom and courage to be myself.

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ABSTRACT

The present study investigated the development of emotional intelligence (EI) in preschool-aged children over a six month period. This study sought to identify and measure the separate components (regulation, recognition, and understanding of emotion) and predictor variables (child temperament, parent personality, and parent EI) of a child's EI. Also of interest was change over the six month period in the child's temperament and the child's EI components.

Participants included 23 children and their parents, who came in to the laboratory for two visits, six months apart. Parents filled out personality questionnaires, an adult EI test, 2 child temperament reports and 2 family information sheets (1 for each visit). At each laboratory visit, children participated in activities designed to measure emotion regulation, and recognition and understanding of emotion in others.

Analyses of the 3 EI components demonstrated that they were not significantly related to each other. Findings indicate that temperament is the strongest predictor of all three child EI components, yielding the most significant relationships with the EI components. In particular, the temperament dimensions rhythmicity and adaptability proved to be strong predictors of the child's understanding of emotion in others. The specific temperament dimensions related to the EI components varied with age of the child. Parent personality (both mother and father) and age of the child significantly predicted child's emotion regulation. Trends existed for the relationships between parent personality and child's recognition and understanding of emotion. Parent EI, obtained for one parent only, was moderately related (approaching significance) to child's recognition of emotion. Significant change over the six month period occurred in the child's self-regulation and recognition of emotion in others; children improved in regulation and recognition of emotion.

Results also highlight temperament stability and significant relationships between parent personality and child temperament. Discussion includes proposal for redefining EI for preschool-aged children, based upon the weak relationship between the EI components. The relationship between emotion regulation and temperament is also discussed. Recommendations for future studies and assessment issues (limitations to the study) are included.

THE DEVELOPMENT OF EMOTIONAL INTELLIGENCE:
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INTRODUCTION

Extensive research has focused on emotional development in young children, including such areas as emotion regulation (Rothbart & Jones, 1998), emotion expression (Rotenberg & Eisenberg, 1997), empathy (Eisenberg, 1992), and perception of emotion (Camras & Allison, 1985). Of recent interest is the construct of emotional intelligence (EI), defined as the ability to accurately perceive others' emotions, to understand and analyze others' emotions, to effectively utilize one's own emotions, and to regulate one's own emotions (Mayer & Salovey, 1997). Although these components have previously been studied independently by various groups of psychologists, they have now been unified under a single construct. The present longitudinal study focused on the development of emotional intelligence in preschool-aged children. In addition, this study investigated possible influences on the development of emotional intelligence, including the child's temperament, the parent's personality, and the parent's emotional intelligence. In studying these influences, more can be understood about the emergence of emotional intelligence skills and the interactions of biology and environment in the development of emotional intelligence.

Research in Emotional Development

Past research has focused on areas of emotional development in children, concerning such areas as emotion regulation (Cicchetti, Ganiban, & Barnet, 1991), emotion expression (Malatesta-Magai, 1991), and empathy (Damon, 1983). Emotion

regulation has been a topic of interest to many researchers, for the implications of effective emotion regulation are significant. The primary goal in emotion regulation is to modulate and control arousal, which then enables an individual to remain within a "performance-optimizing range" (Garber & Dodge, 1991, p. 15). There are many interacting factors that can determine or contribute to a child's ability to regulate emotions well, such as temperament, socialization and parental practices, and social context of the emotional experience (Underwood, 1997). There have been some concerns expressed in the realm of measuring emotion regulation, in that the modulation of arousal may be inseparable from the intensity of the experienced emotion (Underwood; Walden & Smith, 1997). Emotion regulation may refer to modulation of the emotional tone (the specific emotion experienced) or to the emotional dynamics, such as the intensity or range of emotion experienced (Walden & Smith).

Researchers (Eisenberg et al., 1996) have examined negative emotionality and emotion regulation as predicting problem behavior in children. Parents and teachers provided information for children's problem behavior (e.g., aggression, noncompliance) and measures of emotionality. Children's regulation of emotion was measured while watching a distress film sequence. Eisenberg and her colleagues found that effective emotion regulation buffered the effects of negative emotionality (tendency towards negative emotions). Thus, children who were moderate to high in negative emotionality and high in emotion regulation were protected from the (potentially) negative effects of

the emotionality (thus less likely to exhibit problem behavior). Also, emotional responding and emotion regulation in young children have been linked to socialization and social adaptation (Eisenberg, Fabes, & Losoya, 1997; Rubin, Coplan, Fox, & Calkins, 1995). Rubin et al. examined the interacting effects of children's emotion regulation and social interaction on social adaptation. Findings from their study suggest that low social interaction children who exhibited ineffective (poor) regulation of emotion were more likely to exhibit social wariness in peer play. High social interaction children who exhibited ineffective regulation of emotion were more likely to exhibit disruptiveness in peer play. Thus, the effectiveness of regulation of emotion determined, in part, the child's social adaptation (Rubin et al.). These studies highlight the substantial impact of emotion regulation on a child's emotional and social development.

Other areas of emotional development that have been studied extensively include recognition and understanding of emotion in others. A child's ability to accurately perceive emotion in both facial expressions and story vignettes has also been investigated (Camras & Allison, 1985; Camras, Grow, & Ribordy, 1983; Ribordy, Camras, Stefani, & Spaccarelli, 1988). Camras and colleagues investigated abused children's ability to accurately recognize emotional expressions. The participants (mean age five-years-old) were shown photographs of children portraying different facial emotional expressions. The participants also listened to brief stories about a child. The participants were asked to choose the picture that corresponded with the emotion in the story (emotional term was

used in story; for example, "he is happy"). Findings (Camras et al.) indicate that abused children are less accurate than nonabused children in recognizing (identifying) emotional expressions. As well, these abused children were more likely to be rated by their teachers as less socially competent than their peers. This study illustrates the connection that exists between recognition of emotion and children's perceived social competence or abilities, not to mention the detrimental effects of abuse on children's emotional and social development. Research on the development of friendship and the increasing importance of peers incorporates interpersonal understanding abilities of the child (Damon, 1983). As children develop friendships, there is an increasing importance placed upon interpersonal relations, such as taking turns, sharing, role-playing, and helping others. These behaviors are indicative of children's understanding of other people's feelings and the child's ability to take another person's perspective.

In the past, these aspects of emotional development have been studied as separate, but interacting, components. Now that these components of emotion regulation, recognition, and understanding of emotion have been unified under a single construct, all of these factors may now contribute to the assessment of a child's level of emotional intelligence.

Emotional Intelligence

A brief look at the origins of emotional intelligence will facilitate understanding and appreciation of the current concept of emotional intelligence. Intelligence testing

originated with Binet's development of tests designed to differentiate children according to their appropriate grade level (Gardner, 1983). Spearman was instrumental in solidifying the 'general factor of intelligence' (g), which identifies an overall intelligence with one number. On the other hand, Thurstone promoted the concept of a set of intelligences, or "mental faculties" that were relatively independent of one another and indicative of different abilities (Gardner). According to Gardner, neither of these approaches by Spearman (general intelligence) or Thurstone (set of intelligences) have proven to be more correct than the other. In 1983, Gardner proposed a theory of multiple intelligences, based on his belief that intelligence was not composed of one general factor, but of several components. Gardner was of the persuasion that there existed several important and independent human intellectual abilities. One of the main purposes for Gardner's argument was practical; he suggested that identification of an individual's abilities could enhance the individual's learning and acquisition of knowledge and skill by tailoring a program in accordance with the individual's abilities (i.e., a person who shows great aptitude in music may learn best through the medium of music).

Gardner noted that "human beings have a proclivity to execute certain specifiable intellectual operations, while proving incapable of performing other intellectual operations" (1983, p. 32). This suggested to him that people in general, and child prodigies and idiots savants in particular, can express a profound intelligence in one area, but not in other areas. Therefore, a general intelligence score was not indicative of an

individual's true abilities. Furthermore, he pointed out that much of the information obtained in an intelligence test reflects a bias towards a knowledge base rather than reasoning abilities (crystallized versus fluid intelligence).

It has been noted that an intelligence is qualitatively different from another if there is a low to moderate correlation between them (Mayer & Salovey, 1997). If two intelligences are highly correlated with each other, then they may be perceived as measuring the same intelligence (Mayer & Salovey). Thus, intelligences should yield a low to moderate correlation at most for them to be considered different. Gardner's theory of multiple intelligences (1983) included seven different types of intelligences, all purported to be different from one another. Two of the intelligences, intrapersonal and interpersonal intelligences, comprised the basis for the present concept of emotional intelligence. Intrapersonal intelligence was defined by Gardner (1983) as having "access to one's own feeling life - one's range of affects or emotions: the capacity to effect discriminations among these feelings and, eventually, to label them, to enmesh them in symbolic codes, to draw upon them as a means of understanding and guiding one's behavior" (p. 239). This is the self-oriented intelligence that turns reflection and contemplation inwards. Gardner defined interpersonal intelligence as "the ability to notice and make distinctions among other individuals and, in particular, among their moods, temperaments, motivations, and intentions" (p. 239). This is the other-oriented intelligence that directs recognition and understanding outwards. Gardner posited these

two intelligences together because of their developmentally intertwined relationship with one another; he indicates that neither form can develop without the other.

Elaborating on Gardner's intrapersonal and interpersonal intelligences, Mayer and Salovey introduced the term "emotional intelligence" in 1990. They combined the two intelligences into one and have since delineated four essential levels of emotional intelligence (see Figure 1). These four components include:

The ability to perceive accurately, appraise, and express emotion; the ability to access and/or generate feelings when they facilitate thought; the ability to understand emotion and emotional knowledge; and the ability to regulate emotions to promote emotional and intellectual growth. (Mayer & Salovey, 1997, p. 10)

Hence, elements of emotional functioning have been brought together under one unified construct, namely emotional intelligence. Examination of these four levels provides a measure of emotional intelligence for an individual.

Why should we study and measure emotional intelligence? The implications for a high level of emotional intelligence are considerable; an individual may have a better chance of enjoying adaptive communication skills, satisfying relationships and greater success in life (Mayer & Salovey, 1997). Goleman (1995) points out that "intellect cannot work at its best without emotional intelligence" (p. 28). People are not likely to effectively absorb and process information if they are experiencing strong (negative)

emotions. Thus, emotional intelligence may play a significant role in the facilitation of cognitive functioning.

Mayer and Salovey (1997) illustrated the importance of effective emotion regulation and emotional facilitation of thinking in moments of a crisis. Goleman (1995) also mentions the valuable contributions of emotional intelligence skills in managing relationships with others, "these are the social competences that make for effectiveness in dealings with others; deficits here lead to ineptness in the social world or repeated interpersonal disasters" (p. 113). A person with a high level of emotional intelligence may be perceived as one who can reason with emotion (Mayer & Salovey). Conversely, if someone cannot reason with emotion effectively, then the emotion may take over and control the individual's decisions and behaviors. Goleman provides an example of this in his description of a "hijacking", in which certain parts of the brain trigger an alarm (in response to a stimulus) and thus precipitate immediate reactions before the individual can comprehend what has occurred. The individual may then regret what has been said or done in the heat of the moment.

Impulse control, the ability to resist temptation, is another area pertinent to emotional intelligence. Impulsivity, or poor impulse control, in children is often used to predict later delinquency (Goleman). The child who does not demonstrate effective emotion regulation may thus be at risk for engaging in criminal acts, perhaps even leading to a "hijacking" as previously discussed. Empathy is related to one's ability to recognize

and understand emotions in others. When a person can take another person's perspective, he/she demonstrates empathy. A noted absence of empathy (Goleman) may also be associated with criminal behavior (i.e., acts that deliberately inflict harm upon others). Given these suggestions of the significance of EI, it may be beneficial to identify and measure the components that make up children's emotional intelligence and how these develop with age.

As well, investigation of children's emotional intelligence may reveal how much of EI may be learned or acquired. There may be intervention opportunities for children who exhibit lower emotional intelligence levels (Mayer & Salovey, 1997). Specifically, various programs that offer children training and coaching in identifying and managing emotions in oneself and others have produced positive outcomes (Eisenberg, Wentzel, & Harris, 1998). For example, the Empathy Training Program (Eisenberg et al.) focused on identifying emotions in oneself and others, and practicing taking the perspective of another person. The children who received this training over a 10-week period demonstrated improvements in prosocial behavior. Along with any training of emotional intelligence skills, there should be guidance in the proper use of emotional intelligence; for example, the ability to manage emotions in others should not result in direct manipulation of others with harmful or illicit intent. Gardner (1983) illustrates this with his comment that one can use specific intelligences for "highly nefarious purposes" (p. 68).

Influences of Emotional Intelligence: Temperament

The influences and correlates of emotional intelligence were also of interest in this investigation; the primary influence of interest was the child's temperament. Presently, there are multiple theories of temperament. These theories of temperament differ in such areas as defining the specific make-up of a child's temperament, classification of temperament, and the scope of behavioral tendencies that may comprise a child's temperament. A review of several of these theories will be instrumental in discerning the relationship between temperament and a child's emotional intelligence.

An attempt to define temperament can lead to many possible answers, for the different theories concerning temperament vary substantially in the details of the definition. However, there do seem to be some aspects of temperament upon which theorists agree. Goldsmith et al. (1987) outlined these points of consensus. One point of agreement is that temperament refers to a child's behavioral tendencies, not to specific behaviors themselves (Goldsmith et al.). Another area of agreement concerns the origin of temperament, in that temperament is biologically based. This biological origin of temperament contributes to the continuity or stability of temperament (Goldsmith et al.). Many temperament theorists focus on infant temperament, primarily because as the child grows older, temperament and its relationships with other factors and abilities (e.g., cognition, motivation) become more intricate, due to the child's experiences and development (Goldsmith et al.). Hence, many perceive early infant temperament to be a

more veritable expression of the child's temperament. Another area of agreement among temperament theorists is that temperament reflects individual differences among children (Goldsmith et al.).

Theorists do differ, however, on other areas concerning temperament. One of the primary areas of disagreement concern the classification of certain temperament characteristics. For example, some theorists follow a more dimensional approach to temperament, in that one may rate a child on a particular characteristic or behavioral tendency in terms of quantity (low or high on the dimension). Theorists who promote the dimensional approach include Buss and Plomin, and Thomas and Chess (Goldsmith et. al, 1987). Buss and Plomin define temperament as a "set of inherited personality traits that appear early in life" (Goldsmith et al., p. 508). These traits are inherited, and they lay the foundation for the developing personality. Buss and Plomin's definition of temperament incorporates three primary categories - emotionality (child's intensity of reaction - primarily concerning negative emotions), activity (speed, energy, and duration of child's movements), and sociability (child's inclination to be with others). Although there may be some differentiation in the expressions of these three temperament categories over the course of development, Buss and Plomin indicate that the genetic origins of temperament suggest overall stability (Goldsmith et al.; Pedlow, Sanson, Prior, & Oberklaid, 1993). Environmental influences of temperament are recognized, but the child's temperament is deemed an important influence of the environment. This type of influence may be

evident in a classroom, in which a child with a very high activity level may affect the dynamics of the entire classroom.

Thomas and Chess also promote a dimensional approach to temperament, based on their New York Longitudinal Study (Goldsmith et al., 1987; Henderson & Fox, 1998). They derived nine temperament dimensions from parent reports of infant behavior over a period of time. These categories include activity level, rhythmicity (predictability of daily cycles), adaptability, intensity (strength of reaction), approach/withdrawal (reaction to novel stimuli), mood, distractibility, persistence, and sensory reactivity. Thomas and Chess indicate that temperament encompasses the how of behavior, rather than the why and what of behavior (Goldsmith et al.; Henderson & Fox). The stylistic elements of a child's behavior are described by temperament, such as the energy with which a child reaches for a toy. Thomas and Chess highlight the importance of differentiating temperament from other attributes, such as motivation and abilities (Goldsmith et al.). They also stress that context should be taken into consideration when rating temperament. Like Buss and Plomin, Thomas and Chess acknowledge the interaction between child temperament and environment, "temperament is an attribute of the child that mediates the influence of the environment" (Goldsmith et al., p. 509). Temperament helps to explain why children respond differently in similar situations. Thomas and Chess also promote a "goodness of fit" model (Carey, 1998; Goldsmith et al.; Henderson & Fox) in which the child's temperament is a good match to the environment, so that optimum development

may occur. Thus, when demands of the environment and expectations of others match the child's temperament, then there is a goodness of fit.

In addition to the dimensional approach, Thomas and Chess described three types of temperament, incorporating particular levels of dimensions into specific clusters or types. The three types of temperament are difficult, easy, and slow-to-warm-up; each type varies on levels of dimensions (Carey, Goldsmith et al., Henderson & Fox). For example, a difficult temperament has typically suggested a child who is intense, negative, and irregular, with a tendency to withdraw and adapt gradually (Henderson & Fox). The difficult temperament type has been linked to a higher risk for developing behavior problems (Goldsmith et al.), though this may be more evident in a mismatch between child and temperament (parents/teachers who experience problems and stress in handling difficult temperament type).

Kagan, another temperament researcher, portrays temperament in terms of categories. He has classified different types of children, who differ in a more qualitative sense rather than in a quantitative way (Henderson & Fox, 1998). His studies with inhibited and uninhibited children have demonstrated stability of this behavioral tendency over several years (Henderson & Fox; Kagan et al., 1984). Kagan has defined inhibited and uninhibited primarily in terms of the child's response to the unfamiliar. His studies involved measurement of the child's heart rate in different circumstances, and he has noted that inhibited children at 21 months exhibited similar inhibited behavior tendencies

and heart rate variability two years later (Kagan et al.). Some of the inhibited behavioral tendencies that were observed in the laboratory included retreating from an unfamiliar person, clinging to the parent, crying, and taking a long time to interact with an unfamiliar person. Henderson and Fox have pointed out that Kagan's use of categorical descriptions for inhibited and uninhibited children (typically describing children with more extreme scores - about 10-15% of population) may be useful to educators in identifying these children in classrooms. Children who consistently exhibit extreme scores for inhibited or uninhibited behavioral tendencies may be at greater risk for developing anxiety problems or conduct disorders, respectively (Henderson & Fox). Thus, Kagan's categorical descriptions may prove instrumental in identifying at-risk children.

Rothbart and Derryberry have incorporated the element of self-regulation into their definition of temperament (Goldsmith et al., 1987; Henderson & Fox, 1998; Rothbart & Jones, 1998). They indicate that temperament involves individual differences in both reactivity and self-regulation. Reactivity refers to the arousability of the child, and self-regulation refers to ways (e.g., attention, avoidance) in which the child modulates the reactivity (Goldsmith et al.). Rothbart and Derryberry point out that temperament may be observed in patterns of emotionality, activity, and attention. There are six different temperament categories or dimensions that Rothbart and Derryberry have studied in infants; these include activity, smiling and laughter, fear, frustration, soothability, and duration of orienting (Goldsmith et al.). Similar to Thomas and Chess,

Rothbart proposes that personality involves more than temperament, namely self-concept and specific expectations and attitudes (Goldsmith et al.). She suggests that the newborn's temperament is the newborn's personality, and that "additional personality structures and strategies are developed in the course of maturation and subsequent interaction with the environment" (Goldsmith et al., p. 510). Hence, Rothbart also alludes to the biological basis of temperament and personality.

One of the unique elements of Rothbart and Derryberry's theory of temperament is the inclusion of self-regulation. Thus, when they speak of the child's level on a particular dimension, they also consider the regulation capabilities of the child, and the nuances of the environment or situation. In other words, the expression of the child's temperament may be influenced by the degree of stimulation in the environment, as well as the regulatory capacities that the environment offers and that the child brings to the situation (Goldsmith et al., 1987). Additionally, the development of a child's regulation capabilities (which would correspond with child's development in such areas as cognition and motivation) may affect the stability of temperament. Rothbart and Derryberry (Goldsmith et al.) indicate that periods of instability in temperament may correspond with developmental transitions, but that temperament remains relatively stable.

In summary, temperament is generally considered by theorists to be a biologically based set of traits (consisting of variations of activity, emotionality, and sociability) that later becomes the basis for personality (Goldsmith et al., 1987). Temperament describes

the stylistic qualities of a child's behavioral tendencies, and remains relatively stable over time (Teglasi, 1998). As the child develops, his or her temperament changes slightly under the influence of the environment. The child's environment and experiences affect the expression and development of temperament. In turn, the child's temperament affects his/her environment and other people in the environment. "By assuming a bidirectional interplay among intrinsic attributes of a person and external demands, supports, and circumstances, temperament theory supports the widely accepted assumption that development is propelled by the person and environment interaction (Teglasi, p. 475).

In the current study, the nine temperament dimensions of Thomas and Chess and their relationship with the child's emotional intelligence were investigated. A brief description of each dimension will be helpful in relating the temperament dimensions with the child's emotional intelligence. The activity level category is a measure of the daily motor activity of the child. Rhythmicity refers to the regularity of bodily processes of the child (e.g., eating, sleeping, & eliminating). Adaptability is a measure of the child's ease of transition to new or changed situations. The intensity of reaction dimension is the degree to which the child responds to stimuli. Approach/withdrawal refers to the child's first reaction to novel stimuli and situations. Quality of mood is a measure of the child's level of positive or negative affect. The distractibility category refers to the effectiveness of stimuli in the environment to shift the child's attention and/or behavior. Persistence is the degree to which the child maintains his/her interest or pursues and activity, despite

obstacles. The last dimension is threshold of responsiveness, which indicates the level of sensory stimulation that is necessary to evoke a response from the child.

Similar to Rothbart and Derryberry, other researchers have noted that temperament is closely linked to emotion regulation. Several studies have highlighted the close relationship between emotion regulation and temperament (Clark & Watson, 1999; Rubin et al., 1995; Underwood, 1997; Walden & Smith, 1997). As stated by Walden and Smith (1997),

Reactivity refers to individual differences in the threshold and intensity of emotional experience, whereas regulation refers to the modulation of arousal. Thus, temperament and emotion regulation are intertwined. This perspective highlights the interdependence between the individual's level of emotional arousability and the extent to which regulatory processes will be employed. That is, individuals differ in their basic levels of arousability, but once aroused, they also differ in the ease and way in which the emotional arousal is regulated. (p. 8)

Given this close relationship between temperament and regulation of emotion, multiple temperament ratings were obtained for each child over the course of the study.

Theorists contend that although alteration of specific characteristics of temperament in development occurs, a general pattern of consistent behavior may be observed. Such stability points to the underlying endurance of temperamental behavior patterns in a child (Goldsmith et al., 1987; Matheny, Wilson, & Nuss, 1984; Pedlow et

al., 1993; Peters-Martins & Wachs, 1984; Riese, 1987). Additionally, systematic variance in temperamental behavior may be accounted for by genetic factors. There is increasing evidence for the heritability of temperament. This is apparent in the higher concordance rate of change among monozygotic twins than dyzygotic twins when change is observed (Matheny, 1989; Saudino, Plomin, & DeFries, 1996). Specifically, activity level, task orientation (persistence), and affect-extraversion (emotionality and sociability) showed significant heritability in the MacArthur Longitudinal Twin Study (Saudino et al.). Matheny found significant evidence for the heritability of behavior inhibition (approach/withdraw) in his study with monozygotic and dyzygotic twins. In addition to Buss and Plomin (Goldsmith et al., 1987), Clark and Watson (1999) propose that genes are responsible for observed stability in temperament, while environment is responsible for observed change in temperament. In looking at the relationship between temperament and emotional intelligence in a young child, there may be such evidence of a biological basis for emotional intelligence, which leads to the influence of parent variables.

Influences of Emotional Intelligence: Parent Variables

Other influences that may have both biological and social influence in the development of emotional intelligence are the parent's personality and the parent's emotional intelligence. These influences have obvious origins: the child shares the parents' genes and is raised in an environment constructed by the parent.

Like temperament, personality is defined by theorists in different ways, most notably in the number of domains or dimensions associated with personality. The present study incorporates five major dimensions of personality (Costa, McCrae, & Dye, 1991), which include Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness. Other theorists include three domains of personality (e.g., Clark & Watson, 1999). The three domains are similar to those in the five dimension model; these three domains include Neuroticism/Negative Emotionality, Extraversion/Positive Emotionality, and Disinhibition versus Constraint (which incorporates the Agreeableness and Conscientiousness domains of the five dimension model).

Also like temperament, personality research has highlighted the genetic component of most personality traits (Clark & Watson, 1999). Research suggests that specific personality factors show heritability (Clark & Watson; Kagan, 1984). Kagan has found that responses to Introversion/Extraversion scales typically demonstrate significant heritability. His studies involving inhibited and uninhibited behaviors and the measurement of heart rate indicate that inhibited and uninhibited behaviors are related to Extraversion. He has found that introverts, like children exhibiting inhibited behavior, show large increases in heart rate variability under mild stress. This heritability link in personality (and temperament) provides a critical connection between the parent's personality and the child's temperament. Additionally, the interaction of the parent's personality and the child's temperament in an environmental context contributes to the

development of the child's temperament (as previously discussed, in terms of development influenced by person-environment interaction). Thus, the parent's personality is likely to affect the child's emotional intelligence in different ways - directly upon the child's emotional intelligence (presuming that development of emotional intelligence is similar to temperament, in that it is affected by environmental factors), and through the child's temperament.

Clark and Watson (1999) have also pointed out increasing evidence for the role of affective experiences in the Neuroticism/Negative Affectivity and Extraversion/Positive Affectivity domains, proposing that "affectivity may be viewed as a core - if not the core - of these two dimensions" (p. 406). Thus, personality factors are linked to the expression of an individual's emotional experiences. This link suggests a relationship between one's personality and one's emotional intelligence. Additionally, it has been proposed that affective regulation (i.e., regulation of emotion) is associated with the Disinhibition versus Constraint dimension (Clark & Watson), and thereby strengthens the suggested relationship between personality and emotional intelligence.

Like the relationship between parent personality and child temperament, there is a supposed connection between the parent's emotional intelligence and the child's emotional intelligence. The possibility of genetic components in emotional intelligence may be evident in the relationship between parent and child EI. As well, it is thought that the parent's emotional intelligence may influence the child's development of emotional

intelligence, through such experiences as direct observation and modeling of the parents, and through discussions pertaining to emotional intelligence components (i.e. - some parents probably discuss feelings and emotions more readily with their children).

Personality inventories, specifically, the NEO-FFI (Costa & McCrae, 1989), and a short form of the Emotional Intelligence test (Mayer, Salovey, & Caruso, 1997) were administered to the parents. These measures were included in order to determine the relationships between parent personality and parent EI with the child's development of emotional intelligence. Both parents completed the personality inventories. However, only one parent (all mothers, plus one father) took the short form of the Emotional Intelligence Test and accompanied the child to the laboratory visits.

Overview of a Longitudinal Approach

This longitudinal study sought to identify changes that occur in components of emotional intelligence in preschool-aged children and the influences or predictors of the development of emotional intelligence. Three of the four components of emotional intelligence were incorporated in the study: regulation of emotion, perception of emotion, and understanding of emotion. The study incorporated two laboratory visits over a six-month period. See Table 1 for details about the laboratory visits.

Overall, there was an exploratory approach to the present study, though research in some of the individual areas previously reviewed provided a basis for predictions. These predictions included evidence of temperament stability, evidence of a relationship

between the child's temperament and regulation of emotion, and evidence of a relationship between the parent's personality and child's temperament. It was proposed that the three child emotional intelligence components would be related to each other, and that there would be evidence of change over time, primarily improvement, in the three components. As well, it was proposed that the parent's emotional intelligence would be related to the child's emotional intelligence.

Method

Participants

Participants included 8 boys and 15 girls and their parents, who responded to advertisements for the study in the local papers. Two of the girls were fraternal twins. For two other children (one boy and one girl), only the mother participated in the study (father was absent).

The mean age for the first laboratory visit was 40.74 months (41 months), $SD = 2.68$ months. The range was 10 months, with the youngest at 37 months and the oldest child at 47 months. The second visit occurred approximately six months after the first visit. The mean age for the second visit was 47.35 months (47 months), $SD = 2.76$ months. The range was 9 months, with the youngest at 44 months and the oldest child at 53 months.

Upon completion of the study, parents received feedback on their personalities, their child's temperament (two reports for the two visits), and \$50.

Materials

Emotional Intelligence Test (parent). The Emotional Intelligence Test, developed by Mayer, Salovey and Caruso (1997), was administered to the parent accompanying the child to the laboratory visits (all mothers, plus one father - see Table 1). The short form of the test, which takes about an hour to fill out, was mailed to the parent to be completed at home. The test is designed to measure the four components of the emotional intelligence model (Mayer and Salovey, 1997) which include identifying emotions, using emotions, understanding emotions, and managing emotions (see Figure 1). The short form of the Emotional Intelligence test consisted of 34 items, which used either a 4 or 5-point rating scale. Preliminary studies of the validity and reliability measures specifically for the short form of the test have yielded tenuous results. Scoring was completed in SPSS by a program specifically designed to score the short form of the EI test. The test was scored in three main categories of consensus, expert, and target responses. These three sections produced multiple scores, which were then compiled into one score for the parent's emotional intelligence.

Personality test: NEO-FFI (parent). The NEO Five-Factor Inventory (NEO-FFI), developed by Costa and McCrae (1991), was administered to both parents. This test was mailed to the parents to be completed at home. The NEO-FFI measured five dimensions of an individual's personality: Neuroticism (subscales are Anxiety, Hostility, Depression, Self-Consciousness, Impulsiveness, and Vulnerability), Extraversion (subscales are

Warmth, Gregariousness, Assertiveness, Activity, Excitement Seeking, and Positive Emotions), Openness (subscales are Fantasy, Aesthetics, Feelings, Actions, Ideas, and Values), Agreeableness (subscales are Trust, Straightforwardness, Altruism, Compliance, Modesty, and Tender-Mindedness), and Conscientiousness (subscales are Competence, Order, Dutifulness, Achievement Striving, Self-Discipline, and Deliberation). The NEO-FFI consisted of 60 items, rated on a five-point Likert scale from 'strongly disagree' to 'strongly agree', which determined five 12-item facet scales grouped into five areas. These facet scales have been adequately validated against criterion scales (see Costa, McCrae, & Dye, 1991). Scoring of the NEO-FFI entailed adding the points for each of the five domains, to create one total for each domain. Then, corresponding t-scores were obtained for each domain (five in all), by using standardized scales for the NEO-FFI. Thus, each parent had a total of five scores (one for each domain). Feedback on the parent's personality was provided in the form of a standardized profile sheet. This profile sheet consisted of three brief descriptions for each domain. Checkmarks were placed next to the description that corresponded with the t-score (grouped according to low, average, or high on the domain). Feedback on the parent's personality was delivered to the parents upon completion of the study.

Temperament rating: BSQ (child). The Carey Temperament Scales (CTS) include five age-specific scales for rating a child's temperament. The series of questionnaires focus on the nine categories of temperament determined by the New York

Longitudinal Study (NYLS; Thomas, Chess, Birch, Hertzog, & Korn, 1963). The nine categories of the NYLS consist of activity level, rhythmicity, adaptability, intensity, approach/withdrawal, mood, distractibility, attention span/persistence, and sensory threshold. The activity level category measures the motor activity during daily routines and sleep/wake cycle. Rhythmicity is the regularity of processes related to growth. Adaptability refers to the ease of transition to new or altered situations. Intensity of reaction is the degree to which the child responds to stimuli. The approach/withdrawal category relates to the child's initial positive or negative reaction to novel stimuli. The quality of mood category measures the child's amount of positive or negative affect. The seventh category, distractibility, is the effectiveness of the environmental stimuli to shift attention and/or behavior. Attention span and persistence is the degree to which an interest is maintained or an activity is pursued in the face of obstacles. Finally, threshold of responsiveness, the last category, is the level of sensory stimulation required to evoke a response. An age-specific scale was used in this study. The Behavioral Style Questionnaire (BSQ) for children aged 3-7 years was developed by McDevitt and Carey (1978) and consisted of 100 items. This questionnaire utilized a six-point rating scale indicating frequency of behavior ranging from almost never to almost always typical of the child. There is a reported median test-retest correlation of .81 and a median alpha reliability of .70 (internal consistency) for the nine categories on the BSQ (Fullard, McDevitt, & Carey, 1984; Hubert, Wachs, Peters-Martin, & Gandour, 1982). The

concurrent validity for the BSQ has also been determined (see Hubert et al., 1982). The questionnaire took about 20 minutes to complete and was completed at home by the parent who accompanied the child to the laboratory (see Table 1). Two BSQ reports were filled out by the parent; one report for each laboratory visit at 41 months and 47 months. Scoring of the temperament questionnaires were conducted via a computer program specifically designed for scoring the BSQ. Answers from the questionnaire were entered into the program, which then produced two reports - a caregiver report and a professional report. Each report consisted of a graph illustrating the child's level for all of the temperament dimensions (see Figure 2). As well, each report contained a brief description of the temperament dimensions and the child's behavior that most likely corresponds with the dimension. The two caregiver reports were given to the parents upon completion of the study.

Family Information sheet. This was a brief questionnaire that requested demographic information about the family, as well as about any recent changes in the child's life (see Appendices A and B). Information that was collected included birth date, birth order, sibling ages, education and employment of the parents, as well as preschool and/or playgroup experience of the child. The family information sheet was mailed to the parents before each laboratory visit. Only the birth date information was incorporated in the final analyses.

Emotional intelligence: Regulation of emotion (mildly frustrating task - puzzle).

Emotion regulation was measured in the mildly frustrating task, which used puzzles of different cognitive and motor levels for each child. The puzzle used was selected by the parent according to the child's experience with the toy. The parent was instructed to select a puzzle that would be challenging for the child. The puzzle selected was intended to elicit some frustration from the child in his or her attempt to play with it. This provided an opportunity to observe self-regulation of emotion, a component of emotional intelligence. This puzzle task was videotaped for each laboratory visit, and then coded by two trained raters, who noted the frequency of specific behaviors (see Appendix C). Inter-rater (effective) reliability was established at .98. The information from the coding of the puzzle task was not incorporated in the final analyses of the study.

Emotional intelligence: Regulation of emotion (impulse control - marshmallow).

Emotion regulation was measured in the impulse control task, in which we have borrowed the method developed by Shoda, Mischel and Peake (1990). Marshmallows (or other sweets) were used to tempt the child. The child sat at a table with marshmallows and a bell placed in front of him or her. A clock or timing device was also used. The child was given the opportunity to wait for preferred objects (two marshmallows) or to have a less preferred object (one marshmallow) without waiting. The designated waiting time for the preferred objects was two minutes (120 seconds). The amount of time (in seconds) that the child waited for the preferred objects was an indicator of the child's

ability to regulate his or her emotion, a component of emotional intelligence. This impulse control task was videotaped for each laboratory visit, and then coded by two trained raters, who noted the frequency of specific behaviors (see Appendix D).

Inter-rater (effective) reliability was established at .99. The information from the coding of the impulse control task was not incorporated in the final analyses of the study, but the total time waited for the preferred objects was used as an indication of the child's regulation of emotion.

Emotional intelligence: Recognition of emotion (facial expression recognition task). Different photographs of faces expressing the basic emotions of happiness, sadness, anger, and fear were shown to the child. Two models, a 12-year-old boy and a 13-year-old girl, produced the expressions in the photographs using specific facial muscle movements (Camras & Allison, 1985). The facial expressions were examined and approved by two individuals trained in the Facial Action Coding System (Ekman & Friesen, 1978, as cited in Camras & Allison, 1985). The child was shown the pictures of the facial expressions of happiness, sadness, anger and fear and was asked to identify the emotion the face expressed. The child was given a verbal choice of the four emotion words (happy, sad, mad, and scared) each time the picture of a facial expression was presented. The child's total correct for each laboratory visit was used as the child's ability to accurately recognize emotion in others, a component of emotional intelligence.

Emotional intelligence: Understanding of emotion (story vignettes task).

Understanding of emotion was measured in the story vignettes task. For each laboratory visit, four story vignettes on audiotape (each story under one minute in length) were presented to the child. The stories presented at 47 months were different from the stories presented at 41 months, therefore yielding a total of eight stories presented over the course of the study (see Appendix E). All of the story vignettes were read by a female actress. The stories described a character in an emotion-eliciting situation, but the particular emotion word was not used (Ribordy et al., 1988). The two emotions expressed in the stories were happiness and sadness. For each visit, two stories were read with an incongruent vocal expression (e.g. happy story with sad voice), and two stories were read with a congruent vocal expression (happy story with happy voice). The photographs of facial expressions of happiness, sadness, anger, and fear (same used in the facial recognition task) were shown to the child after each story was presented. The child was asked to point to the photograph (facial expression) that expressed the emotion the character in the story was feeling. The child's total correct for the congruent stories was used as a measure of the child's understanding of emotion in others. For each laboratory visit, there were two congruent stories, yielding four stories in all in which the child's response was deemed correct or incorrect. The incongruent stories provided an opportunity to determine whether the child was more influenced by vocal inflection or the story content (e.g., child selects a sad face for a happy story with a sad tone). The child's

responses for the incongruent stories were not incorporated into the final analyses of the study.

Videotaping. A video recorder was used to tape the child and parent. Each laboratory visit, at 41 months and 47 months, was recorded, with the exception of the break time.

Procedure

This longitudinal study measured each child two times over a six month period (see Figure 1). Each of the laboratory assessment measures (described above) were completed at 41 months and 47 months with slight modifications (different puzzles and story vignettes were used).

The evening before the scheduled appointment, a phone call was made to the parent to confirm the appointment. At this time, it was mentioned that if the child was feeling or acting unlike himself/herself or was ill, to please not come into the laboratory and another appointment would be arranged. The parent was also reminded to bring in the completed packet of questionnaires. In addition, the child's food preferences (and food allergies, if any) were determined, so that appropriate snacks could be provided.

Upon entering the laboratory, the parent and child were greeted by the experimenters and a few minutes were spent in becoming acquainted with the child. The questionnaire packet and signed consent form were collected from the parent. The parent was notified that parts of the visit would be videotaped, and that he/she would either be in

the same room as the child or would be able to view the child from another room.

All participants began with the mildly frustrating task and ended with the impulse control task. The reason for this arrangement was that the children needed a little time to become familiar with the laboratory area (which consisted of several small rooms) and the experimenters. The recognition and understanding tasks, and the impulse control task entailed the child being alone with one of the experimenters, while the parent was watching behind a one-way mirror in another room (as long as the child was okay with separation from the parent). The mildly frustrating task entailed the child being alone in a room with his/her parent; this allowed the child more time to feel comfortable with his/her surroundings. After the mildly frustrating task, the child was offered the option of taking a break for stories and refreshment. In the case that the child experienced frustration, this break time allowed for the child to relax. The facial recognition and understanding emotion tasks, which took place after the break, were randomly ordered between participants. The laboratory visit always ended with the impulse control task; this is because the experimenter left the room for a little bit (two minutes maximum) during this task, leaving the child alone in the room. By the end of the visit, the child was more likely to feel comfortable with this situation. In the event that the child did not wish to be separated from his/her parent at any time, accommodations were made for the parent to remain in the room, but the parent was asked to refrain from influencing the child in any way.

Parental written measures. Child temperament reports were obtained at 41 months and 47 months; the parent who accompanied the child to the laboratory visit filled out the temperament ratings (all mothers, plus one father). One emotional intelligence score (for the accompanying parent) and two personality measures were obtained for the parents at the 41 months visit. The family questionnaires were completed by the accompanying parent for both laboratory visits (a different version for each visit). All of these measures were mailed to the participants and completed at home.

Emotional intelligence: Regulation of emotion (mildly frustrating task - puzzle). For the first task, the child and parent were led back into the testing room that had been cleared of all distracting items. The parent was instructed to select a puzzle that would be challenging for the child, and the parent was told that he/she could assist and soothe the child at any time (in other words, act as normally would). The purpose for selecting a challenging puzzle was to observe how the child regulated his/her emotions in the event that frustration was indeed elicited. The parent and child sat across from one another, or next to each other with a table in front of them. They were told that they would have about 10 minutes to play with the puzzle. This task was videotaped.

Break and refreshment. After the mildly frustrating task, the child and parent were given an opportunity to take a short break (5 minutes) in the greeting room. This break was offered in order to not overly tax the child's attention and motivation. Crackers and juice were available as well as a picture book. After the break, the child was led back

into the testing room and the parent was led into another room with a one-way mirror looking into the testing room.

Emotional intelligence: Recognition of emotion (facial expression recognition task). In the testing room, the experimenter and child sat across from one another with a table in between them. The experimenter showed the child a set of four photographs with either a girl or a boy's face expressing happiness, sadness, anger, and fear. The order of the facial expressions was randomized for each participant. Across the two visits, each child saw both the girl and boy photographs. At the 41 month visit, the photographs were matched to the gender of the participant (e.g., a boy saw pictures of a boy). At the 47 month visit, the participants saw the other set of photographs (e.g., a boy saw pictures of a girl). The experimenter held up the photographs one at a time and asked the child what emotion he/she thought the person in the picture was feeling. The experimenter provided the child with verbal choices, always in the same order (happy, sad, mad and scared), after presenting each picture. The number of correct responses out of four possible correct was the measure of facial recognition. The parent was given the opportunity to observe the child through the one-way mirror looking into the room. This recognition task was videotaped.

Emotional intelligence: Understanding of emotion (story vignettes task). In the testing room, the experimenter and child sat across from one another with a table in between them. Four photographs of either a boy or a girl expressing happiness, sadness,

anger, and fear were lined up on the table in front of the child. The order of the photographs (from left to right) was kept the same for each child. The order changed from the 41 month visit to the 47 month visit (e.g., whatever photograph had been on the left was placed in the middle or on the right). At the 41 month visit, the photographs were matched to the gender of the participant (e.g., a boy saw pictures of a boy). At the 47 month visit, the participants saw the other set of photographs (e.g., a boy saw pictures of a girl). The experimenter then explained that they would listen to some stories (gender of child in story corresponded with gender in photographs) on an audiotape. After each story was finished, the experimenter stopped the tape and asked the child which picture he/she thought the little boy or little girl in the story was feeling. The child was asked to point to the photograph. No verbal labels were provided. Instructions were presented twice to ensure that the child understood. Only two emotions were expressed in the stories (happiness and sadness), but four emotions were presented in the photographs (happiness, sadness, anger and fear). Each child heard a total of four story vignettes. The order of the story vignettes was random, but the last story presented was always a congruent, happy story. The child's responses to the congruent stories (two for each visit) provided a measure of his/her ability to understand emotion. For the two congruent emotion stories, the child's responses were coded as correct or incorrect (two possible correct for each visit). For the two incongruent emotion stories, the child's responses were coded as influenced by tone or influenced by content. The parent was given the

opportunity to observe the child through the one-way mirror looking into the room. This entire task was videotaped.

Emotional intelligence: Regulation of emotion (Impulse control - marshmallow).

This was the last task of the laboratory visit. The assistant brought in a tray to the testing room, where the experimenter and the child were sitting. On the tray was a bell and sweets. The bell was placed on the table in front of the child. As well, reward items (e.g. cookie vs. marshmallow) were placed on the table. The room was cleared of all distracting items. The reward items were pre-tested for age-appropriate interest and selected for its ability to create a conflict for the child in his or her decision to stop the delay or to wait for the preferred item. The child was asked which of the two items he/she preferred; this established the "preferred" item for that particular child. The assistant took away the tray and non-preferred items. The experimenter placed two of the preferred item (e.g., two marshmallows) on one napkin and one of the preferred item (one marshmallow) on another napkin; both napkins were placed on the table within reach of the child. Then the experimenter told the child that she would go out of the room but that "if you wait until I come back ... then you can have this one (pointing to two of the preferred object). If you don't want to wait, you can ring the bell, and bring me back any time you want to. But if you ring the bell then you can't have this one (pointing to two of the preferred object), but you can have that one (pointing to one of the preferred object)" (Shoda, Mischel, & Peake, 1990, p. 980). The elapsed time was the measure of impulse

control. For both laboratory visits, the maximum time waited was two minutes, at which time the experimenter returned to the room and the child was offered two of the preferred item. For this impulse control task, the parent observed the child through the one-way mirror looking into the testing room. This entire task was videotaped. The child's coded behavior (from the videotape) and the timed responses provided a measure of emotion regulation, a component of emotional intelligence. Only the timed responses (total time waited for the marshmallow) were included in the final analyses.

Videotapes. The videotapes provided confirmation of the child's responses in the facial expression recognition task and the story vignette task, as well as the total time waited during the impulse control task. As well, the videotapes were coded for the child's regulation of emotion during the mildly frustrating task and the impulse control task; this coded information was not included in the final analyses.

Questions and goodbye. At this time, the laboratory visit was over and the parent was free to ask questions. The child was given a choice of stickers to take home.

Final debriefing and feedback. For the second laboratory visit (at 47 months), the parent was fully debriefed as to the intent of the study. Feedback on the child's temperament and the parents' personalities, as well as a check for full participation (\$50) were given. Temperament feedback was tailored specifically for the parents by the BSQ of the Carey Temperament Scales. Personality feedback for the parents was provided via

a scoring sheet included with the NEO-FFI. Parents and children were thanked for their participation.

Results

Temperament Stability

In order to determine the stability of the temperament dimensions from 41 to 47 months, within sample t-tests were conducted for each of the nine dimensions. The most change was evident in two of the temperament dimensions, adaptability and mood. From 41 months to 47 months, the children increased in gradual adaptability (away from the standardized average); $t(22) = -2.498, p < .05$ (see Figure 2). Scores on adaptability at 47 months indicated that the children took longer to adapt to changes in schedules and new situations.

Concerning mood, the children's positive mood decreased and gravitated closer to the (standardized) average, $t(22) = 2.012, p \leq .05$. However, the children's mean scores at 47 months remained to the left of the average (see Figure 2) indicating more of a positive mood than a negative mood. None of the remaining temperament dimensions produced a significant change from 41 to 47 months; they were relatively stable, with little change. Overall, there was variability among the children in their temperament dimension scores; each dimension showed a range of at least two standard deviations.

Child Emotional Intelligence

The child EI components included: (a) regulation of emotion, measured by the marshmallow task; (b) recognition of emotion, measured by the faces task; and (c) understanding of emotion, measured by the stories task.

Correlation analyses of the three child EI components (regulation of emotion, recognition of emotion, and understanding of emotion) were performed for the 41 months visit, the 47 months visit, and the total sums across the two visits. Contrary to expectations, the analyses did not reveal any significant relationships. Emotion regulation was not significantly related to recognition of emotion in others ($r = -.24$ at 41 months, $r = .14$ at 47 months, $r = -.03$ across two visits). Emotion regulation was not significantly related to understanding of emotion in others ($r = .07$ at 41 months, $r = -.17$ at 47 months, $r = -.10$ across two visits). Recognition of emotion was not significantly related to understanding of emotion ($r = .12$ at 41 months, $r = -.15$ at 47 months, $r = -.14$ across two visits). Therefore, as these are three different elements, analyses were performed for each EI outcome variable separately.

Changes in Child Emotional Intelligence Components

Paired sample t-tests for change in the child EI components were conducted. Regulation of emotion significantly changed from 41 to 47 months, $t(22) = -.29$, $p < .01$. The children waited longer for the marshmallow at 47 months than they did at 41 months. Recognition of emotion significantly changed from 41 to 47 months, $t(19) =$

2.24, $p < .05$. The children were more accurate at recognizing emotion in others at 47 months. Understanding of emotion did not significantly change from 41 to 47 months, $t(17) = -.52, p = .61$.

Child's Age and Emotional Intelligence Components

Given the change that occurred across the six month time period, regression analyses were conducted to determine the role of age in predicting the variance of the separate components of child EI. Age was a significant predictor of regulation of emotion at the 41 month visit; $R^2 = .27, F(1, 22) = 7.58, p < .025$. At the 41 month visit, the older children in the study were more likely to wait longer for the marshmallow. Age explained 26.5% of the variance in time waited for the marshmallow at the 41 months visit. However, age was no longer a significant predictor of time waited for the marshmallow at the 47 month visit, $R^2 = .07, F(1, 22) = 1.56, p = .23$.

Age was not a significant predictor for the number correct in recognition and understanding of emotion at the 41 months visit; recognition $R^2 = .04, F(1, 19) = .68, p = .42$, and understanding $R^2 = .14, F(1, 17) = 2.59, p = .13$. However, age explained 14% of the variance in understanding emotion ($r = .37$) at the 41 month visit. The trend was that the older children in the study were more likely to be correct in the stories task at the 41 month visit. Age was not a significant predictor for the number correct in recognition ($R^2 = .02, F(1, 20) = .50, p = .51$) and understanding of emotion ($R^2 = .02, F(1, 21) = .30, p = .60$) at the 47 month visit.

In order to examine the relationships between the child EI components and its correlates (temperament, parent personality, and parent EI), multiple regression analyses were performed. Hierarchical regression analyses were performed using the temperament dimensions as predictors of regulation, recognition, and understanding of emotion. Because each assessment (laboratory visit) had a range in months, and age proved to be a covariate with the EI components (in particular, regulation of emotion), age was held constant for all of these analyses by entering it in the first step. Initially, all nine temperament dimensions were included as predictors of EI components in the exploratory analyses. Then the two dimensions with the highest semi-partial squared correlation were selected for additional analyses. Effect sizes for the three child EI components and temperament are listed in Table 2.

Regulation of Emotion (Marshmallow Task)

Descriptive Statistics. The mean waiting time for the marshmallow at 41 months was 44.65 seconds, SD = 48.56 seconds. The range was 0.0 to 120.0 seconds. Only six of the children waited the full two minutes for the marshmallow (see Figure 3). At 47 months, the mean waiting time increased to 84.61 seconds, SD = 49.42 seconds. The range was 0.3 to 120.0 seconds. More of the children waited at 47 months; 14 of the children waited the full two minutes for the marshmallow (see Figure 3). All of the children participated in the marshmallow task for both visits.

Temperament. For the 41 month visit, mood and rhythmicity/daily cycles explained 25% of the unique variance in the time waited for the marshmallow ($R^2 = .42$, $F(2,22) = 2.70$, $p > .05$). Mood was a significant predictor of time waited, $\beta = .48$, $p < .05$. The children who waited longer were more likely to have a negative (less positive) mood. Although not significant, there was a trend evident involving rhythmicity and regulation of emotion ($\beta = -.42$, $p = .08$). The children who waited longer were more likely to have regular daily cycles.

For the 47 month visit, mood and activity explained 30% of the unique variance in the time waited for the marshmallow. Activity emerged as a significant predictor for time waited, $\beta = -.54$, $p < .01$. Activity alone explained 24% of the unique variance in the time waited. The children who waited longer for the marshmallow tended to be less active. Mood was not a significant predictor of regulation of emotion at 47 months ($\beta = -.28$, $p = .12$), though the trend indicates that those children with a more positive mood were more likely to wait longer for the marshmallow. This is a reverse of what occurred at 41 months (those with a less positive mood waited longer).

Parent Personality and Parent Emotional Intelligence. Regression analyses were also conducted to determine the relationship between parent personality and the child's regulation of emotion. The time waited for the marshmallow from both visits were summed to create a total time waited (up to 4 minutes). This total time was used in the analyses with the parent personality.

The mothers who scored high on the Conscientiousness (C) domain were more likely to have children who waited longer for the marshmallow, $\beta = .79$, $p < .01$. This C domain of the mothers explained 31% of the variance in the time waited for the marshmallow ($r = .43$). As for the fathers, those who scored low on the Openness (O) domain were more likely to have children who waited longer for the marshmallow, $\beta = -.48$, $p < .05$ ($r = -.28$). Also, fathers who scored high on the Agreeableness (A) domain were more likely to have children who waited longer for the marshmallow, $\beta = .48$, $p \leq .05$ ($r = .29$).

Regression analysis revealed that the parent EI score was not a significant predictor of the child's regulation of emotion ($\beta = .01$, $p = .96$).

Recognition of Emotion (Faces Task)

The faces task included four pictures of facial emotional expressions for each visit. The children were "correct" if they accurately identified the emotion portrayed in the picture.

Descriptive Statistics. The mean number of correct items for recognition of emotion at 41 months was 2.95, $SD = 1.1$. The range was 0.0 to 4.0. Twenty of the children's responses were included in the recognition task for the 41 month visit. The mean number of correct items for recognition of emotion at 47 months increased to 3.52, $SD = .68$. The range decreased by four; children responded with a minimum of two

correct and a maximum of four correct (see Figure 4). Twenty-one of the children's responses were included in the recognition task for the 47 month visit.

Temperament. For the 41 month visit, sensory reactivity/threshold and persistence were significantly related to the number of correct items in recognition of emotion; $R^2 = .37$, $F(2,19) = 4.59$, $p < .05$. Of these two temperament dimensions, sensory reactivity accounted for 28% of the unique variance in number of correct items, $\beta = .54$, $p < .025$. Children who scored high on sensory reactivity (children who are more sensitive) were more likely to correctly identify the emotions in the recognition task. Concerning persistence, the children rated as less persistent were more likely to correctly identify the emotions in the recognition task ($\beta = .33$, $p = .12$).

For the 47 month visit, approach/first reaction and intensity/strength of reaction (temperament dimensions) produced the highest semi-partial squared correlation with the number of correct items in recognition of emotion. Neither were significant predictors of number of correct items, but approach/first reaction explained 14.5% of the unique variance in recognition of emotion in the recognition task ($\beta = .41$, $p = .10$). Children who are more cautious in their approach were more likely to correctly identify the emotions.

Parent Personality and Parent Emotional Intelligence. The relationship between parent personality and the child's recognition of emotion was studied using regression analyses. The number of correct items for both visits were summed to create a total

correct for recognition (up to 8 correct). Though not significant, the Neuroticism scores for the mothers and fathers were the strongest predictors for the child's recognition of emotion. Mothers with low Neuroticism scores ($\beta = -.48$, $p = .21$) and fathers with high Neuroticism scores ($\beta = .61$, $p = .07$) were more likely to have children who correctly identified the emotions in the recognition task. This relationship between the parent's Neuroticism (N) score and the child's recognition of emotion was stronger for the fathers than for the mothers.

Regression analysis indicated that the total parent EI score was not a significant predictor of child's recognition of emotion; $R^2 = .15$, $F(1, 18) = 3.09$, $p = .10$. However, there was a trend for parents with high EI scores (higher level of emotional intelligence) to have children who were more likely to correctly identify emotions in the recognition task. The parent's EI score explained 15% of the variance in total correct for recognition of emotion.

Understanding of Emotion (Stories Task)

The stories task included two types of stories, congruent and incongruent, based on agreement between vocal inflection and emotional content. Only the congruent stories of sad and happy were included in the analyses of the stories task. The children were "correct" if they were able to accurately identify the emotion in the story (point to the correct facial emotional expression for the emotion conveyed in the content and tone of the story).

Descriptive Statistics. For the 41 month visit, the mean correct for understanding emotion was .611, SD = .70. The range was 0.0 to 2.0. Eighteen of the children's responses were included in the understanding task in the 41 month visit. The mean correct for understanding emotion in the 47 month visit was .682, SD = .65. The range was again 0.0 to 2.0. For the 47 month visit, 21 of the children's responses were included in the understanding task.

Temperament. Again with age held constant, hierarchical regression analysis revealed that adaptability and rhythmicity were significant predictors of understanding emotion at 41 months; $R^2 = .65$, $F(2, 17) = 10.95$, $p < .01$. Rhythmicity explained 44% of the unique variance in number correct for understanding emotion ($\beta = .72$, $p \leq .001$), and adaptability explained 22% of the unique variance in number correct ($\beta = -.50$, $p < .01$). Thus, children who have less regular cycles were more likely to understand emotion at 41 months. As well, children who tend to adapt quickly were more likely to understand emotion at 41 months.

For the 47 month visit, adaptability and persistence showed the highest semi-partial squared correlation for understanding emotion, yet neither adaptability ($\beta = .35$, $p = .29$), nor persistence ($\beta = -.27$, $p = .40$) were significant in predicting understanding of emotion. (Recall from the temperament stability results that adaptability changed the most from the first to the second visit; in general, the children took longer to adapt at the time of the second visit.)

Parent Personality and Parent Emotional Intelligence. The relationship between the child's understanding of emotion and parent personality was examined using regression analyses. The number of correct responses across both visits were summed to create a total correct for understanding emotion (up to 4 correct).

When entered together, the personality domains for the mother ($R^2 = .186$, $F(5, 17) = .64$, $p = .67$) and the father ($R^2 = .485$, $F(5, 15) = 1.88$, $p = .19$) were not significant predictors for the child's understanding of emotion. The strongest predictor for the mothers was Neuroticism; $\beta = .42$, $p = .36$. Mothers with a high N score were more likely to have children who did well in understanding emotion. The strongest predictor for the fathers was Openness; $\beta = -.42$, $p = .18$. Fathers with a low O score were more likely to have children who did well in understanding emotion. The father's Neuroticism score was another relatively strong predictor ($\beta = .38$, $p = .25$); fathers with a high N score were more likely to have children who did well in understanding emotion.

The parent EI score was not a significant predictor of the child's understanding of emotion; $R^2 = .008$, $F(1, 16) = .12$, $p = .74$.

Parent Personality (NEO domains) and Composite Child Temperament

The child temperament scores were averaged across the two visits to create one score for each dimension. Multiple regression analyses were conducted to determine the predictive value of parent personality for the child's (averaged) temperament. Effect sizes are listed in Table 3.

Mother's Personality. The mother's personality as a set was significantly related to the activity level of the child, $R^2 = .45$, $F(5,22) = 2.77$, $p < .05$. In particular, the mother's Conscientiousness score ($\beta = -.39$, $p = .14$) and Agreeableness score ($\beta = -.32$, $p = .18$) were the strongest predictors of the child's activity level. Although just trends, mothers with low A scores or low C scores were more likely to have active children.

The mother's personality was significantly related to the adaptability level of the child, $R^2 = .55$, $F(5,22) = 4.11$, $p < .01$. Specifically, the mother's Neuroticism score was a significant predictor of the child's adaptability, $\beta = .57$, $p < .05$. Mothers with a high N score were more likely to have children who adapt gradually.

The mother's score on Openness was a significant predictor of the child's approach/first reaction, $\beta = -.52$, $p < .05$. Mothers with a low O score were more likely to have children who approach situations and people cautiously.

The mother's overall personality was significantly related to the child's mood, $R^2 = .51$, $F(5,22) = 3.48$, $p < .025$. Specifically, the mother's N score was a significant predictor of the child's mood, $\beta = .64$, $p < .025$. Mothers with a high N score were more likely to have children who tend to have a negative mood.

There were no domains of the mother's personality that significantly predicted the child's other temperament dimensions (strength of response, distractibility, persistence, sensory reactivity, and rhythmicity).

Father's Personality. The father's personality as a set was significantly related to the child's mood, $R^2 = .48$, $F(5,20) = 2.78$, $p < .05$. Specifically, the father's Agreeableness score was a significant predictor of the child's mood, $\beta = -.48$, $p < .05$. Fathers with a low A score were more likely to have children who tend to have a negative mood.

The father's personality was significantly related to the child's level of persistence, $R^2 = .60$, $F(5,20) = 4.43$, $p < .01$. Specifically, the father's Agreeableness and Extraversion (E) scores were significant predictors of the child's persistence level; Agreeableness, $\beta = -.48$, $p < .05$ and Extraversion, $\beta = .47$, $p < .05$. If the father has a low score on Agreeableness or a high score on Extraversion, the child is less likely to persist.

The father's score on Openness was a significant predictor of the child's sensory reactivity (threshold) level, $\beta = .60$, $p < .05$. Fathers high on Openness were more likely to have children who are sensitive.

There were no domains of the father's personality that significantly predicted the child's other temperament dimensions (activity, adaptability, approach, strength of reaction, distractibility, and rhythmicity).

Parent Personality and Parent Emotional Intelligence

Correlation analysis of parent personality and parent emotional intelligence (obtained for the parent who accompanied the child to the laboratory - all mothers plus

one father) revealed no significant relationships between the five domains of parent personality and the parent's emotional intelligence score (r 's ranging from $-.002$ to $-.23$).

Summary of Significant Influences on Child Emotional Intelligence Components

Due to the many complex results of the study, it may be helpful to provide an overview of the significant predictors of the individual child EI components (see Figure 5 for all predictors of child EI components).

Regulation of Emotion. Significant predictors of the child's regulation of emotion included age and the child's mood and activity level. As well, the mother's Conscientiousness score and the father's Openness and Agreeableness scores were significantly related to the child's regulation of emotion.

Recognition of Emotion. The child's sensory reactivity level was a significant predictor for the child's recognition of emotion in others.

Understanding of Emotion. Significant predictors of the child's understanding of emotion included the child's rhythmicity and adaptability.

Discussion

The results from this study indicate that there are indeed several different influences/predictors of child emotional intelligence. The results also highlight the areas that do not seem to have a strong relationship with child emotional intelligence (at least, for the participants in this study). With these findings, we may address the issue of assessing emotional intelligence in preschool-aged children.

Changes over Time

One of the most interesting aspects of this study is the change over time in the parent's perceptions of the children's temperaments, the children's responses to the emotional intelligence components, and the relationships that emerge between the child's EI components and other variables.

We were interested in noting any changes in the children's responses and behaviors from 41 months to 47 months, across the six month time period. There was significant change evident in the regulation of emotion task and the recognition of emotion task. Not surprisingly, more of the children waited for the marshmallow at 47 months, thereby indicating that regulation of emotion may be improving as the children get older. This age-related improvement in regulation of emotion has been confirmed in previous studies (Brenner & Salovey, 1997). The children improved in accuracy in the recognition of emotion task for the 47 month visit, suggesting that accuracy or correct labeling of the emotion improves as the children get older. Previous studies have found that most children are accurate in recognizing emotion by age five (Wilson & Smith, 1998). Thus, increased accuracy in identifying and labeling emotion seems to be developing most in the preschool years (from three to five-years-old). There was not a significant change in the responses for the understanding task.

Temperament stability was another question for this study. The temperament dimensions for the children in this study do seem to remain stable across a six month

period, with the exception of adaptability and mood. Adaptability varied the most, with the children increasing in gradual adaptability. The individual temperament dimensions are expected to vary a little bit over time (Rothbart & Jones, 1998), particularly at this stage of development when children may be increasing their scope of activities and interactions by going to a preschool, participating in group activities with peers, and making friends.

Identifying Correlates of Emotional Intelligence

Another goal of this study was to identify the correlates of EI for young children. Which variables offer the most predictive value for the three EI components? We investigated the relationship between the EI components and the child's temperament, the parent personality, and the parent's emotional intelligence.

Temperament. The results indicate that, as predicted, temperament is the strongest correlate for the child's EI as a whole (all three of the EI components). However, the temperament dimensions that show a strong relationship with the EI components differ across time, thereby interacting with age of the child.

For the 41 month visit, mood was significantly related to how long the child waited for the marshmallow. Children with a less positive mood were more likely to wait for the marshmallow. This changes at 47 months, in that children with a more positive mood were more likely to wait for the marshmallow. As well, the strength of the relationship between mood and regulation of emotion decreased from 41 months to 47

months. Activity emerged as a significant predictor for regulation of emotion for the 47 month visit. The children rated as less active were more likely to wait for the marshmallow. This suggests that children who are rated as more active may have a more difficult time regulating their emotion.

Sensory reactivity was a significant predictor of recognition of emotion for the children at 41 months, but not at 47 months. Children rated as more sensitive in the 41 months visit were more accurate in recognizing emotions in others. These children who are rated as sensitive may be able to detect subtle changes in the environment, and they may attend more to details, such as the makeup of different facial expressions. Although not significant, approach/first reaction was related to recognition of emotion for the 47 month visit. Children rated as more cautious (tendency to withdraw) were more accurate in recognizing emotion in others. A cautious or hesitant child may need to evaluate the environment before joining in; the child may look to facial expressions of others to gauge the situation. If the child attends more to other's facial expressions, the child may have more opportunities/experience in recognizing and interpreting the facial expressions.

We may also consider the interaction of regulation of emotion with recognition of emotion. With both of these temperament dimensions, sensory reactivity and approach, it is possible that being high on either of these dimensions can interfere with accuracy in recognition of emotion. If the child is high on the sensory reactivity or approach dimension and cannot regulate his/her emotions well, then the child may attend more to

his/her own emotions than to others' emotions. If a child who is very sensitive and does not regulate emotions well sees another child in distress, the sensitive child may become distressed and then be focused on his/her own emotions; the child may confuse others' emotions with his/her own emotions. Eisenberg, Wentzel, and Harris (1998) suggest that this confusion leads to personal distress rather than sympathy. If a child tends to withdraw and does not regulate emotions well, the child may be overcome with his/her own feelings, and then he/she cannot attend to others' emotions. Thus, researchers (Henderson & Fox, 1998; Eisenberg et al.) propose that it is the combination of being high on specific dimensions (e.g., strength of response/intensity and approach/first response) plus the inability to regulate emotions well that can lead to potential problems for the child. Being high on the particular dimension (e.g., strength of response/intensity and approach/first reaction) is not the primary concern; if the child can regulate his/her emotions, then the expression of the temperament dimension is tempered. So being able to regulate emotions can affect a child's ability to attend to others' emotions, in this case, to accurately recognize emotions in others.

The temperament dimensions adaptability and rhythmicity were significantly related to understanding of emotion at 41 months. Children who were rated as quick to adapt were more likely to understand emotion in others. Hence, children who move with the flow may not be as disturbed by sudden changes, allowing for more attention to be placed upon such things as other people's emotions. Also, children who were less regular

in their daily cycles were more likely to understand emotion at 41 months. Children who are not as dependent upon a particular schedule may also be more likely to go with the flow, allowing for more concentration to be placed on understanding emotion in others. None of the temperament dimensions were significantly related to understanding emotion in others at 47 months.

These findings suggest that the relationship between specific temperament dimensions and the emotional intelligence components of regulation, recognition, and understanding of emotion vary in strength and direction as the children get older. Thus, it is important to consider the age of the child when looking at the relationship between temperament dimensions and the emotional intelligence components.

Parent Personality. Parent personality can also be considered a predictor of child EI, particularly for the child's regulation of emotion. Mothers who scored high on Conscientiousness were more likely to have children who waited longer for the marshmallow. Thus, if a child's mother exhibits conscientious behavior (having strong sense of duty and self-discipline), the child may learn to model this behavior (he/she may also inherit this tendency). Fathers who scored low on Openness or high on Agreeableness were more likely to have children who waited longer for the marshmallow. If the father tends to stick to traditional routines (low on Openness), the child may model this behavior. If the father tends to be trustful and compliant (high on Agreeableness), then the child may be more compliant in waiting for the marshmallow, that is the child

trusts the person who says that he/she will get two treats if he/she waits. These aspects of the parent personality that predict the child's behavior may be inherited and they may be learned through observation and modeling; the child's behavior is most likely an interaction of the two. There were no significant relationships between the parent personality and the child emotional intelligence components of recognition and understanding of emotion.

Parent Emotional Intelligence. Contrary to expectations, parent EI is not significantly related to the child EI components. If we were able to separate the parent EI components and compare these directly with the child EI components (i.e. - compare parent's recognition of emotion with child's recognition of emotion), then perhaps we would have found evidence of a strong relationship. Only recognition of emotion showed indication of a positive relationship with the parent's total EI score; parents with high emotional intelligence scores were more likely to have children with accurate scores in recognition of emotion.

Parent Personality and Child Composite Temperament

In looking at the relationship between the parents' personalities and the child's composite temperament scores, both the mother's and the father's personalities demonstrated significant predictive value for particular temperament dimensions. These relationships are likely a product of genes and the child's environment. The child's scores on adaptability and mood were significantly related to the mother's score on Neuroticism;

a high Neuroticism score corresponds with the child's tendency to adapt gradually and have a negative mood. The child may attend to the mother's expressions of apprehension and negative mood (part of the Neuroticism domain). Mothers who were low on Openness were more likely to have a cautious child. Thus, the child, like the mother, may prefer the familiar to the novel and may be hesitant in trying new things.

The father's score on Agreeableness was a significant predictor for the child's mood. Fathers low on Agreeableness were more likely to have a child who tends to have a negative mood. The child's mood may well be influenced by the father's tendency to be skeptical and guarded (part of Agreeableness). The child's persistence level was significantly related to the father's score on Agreeableness and Extraversion; fathers who scored low on Agreeableness or high on Extraversion have children who are less likely to persist. Fathers who were high on Openness were more likely to have a sensitive child. Thus, the child may pick up on the father's appreciation for aesthetics, imagination, and feelings. This relationship between the parent's personality and the child temperament is important in that they interact, and the child's temperament is shaped, to some extent, by the parent's personality. In turn, the child's temperament, as discussed before, is a significant predictor of the child's EI components.

Assessment of Emotional Intelligence

One of the primary questions at the start of this study was the issue of assessing EI in preschool-aged children. The results of this study lead to a mixed answer - yes, it does

seem possible to assess particular components of EI in three and four-year-olds using the assessment methods of this study. The particular components that seem accessible to testing are regulation of emotion and recognition of emotion, which have been measured in previous studies (Camras et al., 1983; Eisenberg et al., 1998). The area of understanding emotion, while yielding some significant results, may be confounded with age and the complexity of the task, to be discussed later.

Relationship Between Child EI Components. Another question to be addressed is the relationship between the EI components themselves. The three child EI components measured in this study do not show a strong relationship with each other. In particular, the other-oriented components (recognition and understanding of emotion in others) do not seem to be related to the self-oriented component (regulation of emotion). As mentioned before, the child's regulation of emotion seems to interact with age, in that older children are able to regulate their emotions better. In fact, this study may have targeted a specific time period (three to four-year-olds) in which children show a substantial change (improvement) in regulation of emotion. It may be that children acquire an increased understanding of the rewards and consequences that can accompany regulation of emotion; for example, the children may have a better understanding of waiting for two treats at 47 months than at 41 months. The two other-oriented EI components (recognition and understanding of emotion) show some indication of a relationship. In looking at the individual responses, it is possible to see a slight

connection between these two EI components. The two children who were most accurate in understanding emotion (three out of four correct) were also the most accurate in recognition of emotion (eight out of eight correct).

These findings lead us to question whether or not EI is indeed a unified concept that can be applied to children so young. EI seems to be a developing and changing concept for children of this age group. In the case of this study, it does seem that the regulation of emotion (a self-oriented task) is not related to the recognition or understanding of emotion (other-oriented tasks). The young children in this study may be showing that a marked distinction exists between the self and other components of EI for this age group. It may be that as the children get older, the self and other components of EI blend together and form one measurable concept (EI as defined by adult standards). Hence, EI is a process very much in development for young children - and while we may be able to present glimpses of EI as separate components, it does not seem feasible at this time to view the components as a composite score in preschool-aged children. In other words, emotional intelligence for young children may not be the same thing that it is for adults; the separate EI components may not show the same relationship to each other in children that they do in adults. Thus, we should perhaps refer to EI in preschool-aged children in terms of the separate components, and not as "emotional intelligence" as it pertains to adults.

Role of Regulation of Emotion in Temperament. Rothbart, (Rothbart & Jones, 1998) among other temperament researchers, portrays temperament as inclusive of self-regulation. Regulation of emotion is perceived as a medium through which many of the dimensions are expressed. Thus, the temperament dimensions that we observe and rate are in fact influenced/modulated by the child's ability to regulate his or her own emotion. For example, Rothbart and Jones illustrate the interaction between the approach/first reaction dimension and self-regulation. A child who tends to withdraw and does not regulate his/her emotion well may express fear and have a tendency to pull away from others. Yet, a child who tends to withdraw and does regulate his/her emotion well may give the impression of just being cautious and slightly wary. In other words, the children may in fact be experiencing similar levels on the approach dimension, but the child's ability to regulate his/her emotion affects the expression of the dimension - it affects the child's behavior. Underwood (1997) illustrates this problem in infants, "...reason for viewing temperament and emotion regulation as inseparable may be that ... it is extremely difficult to discriminate between an infant who is low on arousability and one who is successfully self-regulating" (p. 133).

Temperament dimensions are responses to the environment - a child's tendency to respond in a certain way (that is biologically based) that interacts with the child's ability to regulate emotion and produces a response/behavior (Rothbart & Jones, 1998).

Regulation of emotion may not be a part of temperament in that it is a dimension, but that

it is the medium through which many of the dimensions are expressed. In relating this to the present findings, we may look at activity, which demonstrated a significant relationship with how long the children waited for the marshmallow at 47 months. The less active children waited longer for the marshmallow. If we view regulation of emotion as part of temperament, then it may be that the children rated as more active simply do not regulate their emotions as well on this particular dimension. Other children may tend to be active, but they may be able to regulate their emotions better, thereby mitigating the extent or expression of the activity level. We may be able to look at regulation of emotion (relatively) independently - as in the regulation of emotion task in the present study. The children here are required to resist feelings of impulsiveness and temptation. Most of the children participated in some form of self-distracting behavior. Some of the children in the study chose to distract themselves by talking out loud, singing, looking around the room, and shifting about in the chair. These different behaviors are expressions of temperament and regulation of emotion. Some of the children who participated in these self-distracting behaviors did not wait, while others did wait. Thus, it may be that the child's ability to regulate his/her emotions is the key difference - and it is what we intended to measure. The children who waited and the children who did not wait may be very similar on certain temperament dimensions, but it may be the ability to regulate emotion that distinguishes them.

My concern is not with the issue of measuring regulation of emotion. It is with the issue of assessing temperament and not acknowledging the importance of emotion regulation in the expression of temperament dimensions. When a parent or teacher assesses temperament, the rater is scoring the child on the expression of the temperament dimension - meaning the child's natural inclination for something plus the child's ability to regulate emotion. The child may be feeling more anxiety on the inside than he/she expresses on the outside, because he/she is able to control the expression of the feeling. Thus, because temperament ratings do not come from the self, but from observations of others, we may not be tapping into what the child is really experiencing - or what the child's true tendencies are. Yet, when we measure adult personality, many of the assessment tools are self-reported (as in the case of the NEO-FFI, used in the present study). The adult is hereby able to present his/her self-perceived emotions - including or not including the person's ability to regulate his/her emotion. So my question is in regards to the assessment of temperament - it seems to include regulation of emotion within the scores/ratings themselves. But adult personality assessments may not include this aspect of emotion regulation. In which case, it may then emerge as part of emotional intelligence. If this is the situation, then temperament ratings and emotion regulation for young children are not independent enough from each other to treat them as separate constructs. In summary, the results of this study point to a weak relationship between the

emotion regulation (self-oriented task) and the emotion recognition and understanding (other-oriented tasks) for preschool-aged children.

Given this perspective on temperament and the mediating role of emotion regulation in temperament ratings, it seems that emotional intelligence for children (at this age) cannot incorporate regulation of emotion as a component - not until temperament ratings are based on self-report more than observation. Because temperament ratings and emotion regulation are so intertwined for these preschool-aged children, I question whether or not emotion regulation can be included independent of the concept of emotional intelligence for young children - it seems to reside more within temperament. I propose that emotion regulation is a component of emotional intelligence for adults, but that it is a part of temperament (ratings) for children. There is probably a great deal of overlap with regulation of emotion and temperament (as it is assessed).

Confounds and Future Studies

One of the obvious confounds that should be mentioned is the small sample size, which limits the overall power of the study. Future studies should try to include a larger sample size. As well, there were a few assessment issues that prevented some of the children from relaying what they might have known. The recognition and understanding tasks were based around the concept of choice. For each task, the child was presented with a choice of either emotion labels (recognition task) or pictures of emotional expressions (understanding task). There were a few children, particularly for the 41

month visit, who did not respond appropriately when given a choice; these children simply repeated everything the experimenter said. For the 47 month visit, only one child continued to respond in this way. This may be an indication that the incorporation of choices made it too difficult for some of the younger children in the study. On the other hand, it may point to a lack of experience with choice for some of the children. Future studies may want to consider the issue of offering choices in measuring recognition and understanding of emotion.

Another problem arose with the understanding task in that some of the children thought that all of the pictures presented needed to "have a turn." The stories presented were intended to only coincide with either a happy or a sad face. Having the four pictures of happiness, sadness, anger, and fear evidently confused some of the children, for they thought that each picture corresponded with a story. In response to this, future studies for this young age group might want to include pictures of only those emotions that pertain to the stories. One might then include only the happy and sad faces, or include stories for the mad and scared faces. As well, some of the stories elicited particular responses from the children. For example, one of the stories might make an older child sad, but might make a three-year-old angry (e.g., Johnny's favorite stuffed animal was old and worn out and his mother had to get rid of it). Therefore, extensive pre-testing for the stories should be conducted with the intended age group (what is intended for a five-year-old may be not interpreted the same by a three-year-old). Most of the stories were taken from a previous

study conducted with five and six-year-olds (Ribordy et al., 1988). Other studies using similar matching tasks for understanding of emotion (matching facial expression to character in story) have found that young children rely more on facial expressions for the emotion, while older children rely on contextual cues for the emotion (Smith & Walden, 1998). Thus, the interpretation and salience of the contextual cues in the story may differ for three and five-year-olds.

In essence, the understanding emotion task was, I believe, too complex for most of the children in the study. In making the aforementioned changes to the stories themselves and the picture presentation, the understanding emotion task may be more appropriate for this age group. In the present study, it is likely that only a portion of the component understanding emotion in others was measured. I do think that some aspect of the EI component understanding of emotion was assessed, but with the stories and presentation used, the EI component was fully accessible for measurement.

Other assessment issues that emerged included time of day, recent changes in the child's schedule, and special events. Some of the children came into the laboratory after a very long day, while others came in after attending a party with lots of candy and sweets. These types of situations could affect the child's behavior and attention level.

The regulation of emotion task allowed for many curious observations and speculations. One of the interesting findings was the increase in children who waited the full two minutes for the marshmallow in the second visit. Most of the children

remembered this particular part of the visit from six months earlier, and they commented on it. Some commented that they would "wait this time". Thus, I speculate that the previous experience of the marshmallow task may have influenced whether or not the children waited. In the first visit, the children may not have fully understood the conditions of the game (wait and you get two of treat, ring the bell and you get one of treat). Having experienced the consequences of not waiting, the children may have then decided that the second time (at 47 months) they would wait. Hence, had the children fully understood the consequences and rewards, then some of them may have waited the first time (at 41 months).

There were also a few children who seemed to understand the consequences of the game, in that ringing the bell means not getting two treats, but found ways around this condition. In order to still get two treats, a few of the children chose to eat the treats (all of them) before ringing the bell. One child came to get the experimenter, but definitely did not want to ring the bell, because it meant she would not get two treats. These children found ways around the conditions and rules of the marshmallow task (loopholes).

The lack of a significant relationship (low to moderate correlation) between the parent personality and parent emotional intelligence points to the fact that they are measures of two distinct concepts. If we were able to break down the parent's EI score into the four main components and compare these with the five facets of the parent's

personality, then we may have found that some of the EI components had stronger relationships with particular personality facets. Future studies may wish to obtain the EI scores for both parents, and compare these scores with parents' personality scores.

Future studies may wish to include attachment style as a predictor of child EI components. Researchers have suggested a relationship between attachment style and a child's regulation of emotion (Saarni, 1997). A child's attachment style may be a valid predictor of a child's ability to regulate emotion. Other researchers have promoted the influence of cognitive-language skills in developing regulation, recognition and understanding of emotion (Greenberg & Snell, 1997). As language skills are rapidly developing during the preschool years, it would be interesting to note if children with a language delay exhibit a lower/poor performance in the EI components (specifically, recognition and understanding of emotion).

Contributions of Study

This study has confirmed results from previous studies and contributed new findings about assessment of preschool-aged children and emotional development. We are able to measure regulation of emotion and recognition of emotion in three- to four-year-old children. To some degree, we are also able to measure understanding of emotion. This study suggests that the EI components may not be closely related at a young age, but that they probably blend together later in development (perhaps not until adulthood).

Although there seems to be some natural improvement in the EI components with time and experience, we may be able to identify those who could benefit from a little extra coaching/training in specific skills. For example, a child who, early on, seems to have difficulty accurately recognizing emotions in others may benefit from discussions and games (perhaps involving demonstrations of different emotions, facial expressions, and vocal inflections). Such training programs designed to enhance and improve a child's social interactions/skills indicate that "interventions that target emotions can have positive impacts on prosocial behavior" (Eisenberg et al., 1998, p. 517). It is interesting to note that at this young age, poor performance in one area does not preclude a child from doing well in other (e.g. - a child could be inaccurate in recognition and still exhibit high regulation of emotion). For this reason, it would be short-sighted to state that a child who is inaccurate in recognition is low in overall emotional intelligence. The components of EI in children do not seem to share the same relationship to each other that they do in adults, which is why we should refer to a child's ability in separate EI components, not an overall emotional intelligence score. A child who exhibits difficulty in some of the components may be at risk for having a low level of emotional intelligence later in life, which is why it may be beneficial to work with the child early on. A high level of emotional intelligence may provide many benefits, as emotions and social interactions with others pervade all areas in life. However, we should remember that it is how the emotional intelligence is used that is truly important. In coaching or training

children in the areas of emotional intelligence, we must also transfer a sense of social responsibility and judgment (good intentions). The Child Development Project (Eisenberg et al.) has incorporated some of these aspects of social responsibility along with their attempt to enhance a greater understanding of others' feelings and perspectives. Topics such as fairness, concern, helping behaviors, and respect for others have been integrated into the children's classrooms and group activities. Overall, the Child Development Project (Eisenberg et al.) has witnessed increases in children's prosocial behavior. This project and other intervention programs highlight the valuable and beneficial outcomes that may result from fostering children's development of emotional intelligence.

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Table 1

Measures and Variables for the Laboratory Visits

Measures and Variables	First Visit to Laboratory child mean age = 41 months	Second Visit to Laboratory child mean age = 47 months
Child Temperament (BSQ) ^a	✓	✓
Family Information Sheet ^b	✓	✓
Parent Personality (NEO-FFI)		
mother	✓	
father	✓	
Parent EI (short form) ^c	✓	
child's regulation of emotion		
mildly frustrating task (puzzle)	✓	✓
impulse control task (marshmallow)	✓	✓
child's recognition of emotion		
faces task	✓	✓
child's understanding of emotion		
stories task	✓	✓

^aAll of the mothers, plus one of the fathers filled out the BSQ for each visit

^bSee Appendices A and B

^cAll of the mothers, plus one of the fathers completed the EI test

Table 2
 Effect Sizes for Child Temperament Dimensions and Child Emotional Intelligence (EI) Components

EI Factors ^a	Temperament Dimensions								
	1	2	3	4	5	6	7	8	9
regulation of emotion									
1 st visit	S	S	S	M	S	S	S	S	S
2 nd visit	L***	S	M	L	L	M	M	M	S
recognition of emotion									
1 st visit	S	S	S	S	S	S	M	L**	M
2 nd visit	S	M	L	M	S*	M	S	M	M
understanding of emotion									
1 st visit	S	M	L	S	L	S	S	M	L
2 nd visit	S	S	M	S	S	M	S	M	S

Note. *n* ranges from 18 - 22. Temperament Dimensions 1 = activity; 2 = adaptability; 3 = approach/first reaction; 4 = mood; 5 = intensity/strength of reaction; 6 = distractibility; 7 = persistence; 8 = sensory reactivity/threshold; 9 = rhythmicity/daily cycles. From Behavior Style Questionnaire (BSQ) of the Carey Temperament Scales.

Effect Sizes: S = small ($r = .00 - .20$); M = medium ($r = .21 - .40$); L = large ($r = .41 - 1.00$).

^aEI Factors: regulation of emotion corresponds with marshmallow task; recognition of emotion corresponds with faces task; understanding of emotion corresponds with stories task.

* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

Table 3

Effect Sizes for Child Temperament Dimensions and Parent Personality Domains

Personality Domains ^a	Temperament Dimensions								
	1	2	3	4	5	6	7	8	9
Neuroticism									
mother	M	L*	S	L**	M	S	M	S	M
father	M	S	S	L	S	M	S	S	M
Extraversion									
mother	S	M	M	S	S	S	S	S	L
father	S	S	S	S	S	M	M*	S	S
Openness to Experience									
mother	S	M	M*	M	S	S	S	M	S
father	S	S	S	S	M	M	L	L*	S
Agreeableness									
mother	L	S	M	S	S	M	L	M	M
father	L	M	S	L*	M	S	L*	S	M
Conscientiousness									
mother	L	L	S	L	M	M	L	S	M
father	M	S	S	L	S	M	M	S	S

Note. Mothers $n = 23$; fathers $n = 21$. Temperament Dimensions 1 = activity; 2 = adaptability; 3 = approach/first reaction; 4 = mood; 5 = intensity/strength of reaction; 6 = distractibility; 7 = persistence; 8 = sensory reactivity/threshold; 9 = rhythmicity/daily cycles. From Behavior Style Questionnaire (BSQ) of the Carey Temperament Scales. Effect Sizes: S = small ($r = .00 - .20$); M = medium ($r = .21 - .40$); L = large ($r = .41 - 1.00$).

^aPersonality Facets from NEO Five-Factor Inventory (NEO-FFI).

* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

Table 4

Predictors of the Child's Emotional Intelligence (EI) Components

EI Components	Predictors
regulation of emotion	age* mood* rhythmicity activity** mother - C score** father - O score* and A score*
recognition of emotion	sensory reactivity* persistence approach strength of response mother - N score father - N score parent EI score
understanding of emotion	rhythmicity*** adaptability** persistence mother - N score dad - O & N scores

* $p \leq .05$. ** $p < .01$. *** $p < .0001$.

Figure Captions

Figure 1. Mayer and Salovey's model of emotional intelligence.

Note. From Emotional Development and Emotional Intelligence (p. 11), by J. D. Mayer and P. Salovey, 1997, New York: Basic Books.

Figure 2. Graph of temperament dimensions from Behavioral Style Questionnaire (BSQ) report. The standardized average is 0.0. A 1.0 on this graph indicates 17 children in 100 have more extreme scores. (2 = 3 in 100 3 = 1 in 100 4 = 1 in 1000)

Note: From The Carey Temperament Scales [Computer software], by S. C. McDevitt and W. B. Carey, 1996, Scottsdale, AZ: Behavioral-Developmental Initiatives.

Figure 3. Bar charts of the number of children who waited and did not wait for the marshmallow (regulation of emotion task) at 41 months and at 47 months.

Figure 4. Bar charts of the number of children who got 0, 2, 3, and 4 correct out of 4 possible correct on the facial recognition task at 41 months and at 47 months.

Reflective Regulation of Emotions to Promote Emotional and Intellectual Growth

Ability to stay open to feelings, both those that are pleasant and those that are unpleasant.

Ability to reflectively engage or detach from an emotion depending upon its judged informativeness or utility.

Ability to reflectively monitor emotions in relation to oneself and others, such as recognizing how clear, typical, influential, or reasonable they are.

Ability to manage emotion in oneself and others by moderating negative emotions and enhancing pleasant ones, without repressing or exaggerating information they may convey.

Understanding and Analyzing Emotions; Employing Emotional Knowledge

Ability to label emotions and recognize relations among the words and the emotions themselves, such as the relation between liking and loving.

Ability to interpret the meanings that emotions convey regarding relationships, such as that sadness often accompanies a loss.

Ability to understand complex feelings: simultaneous feelings of love and hate, or blends such as awe as a combination of fear and surprise.

Ability to recognize likely transitions among emotions, such as the transition from anger to satisfaction, or from anger to shame.

Emotional Facilitation of Thinking

Emotions prioritize thinking by directing attention to important information.

Emotions are sufficiently vivid and available that they can be generated as aids to judgment and memory concerning feelings.

Emotional mood swings change the individual's perspective from optimistic to pessimistic, encouraging consideration of multiple points of view.

Emotional states differentially encourage specific problem approaches such as when happiness facilitates inductive reasoning and creativity.

Perception, Appraisal, and Expression of Emotion

Ability to identify emotion in one's physical states, feelings, and thoughts.

Ability to identify emotions in other people, designs, artwork, etc., through language, sound, appearance, and behavior.

Ability to express emotions accurately, and to express needs related to those feelings.

Ability to discriminate between accurate and inaccurate, or honest versus dishonest expressions of feeling.

EMOTIONAL INTELLIGENCE

4 3 2 1 0 1 2 3 4

Inactive	Active
Quick	Gradual
Approaching	Cautious
Positive	Negative
Mild	Intense
Rarely	Often
Often	Rarely
Nonreactive	Sensitive
Regular	Not Regular

ACTIVITY

ADAPTABILITY

FIRST REACTION

MOOD

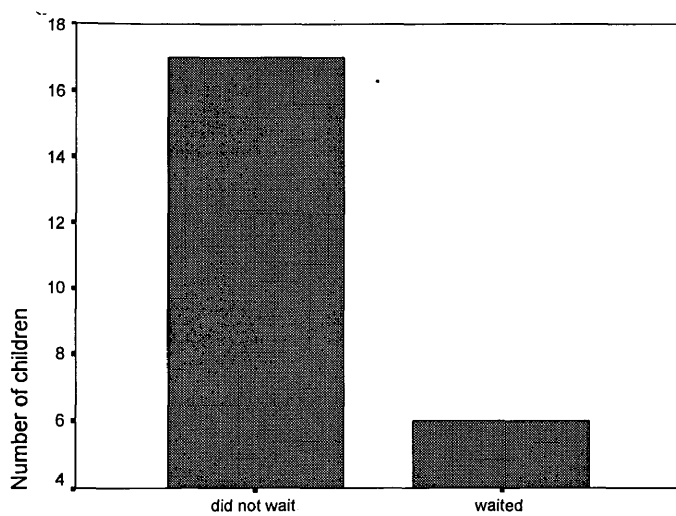
STRENGTH OF RESPONSE

DISTRACTIBILITY

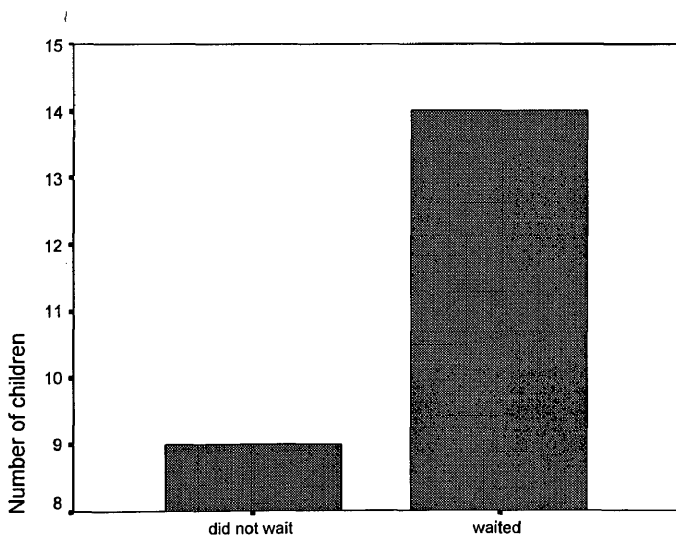
PERSISTENCE

SENSORY REACTIVITY

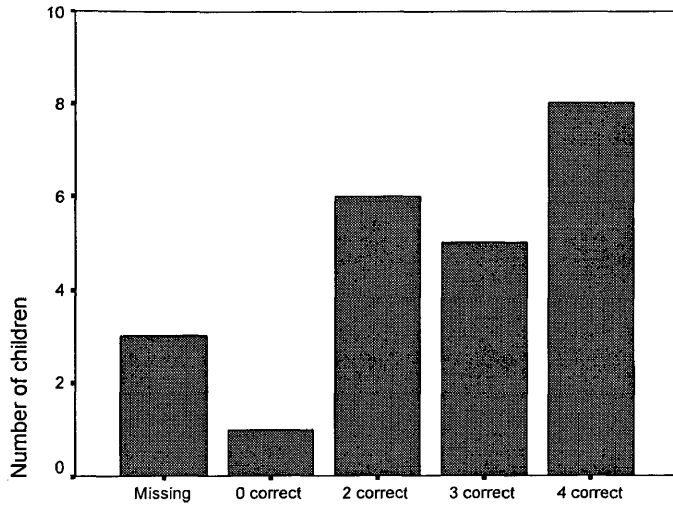
DAILY CYCLES



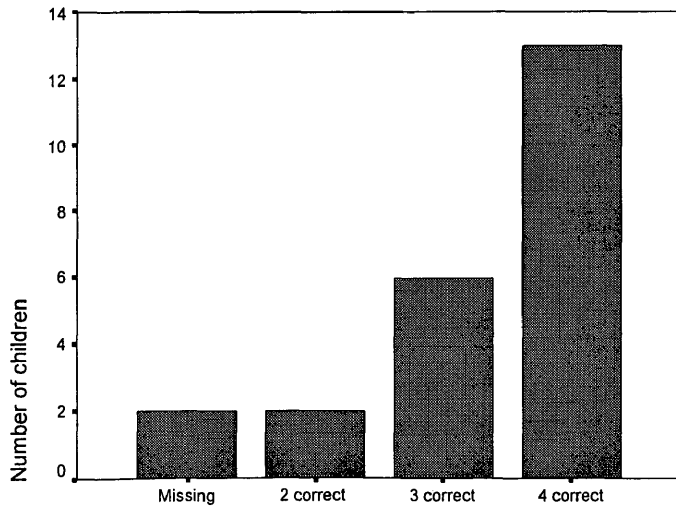
Regulation of emotion at 41 months



Regulation of emotion at 47 months



Recognition of emotion at 41 months



Recognition of emotion at 47 months

Appendix A
Family Information (1)

What is the birth order of the child?

Please name gender and age of siblings (if applicable)

Exact birth date of the child

Was the child born pre-term or full-term?

Is the child adopted?

Have there been any recent, significant events (e.g. move, new school, etc.) in the child's life? If so, please explain

Appendix B

Family Information (2)

Have there been any recent (last 6 months), significant events in the child's life? If so, please explain

Please indicate education and current employment/career area of both parents

Please discuss the child's school or play group experience (experience with other children outside of the home)

Appendix C

Coding of Puzzle Task with Parent

1. request for help
 - frequency of verbal requests
 - frequency of physical requests (e.g., pointing to puzzle piece)
2. child stays on task
 - frequency of non-puzzle oriented questions/comments
 - frequency of parent reminder to continue puzzle
3. tone of child's voice
 - frequency of "whiny" tone
4. words of defeat
 - frequency of expression (e.g., "I don't know how to do this")

Appendix D

Coding of Marshmallow Task

Frequency of distractions attempted from the time adult leaves the room to time of child ringing the bell or adult returning to the room

- distractions include looking away from treat, talking out loud or singing, changing positions, focusing on the bell, the pillow, or anything other than the treat itself

Appendix E

Story Vignettes

Sad Stories

1. Johnny/Susie and his/her sister have a pet dog. The dog is very sick.
2. Johnny's/Susie's favorite stuffed animal that he/she liked a lot was very old and worn out. He/she had to throw it away and gave it to his/her mom to get rid of it.
3. Johnny's/Susie's friend, who he/she really liked to play with, moved away. Johnny/Susie couldn't play with his/her friend any more.
4. Johnny/Susie wanted to go to the playground to play, but it rained all day long. Johnny/Susie could not go to the playground to play.

Happy Stories

1. Johnny/Susie wanted his/her friends to come over to play. So he/she asked them, and they came to play with him/her at his/her house.
2. Johnny/Susie worked hard on a picture and showed it to his/her mother. His/her mother really liked it and said Johnny/Susie did a good job.
3. Johnny/Susie went to the zoo, and his/her aunt bought him/her a really nice balloon that he/she liked a lot.
4. It is Johnny's/Susie's birthday. He/she is given a party with lots of cake and fun games to play, and presents, too.

VITA

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