TEMPERAMENT, JOINT ATTENTION, AND SOCIOEMOTIONAL OUTCOME

TEMPERAMENT AND JOINT ATTENTION:

STABILITY, CONTINUITY, AND PREDICTIVE OUTCOME IN CHILDREN'S SOCIOEMOTIONAL DEVELOPMENT

By

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ABSTRACT

Past research has focused extensively on the influence of temperament and mother-child interactions for the development of psychopathology. However, there is a paucity of research that has examined the role of natural variations in temperament and mother-child interactions on socioemotional outcome in samples of low-risk typically developing children. Furthermore, most research has investigated temperament and mother-child interactions in separate studies. Accordingly, the present work addressed three issues: 1) the short-term and long-term continuity of temperament and joint attention in typically developing children; 2) the predictive value of temperament and joint attention for socioemotional outcome in typically developing children; and 3) joint attention behaviours in a clinical sample of children.

Temperament was assessed through maternal report on the Infant Behavior Questionnaire (IBQ) beginning when children were between 18 and 37 months of age while joint attention was assessed through direct observation. All the IBQ subscales showed 9-month continuity and 4 of the 6 IBQ subscales showed moderate to high stability. Although there was 9-month continuity for all the joint attention measures, only 4 out of the 7 joint attention behaviors showed low to moderate levels of stability. There was little 4-year continuity or stability of temperament.

Cross-sectional relations were found between temperament and socioemotional outcome at both 18 and 37 months of age as well as 69 and 88 months of age. Established joint attention, measured when children were between 18 and 37 months of age, significantly predicted internalizing behaviours in typically developing children

between the ages of 69 and 88 months. Significant differences in joint attention were also found in a clinical sample of children with internalizing disorders between the ages of 5 and 8 years.

The present results suggest that some of the same temperament and joint attention behaviours that are associated with atypical development are also associated with typical variations in socioemotional development.

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Chapter 1:

General Introduction

The field of child development aims to elucidate the mechanisms underlying children's cognitive, emotional, and social development with the goal that such knowledge will aid in the understanding of normal developmental processes and the etiology of developmental psychopathology. One area that has received much focus is the factors underlying individual differences in socioemotional development. In the present work, I define socioemotional development as being comprised of the following three factors: prosocial behaviours, internalizing behaviours, and externalizing behaviours.

Various models have been developed and applied to help structure research on development. Many of these models have been unidirectional, viewing either genes and biological predispositions or environmental factors such as parenting as the sole determinants of children's outcome. More recent research has emphasized the complexity of child development, thus viewing both biological and environmental factors as influencing children's socioemotional outcome. However, despite this increased appreciation for the complexity of child development, there is still a paucity of research that has simultaneously investigated the influence of biological and environmental factors for developmental outcome.

The research that has been done to date has placed much emphasis on the influence of two factors for socioemotional development: 1) temperament, defined as early appearing, behavioural traits that have a biological basis, bias behaviour, and show stability across time and place (Bates, 1986; Buss & Plomin, 1984, 1986; Chess &

Thomas, 1984; Goldsmith & Campos, 1982); and 2) parenting and mother-child interactions.

Temperament

The study of temperament has a long and rich history. The first scientific theory of temperament was proposed in the 2nd century A.D. by Galen, a Greek physician. Galen's theory suggested that individual differences in temperament could be explained by the balance between four bodily humours or fluids: *flegma*, *chole*, *malanchole*, and *sanguis* (Galen, 170 A.D.). Although research on temperament no longer relies on the balance between bodily fluids to account for individual differences in temperament, contemporary research is still very much rooted in Galen's theory, with its focus on biological approaches to explain observable individual variations in temperament.

The modern day scientific study of child temperament began in the late 1950s with the seminal work of Thomas and Chess (1963). Thomas, Chess, and their colleagues (1963) studied 141 children in 85 New York families longitudinally from 2-6 months of age to 16-17 years of age. Based on parental reports, Thomas and Chess developed nine categories of temperament: activity level, rhythmicity/regularity, adaptability, threshold of stimulation, intensity of reaction, quality of mood, distractability, and attention span and persistence. Thomas and Chess emphasized that temperament focused on the stylistic aspects of behavior (i.e., the *how* of behavior) rather than the actual behaviors that were performed (i.e., the *what* of behavior) or the motivation for particular behaviors (i.e., the *why* of behavior).

The New York Longitudinal Study (1963, 1977) spawned a surge of research in the field of temperament. Many researchers (Buss & Plomin, 1984, 1986; Goldsmith & Campos, 1982; Kagan, Reznick, Clarke, Snidman, & Garcia-Coll, 1984; Kagan, Reznick, & Snidman, 1987; Kagan & Snidman, 1991), including Mary Rothbart (1981, 1986), used Thomas and Chess' (1963, 1977) theory as a starting point for their definitions and views of temperament. Mary Rothbart (1981, 1986) defined temperament as "individual differences in reactivity and self-regulation" (Rothbart, 1981, p. 569) and viewed temperament as comprising six dimensions: activity level, smiling and laughter, fear, distress to limitations, soothability, and duration of orienting. More recently, Rothbart and Bates (2006) refined the dimensions of temperament presented in the NYLS study by Thomas and Chess (1963, 1977) and attempted to consolidate the varying dimensions of temperament proposed by the different theories to date. Rothbart and Bates (2006) developed the following three broad dimensions of temperament: effortful control, negative affectivity, and extraversion/surgency. Effortful control is defined as the conscious regulation of one's behavior, including the extent to which one is able to focus and shift attention as necessary, plan future actions, and suppress inappropriate behaviors or responses. Negative affectivity is a measure of the extent to which one experiences frustration, fear, and sadness in response to the blockage of one's goals, the expectation of a negative situation, and the loss of an object or person, respectively, as well as one' ability to self-soothe. Extraversion/surgency includes traits such as smiling and laughter, activity level, impulsivity, and behavioral inhibition. This latter construct is a measure of the extent to which children will express positive affect, approach behaviours and

behavioural inhibition in novel situations (Rothbart & Bates, 2006). Given that difficulties with emotion regulation underlie much of psychopathology (see Keenan, 2000, for a review), research on socioemotional development has utilized the conceptualization of temperament developed by Rothbart and Bates (2006) in the study of early risk factors for later socioemotional outcome.

Parent-Child Interactions

With regards to environmental influences for socioemotional development, much research has focused on the early parenting relationship. A large portion of this research has viewed parenting as unidirectional, focusing on specific aspects of the parents' (usually the mothers') behaviours such as parental warmth, parental sensitivity, and parental harshness (Campbell, Pierce, Moore, Marakovitz, & Newby, 1996; Campbell, Shaw, & Gilliom, 2000; Rothbaum & Weisz, 1994; Russell & Russell, 1996; Shaw, Bell, & Gilliom, 2000; Shaw, Keenan, & Vondra, 1994; Zhou et al., 2002). However, recent work has emphasized the active role that children play in their interactions with their parents, thus suggesting that research should place more emphasis on the dyad as the unit of analysis and on the bidirectional nature of mother-child interactions (Criss, Shaw, & Ingoldsby, 2003; Harrist, Pettit, Dodge, & Bates, 1994; Kuczynski, 2003; Lindsey, Mize, & Pettit, 1997; Pesonen, Raikkonen, Heinonen, Komsi, Jarvenpaa, & Strandberg, 2008). One such aspect of mother-child interactions is joint attention, defined as a state during which both social partners are actively focused on a particular object, event, or topic, and are both aware of each others active participation and focus (Bakeman & Adamson, 1984). Although to date there has been a paucity of research that has specifically

investigated joint attention and its relation to socioemotional outcome, research has focused on dyadic mutuality, of which joint attention is a definitional component (Harrist, Pettit, Dodge, & Bates, 1994; Mize & Pettit, 1997). This research has shown that dyadic mutuality is positively related to socioemotional outcome (Deater-Deckard & Petrill, 2004; Harrist et al., 1994; Lindsey, Mize, & Pettit, 1997; Mize & Pettit, 1997).

Limitations of Past Research

There are a number of limitations with the research reviewed above. First, the majority of the research focused exclusively on the biological (i.e., temperament) or environmental (i.e., parenting and mother-child interactions) aspects of children's development. In the present work, I propose an interactionist model for the study of children's socio-emotional development, emphasizing the importance of investigating both biological and environmental factors as contributing to children's development. Second, there is a lack of research on factors that influence typical variability in socioemotional outcome as the majority of research in this area has utilized samples from mental health clinics or samples of children from the general community who were screened for behavioural problems. Consequently, little research has been conducted on how biological and environmental factors influence typical variations in socioemotional development in low-risk samples of children. Third, although past research has implicated dyadic mutuality and joint attention as being related to socioemotional outcome, with the exception of autism, little research has focused on joint attention behaviours in atypically developing children, such as children with internalizing and externalizing behaviour problems.

An understanding of the factors that influence typical variations in socioemotional outcome (and whether these factors are the same as those that influence atypical socioemotional outcome) is important for at least two reasons. First, it provides further insight into the mechanisms of typical development. Second, a better understanding of factors that influence typical development can provide further insight into atypical development, possibly suggesting ideas for interventions.

Overview of Thesis

The present work focuses on the stability, continuity and predictive value of temperament and mother-child interactions, specifically joint attention, in typically developing and atypically developing children. In Study 1 (Chapter 2), I sought to investigate the short-term and long-term stability and continuity of temperament, as well as the stability of joint attention across time and context. In Studies 2 and 3 (Chapter 3), I investigated the cross-sectional and longitudinal relations between socioemotional development and each of temperament and joint attention in a low-risk sample of typically developing children. In Study 4 (Chapter 4), I conducted a preliminary investigation of group differences in joint attention behaviours among three groups of dyads consisting of the primary caregiver and: 1) children with selective mutism; 2) children with one or more anxiety disorders; and 3) children with no anxiety disorders or selective mutism. In Chapter 5, I integrated the findings from the four studies conducted and provided ideas for future research.

Chapter 2:

Study 1

An investigation of the short-term and long-term stability of temperament and the across-time and across-context stability of joint attention

Introduction

Temperament

The contemporary study of temperament began in the 1950s with the work of Thomas and Chess (1963, 1977). Through their New York Longitudinal Study, Thomas and Chess presented the first theory of temperament consisting of nine defining dimensions (activity, intensity of reaction, rhythmicity/regularity, quality of mood, adaptability, distractibility, threshold of stimulation, attention span, and persistence) and three constellations of behaviour (easy, slow-to-warm-up, and difficult; Thomas & Chess, 1977; Thomas, Chess, Birch, Hertzig, & Korn, 1963). This work spawned a renewed interest in the area of temperament resulting in many researchers using the work of Thomas and Chess as a basis for the development of their own definitions and theories of temperament (Buss & Plomin 1984, 1986; Goldsmith & Campos, 1982; Kagan, Reznick, & Snidman, 1987; Rothbart, 1981, 1986). Although there is much variability in the definition and conceptualization of temperament amongst the prominent theories, researchers agree on five defining features: 1) temperament is made up of a constellation of traits rather than one particular trait; 2) temperament has a biological basis; 3) temperament influences behavioural tendencies, although the pure influence of temperament can only be observed in infancy as later in development a combination of temperament and environmental influences determine behavioural tendencies; 4) temperament is present early in life during infancy; and 5) temperament shows moderate stability across time and place (Goldsmith et al., 1987). Thus, a general definition of temperament is early appearing, behavioural traits that have a biological basis, defined

behavioural tendencies and show stability across time and place, although they can be modified by environmental influences within limits (Bates, 1986; Buss & Plomin, 1984, Chess & Thomas, 1984; Goldsmith & Campos, 1982).

This last point, the stability of temperament across time and place, is essential not only as one of the defining features of temperament but also due to the view that temperament is an early precursor to personality (Avshalom & Silva, 1995) and that certain temperament qualities, such as behavioural inhibition, may place children at an increased risk for later psychopathology (Kaufman & Kagan, 2005). Given its theoretical and applied importance, numerous studies have investigated the continuity and stability of temperament throughout development. As discussed by Pedlow and colleagues (1993), the consideration of both continuity and stability is necessary to provide a thorough assessment of the developmental course of temperament. Continuity provides a measure of the extent to which the temperament trait is continuously present throughout development (Bornstein, Gini, Putnick, Haynes, Painter, Suwalsky, 2006). In terms of stability, two types can be assessed: absolute and relative. Absolute stability refers to the extent that the same level of a temperament trait is present over time (Leising & Igl, 2007) while relative stability refers to the extent that an individual maintains his/her rank order within a group on a particular temperament trait (Bornstein et al., 2006).

The majority of studies have focused on the relative stability of temperament during the first two years of life and have found moderate relative stability of temperament (Carranza Carnicero, Perez-Lopez, Del Carmen Gonzalez Salinas, & Martinez-Fuentes, 2000; Hubert, Wachs, Peters-Martin, & Gandour, 1982; Kivijarvi ,

Raiha, Kaljonen, Tamminen, & Piha, 2005; Lamb, Frodi, Hwang, & Frodi, 1983; Matheny, Wilson, & Nuss, 1984; Matheny, Wilson, & Thoben, 1987; McBride-Chang, Gallahan, & Jacklin, 1996; Riese, 1987; Rothbart, 1986; Worobey & Blajda, 1989). For instance, Worobey and Blajda (1989) examined the correlations between activity level, smiling/laughter, fear, distress to limitations, soothability, and duration of orienting as measured through maternal reports on the Infant Behavior Questionnaire (IBQ; Rothbart, 1981) at 2-weeks, 2-months, and 1 year. The authors found that the correlations ranged from .33 to .65 and that the 2-week and 2-month scores for all the subscales were correlated and all but distress to limitations scores were correlated from 2-months to 1 year. However, for correlations between 2-weeks and 1 year, only the soothability subscale was correlated. Similar results were found in a more recent study conducted by Carranza Carnicero and colleagues (2000). Using the subscales activity level, distress to limitations, fear, duration of orienting, and smiling/laughter from the IBQ completed at 3, 6, and 9 months of age and the Toddler Behavior Assessment Questionnaire (TBAQ; Goldsmith, 1996) completed at 12 months of age, Carranza Carnicero and colleagues (2000) found that for consecutive time points (i.e., 3 months and 6 months) all the subscales showed statistically significant, moderate correlations (r-values ranging from .37 to .61). On the other hand, for longer time points (i.e., 3 months and 9 months), only 2 of the five subscales showed statistically significant correlations that indicated a weak relation over time [r-values of .32 (activity level) and .36 (smiling/laughter)].

In a further study of temperament stability, Matheny and colleagues (1984, 1987) used factor analysis and found that the maternal reports at both 18- and 24-months

clustered to form one factor, which the authors labeled as questionnaire tractability. Questionnaire tractability consisted of positive loadings of mood and adaptability and negative loadings of intensity, activity and distractibility. Questionnaire tractability scores at 18- and 24-months of age were moderately correlated (correlations ranged from .38 to .52 for infants at 12-, 18- and 24- months of age; Matheny, Wilson, & Nuss, 1984).

The studies reviewed above focused on the relative stability of temperament over the first two years of life. Other studies have expanded their investigation of the relative stability of temperament to preschool and school-age children (Durbin, Hayden, Klein, & Olino, 2007; McBride-Chang et al., 1996; McNeill & Persson-Blennow, 1988; Mufson, Fendrich, & Warner, 1989; Novosad & Thoman, 1999; Tomlinson, Harbaugh, & Anderson, 1996). In general, these studies have found similar patterns of relative stability, with higher rates of relative stability for assessments spanning shorter periods of time and lower rates of relative stability for assessments spanning longer periods of time. Durbin and colleagues (2007) used the Child Behaviour Questionnaire (CBQ; Rothbart, Ahadi, Hershey, & Fisher, 2001), which includes the temperament dimensions of smiling/laughter, shyness, activity level, sadness, anger, and fear, to assess relative temperament stability at ages 3 years, 5-6 years, and 7 years. The authors found statistically significant, moderate correlations between consecutive time points (i.e. 3 years and 5-6 years) with correlation values decreasing slightly but still remaining statistically significant between longer time points (i.e., 3 years to 7 years).

The finding of only moderate relative stability in measures of temperament across development can be interpreted in one of two ways. First, it may reflect an actual

discontinuity in the development of temperament due to environmental influences. Second, it may reflect measurement error.

As reviewed by Martin and colleagues (1986), the study of the absolute and relative stability of temperament is made difficult by four main issues. First, the rapid rate of child development over the first few years of life results in changes in the function and motivation of behaviour over time. Second, the behavioural presentation of temperament changes throughout development, increasing the possibility of measurement error due to difficulties in identifying age-appropriate behaviours for the temperament constructs. Third, given that temperament is influenced by environmental factors, the rapid environmental changes that children experience as they move from infancy, to toddlerhood, to preschool, and school age can lead to instability of temperament constructs. Fourth, the rapid cognitive development of children results in greater understanding of the environment and greater self-regulation in terms of emotional reactions, leading to possible discontinuities in temperament.

As mentioned above, although relative stability is important in the study of the developmental trajectory of temperament, it is also important to assess the continuity of temperament traits throughout development. Pedlow and colleagues (1993) were the first to investigate both the continuity and stability of temperament in a sample of 450 Australian children assessed at 4-8 months, 18-22 months, 32-36 months, 44-52 months, 57-78 months and 88-99 months using age-appropriate temperament questionnaires completed by the mothers. Using structural equation modeling, the authors found that six of the eight factors showed continuity over time: approach, rhythmicity, persistence,

irritability, inflexibility, and cooperation-manageability (but not activity-reactivity or distractibility). The authors also found statistically significant moderate correlations across consecutive time periods (i.e., 4-8 months and 18-22 months) for the six measures that showed continuity (*r* values ranging from .33 to .78). More recent research has continued in the same direction as begun by Pedlow and colleagues (1993), using structural equation modeling and latent growth curve analyses to further delineate the stability and continuity of temperament (Komsi et al., 2006; Lemery, Goldsmith, Klinnert, & Mrazek, 1999; Partridge & Lerner, 2007).

In summary, the research to date on the stability of temperament has found evidence for moderate relative stability over time, with relative stability increasing as children get older. One of the challenges with current temperament research is the numerous temperament questionnaires that are available. This diversity in questionnaires makes comparisons across studies focusing on the same age groups but using different questionnaires difficult.

In the present study, I investigated the short and long term continuity and stability of temperament, as measured through the IBQ (Rothbart, 1981, 1986) and the CBQ (Rothbart et al., 2001), for two groups of typically developing children. As reviewed above, the majority of past studies have focused solely on relative stability, measured using the Pearson product-moment correlation, and many of these studies have failed to consider the continuity of temperament constructs. In the present study, I measured both relative and absolute stability, through partial correlations and intraclass correlation coefficients, respectively, as well as continuity, using paired-samples t-tests. My use of

partial correlations (controlling for time between visits) was guided by the definition of relative stability presented by Bornstein and colleagues (2006), namely that stability is "consistency across time or context in the relative ranks of individuals in a group" (p. 2). However, Leising and Igl (2007) have discussed that one of the weaknesses of the Pearson product moment correlation is that it does not examine absolute stability. That is, the Pearson product-moment correlation measures the extent to which the score received by a participant is stable across time relative to the mean of the group at the different time points. Thus, the Pearson product-moment correlation can still be high even if participants show an increase or decrease in scores over time as long as the group as a whole shows the same decrease or increase. As suggested by Leising and Igl (2007), given that questionnaires are already completed by considering the child's behaviour in relation to a particular age-appropriate peer-group, the use of statistical methods that also rely on scores relative to the group mean to assess stability can interfere in attaining a true perspective on the absolute stability of temperament. The intraclass correlation coefficient (ICC) deals with this issue by allowing the calculation of absolute stability across time. Thus, in addition to the partial correlation as a measure of relative stability, I also used the ICC as a measure of absolute stability. My use of paired-samples t-tests for the measure of continuity was guided by Bornstein and colleagues' (2006) definition of continuity as "consistency in group mean level across time or context" (p. 3).

To assess the short-term relative and absolute stability of temperament, mothers completed the IBQ (Rothbart, 1981, 1986), a measure of the reactive and regulative aspects of temperament, for 18 typically-developing children between the ages of 18 and

37 months. The mothers again completed the IBQ (Rothbart, 1981, 1986) approximately 9 months after the first visit. As I mention below, in addition to the assessment of temperament, the mother-child dyads also participated in unstructured and semi-structured tasks meant to elicit joint attention. These tasks dictated the age-range that was utilized for the present study as well as the time interval between visits. To assess the long-term relative and absolute stability of temperament, mothers completed the IBQ (Rothbart, 1981, 1986) for 30 typically developing children between the ages of 19 and 37 months. Approximately four years after the first visit, the mothers completed the CBQ (Rothbart et al., 2001), which includes subscales that are conceptually identical to those on the IBQ (Rothbart, 1981, 1986).

Joint Attention

There is a large corpus of literature that illustrates the importance of mother-child interactions for children's social, emotional, and cognitive development. A specific aspect of mother-child interactions that has been implicated in many areas of child development, including the development of receptive and expressive language (Baron-Cohen, Baldwin, Crowson, 1997; Brooks & Meltzoff, 2008; Delgado, Mundy, Crowson, Markus, Yale, Schwartz, 2002; Shimpi & Huttenlocher, 2007; Tomasello & Farrar, 1986), emotion regulation (Morales, Mundy, Crowson, Neal, & Delgado, 2005; Mundy & Willoughby, 1996), social behaviours (McEvoy, Rogers & Pennington, 1993; Sheinkopf, Mundy, Claussen & Willoughby, 2004), play (Bigelow, MacLean, & Proctor, 2004; Cleveland, Schug, & Striano, 2007; Cleveland & Striano, 2007), and theory of mind (Aschersleben, Hofer, & Jovanovic, 2008; Charman, Baron-Cohen, Swettenham,

Baird, Cox, & Drew, 2000; Colonnesi, Riefe, Koops, & Perucchini, 2008; Nelson, Adamson, & Bakeman, 2008), is joint attention. Joint attention is formally defined as a state in which two social partners (i.e., the mother and child) are mutually focused on the same object, event or activity and are both aware of each others' focus on the object, event or activity (Bakeman & Adamson, 1984). Joint attention differs from requests or imperatives as the goal for joint attention is to share an object, event or activity with a social partner rather than to obtain an object that one desires from the social partner (Mundy & Willoughby, 1996). The development of joint attention begins during the first few months of life with the onset of face-to-face interactions between infants and their mothers (Tronick, Als, & Brazelton, 1980). Around 6 months of age, infants begin to engage in significantly fewer episodes of face-to-face interactions as they develop an increased interest in objects and events in their environments (Adamson & Chase, 1998). Around 12 to 15 months of age, children begin to engage in their first episodes of joint attention as they attain the ability to actively shift their attention between objects or events in their environment and their mothers (Bakeman & Adamson, 1984; Carpenter, Nagell, & Tomasello, 1998).

Underlying this view of the importance of mother-child interactions, generally, and joint attention, more specifically, for children's normal development, is the assumption that there is stability and continuity in the quality of mother-child interactions over time. Surprisingly, however, there is a paucity of research investigating the stability of mother-child interactions across time. The little research that has been conducted in this area has been mixed. For instance, some studies investigating maternal

responsiveness and positive affect have found significant stability across time (Bradley 1989; Goldberg, Lojkasek, Gartner, & Corter, 1989; Pine 1992) while others have found a lack of stability (Bornstein & Tamis-Lemonda, & Haynes, 1989). It is important to note that the majority of the studies in this area have focused exclusively on the interactive behaviours of the mothers and have not placed much focus on the stability across time of the child's interactive behaviours.

To the best of my knowledge, no studies have investigated the stability of mother-child interactions using the dyad as the unit of analysis rather than the individual participants and focusing on the interactive behaviours that are involved in the successful establishment and maintenance of joint attention. Consequently, one of the goals of the current study was to investigate the continuity and stability of joint attention behaviours over an average period of 9-months in a sample of typically developing children between the ages of 19 and 37 months. To reduce confounds, the dyads were observed in the same tasks using the same standard set of toys at both visits. Accordingly, I set the average time between visits at 9-months to ensure that the toys and tasks were age-appropriate at both visits and would capture the children's attention as well as to decrease carry-over effects from the first visit to the second visit. The rationale for the age range that I utilized in the present study was based on the fact that, although research has shown that infants are able to respond and detect some aspects of joint attention behaviours during the first half of their first year of life (Cleveland, Schug, & Striano, 2007; Gredeback, Theuring, Hauf, Kenward, 2008; Parise, Reid, Stets, Striano, 2008; Striano, Stahl, Cleveland, & Hoehl, 2007; Tremblay & Rovira, 2007), the first signs of true joint

attention typically appear towards the end of the first year of life (Carpenter, Nagell, &Tomasello, 1998) and children do not show a consistent ability to engage in joint attention until between 15 and 18 months of age (Bakeman & Adamson, 1984; Carpenter et al., 1998). As is described below, the present study's definition of joint attention was more cognitively and attentionally demanding than previous definitions. Consequently, I decided to include children at the higher end of the age range for the development of joint attention in the present study.

Another issue that is widely present in the area of observational studies is cross-context stability. Without question, observational studies are useful as they provide an objective assessment of the mother-child interactions. Furthermore, the videotaping of the observations enables researchers to observe and code the complex mechanisms that underlie the establishment and maintenance of interactions (Gardner, 2000). However, observational methods also have weaknesses, one of which is the question of cross-context stability. Many studies observe mother-child interactions in the laboratory setting and then generalize the findings to other situations. One of the challenges with this approach is that it raises the issue of the extent to which the laboratory setting influences the behaviour of the dyad. This brings into question whether the laboratory-based observations of mother-child interactions have ecological validity and can be extended to everyday interactions in the home-setting. As discussed by Bronfenbrenner (1977), this is especially critical in observations of younger children as young children are highly sensitive to their environments and may behave differently in an unfamiliar setting, such as a laboratory, compared to a familiar setting, such as the home.

As with stability across time, there is a lack of research on the stability of mother-infant interactions across contexts or settings. The research that has been done on this issue has produced mixed findings. The majority of the studies have focused on maternal behaviours and qualities, such as maternal emotional availability, responsiveness, directiveness, and positive affect (Biringen, Emde, Brown, Lowe, Myers, & Nelson, 1999; Biringen, Matheny, Bretheron, Recouf, & Sherman, 2000; Borduin & Henggeler, 1981; Bornstein, Gini, Putnick, Haynes, Painter, & Suwalsky, 2006; O'Brien, Johnson, & Anderson-Gotez, 1989). Furthermore, one of the difficulties with the interpretation of the results is that most of the studies have utilized different tasks across settings, such as free play in the laboratory and the completion of daily household tasks in the home setting. Given that different tasks may elicit different types of behaviours (Borduin & Henggeler, 1981), this confounds the results making it unclear whether the lack of cross-context stability is due to the different settings or the different tasks in which the dyads engage. Thus, another goal of the present study was to assess the stability of joint attention across context. Eighteen typically-developing children and their mothers first completed a set of unstructured and semi-structured tasks in the home when the children were between 19 and 37 months of age and then completed the same set of tasks in the laboratory an average of 9-months after the home visit.

It is important to note that, although much research has been conducted on joint attention and its relation to cognitive, emotional, and social development (Charman et al., 2000; Tomasello & Farrar, 1986), there is a great deal of variability in the literature in the way that joint attention has been operationalized. As reviewed by Tasker and Schmidt

(2008), there is a dual-usage problem in the use of the term joint attention given that many researchers use the term as representing both the behaviours that are associated with the achievement of joint attention (i.e., initiation acts) as well as the outcome of the behaviours (i.e., the actual state of joint attention). As well, there is much variability between researchers in the operationalization of the state of joint attention. These issues present difficulties in discriminating between the process by which joint attention is achieved and the final outcome state of joint attention as well as in the interpretation of the various studies investigating joint attention. In the present study, I used the conceptualization of joint attention developed by Tasker and Schmidt (2008), which is based on the work of Tomasello and Todd (1983), Tomasello and Farrar (1986), Bakeman and Adamson (1984) and Rocissano and Yatchmink (1984).

Summary

To summarize, the goals of the present study were to answer the following three questions: 1) Is there short-term continuity and stability in maternal-report of temperament over an average period of 9-months in a sample of typically developing children between the ages of 19 to 37 months?; 2) Is there long-term continuity and stability in maternal-report of temperament over an average period of 4 years in a sample of typically developing children between the ages of 18 to 37 months?; and 3) Is there stability in measures of joint attention across an average period of 9 months and across contexts (i.e., home and laboratory) in typically developing children aged 19 to 37 months?

Based on the literature reviewed above, and the previous research findings that the stability of temperament decreases as the time between assessments increases, I hypothesized that there would be moderate stability and continuity of maternal ratings of temperament completed an average of 9 months apart and modest stability and continuity of maternal ratings of temperament completed an average of 4 years apart.

Due to the lack of previous research on the stability and continuity of joint attention across time and setting and the conflicting research to date on the stability and continuity of other aspects of mother-child interactions, it was difficult to make specific hypotheses. However, consistent with the view adopted by Bornstein and colleagues (2006), I predicted that mother-child interactions in which the mothers utilized the same standard set of toys and completed the same unstructured and semi-structured tasks with their children in both the laboratory and the home may be less spontaneous and more constricted in the laboratory due to the novelty of the setting and the increased situational demands. Consequently, I expected that dyads may engage in fewer episodes of joint attention and that the joint attention span (i.e. the number of back and forth communicative acts between the mother and child) may be shorter in the laboratory compared to the home setting.

Method

Participants

Fifty-eight typically developing children (35 male, 23 female) and their mothers participated in the present study. The dyads were recruited from the Child Database in the Department of Psychology, Neuroscience and Behaviour at McMaster University,

Hamilton, Ontario. The Child Database consists of the names of children and their primary caregivers who were recruited at birth through the McMaster University Medical Centre and St. Joseph's Health Care, Hamilton, Ontario. The children ranged in age from 18 to 37 months (*M* age = 25.45, *SD* = 5.62). For their first visit, dyads were randomly assigned to either a home visit or a lab visit. Twenty-eight (16 male, 12 female) children and their mothers were visited by a researcher in the home while thirty dyads came into the laboratory. There were no statistically significant differences on any of the demographic, questionnaire, or interaction variables between the dyads who came to the laboratory and those who were visited at home for the first visit. Thus, I combined the dyads to form one group. In order to assess the stability of temperament and mother-child interactions across time and context, the dyads that were seen in the home for their first visit were contacted approximately nine months later (range = 5 – 13 months, *SD* = 1.93) and were invited to come to the laboratory to complete the same set of questionnaires and mother-child interaction tasks. Eighteen (64.3%) of the dyads agreed to participate in the second visit. Approximately four years after the first visit, the whole sample of 58 dyads was again contacted to complete a follow-up package of questionnaires, including a measure of temperament. Thirty-one dyads (53%) were successfully contacted (the other 27 dyads had moved and I was unable to obtain their new contact information) and thirty (52%) dyads agreed to participate in the follow-up visit. Therefore, the present study comprised two groups: dyads who were seen in the home at the first visit and then came to the laboratory approximately nine months later for a second visit (Group 1), and dyads who were seen either in the home or in the

laboratory during the first visit and participated in the questionnaire follow-up approximately 4 years after their first visit (Group 2). I provide demographic information for both groups below. Given that for both groups there were no significant differences on any of the demographic, temperament, or interactive variables between those participants who took part in the follow-up and those who did not, the demographic information presented below is based only on those dyads that participated in both the Time 1 and Time 2 assessments.

Group 1. Eighteen dyads (10 male, 8 female) comprised Group 1. The mean age of the children at the first visit was 25.78 months (range = 19-37 months, *SD* = 5.25). All the children were born healthy at term (i.e. > 36 weeks). The mean age of the mothers was 34 years (range = 26-45 years, *SD* = 4.68). All the mothers were married and English was the first language in the home for all the dyads. The majority of the mothers (72%) had completed university/college. Forty-seven percent of the children attended preschool for an average of 2.75 days per week (range = 1 to 5 days) and an average of 6.44 hours per day (range = 2 to 9 hours, *SD* = 2.47). See Table 2.1

Group 2. Thirty dyads (18 male, 12 females) comprised Group 2. The mean age of the children at the first assessment was 24 months (range = 18 – 37, *SD* = 4.61), and the mean age of their mothers was 33.23 years (range = 24 – 43 years, *SD* = 4.55). All the mothers were married and English was the language spoken at home for all the dyads. The majority of the mothers (70%) had completed university or college. Fifty-nine percent of the children attended preschool for an average of 2.94 days per week (range =

1 – 5 days, *SD* = 1.44) and for an average of 6.19 hours per day (range = 1.00 – 9.50, *SD* = 3.08). See Table 2.2.

At the follow-up visit approximately four years later, the mean age of the children was 74.50 months (range = 69 – 88 months, *SD* = 4.99). All the children were attending school (40% in Junior or Senior Kindergarten, 50% in Grade 1, and 10% in Grade 2) for an average of 25.10 hours per week (range = 11 – 35, *SD* = 8.76). All the dyads spoke English at home. Twenty-eight (93%) mothers were married and 2 (7%) were single. During the previous year, 15 (50%) mothers worked full time, 8 (27%) worked part-time, 2 (7%) worked both full time and part-time, and 5 (17%) did not work. The majority of the dyads (89%) had a total family income that was greater than $60,000 during the previous year.

Procedure

The study was approved by the McMaster University Research Ethics Board. All mothers provided written consent prior to participation.

Group 1. The dyads were visited by one of the researchers in their homes. The mother first completed a standard demographic questionnaire and then completed the Infant Behaviour Questionnaire (IBQ; Rothbart, 1981, 1986). The IBQ is a widely used measure of temperament developed by Rothbart (1981, 1986) that focuses on the child's reactivity and self-regulation. The IBQ (Rothbart, 1981, 1986) comprises 94 questions. The primary caregiver, in this case the mother, is asked to read through a number of behavioural reactions to everyday tasks, such as feeding, sleeping, bathing, dressing, play, and soothing, and rate the applicability of the descriptions to her toddler's responses

in such situations during the last week on a scale of 1 (never) to 7 (always). The mother may also select does not apply for inapplicable items. The IBQ (Rothbart, 1981, 1986) consists of six subscales: activity level, soothability, latency to approach, distress to limitations, smiling and laughter, and duration of orienting.

Activity level is a measure of the child's gross motor activity, measured by assessing the frequency and intensity of such behaviours as arm and leg movements, squirming, and general locomotor movements (Rothbart, 1981). Sample questions include: "During feeding how often did the baby lie or sit quietly" (reverse scored), "When placed in an infant seat or car seat, how often did the baby lie or sit quietly" (reverse scored).

Soothability assesses how quickly and easily the mother's use of soothing techniques such as holding or rubbing the child's back calms the child and helps him/her return to baseline (Rothbart, 1981). Sample questions include: "How often did the method of rocking soothe the baby", "How often did showing the baby something to look at soothe the baby."

Latency to approach is a measure of the extent to which the child will display approach or acceptance behaviours towards novel or intense stimuli such as individuals, objects, and situations (Rothbart, 1981). Sample questions include: "When given a new food or liquid, how often did the baby accept it immediately" (reverse scored), "When introduced to a strange person, how often did the baby cling to a parent."

Distress to limitations is a measure of the tendency of the child to fuss or cry in response to situations where his/her goals are blocked such as situations when he/she

cannot attain the food that he/she wants or cannot do something that he/she wants (Rothbart, 1981). Sample questions include: "When having to wait for food or liquids during the last week, how often did the baby show mild fussing", "When the baby wanted something, how often did s/he become upset when s/he could not get what s/he wanted."

Smiling and laughter is a measure of the extent to which the child tends to exhibit smiling and/or laughter in a variety of situations (Rothbart, 1981). Sample questions include: "When being dressed or undressed the last week, how often did the baby smile or laugh", "When you returned from having been away and the baby was awake, how often did s/he smile or laugh."

Duration of orienting is a measure of the extent to which the child will remain visually or interactively focused on a particular object, activity, or event for an extended period of time during which there are no changes in environmental stimulation (Rothbart, 1981). Sample questions include: "How often during the last week did the baby look at pictures in books and/or magazines for 5 minutes or longer", "During the last week did the baby play with one toy or object for 5-10 minutes."

The subscales are calculated by summing the ratings for the questions that make-up each subscale and then dividing by the number of questions that were answered. Past research has shown adequate internal consistency for all subscales of the IBQ with the following Cronbach alpha levels for: Activity Level (.73 - .84), Smiling and Laughter (.73 - .85), Fear (.81 - .84), Distress to limitations (.75 - .84), Soothability (.73 - .84), and Duration of Orienting (.67 - .75; Rothbart, 1981). In the present study, the small sample size and the fact that many mothers did not complete all the questions for each subscale

made the calculation of Cronbach alphas using the raw data difficult. As a result, median imputation was used for missing data in the calculation of the Cronbach alphas. For each participant, the median score for each subscale was calculated, and these scores were used to replace missing data for the subscales. For Group 1, the Cronbach alphas for the IBQ subscales at Time 1 were good for all subscales except Smiling and Laughter and Activity Level: .81 (Distress to Limitations), .85 (Latency to Approach), .77 (Duration of Orienting), .48 (Smiling and Laughter), .84 (Soothability), and .43 (Activity Level). The Cronbach alphas for the IBQ subscales at Time 2 were good for all subscales: .87 (Activity Level), .83 (Distress to Limitations), .79 (Latency to Approach), .78 (Duration of Orienting), .82 (Smiling and Laughter), and .82 (Soothability).

Once the mothers completed the IBQ, they were observed and videotaped interacting with their toddler in a free play task and in four semi-structured tasks (Tasker & Schmidt, 2008). A standardized assortment of toys that have been widely-used in the joint attention literature were arranged in a roughly 1.5 m by 1.5 m area on the floor, including a tea-set (Charman et al., 2000; Prendergast & McCollum, 1996; Wetherby & Prizant, 1990), doll (Bakeman & Adamson, 1984; Charman et al., 2000; Prendergast & McCollum, 1996; Tomasello & Farrar, 1986; Vaughan et al., 2003), puzzle and blocks (Bakeman & Adamson; Tomasello & Farrar; Vaughan et al., 2003; Wetherby & Prizant, 1990), truck (Charman et al., 2000; Namy, Acredolo, & Goodwyn, 2000), farm animals, figurines of familiar cartoon characters, and a kitchen stove with miniature pots, pans, and cutlery (Charman et al., 2000; Namy et al., 2000; Vaughan et al., 2003). The mother and her toddler were seated side-by-side on the floor within reach of the toys. The

mother was instructed to play with her child as she would if she had a few minutes of free time.

The dyad was given a maximum warm up time of 1 minute before the Free Play Task (5 minutes) began. After 5 minutes, the researcher waved her hand to solicit the mother's attention, and the mother began the Bubbles Task (3 minutes). During the bubbles task, the mother blew bubbles in the direction of the child but away from the child's face. Following 3 minutes, the experimenter again waved her hand to solicit the mother's attention, indicating for the mother to close and put the bubbles away. The experimenter waited between 20 seconds to 1 minute before starting the Laser Pointer Task (1 minute). During the Laser Pointer Task, the experimenter discretely shined a laser pointer on the floor in front of the child, turning the laser pointer on and off 3 times during the 1 minute. The experimenter again waited between 20 seconds to 1 minute before starting the Bumble Ball Task (1 minute). The experimenter turned on and released a ball that bounced around in front of the mother and child. After 1 minute, the experimenter removed and turned off the ball while handing 3 books to the mother. During the Book Sharing Task (3 minutes), the mother was instructed to present the three books to her child and ask her child to pick one. Once the child picked a book, the mother put the other two books behind her back and she and her child examined the child's chosen book. If the child became bored with the book, the mother again presented the other two books that were behind her back and asked the child to pick a new one. After 3 minutes, the experimenter announced the completion of the observational part of the study.

Immediately following the mother-child interaction tasks, the mother was asked to complete the Caregiver Perception Rating questionnaire from the Communication and Symbolic Behavior Scale (CSBS DP; Wetherby & Prizant, 1990) to ascertain that the child's behaviour during the free play and semi-structured tasks was typical and was not influenced by the presence of the camera or the experimenter. The mother rated the typicality of her child's behaviour during the interaction on a 3-point scale (1 = less than usual, 2 = typical, 3 = more than usual) on the following items: alertness, emotionality, interest and attention, comfort, activity, communication, and play. All the mothers rated their children's behaviours during the observation task as typical on all six items.

The laboratory visit took place approximately 9 months (range = 5 – 13 months, *SD* = 1.93) after the home-visit. The procedure was identical to the one for the home-visit.

Group 2. The dyads were either visited in their homes by a researcher (n = 11) or came to the Child Emotion Laboratory at McMaster University (n = 18). During this first visit, the mothers completed the demographics and IBQ (Rothbart, 1981, 1986) questionnaires. The Cronbach alphas for the IBQ questionnaires completed by Group 2 were calculated using the raw data due to the larger sample size and, thus, the availability of more participants where all the questions for a particular subscale were completed. The following were the Cronbach alphas for the six IBQ subscales: .55 (Activity Level), .83 (Distress to Limitations), .79 (Latency to Approach), .43 (Duration of Orienting), .68 (Smiling and Laughter), and .83 (Soothability). With the exception of Activity Level and Duration of Orienting, the IBQ subscales showed adequate internal consistency.

Approximately four years after the first visit, the mothers were sent a package of questionnaires to complete that included a standard demographic questionnaire and the Child Behavior Questionnaire (CBQ; Rothbart et al., 2001).

The CBQ is a widely-used measure of temperament for children between the ages of 3 and 7 years that was developed by Rothbart and colleagues (2001). The CBQ comprises 191 questions that focus on the reactivity and regulative aspects of temperament. Like the IBQ, the CBQ asks the primary caregiver to read through a number of behavioral reactions to everyday situations and rate the extent to which they describe their children's reactions during the last 6 months on a scale of 1 (extremely untrue) to 7 (extremely true) with the option for also indicating not applicable for inapplicable items. The CBQ comprises of 15 subscales, six of which correspond with the six subscales of the IBQ. Given that I was interested in the stability of temperament over time, for the present study, my focus was on the six subscales of the CBQ that corresponded with the subscales that make up the IBQ. These are: Activity, Anger/Frustration, Attentional Focusing, Falling Reactivity/Soothability, Fear, and Smiling/Laughter (Rothbart et al., 2001).

Activity is a measure of the child's gross motor activity with a focus on the rate and degree of locomotion (Rothbart et al., 2001). Sample questions include "Seems always in a big hurry to get from one place to another", "Is full of energy, even in the evenings."

Anger/Frustration is a measure of the extent to which the child expresses negative affect in response to the blockage of his/her goals or the disruption of his/her focus on a

particular task (Rothbart et al., 2001). Sample questions include: "Has temper tantrums when he/she doesn't get what he/she wants", "Gets angry when called from play before he/she is ready to quit."

Attentional Focusing measures the extent to which the child is able to focus his attention on a task for an extended period of time (Rothbart et al., 2001). Sample questions include: "When drawing or coloring in a book shows strong concentration", "Will ignore others when playing with an interesting toy."

Soothability measures how quickly the child recovers from an episode of intense distress, excitement, or general arousal (Rothbart et al., 2001). Sample questions include: "Calms down quickly following an exciting event", "Changes from being upset to feeling much better within a few minutes."

Fear measures the extent to which the child exhibits negative affect such as nervousness or worry in anticipation of potentially threatening events (Rothbart et al., 2001). Sample questions include: "Is afraid of fire", "Gets nervous about going to the dentist."

Smiling and laughter measures the degree to which the child expresses positive affect in the form of smiling and laughter towards changes in the environment such as changes in the intensity or complexity of stimuli (Rothbart et al., 2001). Sample questions include: "Laughs a lot at jokes and silly happenings", "Smiles and laughs during play with parents." See Table 2.3 for an outline of corresponding IBQ and CBQ subscales.

Past research has shown adequate internal consistency for the six CBQ subscales that are of interest here with Cronbach's alphas ranging from .66 (Soothability) to .80 (Anger/Frustration; Rothbart et al., 2001). The six CBQ subscales of interest in the present study also showed adequate internal consistency with the Cronbach alphas as follows: .61 (Activity Level), .86 (Anger/Frustration), .64 (Attentional Focusing), .89 (Soothability), .79 (Fear), and .69 (Smiling and Laughter).

Behavioural Coding

The videotaped interactions were transcribed in real time for verbal and non-verbal communicative acts and behaviours to provide a running record of the mother-child interaction. The transcriptions where then used to code the following joint attention variables: maternal and child initiation acts, established joint attention (EJA), joint attention span (JA Span), and the termination of joint attention. To prevent familiarity with participants, two different primary coders who were blind to the hypotheses of the present study transcribed and coded the joint attention behaviours for Time 1 and Time 2. To assess inter-observer reliability, a secondary coder coded 6 (43%) randomly selected subjects for Time 1 and Time 2. Cohen's kappa coefficients computed for Child and Maternal Initiation Acts as well as Established Joint Attention through Child and Maternal Initiation Acts were good at both time 1 [range = .73 (Child Initiation Acts) - .87 (Established Joint Attention through Child Initiation Acts)] and time 2 [range = .85 (Child Initiation Act, Maternal Initiation Act, Established Joint Attention through Child Initiation Acts) to .97 (Established Joint Attention through Maternal Initiation Act)]. Given that the Joint Attention Span was a continuous measure, Intraclass Correlation

Coefficients were calculated to assess inter-observer reliability for Joint Attention Span. Intraclass correlation coefficients for Joint Attention Span were excellent for both time 1 and time 2 (.99 at both time points).

Initiation Acts. Initiation acts have been defined as spontaneous, intentional verbal or non-verbal communicative acts directed towards the other social partner with the intent of directing that social partner's attention toward a particular object or event in order to share that object or event with the social partner (Landry, Smith, Miller-Loncar, & Swank, 1998; Mundy & Willoughby, 1996; Newland, Roggman, & Boyce, 2001). Tasker and Schmidt (2008) conceptualized initiation acts as active verbal or non-verbal behaviours that were directed toward a social partner and were not part of the current focus of interaction. Initiation Acts were considered "successful" when the social partner that the initiation act was directed to responded within 5 seconds. Both "successful" (i.e., those that were responded to) and "unsuccessful" (i.e., those that were not responded to) initiation acts where coded. Two types of initiation acts were coded: 1) Maternal Initiation Acts (MIA); and 2) Child Initiation Acts (CIA).

1. Maternal Initiation Acts (MIA). Maternal Initiation Acts (MIA) were intentional and active verbal or non-verbal communicative acts performed by the mother in order to direct her child's attention to an object or event on which the child was not currently focused (Tasker & Schmidt, 2008, Tomasello & Todd, 1983) or in order to share in the child's current focus of attention (Hundert, Mahoney, Mundy & Vernon, 1998; Tomasello & Todd, 1983). The MIA variable was created by summing the total number

of Maternal Initiation Acts performed across all 5 tasks (i.e. Free Play, Bubbles, Laser Pointer, Bumble Ball, and Book Sharing).

2. Child Initiation Acts (CIA). Child Initiation Acts (CIA) were intentional and active verbal or non-verbal communicative acts performed by the child toward the mother for the purpose of getting the mother's attention or directing the mother's attention to a particular object or event in the environment (Hundert et al., 1998; Prendergast & McCollum, 1996; Tasker & Schmidt. 2008; Tomasello & Todd, 1983). The CIA variable was created by summing across the total number of Child Initiation Acts performed across all 5 tasks.

Established Joint Attention (EJA). The conceptualization of joint attention used in the present study was based on a modified version of the protocols and conceptualizations of Bakeman and Adamson (1984), Tomasello & Farrar (1986), Tomasello & Todd, 1983, and Rocisanno & Yatchmink (1984). Bakeman and Adamson as well as Tomasello and Todd (1986) considered joint attention to be established once the dyad was visually and behaviourally focused on a particular object, activity, or event for a minimum of 3 seconds. Thus, for both of these research groups, joint attention was either present or absent and there was no consideration of the interactive mechanisms through which joint attention was established.

In the present study, I used a modified conceptualization of joint attention developed by Tasker and Schmidt (2008). This conceptualization emphasized the behaviours leading up to the establishment of joint attention. In the criteria outlined by

Tasker and Schmidt (2008), three contingent, on-topic communicative acts had to follow the initiation act before joint attention was considered established. Thus, the following sequence of on-topic communicative exchanges had to occur: 1) the mother or the child performed an initiation act in order to get the other social partner's attention and direct it toward an object or event; 2) the social partner provided an on-topic verbal or non-verbal response within 5 seconds and the response lasted for a minimum of 3 seconds; 3) the social partner who initiated provided a verbal or non-verbal response, such as eye gaze toward the social partner (Bakeman & Admson, 1984; Charman et al., 2000; Ingsholt, 2002; Tomasello & Farrar, 1986), to indicate his/her awareness of the shared attention; 4) the social partners remained visually focused on the object, activity or event, and communicated around it through the exchange of smiles, verbalizations, and vocalizations (Tasker & Schmidt, 2008). The present study had two EJA variables based on which social partner initiated the interaction that resulted in EJA: Maternal Established Joint Attention and Child Established Joint Attention. Maternal EJA was calculated by summing the total number of EJA episodes that were initiated by the mother across all 5 tasks and Child EJA was calculated by summing across the total number of EJA episodes that were initiated by the child across all 5 tasks.

Joint attention was considered terminated when one of the social partners either initiated a new topic of focus (Newland et al., 2001; Wood & Wood, 1997) or showed a disinterest in the current focus through behaviours such as yawning, visually looking away (Koester & Meadow-Orlans, 1999; Prendergast & McCollum, 1996), physically moving their bodies away from the interaction, squirming (Smith-Gray & Koester, 1995),

focusing on a different object (Koester & Meadow-Orlans, 1999), examining body parts such as fingers or belly-button, thumb-sucking, or, arching the back (Smith-Gray & Koester, 1995), or vocalizations of frustration. Either of the social partners had to engage in these behaviours for more than 3 seconds in order for joint attention to be terminated (Tasker & Schmidt, 2008).

Joint Attention Span. The length of an established joint attention episode was defined not by the time spent in joint attention but rather by the number of back and forth communicative exchanges by the mother and child within a joint attention episode. Joint attention span was calculated by summing across the number of back and forth communicative acts for all episodes of established joint attention across all 5 interactive tasks.

Success Rate. My calculation of success rates was identical to the procedure used by Tomasello and Todd (1983). I divided the number of initiation acts that resulted in established joint attention by the total number of initiation acts performed (i.e. initiation acts that resulted in established joint attention and those that did not). Two types of success rates were identified based on the type of initiation act: Maternal Success Rates, and Child Success Rates.

The dyads were observed in the interaction protocol for a total of 13 minutes. However, there was some variability amongst dyads in the amount of time they were observed due to experimenter error and due to the mothers terminating the Bubbles Task before they were instructed to do so. To account for this variability, relative frequency scores were created by multiplying the joint attention variables by 13 (the amount of time

the dyads were supposed to be observed) and dividing by the number of minutes the dyads were actually observed.

Statistical Analyses

The short and long-term continuity of temperament was assessed by conducting paired-sample *t*-tests comparing identical IBQ (Rothbart, 1981, 1986) subscales (short-term continuity) and comparing corresponding IBQ (Rothbart, 1981, 1986) and CBQ (Rothbart et al., 2001) subscales (long-term continuity). Intraclass correlation coefficients (ICC) and partial correlations controlling for time between visits were used to calculate the short and long-term absolute and relative stability of temperament, respectively. To assess short-term stability of temperament (Group 1), the ICC and partial correlations were conducted on identical IBQ (Rothbart, 1981, 1986) subscales at Time 1 and Time 2. Four mothers did not complete the IBQ (Rothbart, 1981, 1986) at Time 1. Therefore, these analyses were based on a sample size of 14 dyads.

To assess long-term temperament stability (Group 2), the ICC and partial correlations were conducted on corresponding IBQ (Rothbart, 1981, 1986) and CBQ (Rothbart et al., 2001) subscales. The same statistical methods were used for the assessment of the stability and continuity of joint attention measures across time and context. That is, the continuity of joint attention measures was assessed through paired-samples *t*-tests, and the relative and absolute stability of joint attention measures across time and context was assessed through ICC and partial correlations controlling for time between visits. Joint attention measures were missing for four dyads due to malfunctioning of the video-recording equipment. Therefore, the statistical analyses

were based on a sample of 14 dyads. The significance level for all analyses was set at $p < .05$. I did not control for multiple tests because I had a priori hypotheses.

Results

Short-term Continuity and Stability of Temperament

To assess the continuity of temperament across an average period of 9-months, six paired samples *t*-tests were conducted. As predicted, there were no statistically significant differences between time 1 and time 2 on any of the six temperament subscales (see Table 2.4). There were no significant relations between child's age at Time 1 and any of the IBQ (Rothbart, 1981, 1986) subscales at Time 1 or Time 2. The only significant sex difference for the IBQ (Rothbart, 1981, 1986) subscales was for Activity Level measured at Time 2 with females having statistically significantly higher activity levels compared to males. Therefore, to assess the short-term stability of temperament, partial correlations between identical IBQ subscales completed across an average time-span of 9 months were conducted, controlling for time between Time 1 and Time 2 and, for Activity Level, also controlling for child's sex.

As predicted, the partial correlations controlling for time between Time 1 and Time 2 (and for sex for Activity Level) revealed statistically significant relations between the following subscales: Latency to Approach Novel Stimuli ($r(11) = .74, p < .01$), Duration of Orienting ($r(11) = .60, p = .03$), Smiling and Laughter ($r(11) = .67, p = .01$), and Soothability ($r(11) = .63, p = .02$; see Table 2.5).

To assess the absolute stability of identical IBQ subscales, I conducted ICCs. As predicted, the absolute stabilities across an average time span of 9 months were moderate

to high for Latency to Approach Stimuli (ICC = .85), Duration of Orienting (ICC = .73), Smiling and Laughter (ICC = .73), and Soothability (ICC = .76). However, the ICCs showed weak absolute stability for Activity Level (ICC = .20) and Distress to Limitations (ICC = .39; see Table 2.6).

Long-term Continuity and Stability of Temperament

To assess the long-term continuity of temperament across an average period of 4 years, six paired samples *t*-tests were conducted. Consistent with my predictions, the IBQ subscales of Activity Level ($M = 3.52$, $SD = .64$), Distress to Limitations ($M = 2.99$, $SD = .71$), and Latency to Approach ($M = 2.97$, $SD = .83$) were significantly lower than the corresponding CBQ subscales of Activity Level ($M = 4.80$, $SD = .69$; $t(29) = -8.2$, $p < .001$, Cohen's $d = 1.92$), Anger/Frustation ($M = 4.43$, $SD = 1.03$; $t(29) = -8.61$, $p < .001$, Cohen's $d = 1.63$), and Fear ($M = 3.39$, $SD = 1.04$; $t(29) = -2.20$, $p = .04$, Cohen's d = .55), respectively. There were no statistically significant differences between the IBQ subscales of Duration of Orienting ($M = 4.64$, $SD = .95$), Smiling and Laughter ($M = 5.81$, $SD = .52$), and Soothability ($M = 5.11$, $SD = 1.00$), and the corresponding CBQ subscales of Attentional Focusing ($M = 4.95$, $SD = .71$; $t(29) = -1.52$, $p = .14$, Cohen's $d = .37$), Smiling and Laughter ($M = 6.02$, $SD = .42$; $t(29) = -1.86$, $p = .07$, Cohen's $d = .42$), and Soothability ($M = 5.23$, $SD = .87$; $t(29) = -.66$, $p = .54$, Cohen's $d = .14$), respectively (see Table 2.7).

There were no significant sex differences for the six subscales of the IBQ (Rothbart, 1981, 1986) and the corresponding six subscales of the CBQ (Rothbart et al., 2001). Although there were no significant relations between the child's age at Time 2

and his/her scores on the six CBQ (Rothbart et al., 2001) subscales of interest, there was a statistically significant relation between the child's age at Time 1 and his/her score on the IBQ Duration of Orienting (Rothbart, 1981, 1986) subscale. Therefore, partial correlations between corresponding subscales of the IBQ (Rothbart, 1981, 1986) and CBQ (Rothbart et al., 2001) controlling for time between visits and, for Duration of Orienting, age of child at the first visit were conducted. Only one statistically significant correlation was found between the IBQ subscale Distress to Limitations and the corresponding CBQ subscale Anger/Frustration ($r(29) = .50, p < .01$; see Table 2.8). The intraclass correlation coefficients between corresponding subscales of the IBQ and CBQ showed low to moderate absolute stability with ICCs ranging from .11 (Activity Level) to .46 (Soothability; see Table 2.9).

Continuity and Stability of Joint Attention

To assess the continuity of joint attention across time and context, paired-samples *t*-tests comparing identical joint attention measures across an average time span of 9 months and across settings (home and laboratory) were conducted. Contrary to my predictions, there were no statistically significant differences between any of the joint attention measures at Time 1 in the home and at Time 2 in the laboratory (see Table 2.10). There were no significant relations between child's age and any of the joint attention measures at Time 1 or Time 2. There was, however, a significant effect for sex at Time 1 for Child Initiation Acts with females performing significantly more Child Initiation Acts than males. Therefore, partial correlations between identical joint attention measures at Time 1 and Time 2 controlling for time between visits and, for

Child Initiation Acts, sex, were conducted to assess the relative stability of joint attention across time (average 9 months) and context (home and laboratory). There were no statistically significant partial correlations between Time 1 and Time 2 for any of the joint attention variables (see Table 2.11).

To assess absolute stability of joint attention, ICCs between identical joint attention variables at Time 1 and Time 2 were conducted. There were weak to moderate levels of absolute stability with the largest ICC values for Child Initiation Acts (ICC = .51), CIA Success Rate (ICC = .41), and Maternal Established Joint Attention (ICC = .61; see Table 2.12).

Discussion

Short and Long term Continuity and Stability of Temperament

In the present study, I investigated the short-term and long-term continuity and stability of temperament in two groups of typically developing children between the ages of 18 and 37 months. Short-term continuity and stability of temperament was measured by assessing maternal-report of temperament across an average period of 9 months. There were no statistically significant differences between the means of the temperament subscales across the 9-month period, indicating short-term continuity of temperament. Consistent with previous work and with my predictions, there was significant short-term stability for 4 of the 6 subscales of temperament: latency to approach novel stimuli, duration of orienting, smiling and laughter, and soothability. Importantly, the majority of past studies have focused exclusively on relative stability, measured through the Pearson product-moment correlation coefficient, in their assessment of the stability of

temperament. In the present study, two measures of stability were used: absolute stability and relative stability. The results for both measures were similar indicating that temperament showed both high absolute levels of stability (i.e., based on maternal-report children received the same or similar absolute scores on the subscales from time 1 to time 2) as well as relative stability (i.e., compared to the group means, participants maintained their rank-order over time).

The long-term stability and continuity of temperament was measured by comparing ratings of temperament conducted when the children were between 18 and 37 months of age and four years later. Four of the 6 subscales showed a lack of continuity over time. With the exception of attentional focusing and soothability, the mean scores for the CBQ subscales completed when children were between the ages of 69 to 88 months were statistically significantly higher than the corresponding IBQ subscales completed when children were between the ages of 18 and 37 months. Thus, as a group, children were rated as being more fearful, exhibiting more smiling and laughter, exhibiting higher levels of anger/frustration in response to the blockage of their goals, and showing higher activity levels when they were between 69 to 88 months of age compared to 18 to 37 months of age. The finding of short-term continuity, but no long-term continuity, is consistent with previous work (Carranza Carnicero et al., 2000; Tomlinson et al., 1996; Worobey & Blajda, 1989) and supports the view presented by Thomas and Chess (1977) that there is a high level of continuity within the same developmental stage but more discontinuity across developmental stages. Tomlinson and colleagues (1996) found that, with the exception of soothability, all the mean scores for

the IBQ subscales completed at 3 months of age were significantly lower than the mean scores for the CBQ subscales completed at 6 years of age. They suggested that these differences may be a reflection of developmental changes, most notably the switch from the child's reliance on external factors (i.e., the mother) to regulate and manage the environment to the child's growing independence and ability to control his/her own environment and behavioural responses to the environment.

Given that, unlike Tomlinson and colleagues (1996), the first assessment of temperament in the present study occurred at a later age when the children were between the ages of 18 and 37 months, I suggest that the discontinuity in the temperament subscales across time is a reflection of the children's cognitive development. As suggested by Sroufe (1996), emotional development is intertwined with cognitive development such that changes in either emotion or cognition influence the other. During the four-year period from 18 to 37 months of age to 69 to 88 months, children are exposed to new environments and stimuli and experience rapid cognitive growth and development. These changes influence the ways in which children view and interpret environmental stimuli and the ways in which they react to them, thus leading to what Belsky and colleagues (1991) term as "lawful discontinuity" in temperament.

Given this lack of continuity, there was practically no long-term absolute or relative stability of temperament. Only distress to limitations showed statistically significant relative stability and all the subscales showed weak to moderate absolute stability with soothability showing the highest degree of absolute stability. These results

are consistent with past studies that have found low levels of stability when temperament was assessed across longer time periods.

It is important to note that, even in the presence of short-term stability of temperament, the correlation coefficients for relative and absolute stability were moderate. For instance, the relative stability of Latency to Approach Stimuli for the 9-month period was .74, indicating that the Latency to Approach subscale at Time 1 explained 55% of the variance of the Latency to Approach subscale at Time 2. Although a portion of the remaining unexplained variance can be attributed to measurement error, it is highly liked that others factors such as environment also explain some of the remaining variance. Adopting an interactionist perspective of child development, I view biology as setting a template and predisposing children to particular behavioural reactions and tendencies, while the environment acts on the scaffolding that is established by temperament. Consequently, although temperament sets the basis for behavioural responses to stimuli, environmental influences further refine these responses. Thus, assessments of temperament that occur over long time spans, such as a few years, will involve the culmination of many years of environmental experiences and rapid social, cognitive, and emotional development, resulting in a high degree of discontinuity and instability in temperament. Research that investigates temperament over short periods of time and over a number of assessments -- although costly in both time and resources -- will help to further illustrate the developmental trajectory of different aspects of temperament and the environmental factors that influence these developmental trajectories. Preliminary work in this area, for example, has suggested that, although

there is a great deal of heterogeneity in the development of difficult temperament, the developmental trajectory for this temperamental style may be curvilinear such that difficult temperament increases until about the ages of 2 and 3 years and then decreases until the age of 5 years (Partridge & Lerner, 2007).

Limitations

There were a number of limitations that need to be addressed. First, it is important to note that the current study utilized maternal report to assess temperament. While the use of maternal report has a number of advantages, including, the mother's ability to assess the child's behaviour in a variety of situations and contexts, low-costs, and time-effectiveness (Seifer, Sameroff, Barrett, & Krafchuk, 1994), it also poses a number of challenges. Mothers may be biased in their reports of their children's temperament and, depending on their experiences and knowledge of children may vary in the anchor points that they apply to the completion of the questionnaires (i.e., what is considered a low level of a behaviour and what is considered a high level). This brings into question whether stability of temperament as reported by mothers is a reflection of true behavioural stability in the child or rather a reflection of stability in the mother's perceptions of the child (Lemery et al., 1999; Saudino, 2003). In general, research assessing these issues has shown that maternal report of temperament has both a subjective component, which is based on factors that are unrelated to the child's behaviours, and a strong objective component, based on the child's actual behavioural tendencies (Bates & Bayles, 1984; Mebert, 1991). For instance, parity, maternal personality characteristics, including extraversion and achievement (Bates, Freeland, &

Lounsbury, 1979), maternal temperament (Matheny et al., 1987), maternal mental health, and prenatal expectations (Mebert, 1991) can all influence the mother's ratings of the child's temperament. In the present study, I did not assess or control for any of these variables. Thus, future research that controls for these maternal factors will aid in attaining a clearer understanding of the stability and continuity of actual child behaviours and not the stability and continuity of maternal perceptions of children's behaviours.

As well, the incorporation of an observation-based assessment of temperament into the present study would help to strengthen the results. In general, studies that have assessed temperament through both maternal-report and observation of behaviours have found lower stability for temperament measures as assessed through observation (Carranza Carnicero et al., 2000; Matheny et al., 1984, 1987; Rothbart, 1986). However, it is not clear whether this discrepancy in stability of temperament is a reflection of maternal biases or the fact that observation-based ratings of temperament behaviours are based on observations that span a short period of time and a limited number of contexts, thus limiting the extent to which the observer obtains a true and accurate picture of the child's temperament (Durbin et al., 2007).

The Infant Behaviour Questionnaire and the Child Behavior Questionnaire all ask mothers to rate their children on specific behaviours in specific situations over a short period of time (i.e., 1 week for IBQ and 6 months for CBQ). This is a strength of the questionnaires as research has shown that questionnaires that ask about the appearance of specific, well-defined child behaviours in specific situations over a short period of time (i.e., a few weeks) provide more accurate assessments of children's temperament

compared to questionnaires that ask the mother to report over a long period of time using more general questions (Pedlow, Sanson, Prior, & Oberklaid, 1993). However, it is important to note that the use of the IBQ in our current sample of children between the ages of 18 and 37 months and 27 and 36 months may be a weakness of the present study. The IBQ was originally developed for infants up to the age of 12 months (Rothbart, 1981). Therefore, its use in the present study may have biased the results, especially for the assessment of short-term continuity and stability, given that the questions the mothers were answering may not have been age-appropriate. This may also explain why some of the IBQ subscales, namely Activity Level and Smiling and Laughter for Group 1 at Time 1 and Activity Level and Duration of Orienting for Group 2, showed low internal consistency. This lack of internal consistency may underlie the low absolute and relative short-term and long-term stability of Activity Level that was evident in the present study. However, there are also a few factors that increase my confidence in the validity of the present results, although I do acknowledge that they have to be interpreted with caution and future research is needed to replicate the results using the age-appropriate Toddler Assessment Behavior Questionnaire (TBAQ; Goldsmith, 1996). First, the IBQ is structured such that there is a "non applicable" option that mothers can choose for items that are inapplicable for their children rather than being forced to answer all the questions. The subscales are then calculated by summing across the questions that were answered and dividing by the number of answered questions. Therefore, mothers were not forced to answer questions that may not have been age-appropriate. Furthermore, for the Group 1 participants, I calculated the percentage of questions for each subscale that

mothers answered and reran the analyses for each subscale only including those participants who had 75% or more of the questions answered at both time points. I did this for all the subscales except for Smiling and Laughter and Latency to Approach since all the mothers for these two subscales at both time points answered 75% or more of the questions. This procedure decreased the sample sizes to between 8 (Activity Level and Soothability) and 13 (Latency to Approach). However, the pattern of results for the short-term continuity and stability of temperament remained the same. Furthermore, I also used median-imputation by calculating the median that each participant received for each subscale and then using those median scores to impute missing data. These analyses allowed me to use the full sample. Again, I found the same pattern of results as my original analyses for short-term continuity and stability. Thus, I feel that this strengthens the validity of my original results, even if the IBQ was originally standardized for children up to the age of 12 months.

Fourth, as mentioned briefly above, the assessment of temperament for both groups only occurred at two points in time. For Group 1, those two time points were separated by an average of 9-months while for Group 2 they were separated by an average of four years. Given the rapid rate of cognitive, emotional, and social development that children experience during the toddler years, the separation of multiple assessments across such long time intervals makes the measurement of stability and continuity difficult and confounded by the rapid rate of growth and development that children experience between assessments. Thus, multiple assessments conducted over shorter periods of time would strengthen the results and provide a clearer picture of

development over time. Fifth, given the longitudinal nature of the studies, there was attrition of participants over time. Although I did not find any significant differences on the demographic or temperament measures between those individuals who participated in the follow-up visits and those who did not, a more systematic assessment of participant attrition would help to ensure that any potential biases are identified.

Continuity and Stability of Joint Attention across Time and Context

With regards to the continuity and stability of joint attention, two types of behaviours were analyzed: individual (i.e. Maternal Initiation Act and Child Initiation Act) and interactive (i.e., Maternal Established Joint Attention, Child Established Joint Attention, Maternal Success Rate, Child Success Rate, and Joint Attention Span) across an average period of 9 months and across two settings (home and laboratory). The distinction between individual and interactive behaviours is dependent on whether the particular behaviour or variable was solely determined by the individual (i.e., an initiation act) or was dependent on the contingent, co-operative back and forth communication between the two social partner (i.e., the establishment of joint attention).

With regards to the continuity and stability of individual joint attention behaviours across time and context, although there was continuity in both maternal and child initiation acts, the analyses of absolute stability revealed moderate absolute stability only for Child Initiation Acts. In terms of the interactive behaviours, again, although there was continuity for all interactive behaviours across time and context, there was moderate absolute stability for two child interactive behaviours (Child Established Joint

Attention, and Child Success Rate) but only one maternal interactive behaviour (Maternal Established Joint Attention).

With regards to individual behaviours, it appears that children's initiation acts were influenced less by the different settings and the time span compared to the mother's initiation acts. Due to the fact that time and setting were confounded in the present study, it was difficult to parse out the extent to which stability in behaviours was influenced by time versus setting. However, given that our assessment of joint attention occurred across a time of rapid social, emotional, and cognitive development for children, I would expect that if time between visits was the main factor influencing interactions, it would be the child initiation acts that would show a lack of stability. Given that I found the opposite pattern of results with child initiation acts exhibiting moderate absolute stability while maternal initiation acts showed weak absolute stability, it appears that context had the greatest influence on the individual behaviours. This finding is important as mother-child interactions, such as joint attention, play key roles in children's social, emotional, and cognitive development. Often, mother-child interactions are assessed in the laboratory and conclusions are developed based on these observations. The present results, although preliminary and in need of further replication, suggest that the absolute stability of maternal behaviours across these settings is weak and may not provide an accurate perspective of maternal behaviours in mother-child interactions in the home. Thus, when the focus is on maternal behaviours, efforts should be made whenever possible to assess maternal behaviours in the home setting.

With regards to the absolute stability on the child initiated and maternal initiated interactive behaviours, the identification of how context and time influences the interactive behaviours is made difficult by the fact that a variable such as child initiated established joint attention involves a behavioural chain that consists of an initiation act, in this case a child intiation act, followed by 3 back and forth communicative exchanges between the mother and child. Consequently, and by definition, the interactive behaviours provide a window into the extent to which the dyad as a whole shows stability across time and context in interactive behaviours without providing insight into which member of the dyad or if both members of the dyad are affected by the different settings. Thus, the finding of moderate absolute stability across an average time period of 9 months and across contexts (i.e., home and laboratory) for 3 of the 5 interactive behaviours assessed suggests that, although there is dyadic stability across time and context in interactive behaviours, there is also some instability. Again, this has implications for research as caution must be taken when generalizing interactive behaviours observed in the laboratory to interactive behaviours in more familiar settings, such as the home.

Limitations

The study had a number of limitations that need to be considered regarding joint attention. First, as mentioned above, time and context were confounded in the present study, limiting the extent to which any lack of stability or discontinuity in behaviours could be attributed to time or context. Future studies are needed that parse out the influence of time and context by assessing interactive behaviours in both settings across a

short period of time such as a few days. Second, the presence of videotaping equipment can influence interactive behaviours (Gardner, 2000). In the present study, I did not vary the presence of videotaping equipment. That is, the equipment was present and visible to both mother and child in both the laboratory and the home. Future studies that vary the visibility and presence of video-taping equipment can provide further insight into the extent to which these factors influence mother-child interactions. Third, the visits across settings in this study were not counter-balanced such that all children were first seen in the home setting and then seen in the laboratory. Thus, it is possible that learning and familiarity may have influenced the results. However, the home and laboratory visits were conducted by different experimenters, thus minimizing the extent to which familiarity with the researcher may have influenced the results. Fourth, there was variability in the amount of time that passed between visits. Although I controlled for this variability in my analyses of relative stability, given the rapid rate of cognitive, social and emotional development that children undergo during the toddler years, the use of the same interval between visits would have made for cleaner results. Fifth, as mentioned above, the longitudinal nature of the study resulted in attrition of participants over time. Although I did not find any significant differences on the demographic or joint atteniton measures between those dyads who participated in the follow-up visit and those who did not, a more systematic assessment of participant attrition would help to ensure that any potential biases are identified. Lastly, the majority of families who participated in the present study had a high socioeconomic status, as measured through income, and the

mothers were married. Thus our results need to be generalized with caution to low-income families.

Conclusion

I investigated two areas of continuity and stability in the present study: 1) the continuity and stability of temperament across time and 2) the continuity and stability of mother-child interactive behaviours across time and context. I found evidence for 9-month continuity and stability in maternal-report of temperament in a sample of typically developing children between the ages of 19 and 37 months but little evidence for 4-year continuity and stability. With regards to the 9-month continuity and stability of joint attention behaviours across time and context, the results were mixed with some individual and interactive behaviours having high degrees of stability across time and context and others showing low levels of stability.

There are a number of strengths in the present study's assessment of the short and long term continuity and stability of temperament, including the use of two different measures of stability (absolute and relative), and the use of questionnaires that provide corresponding and conceptually-identical subscales across development, and that ask mothers about a specific set of behaviours in specific situations across a short period of time.

The present investigation of the stability of joint attention behaviours across time and context also has a number of strengths. To the best of my knowledge, it is the first study to investigate the cross-context and cross-time continuity and stability of joint attention behaviours. By using the same tasks in both settings, it enables any differences

observed to be attributed to time or setting but not to task. The continuity and stability of mother-child interactions is an important and often overlooked area of research in developmental psychology given the view that mother-child interactions are crucial for children's development and researchers often extend interactive patterns that they see in the laboratory to the home setting without any compelling evidence to support the cross-context stability of mother-child interactions. My finding of moderate cross-context and cross-time stability for 4 of the 7 individual and interactive variables I investigated suggests that, although there is some empirical support for the generalization of interactive behaviours across time and place, such generalizations need to be made with caution. There is a strong need for further research to investigate the stability of joint attention behaviours specifically, and mother-child interactive behaviours, more generally, across time and context, and I hope that the preliminary results from the present study will stimulate such work.

With regards to the continuity and stability of temperament, my findings illustrate that although temperament shows some stability, it is also malleable, especially during the first few years of life. This has important clinical implications as it highlights that although temperament is important in determining children's developmental outcome it is not destiny. Future research that investigates the external factors that influence the development of temperament will help to provide further insight into developmental outcome and will inform early interventions for mothers of children who exhibit difficult temperament styles.

Chapter 3:

Studies 2 and 3

Cross-sectional and longitudinal relations among temperament, joint attention, and socioemotional development in typically developing children

Introduction

Temperament

Although the development of social competence is complex and consists of the interplay between vulnerability and protective factors, it is widely accepted that temperament plays a role in the etiology of social competence. This area of research is based on the theoretical framework developed by Rothbart and colleagues (Rothbart & Bates, 1998), focusing on two aspects of temperament: reactivity and regulation. Reactivity is composed of two factors: 1) negative affectivity, defined as the tendency for individuals to experience feelings of fear, sadness, anxiety, frustration and anger (Putnam, Ellis, & Rothbart, 2002); and 2) extraversion/surgency, conceptualized as the tendency to experience positive affect and to engage in such behaviours as smiling, assertiveness, and high activity. Regulation is measured by the construct of effortful control, defined as "the ability to inhibit a dominant response to perform a subdominant response" (Rothbart & Bates, 1998). Effortful control can be further decomposed into two lower-order constructs: 1) inhibitory control, defined as the ability to inhibit one's behaviour; and 2) attentional control, defined as the ability to focus one's attention as well as shift one's attention when necessary.

Research has shown that both reactivity and regulation are associated with internalizing and externalizing behaviours (Asendorpf & Van Aken, 2003; Caspi, Henry, McGee, Moffitt, & Silva, 1995; Ehler, Evans, & McGhee, 1999; Huey & Weisz, 1997; Lonigan, Phillips, & Hooe, 2003; Muris, Meesters, & Blijlevens, 2007; Rydell, Berlin, & Bohlin, 2003; Ruschena, Prior, Sanson, & Smart, 2005; see Muris & Ollendick, for an

excellent review) as well as prosocial behaviours (Eisenberg, Fabes, Bernzweig, Karbon, Poulin, & Hanish, 1993; Eisenberg, Fabes, Murphy, Karbon, Smith, & Maszk, 1996; Eisenberg, Fabes, et al., 1997; Eisenberg, Guthrie, et al., 1997; Rydell, Berlin, & Bohlin, 2003). High levels of negative emotionality are significantly associated with high levels of internalizing and externalizing behaviours and low levels of prosocial behaviours (Eisenberg, Fabes et al., 1993; Eisenberg, Fabes et al., 1997; Eisenberg, Guthrie et al., 1997) while high levels of positive emotionality are associated with prosocial behaviours (Denham, McKinley, Couchoud, & Holt, 1990; Eisenberg, Fabes, Murphy et al., 1996; Lengua, West, & Sandler, 1998). Furthermore, with regards to internalizing and externalizing behaviours, the lower-order factors of emotionality further determine the direction of outcome. That is, sadness and fear are associated with internalizing behaviours, while anger is associated with externalizing behaviours (Muris et al., 2007, Rydell et al., 2003).

In a longitudinal study, Rydell and colleagues (2003) assessed emotionality using questionnaires when children were 5-years of age and then assessed internalizing, externalizing, and prosocial behaviours about 1.5 years later. The authors found that emotionality was associated with internalizing, externalizing, and prosocial behaviours. Those children who showed high levels of the lower-order factors of fear and/or sadness had higher levels of internalizing behaviours and those who showed high levels of the lower-order factor of anger had higher levels of externalizing behaviours. Both anger and fear were associated with prosocial behaviours such that children who showed high levels of fear and/or anger were rated as exhibiting low levels of prosocial behaviours.

Recent research has also suggested that the regulative aspects of temperament, defined as effortful control and composed of both inhibitory control and attentional focusing, are also important in socioemotional development (Posner & Rothbart, 2000). Studies have shown that low regulation is associated with high levels of both internalizing and externalizing behaviours (Eisenberg et al., 2001; Meesters, Muris, & van Rooijen, 2007; Muris, de Jong, & Engelen, 2004; Muris et al., 2007; Valiente et al., 2004) as well as low levels of prosocial behaviours (Calkins, Gill, Johnson, & Smith, 1999; Eisenberg et al., 1993; Eisenberg, Fabes, Murphy, et al., 1996; Eisenberg, Fabes et al., 1997; Eisenberg, Guthrie et al., 1997; Nelson, Martin, Hodge, Havill, & Kamphaus, 1999; Rothbart, Ahadi, & Hershey, 1994; Rydell et al., 2003). For instance, Eisenberg and colleagues (2001) classified a sample of 214 typically developing children ages 4-8 years into one of four groups based on maternal ratings on the Child Behavior Checklist: internalizing only, externalizing only, internalizing and externalizing, and control. The parents also completed measures of their children's emotionality and regulation. The authors found that compared to the controls, children in the internalizing, externalizing, and combined groups were significantly higher on measures of negative emotionality and significantly lower on effortful control. In another study, Eisenberg, Fabes, and colleagues (1997) found that high levels of child self-regulation measured when children were between 4 to 6 years of age and 6 to 8 years of age was related with high levels of social competence in children between the ages of 8 to 10 years.

Furthermore, studies have shown that the lower-order factors of regulation determine the direction of behavioural tendencies for internalizing and externalizing

behaviours such that low levels of inhibitory control appear to be associated with externalizing behaviours, while low levels of attentional control appear to be more strongly associated with internalizing behaviours (Muris et al., 2004; Muris, van der Pennen, Sigmond, & Mayer, 2008). This pattern is in line with the diagnostic presentation of internalizing and externalizing disorders given that individuals with internalizing disorders such as anxiety and depression tend to have difficulties controlling and changing negative thoughts and cognitions while individuals with externalizing disorders such as conduct disorder have difficulties controlling their overt behavioural reactions (Muris & Ollendick, 2005).

With regards to prosocial behaviours, research has generally focused on the composite measure of self regulation and has not taken into account the lower-order factors of regulation. One of the few studies that has examined the lower-order factors found that inhibitory control measured through maternal report when children were 15 months of age was significantly related to prosocial behaviours when children were 30 months old (Van Hecke et al., 2007).

The above studies suggest that it is a combination of reactivity and regulation that influences socioemotional development. A limited number of studies have begun to investigate whether the influence of reactivity and regulation is additive such that each factor accounts for separate variance or whether the two are interactive such that regulation predicts behavioural problems most strongly in individuals who are high in reactivity. To date, the research on this issue has been mixed.

In terms of internalizing and externalizing behaviours, out of three studies, two have found some interactions between negative emotionality and effortful control in the prediction of internalizing and externalizing behaviours. Using both inhibitory control and attentional control as measures of temperamental regulation, Eisenberg and colleagues (2000) found a significant interaction between emotional reactivity and attentional control in the prediction of externalizing behaviours in a longitudinal sample of 146 typically developing children with average ages of 7 and 9 years at the first and second assessments, respectively. The interaction between emotional reactivity and inhibitory control was less clear and suggested that there was no significant interaction such that inhibitory control predicted externalizing behaviours equally well in individuals who were high or low in emotional reactivity. In a larger sample of 409 non-clinical children aged 9-17 years, Meesters and colleagues (2007) investigated the relations between neuroticism, attentional control, anxiety, and aggression. The researchers found that both neuroticism and attentional control made additive contributions to the prediction of aggression while a significant interaction between neuroticism and attentional control was found for anxiety disorders, indicating that individuals who had high levels of neuroticism and low levels of attentional control were significantly more likely to experience anxiety. In contrast, Muris and colleagues (2004) investigated the influence of attentional control and neuroticism on symptoms of anxiety disorders in a large non-clinical sample of 303 children between the ages of 8-13 years and found that the influence of neuroticism and attentional control were additive.

With regards to prosocial behaviours, although some studies found significant interactions between emotionality and regulation (Diener & Kim, 2004; Eisenberg, Fabes et al., 1997; Eisenberg, Fabes, Guthrie, & Reiser, 2000; Eisenberg, Guthrie et al., 1997), others found additive effects (Eisenberg, Fabes, Murphy, Maszk, Sith, & Karbon, 1995; Eisenberg, Fabes, Murphy et al., 1996; Rothbart & Bates, 1998; Rydell et al., 2003). For instance, in a short-term longitudinal study conducted by Diener and Kim (2004), self-regulation and emotionality were assessed through maternal report when children were between 24 and 56 months of age and prosocial behaviours were assessed through teacher report approximately 5 months later. The researchers found that the interaction between anger proneness and self-regulation was significantly related to prosocial behaviours such that children who were high on anger proneness and low on self-regulation had the lowest prosocial behaviours while those children who were high on both anger proneness and self regulation exhibited high prosocial behaviours similar to those of children who were low on anger proneness. In contrast, in their study of 125 children, Rydell and colleagues (2003) found that regulation and reactivity, measured through parental report when children were 5 years old, made additive contributions to the prediction of prosocial behaviours when children were 6 years old. That is, high anger and low levels of regulation were independently related to the prediction of low prosocial behaviours. Accordingly, although the literature has shown clear relations between negative emotionality and social competence as well as effortful control and social competence, the nature of the relation between negative emotionality and effortful control (i.e. additive or interactive) is still unclear.

Parenting

In addition to temperament, another important factor that plays a role in the development of social competence is parenting. There is a large corpus of research that has related general parenting characteristics to developmental outcomes. For instance, parenting that is characterized by harshness, rejection, and inconsistency has been shown to be associated with higher levels of externalizing problems while parenting that is overintrusive or withdrawn has been associated with higher levels of internalizing problems (Campbell, Pierce, Moore, Marakovitz, & Newby, 1996; Campbell, Shaw, & Gilliom, 2000; Shaw, Bell, & Gilliom, 2000). In addition, researchers have also investigated the positive aspects of parenting, finding that warmth, positive affect, and responsiveness, are all associated with lower levels of externalizing and internalizing behaviours and higher levels of social competence (Rothbaum & Weisz, 1994; Russell & Russell, 1996; Shaw, Keenan, & Vondra, 1994; Zhou et al., 2002).

Although these studies provide insight into the global parenting factors that influence socioemotional development, they focus largely on the role of the parent, in most cases the mother, and fail to consider the bidirectional characteristics of the relationship. Recent research is increasingly emphasizing using the dyad as the unit of analysis rather than focusing solely on one social partner, thus acknowledging the important bidirectional interactions that occur in the mother-child relationship.

Joint Attention

One such measure of the bidirectional relationship between the mother and child is joint attention. Although there is variability in the conceptualization and measurement

of joint attention, joint attention can be defined as a state in which both social partners are actively engaged around a particular object, task or event, and are aware of each other's active involvement (Bakeman & Adamson, 1984). Although few studies have focused specifically on the influence of joint attention on behavioural outcome, some studies have investigated the influence of attention skills on social competence. In a cross-sectional study with preschool aged children, Murphy and colleagues (2007) found that scores on a computerized assessment of attention were associated with children's social competence with their peers such that children who were more accurate on the attention task had higher social competence scores. Using longitudinal approaches, both Morales and colleagues (2005) and Gaertner and colleagues (2008) found significant relations between focused attention and negative emotionality in toddlerhood (r-values ranging from -0.35 to -0.40). That is, high levels of focused attention were associated with lower levels of negative emotionality during toddlerhood.

To the best of my knowledge, only two studies to date have investigated the influence of joint attention on behavioral outcome. Using a cross-sectional approach, Morales and colleagues (2005) measured joint attention and emotional regulation when children were 24 months of age. The authors found a significant relation between joint attention and emotion regulation, indicating that children who spent significantly longer periods of time in joint attention with their mothers showed an increased ability to independently regulate their emotions during a delay task. Given that many individuals have suggested that difficulties with emotion regulation may underlie developmental psychopathology (see Keenan, 2000, for a review), a natural question that stems from the

findings of Morales and colleagues (2005) is whether joint attention influences socioemotional development. Sheinkopf and colleagues (2004) addressed this question through a longitudinal study in which joint attention behaviours were assessed when children were 12, 15, and 18 months of age and behavioural outcomes were assessed when children were 36 months of age. Sheinkopf and colleagues (2004) measured joint attention using structured tasks that the child completed with the experimenter. These tasks measured the extent to which the child initiated joint attention with the experimenter around presented toys as well as responded to bids for joint attention from the experimenter. The authors found that higher rates of responding to joint attention were associated with lower rates of withdrawn behaviours and higher ratings of social competence while higher rates of initiating joint attention were associated with lower rates of disruptive behaviours. Thus, there is evidence that aspects of joint attention predict socioemotional outcome.

Temperament and Joint Attention

The studies reviewed above have focused either on the influence of temperament or joint attention on developmental outcome. However, we know that development is complex and influenced by the interplay of many biological and environmental factors. To the best of my knowledge, only one study to date has investigated the relative influence of both temperament and joint attention on social competence. Using hierarchical linear regression, Van Hecke and colleagues (2007) investigated the extent to which joint attention behaviours predicted externalizing behaviours and social competence in 30-month old children over and above temperament, cognition and

language. The authors found that both initiating joint attention and responding to the experimenter's bids for joint attention negatively predicted maternally reported externalizing behaviours over and above the temperament measure inhibitory control. For social competence, only the child's initiation of joint attention with the experimenter predicted maternally reported social competence over and above the temperament measure of inhibitory control. Thus, these results suggest that joint attention behaviours make unique contributions to the prediction of externalizing behaviours and social competence over and above temperament. It also suggests that different aspects of joint attention behaviours may differ in the extent to which they influence the development of externalizing behaviours and social competence.

One limitation of the studies focusing on joint attention discussed above was the manner in which joint attention was measured. The studies utilized a structured task that was completed between the child and the experimenter to assess joint attention behaviours. Furthermore, the authors only considered initiations for joint attention as well as responding to joint attention. Thus, joint attention was either present or absent, and there was no consideration of the mechanism through which joint attention was established or the length of joint attention episodes. However, research has shown that, although the establishment of joint attention is important, the significance of joint attention for development is largely based on the fact that joint attention episodes provide an opportunity for children to learn, amongst other things, social skills such as turn-taking and emotion regulation (McEvoy, Rogers, & Pennington, 1993; Mundy & Willoughby, 1996; Sheinkopf et al., 2004). Thus, the length of time that dyads spend in

joint attention may also influence developmental outcome. Consequently, in the present study, I investigated the influence of joint attention on socioemotional development in typically developing children, expanding on previous findings in a number of ways.

The Present Study

I conducted two studies to investigate the influence of temperament and joint attention on socioemotional outcome in a non-clinical sample of typically developing children. The children and their mothers first visited the laboratory or participated in a home-visit when the children were between 18 and 36 months old. During this first visit, the mothers and their children were videotaped in a variety of interactive tasks, which were coded for joint attention behaviours. The assessment of joint attention expanded on previous work in several ways. First, I utilized one unstructured free play task and four semi-structured tasks that were completed by the mother and child as the assessment of joint attention. Second, unlike past studies that focused solely on the behaviours of the child in response to the experimenter, I considered the dyad as the unit of analysis, thus analyzing the sequence of back and forth interactive behaviours between the mother and child. Third, I coded both for the establishment of joint attention as well as the number of back and forth exchanges within joint attention episodes, thus taking into consideration not only the presence of joint attention but also the length of communicative exchanges within joint attention episodes.

The mothers also completed the Infant Behavior Questionnaire (IBQ; Rothbart, 1981, 1986) during the first visit as a measure of their children's temperament as well as the Adaptive Social Behavior Inventory (ASBI; Hogan, Scott, & Bauer, 1992), as a

measure of their children's socioemotional behaviour. Approximately four years after the first visit, when the children were between 69 and 88 months of age, the mothers completed the Child Behavior Questionnaire (CBQ; Rothbart, Ahadi, Hershey, & Fisher, 2001) as a measure of their children's temperament and the Child Behavior Checklist (Achenbach, 1991), as a measure of their children's internalizing and externalizing behaviours.

In Study 2, I assessed the cross-sectional relations between socioemotional outcome (i.e, prosocial behaviours and disruptive behaviours), as reported by mothers, and each of temperament and joint attention. In Study 3, I assessed the longitudinal relations between internalizing and externalizing behaviours and each of temperament and joint attention. Both studies addressed the following two questions: 1) Are temperament and joint attention individually related to socioemotional behaviours in a sample of typically developing children? and 2) Do joint attention behaviours contribute to socioemotional behaviours in a non-clinical sample of typically developing children over and above temperament?

For Study 2, based on past research, I predicted that the temperament measures of emotionality (i.e., anger/frustration, and smiling and laughter) would be individually related with socioemotional outcome such that anger/frustration would be positively related with disruptive behaviours and negatively related with prosocial behaviors while smiling and laughter would be positively related with prosocial behaviours. With regards to the regulative aspects of temperament, I predicted that soothability would be negatively related with disruptive behaviours and positively related with prosocial

behaviours. Given the paucity of research on the influence of joint attention on socioemotional outcome, I made general predictions as to the relation of joint attention with disruptive and prosocial behaviours. Based on past research that has implicated joint attention as playing an important role in the development of such social skills as emotion regulation (Morales, Mundy, Crowson, Neal, & Delgado, 2005; Mundy & Willoughby, 1996), theory of mind (Aschersleben, Hofer, & Jovanovic, 2008; Charman, Baron-Cohen, Swettenham, Baird, Cox, & Drew, 2000; Colonnesi, Riefe, Koops, & Perucchini, 2008; Nelson, Adamson, & Bakeman, 2008), and turn-taking (McEvoy et al., 1993; Sheinkopf et al., 2004), I predicted that higher levels of established joint attention episodes and higher frequencies of back and forth exchanges within joint attention episodes would be related with lower disruptive behaviours and higher prosocial behaviours. Lastly, based on the work of Van Hecke and colleagues (2007), I predicted that joint attention behaviours would predict disruptive and prosocial behaviours over and above temperament and that the specific joint attention behaviours may differ between the prediction of prosocial and disruptive behaviours.

For Study 3, I predicted that the temperament measures of emotionality (i.e., fear, sadness, and anger) would be individually related to internalizing and externalizing behaviours such that maternal ratings of fear and sadness would be positively related to maternal ratings of internalizing behaviours and maternal ratings of anger would be positively related to maternal ratings of externalizing behaviours. With regards to the regulative aspects of temperament, I predicted that maternal ratings of inhibitory control would be negatively related to externalizing behaviours and maternal ratings of

attentional control would be negatively related to internalizing behaviours. Again, given the paucity of research on the influence of joint attention on socioemotional outcome, I made general predictions as to the relation of joint attention with internalizing and externalizing behaviours. I predicted that dyads who, at 18 to 37 months of age, established more joint attention episodes and who had more back and forth exchanges within joint attention episodes would have children who would be rated as lower on both internalizing and externalizing behaviours when they were between 69 and 88 months of age. I also again predicted that joint attention behaviours would predict internalizing and externalizing behaviours over and above temperament and that the specific joint attention behaviours may differ between the prediction of internalizing and externalizing behaviours.

Study 2

Method

Overview

Fifty-two mothers and their children came to the laboratory ($n = 31$) or were visited at home ($n = 21$) when their children were between 18 and 37 months old (M age = 25.10 months, $SD = 5.64$). The mothers and their children were observed and videotaped in five widely used joint attention tasks. Mothers also completed a standard demographic questionnaire, the Infant Behavior Questionnaire (IBQ, Rothbart, 1981), and the Adaptive Social Behavior Inventory (ASBI, Hogan et al., 1992), a measure of their children's socioemotional development. As a token of my appreciation, children received toys upon completion of the visit. There were no statistically significant

differences on any of the demographic, behavioural, or questionnaire measures between those dyads that completed the first visit at home and those that completed the first visit in the laboratory. Therefore, I combined the two groups into one group. Two dyads did not have complete data for the temperament, joint attention and socioemotional measures. Therefore, the sample for Study 2 was composed of fifty dyads.

Participants

Fifty children (31 males, 19 females) between the ages of 18 and 37 months (*M* age = 24.82, *SD* = 5.51) and their mothers participated in Study 2. All but one of the children were from two-parent families and the average age of their mothers was 33.33 years (range = 24 – 43 years, *SD* = 4.61). Forty-nine (98%) mothers reported English as the family's first language and one (2%) reported English as their family's second language. Twenty-five children (53%) attended preschool for an average of 3.24 days a week (range = 1 to 5, *SD* = 1.42) and 6.68 hours per day (range = 1 – 9.50, *SD* = 2.56). Three mothers did not report whether their children attended preschool. The majority of the mothers (66%) were university graduates. See Table 3.1 for demographic information.

Procedures

All procedures for the study were approved by the McMaster University Research Ethics Board. All mothers provided written consent.

Behavioural Tasks

The mothers and their children were observed and videotaped in one unstructured free play task and four semi-structured tasks (Bubbles, Laser Pointer, Bumble Ball, and

Book Sharing; Tasker & Schmidt, 2008). A standard assortment of toys that have been used in previous studies of joint attention, including, a tea-set (Charman et al., 2000; Prendergast & McCollum, 1996; Wetherby & Prizant, 1990), doll (Bakeman & Adamson, 1984; Charman et al., 2000; Prendergast & McCollum, 1996; Tomasello & Farrar, 1986; Vaughan et al., 2003), puzzle and blocks (Bakeman & Adamson; Tomasello & Farrar; Vaughan et al., 2003; Wetherby & Prizant, 1990), truck (Charman et al., 2000; Namy, Acredolo, & Goodwyn, 2000), farm animals, figurines of familiar cartoon characters, and a kitchen stove with miniature pots, pans, and cutlery (Charman et al., 2000; Namy et al., 2000; Vaughan et al., 2003), was arranged on the floor in an area that was roughly 1.5 m by 1.5 m. The mother and her child were seated on the floor side-by-side and within arms reach of each other and of the toys. The mother was reminded to interact and play with her child as she would if she had a few minutes of free time. The dyad was given a maximum warm-up period of 1 minute before videotaping commenced. During the Free Play (5 minutes) the mother and child were allowed to play with the available toys as they wished. After 5 minutes, the experimenter waved her hand to indicate for the mother to start the Bubbles Task. During the Bubbles Task (3 minutes), the mother blew bubbles toward the child but away from the child's face. After 3 minutes, the experimenter again attained the mother's attention by waving her hand, indicating for the mother to place the lid back on the bubbles and to put the bubbles behind her back. The experimenter waited between 20 seconds and 1 minute before beginning the Laser Pointer task. During the Laser Pointer task (1 minute) the experimenter discretely shined a laser pointer on the floor in view of both the mother and

child. During the 1 minute period, the experimenter turned the laser pointer on and off three times. After 1 minute, the experimenter again waited between 20 seconds and 1 minute before starting the Bumble Ball Task. During the Bumble Ball Task (1 minute), the experimenter turned on and released a bumble ball that bounced around in front of the mother and child. After 1 minute, the experimenter picked up and turned off the bumble ball while handing the mother three books, which marked the beginning of the Book Sharing task (3 minutes). The mother presented the three books to the child and asked the child to pick one of the books to read. After the child picked a book, the mother placed the remaining 2 books behind her back and she and her child looked through the child's chosen book. If the child became bored with his/her chosen book, the mother again presented the other two books to the child and asked the child to pick another book. After 3 minutes, the experimenter announced the end of the observation period.

Subjective Measures

Caregiver Pereception Rating Scale. The mothers completed the Caregiver Perception Rating Scale from the Communication and Symbolic Scale (CSBS DP; Wetherby & Prizant, 1990) immediately after the observation period to ensure that the child's behaviour during the observation period was typical and was not affected by the presence of the experimenter, the video camera or by the new setting (for those subjects whose visit occurred in the laboratory). The mothers rated the typicality of their children's behaviour on seven items (alertness, emotionality, interest and attention, comfort, activity, communication, and play) using a 3-point scale (1 = less than usual, 2 =

typical, 3 = more than usual). All the mothers ranked their children's behaviours during the interactive episodes as typical on the seven items assessed.

Infant Behavior Questionnaire (IBQ). Mothers also completed the IBQ (Rothbart, 1981) as a measure of their child's temperament. The IBQ is a 94-item widely used questionnaire that focuses on the regulative and reactive aspects of temperament. The questionnaire consists of statements describing children's behavioural reactions to a variety of everyday situations including, bathing, playing, soothing, feeding, sleeping, and dressing (Rothbart, 1981). The respondent, in this case the mother, is asked to rate the applicability of the statements to their children's behaviours in the last week using a scale ranging from 1 (never) to 7 (always). The respondent can also indicate if certain statements are inapplicable. The items are then reduced to six subscales by summing across the questions that make-up a subscale and then dividing by the number of questions that were answered. The six subscales that compose the IBQ are activity level, soothability, latency to approach, distress to limitations, smiling and laughter, and duration of orienting (Rothbart, 1981).

For the purpose of the current study, I was interested in the following IBQ Subscales: *Soothability* (a measure of regulation), *Latency to Approach* (a measure of fear), *Distress to Limitations* (a measure of frustration), *Smiling and Laughter* (a measure of positive emotional expression), and *Duration of Orienting* (a measure of attentional focusing). Soothability (9 items) assesses how rapidly the mother is able to calm and soothe the infant after a distressing situation through such techniques as holding and rocking (Rothbart, 1981). Sample questions include: "How often did the method of

singing or talking soothe the baby", "How often did giving the baby a toy soothe the baby." Latency to Approach (16 items) is defined by how quickly the child approaches and accepts intense or novel stimuli, including objects, individuals, and events (Rothbart, 1981). Sample questions include: "How often during the last week did the baby cry/show distress when tickled", "When introduced to a strange person, how often did the baby hang back from the stranger." Distress to Limitations (20 items) is defined as the extent to which the child fusses or cries in response to situations where the infant's goals are blocked, such as when the child does not receive a food or toy that he/she wants (Rothbart, 1981). Sample questions include: "During feeding, how often did the baby fuss or cry when given a disliked food", "How often did the baby seem angry (crying and fussing) when you left her/him in the crib." Smiling and Laughter (15 items) assesses the extent to which the infant shows positive affect in a variety of situations (Rothbart, 1981). Sample questions include: "How often during the last week did the baby laugh aloud in play", "How often during the last week did the baby laugh when ticked". Duration of Orienting (8 items) is a measure of the extent which the child is able to visually focus or remain engaged on a particular object, activity, or event for an extended period of time during which no other stimuli are presented (Rothbart, 1981). Sample questions include: "After sleeping, how often did the baby coo and vocalize for a period of 5 minutes or longer", "How often during the last week did the baby stare at a mobile, crib bumper or picture for 5 minutes or longer".

Past research has shown adequate internal consistency for the IBQ subscales with the following Cronbach alphas for the subscales: Soothability (.73 - .84), Latency to

Approach (.81 - .84), Distress to Limitations (.75 - .84), Smiling and Laughter (.73 - .85), and Duration of Orienting (.67 - .75; Rothbart, 1981). With the exception of Duration of Orienting (.43), all the IBQ subscales showed adequate internal consistency in the present study with the following Cronbach alphas: .83 (Distress to Limitations), .79 (Latency to Approach), .76 (Smiling and Laughter), and .83 (Soothability).

Adaptive Social Behavior Inventory (ASBI). As a measure of their children's socioemotional development, mothers completed the ASBI (Hogan et al., 1992). The ASBI is a 30-item maternal-report questionnaire that focuses on the child's behaviors in a wide variety of social situations including interactions with peers and adults, social knowledge, and self-control. Mothers are asked to read descriptions of various social behaviours and rate the extent two which their children engage in such behaviours on a scale from 1 (rarely or never) to 3 (almost always). The items are reduced to the following 3 subscales: *Disrupt*, *Express*, and *Comply*. A composite *Prosocial* score is created by summing the *Express* and *Comply* subscales (Hogan et al., 1992). The *Express* subscale (13 items) asks about the child's ability to initiate and engage in social behaviors and express appropriate emotions. Sample items for the *Express* subscale include "Understands others' feelings, like when they are happy, sad or mad", "Is open and direct about what he/she wants (Hogan et al., 1992)". The *Comply* subscale (10 items) assesses the child's ability to cooperate and respond appropriately. Sample items for the *Comply* subscale are "Follows rules in games", "Co-operates with your request" (Hogan et al., 1992). The *Disrupt* subscale (7 items) assesses the frequency with which the child engages in negative but age-normative behaviors. Sample items for the *Disrupt*

subscale are "Gets upset when you don't pay enough attention", "Teases other children, uses name-calling" (Hogan et al., 1992). Past research has shown adequate internal consistency for the subscales comprising the ASBI with Cronbach alphas ranging from .71 (*Disrupt*) to .79 (*Comply* and *Express*; Hogan et al., 1992). The ASBI subscales also showed good internal consistency in the present study with the following Cronbach alphas: .70 (*Express*), .80 (*Comply*), .63 (*Disrupt*), and .84 (*Prosocial*).

Behavioural Coding

The videotaped mother-child interactions during the five tasks were transcribed in real time for both verbal and non-verbal communicative acts and behaviours to provide a running record of the mother-child interactions. During the Free Play, all verbal and non-verbal communicative acts were transcribed. However, for the four semi-structured tasks (i.e., Bubbles, Laser Pointer, Bumble Ball, and Book Sharing) only those verbal and non-verbal communicative acts and behaviours that were focused on the specified task were transcribed. For instance, if during the Laser Pointer task the mother and child engaged in a tea party or in building a tower, these interactive behaviours were not transcribed as they were not focused around the laser pointer. The mother-child interactive behaviours during the Free Play task and four semi-structured tasks were coded for the following joint attention behaviours: Initiation Acts, Established Joint Attention, and Joint Attention Span.

Initiation Acts. Initiation acts were defined as spontaneous verbal or non-verbal behaviours that were not part of an ongoing interactive episode and that were meant to attain and direct the social partner's attention to a particular object or event for the

purpose of sharing that object or event with the social partner (Landry, Smith, Miller-Loncar, & Swank, 1998; Mundy & Willoughby, 1996; Newland, Roggman, & Boyce, 2001). Two types of initiation acts were coded: 1) Maternal Initiation Acts (MIA), and 2) Child Initiation Acts (CIA). Initiation acts were considered "successful" when the social partner to whom the initiation act was directed responded within 5 seconds of the initiation act. Both "successful" (i.e., those that were responded to) and "unsuccessful" (i.e., those that were not responded to) initiation acts were coded.

1) Maternal Initiation Acts (MIA) were defined as spontaneous, intentional verbal or non-verbal communicative acts performed by the mother in order to attain and direct her child's focus of attention to a particular object or event or to follow-in to her child's current focus of attention in order to share in the child's focus of attention (Hundert, Mahoney, Mundy & Vernon, 1998; Tasker & Schmidt, 2008, Tomasello & Todd, 1983). To generate a total MIA score, the total number of MIAs that occurred across all 5 tasks were summed (Free Play, Bubbles, Laser Pointer, Bumble Ball, and Book Sharing).

2) Child Initiation Acts (CIA) were defined as spontaneous, intentional verbal or non-verbal communicative acts performed by the child in order to either direct the mother's attention to a particular object or event or to follow-in to the mother's current focus of attention in order to share and participate in the mother's current focus of attention (Hundert et al., 1998; Prendergast & McCollum, 1996; Tasker & Schmidt. 2008; Tomasello & Todd, 1983). Again, to generate a total score for CIA, the total number of CIAs that occurred across all 5 tasks were summed.

Established Joint Attention (EJA). The conceptualization and operationalization of joint attention was based on the work of Bakeman and Adamson (1984), Tomasello and Farrar (1986), Tomasello and Todd, 1983, and Rocisanno and Yatchmink (1984). The majority of past studies have viewed joint attention as being present when both social partners are actively focused on the same object for a minimum of 3 seconds and when one of the social partners performs a communicative act that indicates an awareness of the active participation of the other social partner, most often eye gaze toward the social partner's face (Bakeman & Adamson, 1984; Tomasello & Todd, 1983). For these researchers, joint attention is either absent or present and there is no consideration of the mechanisms through which joint attention is established or the interactive processes that take place once joint attention is established (i.e., within joint attention episodes). One of the few studies that have considered the processes through which joint attention is established was conducted by Ratchmink and Rocissano in 1984 and considered the sequence of contingent back and forth communicative acts that were necessary both for the establishment and the maintenance of joint attention episodes.

Tasker and Schmidt (2008) synthesized the studies reviewed above to generate a model of joint attention that considered both the back-and-forth contingent communicative acts necessary for the establishment of joint attention as well as the interactive processes that occured within episodes of joint attention (i.e., once joint attention was established). Tasker and Schmidt (2008) viewed joint attention as being established when a maternal or child initiation act was followed by three on-topic, contingent, back and forth communicative acts between the mother and child. For joint

attention to be considered established, the following sequence of behavioural events had to take place: 1) one of the social partners (i.e., the mother or the child) performed an initiation act to attain and direct the other social partner's attention to a particular object or event or to follow-in to the social partner's current focus of attention; 2) the social partner to whom the initiation act was directed provided an on-topic verbal or non-verbal response within 5 seconds of the initiation act that lasted a minimum of 3 seconds; 3) the social partner who initiated performed an on-topic verbal or non-verbal response, often in the form of eye gaze, meant to indicate an awareness of the shared focus of attention (Bakeman & Adamson, 1984; Charman et al., 2000; Ingsholt, 2002; Tomasello & Farrar, 1986); and 4) the mother and child both remained visually focused on the particular object, event, or task and continued to verbally and non-verbally interact around it (Tasker & Schmidt, 2008).

Joint attention was terminated when one of the social partners lost focus in the interaction. Termination of joint attention was indicated by two types of behaviours: 1) novel initiations in which one of the social partners performed a new initiation meant to change the dyad's focus of attention to a different object, event or task (Newland et al., 2001; Wood & Wood, 1997), or 2) withdrawal behaviours characterized by looking away (Koester & Meadow-Orlans, 1999; Prendergast & McCollum, 1996), yawning, examining clothing or body parts (Smith-Gray & Koester, 1995), moving away from the interaction, squirming (Smith-Gray & Koester, 1995), focusing on a different object (but not initiating to include the other social partner in playing with the object; Koester & Meadow-Orlans, 1999), and crying and other vocalizations of distress and frustration.

One of the social partners had to engage in these termination behaviours for a minimum of 3 seconds for joint attention to be considered terminated (Schmidt & Tasker, 2008).

Two types of Established Joint Attention that were differentiated by who initiated the sequence of behaviours that lead to the establishment of joint attention were coded. Maternal Initiated Established Joint Attention (MIA EJA) was defined as an established interactive episode that was initiated by the mother (i.e., it began with a MIA) and Child Initiated Established Joint Attention (CIA EJA) was defined as an established interactive episode that was initiated by the child (i.e., it began with a CIA). To create total scores for these variables, the total number of MIA EJA and CIA EJA that occurred across all 5 interactive tasks were summed.

Joint Attention Span (JA Span). Joint Attention Span was defined as the number of communicative acts that occurred within an episode of joint attention. An episode of joint attention was defined as beginning with the first communicative act that occurred after EJA and ending with the occurrence of a termination behaviour that lasted for a minimum of 3 seconds. Thus, the JA span was calculated by counting the number of back and forth communicative exchanges between the point when joint attention was established and the point when one of the social partners performed a termination act that lasted for more than 3 seconds. To create a total score, the total number of communicative exchanges that occurred within episodes of joint attention across all 5 tasks were summed.

All mother-child dyads were supposed to be observed for a total of 13 minutes. However, there was some variability in the amount of time that the dyads were observed

due to experimenter error and some mothers putting the bubbles away before the experimenter signaled the end of the Bubbles task. To account for this variability, we multiplied all the variables by 13 (the amount of time the dyads were supposed to be observed) and divided by the number of minutes they were actually observed.

Two undergraduate volunteers were trained in transcription and the coding protocol described above. The undergraduate volunteers first transcribed the tapes for all verbal and non-verbal communicative acts to provide a running record of the interactions and then used the transcriptions to code for the joint attention behaviours. To assess inter-rater reliability, I transcribed and coded 5 (10%) tapes. Cohen's kappa coefficients assessing inter-rater reliability for the joint attention variables were good and ranged from .74 (Child Initiation Acts and Established Joint Attention through MIA) to .86 (Established Joint Attention through CIA). Given that Joint Attention Span was a continuous variable, Intraclass Correlation Coefficients (ICC) were conducted to assess inter-rater reliability. The ICC for Joint Attention Span was excellent (.99).

Statistical Analyses

Statistical analyses were performed using SPSS software. Partial correlations were first conducted to identify statistically significant relations between the *Prosocial* ASBI composite measure and the *Disrupt* ASBI subscale and the following temperament and joint attention measures: IBQ Duration of Orienting, IBQ Smiling and Laughter, IBQ Soothability, IBQ Distress to Limitations, IBQ Latency to Approach, MIA EJA, CIA EJA, and Total Joint Attention Span. Median splits were then conducted on the temperament and joint attention variables that were significantly related with either the

Prosocial ASBI composite measure or the *Disrupt* ASBI subscale to create high and low groups on the temperament and joint attention measures. Independent samples *t*-tests were then conducted to compare the high and low groups on the *Prosocial* ASBI composite measure and the *Disrupt* ASBI subscale.

Results

Examination of the Distribution of Variables and Age and Gender Effects

The distributions of the temperament, joint attention, and ASBI variables were examined to check for normality. None of the temperament or ASBI variables showed deviations from normality. The joint attention variable CIA EJA was positively skewed. Accordingly, the variable was log transformed. To check for age effects, Pearson product-moment correlations were conducted between child's age and the temperament, joint attention, and ASBI variables. There was a statistically significant positive correlation between IBQ Duration of Orientating and child age ($r(49) = .33, p = .02$). Therefore, all analyses that included the IBQ Duration of Orienting variable were controlled for child's age. To assess sex effects, independent samples *t*-tests comparing the sexes on the temperament, joint attention and ASBI variables were conducted. For the joint attention variables, males ($M = 11.24$, $SD = 3.70$) were significantly higher than females ($M = 7.72$, $SD = 3.12$) on MIA EJA ($t(48) = 3.46, p < .01$). Therefore, all analyses involving the MIA EJA variable were controlled for child's sex. Given that there was a statistically significant positive correlation between the *Express* and *Comply* ASBI subscales ($r(49) = .57, p < .01$), the composite *Prosocial* score was used in the present study.

Correlations between variables

Prosocial. Pearson product-moment correlations and partial correlations were conducted to assess the relations between temperament, joint attention, and the *Prosocial* ASBI subscale. Consistent with predictions, there was a statistically significant negative correlation between IBQ Distress to Limitations ($M = 3.13$, $SD = .75$) and the ASBI *Prosocial* ($M = 58.60$, $SD = 5.40$, $r(49) = -.43$, $p < .01$; See Table 3.2) composite measure. Thus, children who were rated by their mothers as being high on the IBQ Distress to Limitations measure were also rated as being low on social competence. The relation between IBQ Smiling and Laughter ($M = 5.74$, $SD = .60$) and the ASBI Prosocial composite measure approached statistical significance ($r(49) = .27$, $p = .06$; See Table 3.2). In contrast to my predictions, there were no statistically significant relations between the joint attention measures and the *Prosocial* ASBI composite measure (See Table 3.3). As a result, I was unable to investigate the relative influence of temperament and joint attention on prosocial behaviours.

Disrupt. Pearson product-moment correlations and partial correlations were conducted to assess the relations between the *Disrupt* ASBI subscale and each of temperament and joint attention. Consistent with my predictions, there was a statistically significant positive Pearson product-moment correlation between IBQ Distress to Limitation and the ASBI *Disrupt* subscale ($M = 10.34$, $SD = 2.03$, $r(49) = .37$, $p < .01$; See Table 3.2). Children who were rated by their mothers as high on frustration were also rated as engaging in high rates of age-normative disruptive behaviours. Contrary to my predictions, there were no statistically significant correlations between any of the

joint attention variables and the ASBI *Disrupt* subscale (See Table 3.3). As a result, I was unable to investigate the relative influence of temperament and joint attention on disruptive behaviours.

Based on the statistically significant Pearson product-moment correlations, a median split was conducted for the IBQ Distress to Limitations variable to create the following two groups: 1) High IBQ Distress to Limitations ($n = 25$), and 2) Low IBQ Distress to Limitations ($n = 25$). The two groups did not differ on any of the demographic variables.

Between Group Differences

To assess differences on the ASBI Prosocial composite measure and the ASBI Disrupt subscale, two independent samples *t*-tests were conducted with group as the between subjects factor and ASBI Prosocial and ASBI Disrupt as the outcome variables. The Low IBQ Distress to Limitations ($M = 60.96$, $SD = 3.69$) group was significantly higher on the ASBI Prosocial Composite measure than the High IBQ Distress to Limitations group ($M = 56.24$, $SD = 5.85$, $t(48) = 3.41$, $p < .01$; See Figure 3.1). In contrast, the Low IBQ Distress to Limitations ($M = 9.48$, $SD = 1.45$) group was significantly lower on the ASBI Disrupt subscale than the High IBQ Distress to Limitations group ($M = 11.20$, $SD = 2.18$, $t(48) = -3.29$, $p < .01$; See Figure 3.2).

Discussion

In the present study, I sought to investigate the cross-sectional relations between prosocial and disruptive behaviours and each of temperament and joint attention in a sample of typically developing children. My hypotheses were partially supported. As

predicted, reactivity was significantly related to socioemotional outcome. That is, the lower-order factor of anger/frustration, as measured through the IBQ Distress to Limitations subscale, was positively related to disruptive behaviours and negatively related to prosocial behaviours. Thus, children who were rated by their mothers as high on anger/frustration when they were between 18 and 37 months old were also rated by their mothers as high on disruptive behaviours and low on prosocial behaviours. As expected, the relation between prosocial behaviours and positive affect, measured through the IBQ Smiling and Laughter subscale, approached statistical significance such that children who were rated high on positive affect were also rated high on prosocial behaviours. However, contrary to my predictions and to past research (Calkins et al., 1999; Eisenberg et al., 1993; Eisenberg et al., 1996; Eisenberg, Fabes et al., 1997; Eisenberg, Guthrie et al., 1997; Nelson et al., 1999; Rothbart et al., 1994; Rydell et al., 2003), there were no significant relations between socioemotional outcome and self-regulation.

In terms of joint attention, contrary to my predictions, there were no significant relations between the joint attention measures and socioemotional outcome, thus suggesting that the temperament factor of anger/frustration was most strongly related to variability in typically developing children's disruptive and prosocial behaviours.

One of the main limitations of Study 2 was the cross-sectional nature of the study. Consequently, I was unable to make any strong suggestions about the direction of influence. Therefore, in Study 3, I expanded on Study 2 by conducting a longitudinal follow-up in which I assessed socioemotional outcome.

Study 3

The dyads that participated in Study 2 were contacted an average of four years later and were asked to participate in a follow-up that consisted of completion of a demographic questionnaire and two questionnaires assessing their children's temperament and behavioural tendencies. Thirty (58%) mothers were successfully contacted and agreed to have the questionnaires sent to them (the other families had moved, and we were unable to obtain new contact information for them) and 29 (97%) mothers completed and returned the questionnaires. There were no statistically significant differences on any of the demographic, behavioural, or questionnaire measures between the dyads that participated in the follow-up study and those who did not. Accordingly, the demographic information presented for participants in Study 3 is based on the sample of twenty-nine mothers and their children who participated in both the first and second visit. As a token of my appreciation, mothers were sent $5.00 gift certificates to a local coffee house upon completion of the questionnaires at the follow-up.

Participants

The average age of the children during the first visit was 24.10 months (range = 18 to 37 months, *SD* = 4.65). All the children were from two-parent families and the average age of their mothers was 33.38 years (range = 24 – 43 years, *SD* = 4.56). Fifteen (58%) children attended preschool for an average of 3.07 days per week (range = 1 – 5, *SD* = 1.39) and 6.47 hours per day (range = 1 – 9.50, *SD* = 2.97). The majority of

mothers (69%) had a college or university education. English was the first language spoken in all the homes. See Table 3.4 for demographic information.

At the second visit, an average of 50.90 months (range = 47 – 62, *SD* = 2.47) after the first visit, the mean age of the children was 74.66 months (range = 69 – 88, *SD* = 5). All the children attended school, with 11 (37%) attending Junior or Senior Kindergarten, 15 (52%) attending Grade 1 and 3 (10%) attending Grade 2. Twenty-seven (93%) children were from two parent homes and 2 (7%) children were from single parent homes. The mean age of the mothers was 37.45 years (range = 29 to 47, *SD* = 4.67). Two (7%) mothers were high school graduates, four (14%) had completed one or two years of college, seventeen (59%) were college or university graduates, and six (21%) had completed graduate or professional training. During the past year, 15 (52%) mothers worked full time, 8 (28%) worked part-time, 2 (7%) worked both full time and part time,and 4 (14%) did not work. One (3%) mother endorsed a family income between $15,000 and $30,000, 1 (3%) endorsed a family income between $30,000 and $45,000, 5 (17%) endorsed a family income between $60,000 and $75,000, 6 (21%) endorsed a family income between $75,000 and $90,000, and 13 (45%) endorsed a family income that was greater than $100,000. Three (10%) mothers did not report their family's income. See Table 3.4 for demographic information.

Procedure

The procedure for Visit 1 was described in Study 2. Approximately four years after the first visit, mothers were contacted for a follow-up study and, if they agreed to participate, were sent a package of questionnaires that consisted of a standard

demographic questionnaire, the Child Behavior Questionnaire (CBQ; Rothbart et al., 2001), and the Child Behavior Checklist (CBCL; Achenbach, 1991). The Child Behavior Questionnaire (Rothbart et al., 2001), like the IBQ (Rothbart, 1981), assesses the reactive and regulative aspects of temperament in children between the ages of 3 and 7 years.

Maternal Perception Measures

Child Behavior Questionnaire. Similar to the IBQ (Rothbart, 1981), the CBQ (Rothbart et al., 2001) asks the respondent to rate the applicability of 191 items that focus on various behavioural reactions that children may show in response to everyday situations on a scale of 1 (extremely untrue) to 7 (extremely true). There is also an "inapplicable" option that mothers can select for questions that are irrelevant for their child. The CBQ consists of 15 subscales and is scored by summing the answers for all the questions that make-up a subscale and dividing by the total number of questions that were answered (Rothbart et al., 2001). For the present study, I was interested in the following CBQ (Rothbart et al., 2001) subscales: Fear, Sadness, Anger, Inhibitory Control, Attentional Focusing, and Falling Reactivity/Soothability. The Fear subscale (12 items) measures the extent to which the child shows worry and nervousness in anticipation of events that may be potentially distressing or threatening (Rothbart et al., 2001). Sample questions include: "Is afraid of the dark.", "Is not afraid of large dogs and/or other animals" (reverse scored). Sadness (12 items) is a measure of the amount of negative affect and decreased energy that the child exhibits in response to disappointment or a loss (Rothbart et al., 2001). Sample questions include: "Cries sadly when a favorite toy gets lost or broken", "Tends to become sad if the family's plans don't work out".

Anger (13 items) assesses the extent to which the child shows negative affect in response to the blockage or interruption of his/her goals (Rothbart et al., 2001). Sample questions include: "Gets angry when told s/he has to go to bed", "Gets angry when s/he can't find something s/he wants to play with". Inhibitory Control (13 items) assesses the ability of the child to plan behaviours as well as to inhibit or suppress inappropriate behaviours (Rothbart et al., 2001). Sample questions include: "Can lower his/her voice when asked to do so," "Can wait before entering into new activities if s/he is asked to". Attentional Focusing (14 items) is a measure of the extent to which the child is able to maintain his/her focus on a particular task or event and suppress extraneous environmental stimuli (Rothbart et al., 2001). Sample questions include: "When picking up toys or other jobs, usually keeps at the task until it's done", "When building or putting something together, becomes very involved in what s/he is doing, and works for long periods". Soothability (13 items) assesses how quickly the child is able to return to baseline after situations that evoke high levels of distress, excitement, or arousal (Rothbart et al., 2001). Sample questions include: "Seems to forget a bump or scrape after a few minutes", "If upset, cheers up quickly when s/he thinks about something else".

Past research has shown adequate internal consistency for the CBQ subscales that were of interest in the current study with Cronbach alphas ranging from .66 (Soothability) to .80 (Anger; Rothbart et al., 2001). The CBQ subscales also showed good internal consistency in the current study with the following Cronbach alphas: .85 (Anger), .68 (Attentional Focusing), .89 (Soothability), .79 (Fear), .80 (Inhibitory Control), and .59 (Sadness).

Child Behavior Checklist. The Child Behavior Checklist (CBCL/4-16; Achenbach, 1991) is a widely-used questionnaire that assesses problem behaviours in children between the ages of 4 and 16 years. The CBCL (Achenbach et al., 2001) consists of 112 items focusing on various problem behaviours including, anxiety, depression, attention, aggression, and delinquency. The respondent, in this case the mother, is asked to rate the extent to which the child has shown the target behaviours in the past 6 months on a scale of 0 (not true) to 2 (very true). The 112 items on the CBCL make-up eight constructs: Withdrawn (e.g., "Likes to be alone", "Shy or timid"), Somatic Complaints (e.g., "Feels dizzy", "Overtired"), Anxious/Depressed (e.g., "Cries a lot", "Feel he/she has to be perfect"), Social Problems (e.g., "Acts too young for his/her age", "Doesn't get along with other children"), Thought Problems (e.g., "Hears things that aren't there", "Sees things that aren't there"), Attention Problems (e.g., "Can't concentrate, can't pay attention too long", "Can't sit still, restless, or hyperactive"), Delinquent Behaviour (e.g., "Doesn't seem to feel guilty after misbehaving", "Hangs around with children who get in trouble"), and Aggressive Behaviour (e.g., "Argues a lot", "Cruelty, bullying, or meanness to others"; Achenbach, 2001). The items on the CBCL (Achenbach, 2001) can also be reduced to two global measures: 1) Internalizing, which is composed of the subscales Social Withdrawal, Somatic Complaints, and Anxiety/Depression; and 2) Externalizing, which is composed of the subscales Delinquent Behaviour, and Aggressive Behaviour (Achenbach, 2001). For the purpose of the present study, I was interested in the two global measures: Internalizing Behaviours

and Externalizing Behaviours. The global measures showed adequate internal consistency with Cronbach alphas of .66 (Internalizing) and .92 (Externalizing).

Statistical Analyses

Partial correlations were first conducted to identify statistically significant relations between the CBCL Internalizing and CBCL Externalizing measures and the following temperament and joint attention measures: IBQ Duration of Orienting, IBQ Soothability, IBQ Distress to Limitation, IBQ Latency to Approach, IBQ Smiling and Laughter, CBQ Soothability, CBQ Fear, CBQ Sadness, CBQ Anger, CBQ Attentional Focusing, CBQ Inhibitory Control, MIA EJA, CIA EJA, and JA Span. In order to assess individual differences, median splits were conducted on the temperament and joint attention measures that showed statistically significant relations with either the CBCL Internalizing or CBCL Externalizing measures. Based on the median splits, participants were parsed into one of two groups for each measure according to whether they were high or low on the measure of interest. One-way analyses of covariance (ANCOVA) tests were conducted to investigate differences on CBCL Internalizing and CBCL Externalizing between the high and low groups. To investigate the relative influence of temperament and joint attention for internalizing and externalizing behaviours, two hierarchical linear regressions were conducted, one for internalizing behaviours and one for externalizing behaviours. For each linear regression, the following variables were inserted at each step: Step 1 = variables that I controlled for; Step 2 = temperament measures; Step 3 = joint attention measures; and Step 4 = interactions between temperament and joint attention.

Results

Examination of Distribution of Variables and Age and Gender Effects

The distributions of the temperament, joint attention, and CBCL variables were examined for normality. None of the temperament or joint attention variables showed deviations from normality. The CBCL Internalizing and CBCL Externalizing variables were positively skewed. However, this is typical when using these measures with a normal, low-risk population. Since the results did not differ when I used the log transformed or the non-transformed CBCL variables, I decided to use the non-transformed variables in my analyses.

To check for age effects, Pearson product-moment correlations were conducted between child's age and the measures of interest. Children's ages at the first visit were statistically significantly correlated with scores on the IBQ Duration of Orienting subscale ($r(28) = .53, p < .01$). Therefore, all analyses involving the IBQ Duration of Orienting subscale were controlled for child's age at time 1. Independent samples t-tests were also conducted to investigate sex differences for the variables. For the joint attention variables, males ($M = 1.00$, $SD = .15$) were statistically significantly lower than females ($M = 1.16$, $SD = .22$) on CIA EJA. For the CBQ measures, females ($M = 4.58$, $SD = .61$, $t(27) = -2.09$, $p = .05$) were rated by their mothers as statistically significantly higher on the CBQ Sadness subscale compared to males ($M = 3.99$, $SD = .71$, $t(27) = -2.30$, $p = .03$). Therefore, all analyses involving these measures were controlled for the child's sex.

Correlations Among Variables

CBCL Internalizing. The relations between temperament, joint attention and internalizing behaviours were examined using partial correlations controlling for the factors discussed above as well as CBCL Externalizing and, for longitudinal relations (i.e., relations between variables that were collected at different visits), time between visits. I controlled for CBCL Externalizing because there was a statistically significant positive correlation between CBCL Internalizing (M = 3.82, SD = 3.09) and CBCL Externalizing (M = 9.07, SD = 7.89, $r(27) = .60$, $p < .01$). I also controlled for time between visits to prevent individual variability in the time that lapsed between Visit 1 and the follow-up from influencing my results.

There were no statistically significant relations between the CBCL Internalizing and any of the IBQ subscales (See Table 3.5). There was a statistically significant positive correlation between CBCL Internalizing and CBQ Inhibitory Control (M = 5.12, SD = .68, $r(25) = .43$, $p = .03$), and a statistically significant negative correlation between CBCL Internalizing and CBQ Anger (M = 4.41, SD = .95, $r(25) = -.39$, p = .05; See Table 3.6). Thus, children who were rated by their mothers as being high on inhibitory control, defined as being able to successfully inhibit inappropriate behaviours, were also rated by their mothers as being high on internalizing behaviors. On the other hand, mothers who viewed their children as exhibiting high levels of anger rated their children low on internalizing behaviours. There was a statistically significant negative relation between MIA EJA (M = 10.39, SD = 3.75) measured when children were between 18 and 37 months of age and the CBCL Internalizing score ($r(24) = -.46$, $p = .02$; See Table 3.7) reported by mothers when children were between 69 and 88 months of age. Children

who were part of dyads that had higher rates of maternally established joint attention when they were between 18 and 37 months of age, were rated by their mothers as being lower on the CBCL Internalizing measure when they were between 69 and 88 months of age.

As mentioned above, CBCL Internalizing was composed of the following CBCL Subscales: Depression/Anxiety, Somatic Complaints, and Withdrawn. Therefore, to further parse out the influence of temperament and joint attention on internalizing behaviours, I investigated the relation between each of the CBCL subscales that composed the CBCL Internalizing measure and CBQ Inhibitory Control and MIA EJA. The CBQ Inhibitory Control subscale was positively related to the CBCL Somatic Complaints subscale ($r(25) = .45, p = .02$) while MIA EJA was negatively related with the CBCL Withdrawn Behaviours subscale ($r(24) = -.51, p < .01$).

CBCL Externalizing. To examine the relations between temperament, joint attention, and externalizing behaviours, partial correlations were computed controlling for the factors discussed above as well as CBCL Internalizing scores and, for longitudinal relations, time between Visit 1 and the follow-up. There were no statistically significant correlations between CBCL Externalizing and any of the IBQ Subscales (See Table 3.5). There was a statistically significant positive relation between the CBQ Anger ($M = 4.41$, $SD = .95$) and CBCL Externalizing ($r(25) = .53, p < .01$; See Table 3.6), such that children who were rated by their mothers as showing higher levels of anger were also rated as engaging in more externalizing behaviours. As well, CBCL Externalizing was negatively related to: 1) CBQ Soothability ($M = 5.32$, $SD = .80$, $r(25) = -.61, p < .01$) and

CBQ Inhibitory Control (M = 5.12, SD = .68, $r(25)$ = -.54, $p < .01$; See Table 3.6) such that children who were rated by their mothers as being high on soothability or inhibitory control were also rated by their mothers as being low on externalizing behaviours when they were between 69 and 88 months of age. There were no statistically significant relations between any of the joint attention variables assessed and CBCL Externalizing (See Table 3.7).

The CBQ measures that correlated with the CBCL Externalizing score were inter-correlated such that CBQ Anger was negatively related to CBQ Inhibitory Control ($r(28)$ = -.68, $p < .01$) and CBQ Soothability ($r(28)$ = -.49, $p < .01$) while CBQ Inhibitory Control and CBQ Soothability were positively related ($r(28)$ = .59, $p < .01$). Therefore, to decrease the number of statistical analyses, a global score was computed, which I labeled Child Self Control that consisted of CBQ Anger subtracted from the sum of CBQ Inhibitory Control and CBQ Soothability. There was a statistically significant partial relation between Child Self Control (M = 6.03, SD = 1.97) and CBCL Externalizing ($r(25)$ = -.68, $p < .01$), such that children who were rated by their mothers as high on Child Self Control were also rated by their mothers as low on the CBCL Externalizing measure.

As mentioned above, CBCL Externalizing was composed of the following CBCL Subscales: Aggressive Behaviour and Delinquent Behaviour. To further parse the influence of temperament on externalizing behaviours, I examined the relations between each CBCL subscale and Child Self Control. Both the CBCL Aggressive Behaviour subscale (M = 6.61, SD = 4.63) and the CBCL Delinquent Behaviour subscale (M = 1.39,

SD = 1.37) showed statistically significant negatively relations with Child Self Control ($r(24) = -.67, p < .01$; $r(24) = -.45, p = .02$, respectively).

Based on the statistically significant partial correlations, median splits were computed for the following joint attention and temperament variables: MIA EJA, CBQ Inhibitory Control, and Child Self Control. The median splits were used to create the following six groups: 1) high MIA EJA ($n = 14$); 2) low MIA EJA ($n = 14$); 3) high Inhibitory Control ($n = 14$); 4) low Inhibitory Control ($n = 14$); 5) high Child Self Control ($n = 14$); and 6) low Child Self Control ($n = 14$). Since the relation between CBQ Anger and CBCL Internalizing had a p-value that just reached statistical significance ($p = .05$) and considering the number of correlations that were conducted, I did not consider this relation in further analyses. There were a few demographic differences between the groups. The Low Child Self Control group differed significantly from the high Child Self Control group on child's age at Visit 1. The High Inhibitory Control group differed significantly from the Low Inhibitory Control group on mother's age at both the first visit and at the follow-up. Therefore, I controlled for these demographic differences to ensure that any differences found between groups were due to the temperament and joint attention factors and not differences on demographic variables.

Between Group Differences

CBCL Internalizing. To assess group differences on CBCL Internalizing, two ANCOVAs were conducted with group as the between-subjects factor and CBCL Internalizing as the dependent factor controlling for CBCL Externalizing and the factors described above. There was a statistically significant main effect for group when

comparing the Low Inhibitory Control (M = 3.21, SD = 3.07) and the High Inhibitory Control (M = 4.43, SD = 3.11) groups on CBCL Internalizing scores such that children in the Low Inhibitory Control Group had significantly lower CBCL Internalizing Scores compared to children in the High Inhibitory Control group ($F(1, 23) = 4.94$, $p = .04$, Cohen's $d = .39$; see Figure 3.3). The comparison between the Low MIA EJA (M = 5.07, SD = 2.64) and the High MIA EJA (M = 2.57, SD = 3.08) groups on the CBCL Internalizing Scores approached statistical significance ($F(1, 25) = 3.00$, $p = .09$, Cohen's $d = .87$; See Figure 3.4). The Low MIA EJA group had higher scores on the CBCL Internalizing measure compared to the High EJA group.

Again, to further parse the influence of joint attention and temperament on internalizing behaviours, I conducted two one-way ANCOVAS with group as the between-subjects factor and CBCL Somatic subscale and CBCL Withdrawal subscale as the dependent factors. There was a statistically significant difference between the High MIA EJA group (M = .64, SD = .93) and the Low MIA EJA group (M = 1.79, SD = 1.19) such that children who were in dyads who engaged in high rates of MIA EJA were rated by their mothers as being significantly lower on the CBCL Withdrawal Subscale compared to children who were in dyads who engaged in low rates of MIA EJA ($F(1, 25) = 5.48$, $p = .03$, Cohen's $d = 1.08$). The comparison between the High Inhibitory Control (M = 1.64, SD = 2.50) and the Low Inhibitory Control (M = .47, SD = .83) groups approached statistical significance ($F(1, 24) = 3.63$, $p = .07$, Cohen's $d = .63$). Children in the High Inhibitory Control group were rated higher on the CBCL Somatic Complaints subscale compared to children in the Low Inhibitory Control group.

CBCL Externalizing. To assess group differences on CBCL Externalizing, an ANCOVA was conducted with group as the between-subjects factor and CBCL Externalizing as the dependent factor controlling for CBCL Internalizing and the factors described above. There was a statistically significant difference between the Low Child Self Control (M = 10.54. SD = 6.23) and the High Child Self Control (M = 5.50, SD = 3.61) groups on CBCL Externalizing ($F(1, 23) = 7.41$, $p = .01$, Cohen's $d = .99$; See Figure 3.5) such that children in the Low Child Self Control group were rated by their mothers as significantly higher on externalizing behaviours compared to children in the High Child Self Control group.

Two ANCOVAs were conducted to investigate group differences on the CBCL Aggressive Behaviour subscale and the CBCL Delinquent Behaviour subscale for the High and Low Child Self Control groups. There was a statistically significant difference between the High Child Self Control group and the Low Child Self Control group on the CBCL Aggressive Behaviour subscale. Children in the High Child Self Control group (M = 4.57, SD = 3.13) were rated by their mothers as statistically significantly lower on the CBCL Aggressive Behaviour subscale compared to children in the Low Child Self Control group (M = 8.77, SD = 5.25; $F(1, 23) = 8.01$, $p < .01$, Cohen's $d = .97$). For the CBCL Delinquent Behaviour subscale, there were no statistically significant differences between the High Child Self Control group (M = .93, SD = .83) and the Low Child Self Control group (M = 1.77, SD = 1.69, $F(1, 23) = 1.07$, $p = .31$, Cohen's $d = .63$).

Prediction of Internalizing and Externalizing Behaviours

To assess whether joint attention predicted internalizing behaviours over and above temperament, a hierarchical linear regression was conducted. To reduce collinearity, the temperament and joint attention variables were centered by subtracting the means of the variables from each score.

The following variables were inserted into the hierarchical linear regression predicting CBCL Internalizing: Step 1 = time between visits, and CBCL Externalizing, Step 2 = CBQ Inhibitory Control subscale; Step 3 = MIA EJA; Step 4 = the interaction term CBQ Inhibitory Control x MIA EJA. The hierarchical linear regression was statistically significant at Step 2 ($\Delta F(1, 24) = 5.01, p = .03$ with $\Delta R^2 = .11$) and approached statistical significant at Step 3 ($\Delta F(1, 23) = 3.24, p = .09$, with $\Delta R^2 = .06$; See Table 3.8). Only CBCL Externalizing ($\beta = .64, p < .01$) made a statistically significant contribution to the prediction of CBCL Internalizing Behaviours.

Discussion

The present work investigated the role of temperament and joint attention for internalizing and externalizing behaviours in a non-clinical sample of typically developing children. Several variables were consistently related with internalizing and externalizing behaviours. With regards to temperament, there were no significant longitudinal relations. However, there were a number of cross-sectional relations. CBQ Inhibitory Control, CBQ Anger, and CBQ Soothability (Rothbart et al., 2001) were consistently related to the CBCL (Achenbach, 2001) measures. In terms of joint attention measures, only one measure, Maternal Initiated Established Joint Attention, showed a statistically significant relation with internalizing behaviours.

Children who were rated by their mothers as higher on the CBQ Inhibitory Control (Rothbart et al., 2001) subscale, a measure of children's ability to inhibit socially inappropriate behaviours, were also rated by their mothers as higher on internalizing behaviours. In contrast, children who were rated as high on the composite measure Child Self Control, defined as CBQ Anger subtracted from the sum of CBQ Inhibitory Control and CBQ Soothability, were rated by their mothers as low on externalizing behaviours. These results partially replicated past research. The findings that CBQ Inhibitory Control was negatively related to externalizing behavours and CBQ Anger was positively related are consistent with previous studies (Eisenberg et al., 2001; Muris et al., 2004; Muris et al., 2007; Muris et al., 2008; Nelson et al., 1999; Rydell et al., 2003). However, the finding that CBQ Inhibitory Control was also positively related to internalizing behaviours was not consistent with past research, as most studies have found that CBQ Attentional Focusing is associated with internalizing behaviours (Muris et al., 2004; Muris et al., 2008). Furthermore, past studies have found significant positive relations between internalizing behaviours and fear and sadness (Muris et al., 2007, Rydell et al., 2003).

With regards to joint attention behaviours, I only found a relation between joint attention and internalizing behaviours. Using a longitudinal approach, higher rates of Maternal Initiated Established Joint Attention assessed using observational methods when children were between 18 and 37 months of age predicted lower levels of internalizing behaviours, reported by mothers when children were between 69 and 88

months of age. A closer look at the subscales that comprise CBCL Internalizing revealed that this relation was specific to the CBCL Withdrawal (Achenbach, 1991) subscale.

Research assessing the relation between internalizing and externalizing behaviours has often reported significant positive correlations between the two such that children who are high on one measure tend to also be high on the other measure (Lilienfeld, 2003; Loeber & Keenan, 1994). I also found a similar relation between measures of internalizing and externalizing behaviours. Therefore, my analyses of the individual relations always controlled for the CBCL measure that was not the focus in order to attain a pure picture of how temperament and joint attention influenced the specific measure of focus. For instance, all relations investigating internalizing behaviours were controlled for externalizing behaviours and vice versa. Therefore, the hierarchical linear regression predicting internalizing behaviours included externalizing behaviours in Step 1, CBQ Inhibitory Control in Step 2, and MIA EJA in Step 3. I found that children who were high on externalizing behaviours were also high on internalizing behaviours and that neither temperament or joint attention behaviours significantly accounted for additional variance in children's internalizing behaviours. The model including externalizing behaviours, temperament, and joint attention accounted for 55% of the variance in internalizing behaviours. My findings are in contrast to the study by Van Hecke and colleagues (2007), which found that joint attention behaviours made independent unique contributions to externalizing behaviours and a measure of social competence. However, Van Hecke and colleagues (2007) did not assess internalizing

behaviours. Thus, their results may have changed had they assessed and controlled for internalizing behaviours.

General Discussion

I investigated the cross-sectional and longitudinal relations between temperament and joint attention and socioemotional development in a low-risk sample of typically developing children in two separate studies. My cross-sectional findings with regards to temperament and socioemotional outcome partially supported past research. In both studies, I found that anger was a significant predictor of socioemotional outcome, such that high levels of anger were associated with high levels of externalizing and disruptive behaviours and low levels of internalizing and prosocial behaviours. However, unlike past research, although the relations between sadness and fear and socioemotional outcome were not statistically significant, the relations were in the opposite direction than what was expected based on past research, such that fear and sadness were negatively related with internalizing behaviours and positively related with externalizing behaviours. It is likely that the unexpected relations were a reflection of the small sample size, the utilization of a low-risk typically developing sample of children (most past studies have used clinical or high-risk samples), and possible maternal biases in reporting.

With regards to the regulative aspects of temperament, there were statistically significant correlations between measures of self-regulation and internalizing and externalizing behaviours in Study 3, but not Study 2. This is most like a reflection of the manner in which self-regulation was assessed. In Study 3, the measures of self regulation used (Inhibitory Control, Soothability, and Child Self Control) focused on the child's

ability to self-regulate and the extent to which the child was able to modulate his/her emotional reactions independently. This conceptualization of self-regulation is consistent with that of previous studies that have also found significant relations between self-regulation and socioemotional outcome (Calkins et al., 1999; Eisenberg et al., 1993; Eisenberg et al., 1996; Eisenberg, Fabes et al., 1997; Eisenberg, Guthrie et al., 1997; Nelson et al., 1999; Rothbart et al., 1994; Rydell et al., 2003). In contrast, the IBQ Soothability subscale, which was used as a measure of self-regulation in Study 2, assessed soothability in terms of the extent to which the child was easily soothed through maternal actions, such as rocking, holding, and singing. Thus, the differing conceptualizations of self-regulation may underlie the lack of significant relations between self-regulation and socioemotional outcome in Study 2. There are a number of other factors that may aid in understanding some of the discrepancies between the current results and past research.

First, it is important to note that the current study focused on the typical variation in positive and negative socioemotional outcome among children and did not focus on clinically concerning behaviours that are suggestive of psychopathology. Thus, my measures of internalizing and externalizing behaviours were on a continuum and did not represent extreme scores. None of the children in the current sample had CBCL Internalizing scores that met the clinical cut-offs and only two children had CBCL Externalizing scores that met clinical cut offs (Achenbach, 1991). The results remained the same when I reran the analyses for CBCL Externalizing (Achenbach, 1991) scores with these two children removed. Therefore, I retained these children in the sample used

for this study. Although past studies have used nonclinical samples to study the relation between temperament and socioemotional outcome, these studies have often utilized clinical scores on internalizing and externalizing behaviours as a selection criteria for study participation or, due to large sample sizes, included individuals who met clinical cutoff scores for internalizing and externalizing behaviours (Caspi et al., 1995; Eisenberg et al., 2001; Meesters et al., 2007; Oldehinkel, Harman, De Winter, Veenstra, & Ormel, 2004; Rettew, Althoff, Dumenci, Ayer, & Hudziak, 2008; Rydell et al., 2003). Consequently, the extent to which the results of these studies generalize to a sample of typically developing, low risk children from high income and high maternal education families is unclear and may help to explain some of the inconsistencies of the present results.

It is interesting that, although temperament was assessed when children were between the ages of 18 and 37 months using the IBQ (Rothbart, 1981), I failed to find any statistically significant longitudinal relations with internalizing and externalizing behaviours, although I did find statistically significant cross-sectional correlations between the IBQ (Rothbart, 1981) subscales and socioemotional outcome as measured through the ASBI (Hogan et al., 1992). The lack of longitudinal findings is likely due to my selection of temperament questionnaires. The IBQ (Rothbart, 1981) was originally developed and standardized to be a report of temperament in infants up to the ages of 12 months (Rothbart, 1981). Consequently, the use of the IBQ for a sample of children between the ages of 18 and 37 months may have affected the results. However, it is important to note that when completing the IBQ (Rothbart, 1981) parents are not forced

to answer inapplicable questions since they have the option of selecting "not applicable" for questions that are irrelevant for their children. Given that the scoring of the IBQ (Rothbart, 1981) is such that the questions that were answered for each subscale are summed and divided by the total number of questions answered, it should be the case that the present study's scores on the subscales were based only on the questions that mothers found applicable and were not influenced by mothers guessing or providing inaccurate answers for irrelevant questions. A visual examination does reveal that mothers answered more question as inapplicable on the IBQ (Rothbart, 1981) than on the CBQ (Rothbart et al., 2001). Consequently, although the IBQ (Rothbart, 1981) subscales were most likely not influenced by irrelevant questions, their validity may have been influenced by the fact that the scores were based on fewer questions and thus certain relevant behaviours for the age group may not have been assessed.

It is also possible that the finding of cross-sectional but not longitudinal relations between temperament and socioemotional outcome is a reflection of shared variance. Given that both temperament and socioemotional measures were completed by the mothers, it is possible that the results were biased and the correlations inflated because mothers' ratings of children's individual differences may have influenced their ratings of their children's socioemotional outcome.

The finding of only one significant relation between joint attention behaviours and socioemotional outcome across both studies was surprising given that past research has implicated joint attention as playing a role in a number of developmental outcomes, including, the acquisition of receptive and expressive language (Baron-Cohen, Baldwin,

Crowson, 1997; Brooks & Meltzoff, 2008; Delgado, Mundy, Crowson, Markus, Yale, Schwartz, 2002; Shimpi & Huttenlocher, 2007; Tomasello & Farrar, 1986), emotion regulation (Morales, Mundy, Crowson, Neal, & Delgado, 2005; Mundy & Willoughby, 1996), theory of mind (Aschersleben et al., 2008; Charman et al., 2000; Colonnesi et al., 2008; Nelson et al., 2008), and social skills (McEvoy et al., 1993; Sheinkopf et al., 2004). Given that enhanced language skills and emotion regulation as well as effective social skills enable children to better control their emotions and respond effectively and confidently in social situations, one would expect that high levels of established joint attention and high joint attention spans would be related with low levels of internalizing and externalizing behaviours and high levels of prosocial behaviours. Although few in number and utilizing a very structured joint attention task, previous studies have demonstrated negative relations between joint attention and externalizing behaviours as well as positive relations between joint attention and social competence such that children who engaged in high rates of joint attention behaviours were rated lower on externalizing behaviours and higher on social competence (Sheinkopf et al., 2004; Van Hecke et al., 2007). However, I found that high levels of established joint attention through maternal initiation acts when children were between 18 and 37 months of age only predicted lower levels of internalizing behaviours when children were between 69 and 88 months of age. It is possible that the manner in which joint attention was assessed and coded affected the present results.

Although the coding of joint attention from unstructured and semi-structured tasks completed between the mother and child is high in ecological validity, it also presents a

number of possible confounds. First, unlike in a structured task that is completed by a trained experimenter, there is much variability between mothers in terms of the manner in which they engage and interact with their children. Some mothers may be more active and may initiate more frequently while others take a more relaxed and laid-back approach, waiting for the child to initiate interactions. Furthermore, such factors as the mental health of the mother (Field, Healey, Goldstein, & Guthertz, 1990; Goldsmith & Rogoff, 1997; Jameson, Gelfand, Kulcsar, & Teti, 1997; Stein, Gath, Bucher, Bond, Day, & Cooper, 1991), the dyads' attachment status, and the mother's stress levels (Bates, Maslin, & Frankel, 1985) may influence the manner in which the mother interacts with the child. Therefore, my assessment of joint attention behaviours, unlike that of previous studies (Mundy et al., 2003; Sheinkopf et al., 2004; Van Hecke et al., 2007), was not a sole assessment of the child's behaviours but rather of the complex back and forth reciprocal interactions between the mother and child. Thus, my conceptualization of joint attention behaviours was more related to the idea of dyadic mutuality, of which joint attention is considered a definitional component (Harrist, Pettit, Dodge, & Bates, 1994; Mize & Pettit, 1997). Studies focusing on dyadic mutuality have identified a relation between dyadic mutuality and social competence, finding that children who were in dyads who engaged in longer periods of dyadic mutuality were rated as being lower in both internalizing and externalizing problems and higher in social competence (Deater-Deckard & Petrill, 2004; Harrist et al., 1994; Lindsey, Mize, & Pettit, 1997; Mize & Pettit, 1997). However, the definition of dyadic mutuality encompasses more than just joint attention as it also includes the elements of shared emotional expression and turn

taking (Harrist et al., 1994; Mize & Pettit, 1997), and research has found that these elements make individual and differential contributions to the prediction of socioemotional development (Isabella & Belsky, 1991; Lindsey, Cremeens, Colwell, & Caldera, 2008; Lindsey, Mize, & Pettit, 1997), although to date no research has investigated the specific influence of joint attention within the context of dyadic mutuality. Consequently, it is unclear the extent to which joint attention is driving the relation between dyadic mutuality and social competence. Based on the present results, it appears that joint attention behaviours may be having a greater influence on internalizing behaviours than other aspects of socioemotional development.

It is interesting to note that only Maternal Initiated Established Joint Attention was associated with internalizing behaviours and not Child Initiated Established Joint Attention. The main difference between these two measures is the role that each social partner plays in the sequence of back and forth communicative acts necessary for the establishment of joint attention. Maternal Initiated Established Joint Attention requires the mother to initiate the interaction and the child, in turn, to detect the mother's initiation and to provide an on-topic response to it. In contrast, the Child Initiated Established Joint Attention requires the child to initiate the interaction and the mother to show her sensitivity and awareness of the child by responding with an on-topic communicative act. Thus, depending on who initiates, the two mechanisms place the responsibility of detecting and responding to the initiation act and the further sequence of responses that define the present conceptualization of joint attention on different social partners. In general, Child Initiated Established Joint Attention (Study 2: $M = 2.96$, $SD = 2.11$; Study

3: $M = 3.45$, $SD = 2.16$) occurred less frequently than Maternal Initiated Established Joint Attention (Study 2: $M = 9.90$, $SD = 3.86$; Study 3: $M = 10.39$, $SD = 3.68$). Given that all mothers reported their children's behaviours as typical, it is likely that the observed mother-child interactions in the present study were consistent with the manner in which mothers typically engage with their children when playing. Therefore, it is possible that, given the low frequency with which Child Initiated Established Joint Attention occurred, this measure within the mother-child interactive context does not have a strong influence on socioemotional development.

Contrary to my predictions, I also found that there were no significant relations between the number of back and forth communicative acts within a joint attention episode and social competence, although the relation with internalizing behaviours did approach statistical significance in the expected direction (i.e., higher joint attention span was associated with lower internalizing behaviours). This is surprising as, although the establishment of joint attention is important for children's development, one would also expect that the number of communicative acts that are exchanged within joint attention episodes would be important, given that much of the learning for which joint attention is implicated occurs within joint attention episodes. On average, each dyad performed a total of 239.05 ($SD = 75.49$, range = 75.45 – 393.08) and 258.43 ($SD = 70.12$, range = 123.68 – 393.08) communicative acts within joint attention episodes throughout the 13 minutes that they were observed for Studies 2 and 3, respectively. When I divided the total number of communicative acts by the total number of established joint attention episodes, I found that on average each joint episode had 19.35 ($SD = 6.26$, range = 9.71 –

35.00) and 19.13 communicative exchanges (*SD* = 5.48, range = 10.27 – 33.67) for Studies 2 and 3, respectively. Thus, there was a substantial exchange of communicative acts between dyads in joint attention episodes. It is possible that the relation between joint attention span and developmental outcome is not as simple as high joint attention spans being associated with positive socioemotional outcome. It may be more complex in that it may be necessary to consider not just the amount of communicative exchanges but also the quality. For example, instances where the mother extends a joint attention episode even though the child has lost interest, creates a longer joint attention span but may be maladaptive to the child's socioemotional development as the child loses confidence in his/her ability to play a role in social interactions and begins to take a passive, on-looking approach to social interactions. Thus, future research that investigates not only the number of communicative exchanges but also their quality may further clarify the relation between the span of joint attention episodes and children's socioemotional outcome.

My analyses on the relations of temperament and joint attention with socioemotional outcome suggested that temperament had a relation with all aspects of social development assessed (i.e., internalizing, externalizing, prosocial, and disruptive behaviours) while joint attention was only related to internalizing behaviours. The present study utilized a low risk, high SES and high education sample. Consequently, although there was some natural variability in parenting and in home environments, it is likely that overall, most of the children experienced adaptive home environments that were conducive to positive socioemotional outcome. My finding that there were no

significant relations between joint attention behaviours and externalizing and disruptive behaviours is consistent with Raine's (2002, 2008) theory that the influence of genetic factors for the development of externalizing problems is often strongest in environments that are conducive to positive social outcomes. Consequently, given that the samples were characterized by a number of factors that are associated with positive family environments, including high SES, maternal education, and mostly two-parent homes, it is possible that the variability that I saw in joint attention behaviours was not sufficient to explain the variability in externalizing behaviours over and above biological factors.

The present work has a number of strengths that need to be highlighted. First, I used a modified coding protocol that focused on the dyad as the unit of analysis and that considered the intricate back and forth communicative acts between the mother and child. This coding protocol provides much insight into the mechanisms underlying mother-child interactions and, more specifically, joint attention, by acknowledging the complexity of social interactions. Second, unlike past studies which have often used non-clinical samples that met clinical cutoff scores for internalizing and externalizing symptoms, the present study utilized a typically developing, low risk, non-clinical sample that did not meet clinical cutoff scores for internalizing behaviours and of which only two children met clinical cutoff scores for externalizing behaviours. Third, the present study is one of only a few that have been done to date that consider temperament and joint attention in the same sample, thus investigating the relative influence of temperament and joint attention for socioemotional outcome. Fourth, given that I assessed both internalizing and externalizing behaviours, I was able to investigate the correlations between

internalizing and externalizing behaviours and control for them to ensure that the relations were specific to each individual outcome and not influenced by the shared variance of the two outcomes.

Limitations

Despite the aforementioned strengths, there are also a number of limitations that need to be acknowledged. First, the present study had small sample sizes, which decreased my power to detect statistically significant relations and group differences. This was especially an issue with the hierarchical linear regression, as small sample sizes may make the results unstable and easily influenced by the addition or removal of a variable in the regression. Consequently, the results for the hierarchical linear regression need to be interpreted with caution and require replication with larger sample sizes. Second, although the use of a low risk, typically developing sample with a number of protective factors was a strength of the study in that it controlled for a number of factors that influence socioemotional development and created a very pure sample, it was also a limitation in that it decreased the generalizability of my results. Therefore, my results are generalizable only to typically developing, low risk samples. Further work needs to be conducted to determine whether the same developmental patterns may be involved in high-risk samples. Third, individual variation in joint attention behaviours has been associated with language and cognition (Carpenter et al., 1998; Mundy & Gomes, 1998). I did not control for these factors in the present study. Fourth, as mentioned previously, the assessment of joint attention behaviours through mother-child interactions generates possible confounds due to variability in maternal behaviours. I did not assess for factors

that are known to influence mother-child interactions, such as parenting style/approach, mother-child attachment, maternal stress, or maternal mental health. Fifth, the use of the IBQ (Rothbart, 1981) rather than the age appropriate Toddler Behavior Assessment Questionnaire (TBAQ; Goldsmith, 1996) may have influenced the accuracy of maternal reporting of temperament when children were between the ages of 18 and 37 months and potentially decreased my ability to detect longitudinal relations between temperament and internalizing and externalizing behaviours. Lastly, I assessed temperament, and socioemotional outcome through maternal report. Research has shown that maternal report of child behaviours has both a subjective component, based on maternal factors such as beliefs and expectations, parity, age, personality (Matheny, Wilson, & Thoben, 1987), and maternal mental health (Mebert, 1991), as well as an objective component based on the child's actual behaviours (Bates & Bayles, 1984; Mebert, 1991). Therefore, it is not clear whether relations between maternal-reported factors are actual relations or are a result of shared measurement variance. Future studies utilizing multiple responders such as mothers, fathers, and teachers, or observational approaches can further clarify the relations between temperament and joint attention and socioemotional outcome.

Conclusion

The present study investigated the contributions of temperament and joint attention to socioemotional outcome in a non-clinical sample of typically developing, low risk children. In both studies, I found cross-sectional relations between temperament and socioemotional outcome. However, joint attention was significantly related only with internalizing behaviours.

The present results suggest that temperament, a measure that has a biological basis, is the strongest predictor of socioemotional development in non-clinical, typically developing children with a number of protective factors, including maternal education, high SES, and two-parent families. Taken together with previous work, the present findings illustrate the complexity of child development and the interplay between biological factors and social processes. Further research that investigates the relative influence of temperament and joint attention on children's development in varied samples, including high risk and clinical samples, will aid in further refining our understanding of how these two factors influence children's development. It is important to remember that development is a complex interplay of a multitude of factors. Consequently, the context in which the child is raised (i.e., the home environment and familial characteristics), may influence the manner in which biological and social processes interact and influence children's socioemotional development.

Chapter 4:

Study 4

Joint Attention Behaviours During Unstructured and Structured Tasks in Parent-Child Dyads Involving Children with Selective Mutism and Anxiety Disorders

Introduction

Selective mutism (SM) is a disorder in which children fail to speak in one or more social settings (usually outside the home) despite speaking normally in other settings (usually within the home; APA, 2001). Although the disorder is typically diagnosed when children begin school and the demands for speaking outside the home increase, SM usually first appears during the preschool years (Cunningham, McHolm, Boyle, & Patel, 2004; Steinhausen & Juzi, 1996). Its prevalence has been estimated at between 0.7% and 2% of children (Bergman, Piacentini, & McCracken, 2002; Elizur & Perednik, 2003; Kopp & Gillberg, 1997; Kumpulainen, Rasanen, Rasska, & Somppi, 1998). Selective mutism is currently categorized under "Other disorders of infancy and childhood" in the Fourth Revised Edition of the Diagnostic and Statistical Manual (DSM-IV-R; APA, 2001). Many researchers, however, have suggested that it should be viewed as a distinct anxiety disorder (Anstendig, 1999; Sharp, Sherman, & Gross, 2007; Vecchio & Kearney, 2005) or a variant of social phobia (Yeganeh, Beidel, & Turner, 2006). In fact, a number of studies have reported that the majority of children with SM have one or more comorbid anxiety disorders (Black & Uhde, 1995; Dummit, Klein, Tancer, Asche, Martin, & Fairbanks, 1997; Vecchio & Kearney, 2005) and longitudinal studies have found that, although many children with SM overcome the disorder as they get older, they often still experience shyness and symptoms of social anxiety (Joseph, 1999). Given that the disorder most often presents itself in the school setting and with unfamiliar individuals, such as teachers, many studies have focused on the functioning of children with SM in tasks associated with the school setting, such as language and academic

development (Bergman et al., 2002; Cunningham et al., 2004; Kristensen & Oerbeck, 2006; Manassis, Tannock, Garland, Minde, McInnes, & Clark, 2007; McInnes, Fung, Manassis, Fiksenbaum, & Tannock, 2004; Schwartz, Freedy, & Sheridan, 2006). However, almost no research has investigated the quality of interactions between children with SM and their parents.

In contrast, much research has focused on parenting in children with anxiety disorders. Two global aspects of parenting have been implicated as being related to childhood anxiety disorders: parental control and parental rejection. Parental control is characterized by behaviours that promote children's dependence on their parents, including over-regulation of children's activities and routines, making decisions for children, and telling children how to think or feel in response to various situations (Barber, 1996; Steinberg, Elmer, & Mounts, 1989). Theoretically, researchers have suggested that parental control may influence childhood anxiety by teaching children that the environment is threatening and preventing them from exploring the environment and learning ways to cope independently. Consequently, children adopt the cognitive bias that they are unable to cope, resulting in the development of a high degree of fear and anxiety (Barlow, 2002; Chorpita & Barlow, 1998). Parental rejection is characterized by behaviours that promote withdrawal from the child, including low levels of parental warmth, and high levels of unresponsiveness and disapproval (Clark & Ladd, 2000; Maccoby, 1992). Parental acceptance of children's negative emotional expressions has been associated with children's emotion regulation. Consequently, parental rejection and disapproval of negative emotions, such as anxiety, is hypothesized to compromise the

child's development of emotion regulation, thus increasing the child's experience of fear and anxiety (Gottman, Katz, & Hooven, 1997).

There have been a number of methodological variations in the manner in which studies on the relation between parenting and childhood anxiety have been conducted. Some, especially the early studies, have utilized adult retrospective reports of parental control and parental rejection. Others have conducted cross-sectional studies, with the assessment of parenting being based on either child or parental reports. In both cases, these studies have measured perceived parenting rather than actual/observed parenting (see Rapee 1997, for a comprehensive review). Observational approaches to the measurement of parental control and rejection have provided assessments of the relation between actual parenting and childhood anxiety.

Despite this methodological variability, a number of comprehensive reviews (Ginsburg, Siqueland, Masia-Warner, Hedtke, 2004; Masia & Morris, 1998; Rapee, 1997; Wood, McLeod, Sigman, Hwang, & Chu, 2003) and meta-analyses (Gerlsma, Emmelkamp, & Arrindell, 1990; McLeod, Wood, & Weisz, 2007; van der Bruggen, Stams, & Bogels, 2008) have shown that parental control is related to childhood anxiety, although the manner in which parenting is assessed appears to be a moderator such that observational studies have larger effect sizes than studies that assess parental control through questionnaires or interviews (McLeod et al., 2007; van der Bruggen et al., 2008). As suggested by McLeod and colleagues (2007), this appears to be a reflection of the poor convergent validity of a number of parenting scales. With regards to parental rejection, the literature has been more mixed and, in general, meta-analyses have

suggested that the effect sizes for parental rejection are smaller than for parental control, implicating that parental control has a stronger influence on childhood anxiety disorders than parental rejection (McLeod et al., 2007; Rapee, 1997).

Although the research above provides insight into how parental behaviours may influence the development of anxiety disorders, its exclusive focus on the global aspects of parenting is a limitation. There is growing appreciation that parent-child interactions are not solely driven by one social partner. Rather, mother-child interactions are bidirectional and influenced by the behaviours of both social partners. Consequently, studies are increasingly acknowledging the importance of using the dyad as the unit of analysis and of investigating the interactive back and forth communicative exchanges between mothers and their children to gain a more detailed and in-depth understanding of interactive mechanisms (Kuczynski, 2003). One such interactive measure of mother-child interactions is dyadic mutuality, defined as an interactive state that is high on the behaviours of shared positive affect, joint attention, and turn taking (Harrist, Pettit, Dodge, & Bates, 1994; Mize & Pettit, 1997). Interestingly, although research has implicated dyadic mutuality as playing a role in children's socioemotional outcome, including the development of internalizing behaviours (Deater-Deckard & Petrill, 2004; Harrist et al., 1994; Lindsey, Mize, & Pettit, 1997; Mize & Pettit, 1997), there is a paucity of research that has investigated these aspects of parent-child interactions in dyads where children have anxiety disorders. Furthermore, research has suggested that the definitional aspects of dyadic mutuality may have differential relations with socioemotional outcome (Isabella & Belsky, 1991; Lindsey, Cremeens, Colwell, &

Caldera, 2008; Lindsey et al., 1997). One aspect of dyadic mutuality which has received little research in terms of its influence on socioemotional outcome is joint attention -- defined as a state in which both social partners are actively focused on the same object, task or event and are both aware of each other's active participation (Bakeman & Adamson, 1984). In Study 3, I found that high levels of joint attention, measured when children were between 18 and 37 months of age were negatively related with internalizing behaviours when children were between 5 and 7 years of age in a sample of typically developing children. Therefore, in the present study I compared joint attention behavious between the following three groups of dyads: 1) children with selective mutism and their primary caregiver (SM dyads); 2) children with anxiety disorders and their primary caregiver (Mixed Anxiety dyads); and 3) children with no internalizing problems and their primary caregiver (Community Control dyads). The inclusion of the selective mutism group is important for two reasons: 1) as mentioned above, there is a paucity of research that has investigated mother-child interactions in children with SM; and 2) the inclusion of both an SM and a Mixed Anxiety group provides further insights into similarities and differences between children with SM and children with anxiety disorders.

The Present Study

Children between the ages of 5 and 8 years old came to the Child Emotion Laboratory at McMaster University with their primary caregivers (usually the mother) and were observed engaging in three standardized tasks (1 unstructured and 2 structured) that were presented through a power point presentation in order of increasing structure

and stress. The videotaped interactions were coded for joint attention behaviours using a modified coding protocol developed by Tasker and Schmidt (2008). Given that past research has shown that context, including the structure and demands of a task, can influence dyadic behaviours (Rubin, Cheah, & Fox, 2001), I separated my analyses of mother-child interactions into unstructured and structured tasks. The free play task was my measure of mother-child interactions during an unstructured task while the sum of joint attention behaviours during the two structured tasks was my measure of mother-child interactions during structured tasks. The three groups were compared for differences on joint attention behaviours for both structured and unstructured tasks.

Based on the following factors: 1) past research that mothers of children with anxiety disorders tend to exhibit higher levels of control and intrusiveness; 2) the view that SM should be conceptualized as an anxiety disorder; and 3) the focus of our joint attention protocol on contingent, back and forth communicative acts between the social partners, I predicted that the SM and Mixed Anxiety dyads would perform significantly lower on joint attention behaviours compared to the control dyads. Given that past research has shown that differences in parenting behaviours towards anxious children and control children appear to be most pronounced in unstructured situations (Rubin et al., 2001), I predicted that the differences in joint attention behaviours would be greatest during the unstructured free play task compared to the structured tasks.

Method

Participants

Sixty-three children between the ages of 5 and 8 years were recruited from local mental health agencies, including one agency that had a regional selective mutism program, and from the Child Database, which is contained in the Department of Psychology, Neuroscience, & Behavior. The Child Database is comprised of the names of healthy children recruited at birth from McMaster University Medical Centre and St. Joseph's Healthcare, Hamilton, Ontario. Primary caregivers (usually the mothers) completed a packet of questionnaires that were used for the purpose of group assignment in the present study.

Selective Mutism. The inclusion criteria for the SM group were as follows: 1) the primary caregiver indicated that the child did not speak in 2 or more situations on the Speech Situations Questionnaire – Parent Version (SSQ-Parent; Cunningham, McHolm, & Boyle, 2006; Cunningham et al., 2004) or the teacher indicated that the child failed to speak in 2 or more situations on the Speech Situations Questionnaire – Teacher Version (SSQ-Teacher); 2) the lack of speech was not due to a communication disorder; and 3) the lack of speech persisted for more than one month. In total, 19 children (8 male, 11 female) met these criteria. After the laboratory visit, primary caregivers also completed the Internalizing Disorders portion of the Computerized Diagnostic Individual Schedule for Children (C-DISC-IV; Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000) over the phone to assess for comorbid anxiety disorders. The C-DISC-IV (Shaffer et al., 2000) assesses the following childhood internalizing disorders: social phobia, separation anxiety, specific phobia, panic disorder, post-traumatic stress disorder, obsessive

compulsive disorder, agoraphobia, and major depressive disorder. Five mothers did not complete the C-DISC-IV for their children due to scheduling difficulties for the phone interview. Of the 14 children who did have complete C-DISC-IVs, 6 (43%) had one comorbid anxiety disorder (separation anxiety or specific phobia) and 1 (7%) had two comorbid anxiety disorders (separation anxiety and specific phobia).

The mean age of the children was 76.31 months (SD = 10.69, range = 60-94). The majority of the children (84%) came from two-parent homes. Eleven (61%) primary caregivers reported their ages as between 19 and 39 years and 8 (42%) primary caregivers reported their ages as between 40-64 years. The majority of the primary caregivers (53%) had completed a university degree. During the past year, 8 (42%) primary caregivers worked full time, 8 (42%) worked part-time, and 3 (16%) did not work. The family incomes prior to taxes for the previous year were reported as follows: $15,000 - $30,000 (11%), $30,000 - $45,000 (5%), $60,000 - $75,000 (26%), $75,000 – $90,000 (26%), and greater than $100,000 (26%). One (5%) mother did not report the family's income. See Table 4.1.

Mixed Anxiety. The inclusion criteria for the anxiety group were as follows: 1) one or more anxiety diagnoses on the C-DISC-IV; 2) no diagnosis of major depressive disorder on the C-DISC-IV; and 3) no diagnosis of SM based on primary caregiver and teacher ratings on the SSQ. Eighteen children (12 male, 6 female) met the diagnostic criteria for the anxiety group. Twelve (67%) children had one anxiety disorder, 3 (17%) had 2 anxiety disorders, and 3 (17%) had 3 anxiety disorders. The most common anxiety disorders were specific phobia (61%), separation anxiety (39%), and social phobia (33%).

The mean age of the children was 75.44 months (*SD* = 12.49, range = 60-92). The majority of the children (89%) came from two-parent families. Eleven (61%) primary caregivers reported their ages as between 19 and 39 years and 7 (39%) reported their ages as between 40 and 64 years. The education levels for the primary caregivers ranged from some high school (6%) to a post-graduate degree (11%) with the majority of primary caregivers' education falling within completed community college (33%), some university (17%), and university degree (17%). Two (11%) primary caregivers did not report their education levels. During the previous year, four (22%) primary caregivers worked full time, 7 (39%) worked part-time, and 7 (39%) did not work. The family incomes for the previous year were reported as follows: $15,000 - $30,000 (11%), $30,000 - $45,000 (11%), $45,000 - $60,000 (22%), $60,000 - $75,000 (11%), $75,000 – $90,000 (17%), and greater than $100,000 (22%). One (6%) mother did not report the family's income. See Table 4.1.

Community Control. The inclusion criteria for the community control group were as follows: 1) no anxiety or major depressive disorder diagnoses on the C-DISC-IV; 2) no diagnosis of SM based on primary caregiver and teacher reports on the SSQ; and 3) had to be recruited from the Child Database and not from one of the agencies. Twenty-six children (16 male, 10 female) met the diagnostic criteria for the community control group. The mean age of the children was 72.88 months (SD = 9.24, range = 60-94). The majority of the children (88%) came from two-parent families. Fifteen (58%) primary caregivers reported their ages as between 19 and 39 years and 11 (42%) reported their ages as between 40 and 64 years. The education level for the majority of primary

caregiver was a university degree (26%) with completion of high school being the lowest education level (4%) and completion of a postgraduate degree the highest education level (19%). During the past year, 15 (58%) primary caregivers worked full time, 7 (27%) worked part-time, 1 (4%) worked both full time and part time, and 3 (12%) did not work. The majority of primary caregivers (50%) reported their previous year's income as between $75,000 and $90,000, with the lowest income reported being $45,000 - $60,000 (4%) and the highest income reported being greater than $100,000 (31%). See Table 4.1.

Procedure

This study was part of a larger study investigating the etiological, familial, academic, behavioural, and physiological factors in children with selective mutism in comparison to children with anxiety disorders and community controls. All procedures were approved by the McMaster University Health Sciences Research Ethics Board. Children were given $15.00 gift certificates to a local bookstore as a token of our appreciation for their participation in the study.

Children and their primary caregivers came to the Child Emotion Laboratory at McMaster University. The primary caregiver and child were first briefed as to the procedures of the study and all consent forms were signed. The mailing address for the child's school was provided by the primary caregiver so that a questionnaire package could be sent to the child's teacher. The primary caregiver was then given a package of questionnaires to complete, including the diagnostic questionnaires that were utilized for group assignment. Upon completion of the questionnaires, the primary caregiver and child were taken to a room where a table and two chairs were set up as well as a video

camera facing the table. The primary caregiver and child were told that they would have an opportunity to complete some activities together. A laptop computer with a powerpoint presentation was set-up on a side-table beside the child and across from the primary caregiver. The primary caregiver was told that instructions for four activities would be presented on the computer and that a chime would sound with the presentation of each new instruction. The parent was told that he/she was to read the instructions and complete the indicated activities with the child. The experimenter then started the powerpoint presentation and left the room.

The primary caregiver and child were observed in the following four tasks: free play (5 minutes), discussion (2 minutes), preparation (5 minutes), and birthday speech (5 minutes). Given that the present study was focused on the back and forth interactive behaviours between primary caregivers and their children and that the birthday speech was meant as an assessment of the child's behaviours and performance in a social presentation task, the current study focused only on the first 3 interactive tasks. During the free play task (5 minutes), the mother and child were instructed that they could do whatever they liked for a few minutes, including using the provided paper and markers/crayons. The discussion task (2 minutes) consisted of the primary caregiver talking with the child about his/her last birthday. During the preparation task (5 minutes), the primary caregiver was instructed to tell his/her child that he/she would have to give a speech about his/her last birthday in a few minutes. The instructions included a list of things that the speech should cover about the child's last birthday, such as: 1) what they did; 2) who was there; 3) what presents they got; and 4) what they would like to do for

their next birthday. The primary caregiver was instructed that he/she could help the child prepare for the speech in any way he/she liked. During the birthday speech, the primary caregiver was instructed to tell the child to stand up in front of the camera and to perform their speech about their last birthday. After 5 minutes, the computer chimed and the screen went black, indicating the end of the interactive episode. The experimenter went into the room and announced the end of the observation portion of the experiment.

Parent Diagnostic Measures

The primary caregiver completed the Parent Version of the Speech Situations Questionnaire (SSQ-Parent, Cunningham et al., 2006; Cunningham et al., 2004) as a measure of the child's speaking patterns. The SSQ-parent is a 15-item parent-report questionnaire that assesses the extent to which the child speaks in a variety of settings including, the home, school, and community, and to a range of different people, including family, friends, and strangers, on a scale of 0 (never talks) to 2 (talks in a normal voice). The internal consistency of the SSQ-Parent in the study conducted by Cunningham and colleagues (2006) was .82, and in the present study, it was .95.

The primary caregiver also completed the Internalizing portion of the C-DISC-IV (Shaffer et al., 2000) through a telephone interview with a trained research assistant after the laboratory visit. The C-DISC-IV is a structured interview based on the DSM-IV that assesses children for 34 psychiatric disorders (Shaffer et al., 2000). Due to time limitations, I only administered the Internalizing portion of the C-DISC-IV in the present study. Therefore, the children were assessed for the following internalizing disorders: panic disorder, generalized anxiety disorder, social phobia, specific phobia, separation

anxiety, obsessive compulsive disorder, post-traumatic stress disorder, agoraphobia, and major depression. The C-DISC-IV has been shown to be a reliable measure of anxiety disorders (Shaffer et al., 2000). However, its diagnostic accuracy for the assessment of SM has not been established. Therefore, in the present study, I utilized parent- and teacher-report questionnaires for the assessment of SM and the C-DISC-IV for the assessment of anxiety disorders.

Teacher Diagnostic Measures

Teachers completed the Teacher Version of the Speech Situations Questionnaire (SSQ-Teacher) as a measure f the child's speaking patterns in the school setting. The SSQ-Teacher is a 7-item questionnaire that asks teachers to rate the extent to which children speak in a variety of settings in the school, including the classroom, hallway, and playground, and to a variety of individuals, including teachers and friends, on a 3-point scale ranging from 0 (never talks) to 2 (always talks). The internal consistency of the SSQ-Teacher in the present study was .96

Behavioural Coding

The videotaped parent-child interactions were coded for joint attention behaviours using a modified coding protocol developed by Tasker and Schmidt (2008) based on the work of Tomasello and Todd (1983), Bakeman and Adamson (1984), Tomasello and Farrar (1986), and Rocisanno and Yatchmink (1984). The following joint attention behaviours were coded: Initiation Acts, Established Joint Attention, and Average Length of Joint Attention Episodes.

Initiation Acts. Initiation acts were spontaneous verbal or non-verbal communicative behaviours that were not part of an ongoing interactive episode and that were meant to attain and direct the social partner's attention to a particular object or event in order to share that object or event with the social partner (Landry, Smith, Miller-Loncar, & Swank, 1998; Mundy & Willoughby, 1996; Newland, Roggman, & Boyce, 2001). Two types of initiation acts were coded: 1) Parental Initiation Acts (PIA), and 2) Child Initiation Acts (CIA). Both "successful" (i.e., those initiation acts that were responded to) and "unsuccessful (i.e., those initiation acts that were not responded to) initiation acts were coded.

1) Parental Initiation Acts (PIA) were defined as spontaneous, intentional verbal or non-verbal communicative acts performed by the parent for the purpose of attaining and directing the child's focus of attention to a particular object or event or for the purpose of sharing in the child's focus of attention by following-in to the child's current focus of attention (Hundert, Mahoney, Mundy & Vernon, 1998; Tasker & Schmidt, 2008, Tomasello & Todd, 1983).
2) Child Initiation Acts (CIA) were defined as spontaneous, intentional verbal or non-verbal communicative acts performed by the child for the purpose of either directing the parent's attention to a particular object or event or of sharing and participating in the parent's current focus of attention by following-in to the parent's current focus of attention (Hundert et al., 1998; Prendergast & McCollum, 1996; Tasker & Schmidt, 2008; Tomasello & Todd, 1983).

Established Joint Attention (EJA). The conceptualization and operationalization of joint attention was based on the work of Bakeman and Adamson (1984), Tomasello and Farrar (1986), Tomasello and Todd, 1983, and Rocisanno and Yatchmink (1984). Joint attention has been viewed as present in past studies when both social partners were actively focused on the same object for a minimum of 3 seconds and when one of the social partners performed a communicative act that indicated an awareness of the active participation of the other social partner (Bakeman & Adamson, 1984; Tomasello & Todd, 1983). Accordingly, past studies have viewed joint attention as either absent or present and have failed to consider the mechanisms through which joint attention is established or the interactive processes that take place once joint attention is established (i.e., within joint attention episodes). One of the few studies that have considered the processes through which joint attention is established was conducted by Ratchmink and Rocissano (1984) and considered the sequence of contingent back and forth communicative acts that were necessary both for the establishment and the maintenance of joint attention episodes.

Thus, Tasker and Schmidt (2008) synthesized the studies reviewed above to generate a model of joint attention that considered both the back-and-forth contingent communicative acts necessary for the establishment of joint attention as well as the interactive processes that occurred within episodes of joint attention (i.e., once joint attention was established). Tasker and Schmidt (2008) viewed joint attention as being established when a parental or child initiation act was followed by three on-topic, contingent, back and forth communicative acts between the parent and child. Thus, for

joint attention to be considered established, the following sequence of behavioural events had to take place: 1) one of the social partners (i.e., the parent or the child) performed an initiation act to attain and direct the other social partner's attention to a particular object or event or to follow-in to the social partner's current focus of attention; 2) the social partner to whom the initiation act was directed provided an on-topic verbal or non-verbal response within 5 seconds of the initiation act that lasted a minimum of 3 seconds; 3) the social partner who initiated performed an on-topic verbal or non-verbal response, often in the form of eye gaze, meant to indicate an awareness of the shared focus of attention (Bakeman & Admson, 1984; Charman, Baron-Cohen, Swettenham, Baird, Cox, & Drew, 2000; Ingsholt, 2002; Tomasello & Farrar, 1986); and 4) the parent and child both remained visually focused on the particular object, event, or task and continued to verbally and non-verbally interact around it (Tasker & Schmidt, 2008).

Joint attention was terminated when one of the social partners lost focus in the interaction. Termination of joint attention was indicated by the following behaviours: novel initiations, (Newland et al., 2001; Wood & Wood, 1997), looking away (Koester & Meadow-Orlans, 1999; Prendergast & McCollum, 1996), yawning, (Smith-Gray & Koester, 1995), moving away from the interaction, squirming (Smith-Gray & Koester, 1995), focusing on a different object (but not initiating to include the other social partner; Koester & Meadow-Orlans, 1999), and crying and other vocalizations of distress and frustration. One of the social partners had to engage in these termination behaviours for a minimum of 3 seconds for joint attention to be considered terminated (Schmidt & Tasker, 2008).

I coded for two types of Established Joint Attention that were differentiated by who initiated the sequence of behaviours that lead to the establishment of joint attention. Parental Initiated Established Joint Attention (PIA EJA) was defined as an established interactive episode that was initiated by the parent (i.e., it began with a PIA) and Child Initiated Established Joint Attention (CIA EJA) was defined as an established interactive episode that was initiated by the child (i.e., it began with a CIA).

Average Length of Joint Attention Episodes. The length of time that dyads spent in a joint attention episode was calculated in seconds by subtracting the time at which joint attention was established from the time at which joint attention was terminated (i.e., a termination act was performed for 3 seconds by one of the social partners). To calculate the average length of established joint attention episodes, we summed the lengths of all established joint attention episodes for a task and then divided by the number of established joint attention episodes.

I created separate joint attention behaviour scores for structured and unstructured tasks. In total, dyads spent 7 minutes in structured tasks (i.e., discussion and preparation) and 5 minutes in unstructured tasks (i.e., free play). Therefore, to account for differences in time spent in structured versus unstructured tasks and to prevent these differences from confounding my analyses, I created relative frequency scores for the free play joint attention behaviours by multiplying all the free play joint attention behaviours by 7 and dividing by 5. Thus, the total scores for MIA, CIA, MIA EJA, CIA EJA, and Average Length of Joint Attention Episodes for the free play task comprised my unstructured task

joint attention measures. To create my structured tasks joint attention measures, I summed across the discussion and preparation tasks for each joint attention variable.

One undergraduate student was trained by the first author in the coding protocol described. The undergraduate student was blind to the hypotheses of the current study as well as to group membership. Training in the coding procedure consisted of the undergraduate student learning the coding manual and coding three randomly selected tapes with the first author. To assess inter-rater reliability, 10 (16%) randomly selected tapes were coded by the undergraduate student and first author. The reliability for all the coding measures was good with Cohen's kappa coefficients ranging from .75 (PIA) to .82 (PIA EJA). The Intraclass correlation coefficient (ICC) for the continuous variable Average Length of Joint Attention Episode was also good (.93).

Statistical Analyses

Three two-way repeated measures analyses of variance (ANOVAs) were conducted to assess the effects of group and type of task on the joint attention behaviours CIA, CIA EJA, and PIA EJA. Type of task (unstructured and structured) was the within-subjects factor and group (SM, Mixed Anxiety, and Community Control) was the between-subjects factor. Given that child's age showed a statistically significant negative relation with PIA for the structured task and a statistically significant positive relation with Average Length of Established Joint Attention Episodes for the structured task, I conducted two two-way repeated measures analyses of covariance (ANCOVAs) with child's age as the covariate to assess the effects of group (SM, Mixed Anxiety, and Community Control) and type of task (unstructured and structured) on the joint attention

behaviours PIA and Average Length of Established Joint Attention Episodes. Given that the assumption of homogeneity of variance was met, one-way analyses of variance or covariance (for measures that were related with child's age) with Group as the between-subjects factor and structured or unstructured joint attention measure as the within-subjects factor were used to deconstruct statistically significant interactions. Statistically significant one-way ANOVAs were followed up with Tukey HSD tests.

Results

Preliminary Analyses

There was a statistically significant difference between groups on the primary caregiver's education level such that primary caregiver's in the community control and SM groups had higher levels of education than in the Mixed Anxiety group. However, the primary caregiver's education level was not significantly related to any of the behavioural measures assessed in the present study. Therefore, I did not control for the primary caregiver's education level in our analyses. The majority of primary caregivers in the present study were mothers with only five (8%) being fathers. Past research on the influence of parent gender on measures of dyadic mutuality, of which joint attention is a definitional component, has been mixed (Feldman & Eidelman, 2004; Lindsey & Mize, 2000; Lindsey et al., 1997). However, when I reran the analyses including only those dyads that had mothers as the primary caregivers the results remained the same. Therefore, the results presented include the full sample, with both mothers and fathers as primary caregivers.

Parent-Child Interaction Analyses

Parental Interactive Behaviours. There was a statistically significant Group x Task interaction for Parental PIA ($F(2, 59) = 6.69, p = .02, \eta^2 = .13$; See Figure 4.1). The one-way ANOVA with group as the between-subjects factor and unstructured task PIA as the within-subjects factor approached statistical significant ($F(2, 60) = 2.68, p = .08$). Tukey HSD post-hoc tests revealed that the *difference* between the SM ($M = 5.53$, $SD = 6.20$) and Mixed Anxiety ($M = 2.41$, $SD = 1.72$) groups for the number of PIAs during the unstructured task approached statistical significance ($p = .06$, Cohen's $d = .69$; See Figure 4.2). The one-way ANCOVA with child's age as the covariate and group as the between-subjects factor and structured task PIA as the within-subjects factor was not statistically significant ($F(2, 59) = 1.14, p = .33$).

There was a statistically significant Group x Task interaction ($F(2, 60) = 5.01, p = .01, \eta^2 = .14$; See Figure 4.3) for PIA EJA. Two one-way ANOVAs with Group as the between-subjects factor and unstructured task PIA EJA and structured task PIA EJA as the within-subjects factors were conducted. There were no statistically significant differences between the groups on the number of PIA EJA during the unstructured task ($F(2, 60) = 1.56, p = .22$). The groups differed significantly on the number of PIA EJA during the structured task ($F(2, 60) = 4.47, p = .02$). Tukey HSD post-hoc tests revealed that the SM ($M = 2.26$, $SD = 1.15$) group was significantly lower on the PIA EJA variable compared to both the Mixed Anxiety ($M = 3.33$, $SD = 1.41$, $p = .02$, Cohen's $d = .83$) and the Community Control ($M = 3.15$, $SD = 1.05$, $p = .04$, Cohen's $d = .81$; See Figure 4.4) groups.

Child Interactive Behaviours. There were statistically significant main effects for CIA ($F(1, 60) = 40.04$, $p < .01$, $\eta^2 = .40$; See Figure 4.5) and for CIA EJA ($F(1, 60) = 32.35$, $p < .01$, $\eta^2 = .35$; See Figure 4.6). Regardless of group, children performed significantly more CIAs ($M = 2.15$, $SE = .32$) and CIA EJAs ($M = 1.58$, $SE = .24$) during the unstructured task compared to the structured task ($M = .38$, $SE = .09$, $p < .01$, and $M = .38$, $SE = .09$, $p < .01$, respectively).

Average Length of Established Joint Attention Episodes. There was a statistically significant main effect for Average Length of Established Joint Attention Episodes ($F(1, 59) = 4.32$, $p = .04$, $\eta^2 = .07$; See Figure 4.7). Regardless of group, dyads spent significantly more time in joint attention episodes during the unstructured tasks ($M = 133.73$, $SE = 13.05$) compared to the structured tasks ($M = 82.51$, $SE = 6.09$, $p < .01$).

Discussion

The author investigated differences in joint attention behaviours during unstructured and structured tasks in 3 groups of dyads: 1) parent-child dyads with selectively mute children; 2) parent-child dyads with anxious children; and 3) community control parent-child dyads. The results revealed significant group by task interactions for parental behaviours as well as significant main effects for child behaviours.

On average, there were no significant differences between groups in the frequency of PIA EJA or the average length of joint attention episodes during the unstructured free play task. However, the difference between groups on PIAs approached statistical significance such that the parents in the SM dyads performed more PIAs compared to the parents in the Mixed Anxiety dyads during the unstructured task. Therefore, it appears

that, although the SM dyads do establish the same frequency of PIA EJAs as the Mixed Anxiety and Community Control dyads during unstructured free play tasks, parents initiate significantly more in order to achieve these episodes of established joint attention. Three possible mechanisms may explain the current results. First, it may be the case that children in the SM group are less responsive in interactions with their parents. Consequently, more of the parental initiation acts are missed and/or ignored by their children resulting in parents having to initiate significantly more in order to attain their children's attention and active engagement. Second, given past research showing that parents of anxious children tend to be more intrusive and controlling in interactions with their children (Gerlsma et al., 1990; Ginsburg et al., 2004; Masia & Morris, 1998; McLeod et al., 2007; Rapee, 1997; van der Bruggen et al., 2008; Wood et al., 2003) it is possible that the increased frequency of parental initiation acts reflects the parent's over-involvement and intrusiveness. Consequently, if children have developed a learning history of interactions with their parents being characterized by high degrees of control and commanding behaviours, the children may choose to ignore some of the initiation acts performed by their parents. Third, given that SM most often presents itself in unfamiliar situations for the child and that the unstructured free play task was the first task completed by the dyads, it is possible that the parents of children with SM may have identified the situation as potentially stressful for their children. In an attempt to decrease the stressfulness of the situation, the parents may have increased their own interactive behaviours, thus removing the pressure to interact from their children.

The manner in which PIAs were coded and conceptualized in the present study makes it difficult to determine which of the three mechanisms described above underlie the present results. Parental initiation acts were defined as verbal or non-verbal behaviours performed by parents for the purpose of attaining their child's attention in an attempt to direct it to a particular object or event in the environment or for the purpose of following in to the child's current focus (Tasker & Schmidt, 2008). Therefore, in the present study, I only identified the presence or absence of PIAs but did not analyze their content. For instance, PIAs that were characterized by the parent telling the child what to do (e.g., "Lets draw a sun.") would be considered indicative of a high degree of parental controlling behaviours and a low degree of granting of autonomy. However, PIAs consisting of open-ended questions, (e.g., "What do you want to do?"), would be considered as reflecting a low degree of controlling behaviours and a high degree of granting of autonomy. Given that the present study did not analyze the content of PIAs, it is difficult to determine the mechanism underlying the higher levels of PIAs in the SM dyads.

I also found that the SM dyads had significantly less PIA EJAs compared to the Mixed Anxiety and Community Control dyads during the structured task, although there were no significant differences between groups in the number of PIAs or the average length of time spent in joint attention episodes. Given that the establishment of joint attention was conceptualized in the present study as requiring three contingent on-topic communicative acts between social partners (Tasker & Schmidt, 2008) and that I found no significant differences in PIAs, it appears that a decrease in children's responsiveness

may underlie the difference between groups. This difference in responsiveness may be explained by the nature of the structured tasks and the clinical diagnoses that composed the Mixed Anxiety group. My composite measure of structured task was composed of two tasks: 1) the discussion task in which the parent and child were instructed to talk about the child's last birthday; and 2) the preparation task in which the child was informed that he/she would be required to perform a birthday speech and during which the parent and child prepared the speech. Given that the discussion task was only 2 minutes in length while the preparation task was 5 minutes in length, the majority of the behavioural coding on which the structured task composite measure was based was the preparation task. Therefore, the structured task in the present study was very much focused on preparation for a social presentation situation. Given the diagnostic presentation of selective mutism, such a situation would undoubtedly be stressful for children with SM, thus resulting in their withdrawal from the situation and the interaction with their parents. In contrast, the extent to which such a task would be stressful for the Mixed Anxiety group is questionable. The majority of children in the Mixed Anxiety group either suffered from Separation Anxiety Disorder or Specific Phobia and there were only 6 (33%) children who suffered from Social Phobia. Therefore, as a group, the Mixed Anxiety children may not have been as affected by the self-presentation task and may have still remained engaged and co-operative during the structured tasks, thus resulting in no significant differences between the Mixed Anxiety and Community Control dyads on the PIA EJA variable. The incorporation of a pure social phobia group in the present study may have further clarified the present results.

The finding that children with SM tend to become more withdrawn and to establish fewer episodes of joint attention during potentially stressful structured tasks is important as it highlights one mechanism through which the disorder may be maintained. Joint attention episodes have been implicated as important for socioemotional development given that they are a state during which both social partners are actively focused on the same topic, event, or object, thus providing an opportunity for learning to take place (McEvoy, Rogers, & Pennington, 1993; Mundy & Willoughby, 1996; Sheinkopf, Mundy, Claussen, & Willoughby, 2004). When children withdraw from interactions with their parents, especially during stressful situations, opportunities for discussion of the upcoming event in order to reduce anticipatory anxiety as well as modeling of such behaviours as emotion regulation, coping mechanisms, and problem solving, are lost. Consequently, children fail to learn and develop skills to cope with difficult situations, thus resulting in a continued fear of the situation. This finding further highlights the potential usefulness of behavioural therapies as a treatment modality for children with SM given that these therapies emphasize gradual exposure to stressful situations and the development of coping mechanisms (Stone, Kratochwill, Sladezcek, & Serlin, 2002). As well, the present findings suggest that parental involvement in behavioural therapy (Wood, Piacentini, Southam-Gerow, Chu, & Sigman, 2006), especially the teaching of strategies with which to engage their children's active involvement in approaching potentially stressful situations, may improve therapeutic outcome.

With regards to the child variables, there were only significant main effects for task such that, regardless of group, all children performed significantly more CIAs and CIA EJAs in the unstructured free play task compared to the structured task. The manner in which the tasks were set-up may have influenced the results. The presentation of the instructions in the current study was such that a laptop was placed on a side-table behind the child and across from where the parent was sitting. The parent was instructed to read the instructions to him/herself and, with the exception of one set of instructions during the preparation task, the instructions were not to be read to the child. Although the child was free to turn around and look at the computer when the instructions were presented (and most children did do this as they were curious what the chime meant), given that the age range in the present study was between 5 and 8 years of age, the majority of the children were unable to read and understand all of the instructions. Consequently, the mother was the one who first initiated by communicating to the child the instructions. For the unstructured free play task, the instructions were simple in that the mother and child were allowed to play as they wished for a few minutes. Therefore, the child was free to initiate the interaction around whatever topic he/she chose. In contrast, for the structured tasks, there were specific instructions as to what the parent and child were to do as well as what was to be communicated in the child's birthday speech. This increased structure, and the fact that the parents continuously saw the instructions while the child did not, may have lead to the lower frequency of both child variables during the structured task.

It is also important to note that overall, the frequency of child variables was low regardless of task compared to the frequency of maternal variables. This finding is consistent with my studies of joint attention behaviours in typically developing children. This pattern of results suggests that when observing interactions between children and their parents, the relative frequency of parental behaviours will be higher than that of child behaviours, most likely a reflection of the different roles the two social partners adopt.

Contrary to my predictions, there were no group differences for the average length of time spent in joint attention episodes. Therefore, it appears that, although the SM dyads may establish fewer joint attention episodes, once they do successfully establish a joint attention episode, on average they spend about the same amount of time in those episodes as the Mixed Anxiety and Community Control dyads. There was a statistically significant main effect for task for the average length of time spent in joint attention episodes such that, regardless of group, dyads spent significantly more time in joint attention episodes in the unstructured free play task compared to the structured task. It is important to note that, while I coded for all initiation acts during the free play unstructured task, I only coded for on-topic initiation acts during the structured task (i.e., those initiations and interactions that were focused on the child's last birthday and on preparing for the birthday speech). If, for instance, the parent and child began to play "hangman" while waiting to begin the birthday speech, this interaction was not coded. This difference in coding procedures for the unstructured and structured tasks most likely accounted for the significant differences on average length of established joint attention

episodes across tasks. Anecdotally, I did notice that a number of the dyads did not take the full 5 minutes to prepare for the birthday speech, resulting in some of their conversations during the preparation task not being coded.

Strengths and Limitations

The present study has a number of strengths that need to be highlighted. First, to the best of my knowledge, this is the first study that has examined parent-child interactions in children with SM and in children with anxiety disorders using the dyad as the unit of analysis and focusing on the back and forth verbal and non-verbal communication acts between parents and their children rather than on global measures of parenting. The inclusion of non-verbal behaviours in my coding protocol is important as children with SM may differ in the manner in which they interact with their parents due to their inhibition of speech in certain situations. Thus, my inclusion of both verbal and non-verbal behaviours ensures that any group differences that I found are not due to biases in the coding protocol. Second, my incorporation of both structured and unstructured tasks provides a more complete perspective of parent-child interactions in children with anxiety disorders and children with SM, given that past research has shown that interactive behaviours are influenced by context and by situational demands (Rubin et al., 2001). Third, given the rarity of SM, obtaining sample sizes that are large enough for statistical comparisons is a challenge. The present study had a relatively large sample of children with SM.

Despite the aforementioned strengths, there are also a number of limitations that need to be acknowledged. First, the Mixed Anxiety group was composed of children

who met the criteria for one or more anxiety disorders on the C-DISC-IV. In the end, the majority of children in this group either had separation anxiety or specific phobia and a minority of children had social phobia. However, there were varying degrees of impairment in the group given that some children had only one anxiety disorder while others had up to three anxiety disorders. As well, some of the children in the Mixed Anxiety group were receiving treatment and were recruited from local mental health agencies while other children were recruited from the local community and had never received treatment. Thus, those children from the local community who were in the Mixed Anxiety group may have experienced less functional impairment than those children who were receiving treatment. To test this hypothesis, I divided the children in the Mixed Anxiety group according to whether they were recruited from a clinic ($n = 8$) or from the community ($n = 10$). Independent samples t-tests revealed that those children in the Mixed Anxiety group that were recruited from a clinic were rated by their primary caregivers as significantly higher on school avoidance and generalized anxiety disorder. Although limited by a small sample size, this provides some support for the fact that there was heterogeneity of impairment in the Mixed Anxiety group with children who were recruited from a clinic showing higher rates of functional impairment than children recruited from the community. Fourth, given that my structured task focused on preparation for a self-presentation task, it may not have influenced the Mixed Anxiety group as strongly as the SM group. It would be interesting to conduct the present study with a pure social phobia group given that research has suggested that SM may be a variant of Social Phobia. Fifth, due to the high degree of comorbidity between SM and

anxiety disorders, I was unable to attain a pure SM group. Therefore, it is unclear the extent to which my results are reflective of SM or a combination of SM and comorbid anxiety disorders. Sixth, given that my tasks had a logical sequence (i.e., free play, discussion about last birthday, and preparation for birthday speech), I was unable to counter-balance the order of presentation of the tasks. This is a limitation of the present study as there was no "warm-up" period in the room during which the children were able to get acclimated to their surroundings and the presence of the video camera. Thus, this may have influenced the pattern of results, especially with the SM children. Seventh, I did not assess externalizing disorders in the present study. However, research has shown that there is a high degree of comorbidity between internalizing and externalizing disorders (Lilienfeld, 2003). Thus, it is possible that some of my participants may have also been suffering from one or more externalizing disorders. Eighth, the current coding protocol focused on the frequency of back and forth communicative acts between parents and their children. However, there was no consideration of the content of the interactions. Future studies should attempt to also transcribe the interactions for verbal and non-verbal behaviours and to analyze the joint attention episodes for the content of what is said between the parent and child (i.e., the discussion of coping mechanisms during structured tasks, the tendency of parents to over exaggerate threat, etc.). Such an in-depth analysis would provide further insight into the mechanisms through which parenting may be maintaining the disorder.

Conclusion

Joint attention has been implicated in a number of studies as being associated with socioemotional outcome, including internalizing and externalizing behaviours. However, to date, no studies have investigated joint attention behaviours in children with SM and anxiety disorders and their parents. The present study illustrates that joint attention behaviours appear to be impoverished in SM dyads when faced with the completion of a potentially stressful task. These results highlight a potential mechanism through which the disorder may be maintained, given that the children's withdrawal impedes their ability to learn coping mechanisms from their parents, and also stress the importance of behavioural therapies for the treatment of SM. It is important to remember that the present results are preliminary. Thus, no firm conclusions as to the nature of parent-child interactions in children with SM and anxiety disorders can be made. However, my results suggest that there are differences between children with SM and community controls on parent-child interactive behaviours, and these differences should be replicated and further studied.

Chapter 5:

General Discussion

The present work investigated two main areas: 1) the relations among temperament, joint attention, and socioemotional development in typically developing children; and 2) joint attention behaviours in dyads with selectively mute children, anxious children, and community controls.

I found that anger, which showed the highest long-term continuity and stability, had statistically significant cross-sectional relations with socioemotional outcome both when children were between the ages of 18 and 37 months and 69 and 88 months. High levels of anger were associated with higher levels of disruptive behaviours and externalizing behaviours (controlling for internalizing behaviours) as well as lower levels of prosocial behaviours and internalizing behaviours (controlling for externalizing behaviours) in typically developing children. In terms of the regulative aspects of temperament, inhibitory control was cross-sectionally related with internalizing behaviours and the composite measure Child Self Control was cross-sectionally related with externalizing behaviours when children were between 5 and 7 years of age. This pattern of results illustrates that some of the same reactive and regulative aspects of temperament that have been associated in previous studies with internalizing and externalizing disorders (Caspi et al., 1995; Eisenberg et al., 2001; Meesters et al., 2007; Oldehinkel et al., 2004; Rettew et al., 2008; Rydell et al., 2003) are also associated with typical variations in socioemotional outcome. These findings are consistent with the idea that internalizing and externalizing behaviours occur on a continuum. That is, all individuals experience internalizing (e.g., anxiety and depression) and externalizing (e.g., attention problems, and aggression) behaviours to some degree. It is when individuals

experience extreme and functionally impairing variants of these behaviours that psychopathology is diagnosed. The present work suggests that the same theoretical view may apply to the factors that influence socioemotional outcome. Thus, the same dimensions of temperament may be associated with both typical and atypical variations in socioemotional outcome and the difference between typical and atypical outcome may be based on the degree with which children show the temperament constructs or the presence of other environmental factors. Although the present study utilized Pearson correlations and focused on direct relations between temperament dimensions and socioemotional outcome, it is possible that the relations may be indirect and may be mediated or moderated by other factors such as the quality of parenting, the presence or absence of peer relationships, and the quality of the home environment (Sanson, Hemphill, & Smart, 2004).

It is also interesting to note that past studies that have included high risk samples as well as typically developing samples identified a wider array of relations between temperament and socioemotional outcome, finding that the reactive aspects of fear and sadness were also associated with internalizing disorders (Muris et al., 2007, Rydell et al., 2003). Three possible factors may underlie the decreased relations between the reactive aspects of temperament and socioemotional outcome in the present work: 1) the relatively small sample size, 2) the use of a low-risk typically developing sample of children, and 3) reporting bias. In terms of the third point, fear and sadness are emotions that are often experienced internally and are not always easily visible to others. In contrast, anger is an externalizing emotion that is usually very visible and easily noticeable by others. Given

that I relied on maternal report of temperament in the present study, it may be the case that mothers may have been less sensitive and perceptive of fear and sadness and thus may have ranked the children as low or average on these aspects of temperament. In contrast, children's displays of anger are easily visible to the parents, thus possibly making them more salient for the mothers and resulting in a greater amount of variability in mother's ratings of their children's anger.

With regards to joint attention behaviours, I only found a statistically significant negative relation between maternally initiated established joint attention and internalizing behaviours. Interestingly, maternally initiated established joint attention also showed the highest relative and absolute stability across time and context. Dyads who were high on maternally initiated established joint attention had children who were rated as lower on internalizing behaviours approximately four years later. As mentioned previously, it is likely that, given the low-risk sample in the current work and the presence of a number of protective factors such as high levels of maternal education, high SES, and two-parent families, the variations in joint attention behaviours may not have been large enough to account for significant variability in socioemotional outcome, thus resulting in only one relation. It is also important to note that between the ages of 5 and 7 years, children spend increasing amounts of time in the school setting and with their peers. Consequently, these external relationships may start to exert an increased influence on children's socioemotional development. In the current work, I did not assess children's peer relations. However, future work should attempt to assess peer relations through a variety of methods, including parent report, child report, and observation, in an attempt to

further understand the influence of these relationships on children's socioemotional outcome.

Interestingly, I found that the SM, Mixed Anxiety, and Community Control dyads also showed statistically significant differences during the structured task on parental initiated established joint attention, the same joint attention measure that was negatively related with internalizing behaviours in typically developing children. To the best of my knowledge, this was the first work that investigated joint attention behaviours in children with SM and anxiety disorders, thus the results need to be interpreted with caution and require further replication. However, this pattern of findings is consistent with previous research that has implicated joint attention as being associated with a number of factors that are crucial for positive socioemotional development, including emotion regulation (Morales et al., 2005; Mundy & Willoughby, 1996), the development of social skills such as turn-taking (McEvoy et al., 1993; Sheinkopf et al., 2004), and theory of mind (Aschersleben et al., 2008; Charman et al., 2000; Colonnesi et al., 2008; Nelson et al., 2008). Given that my findings only showed statistically significant differences during the structured task, which consisted of preparation for a social presentation task, they suggest that joint attention behaviours may be especially important for children when they are facing challenging and stressful situations. My findings provide preliminary evidence that breakdowns in joint attention during stressful situations may be a mechanism for the development and/or maintenance of SM possibly due to a lack of opportunities to develop coping skills. As well, the findings again provide support for the idea that the same relationship variables that influence typical variability in internalizing behaviours

may also be the point of breakdown in atypically developing children, such as children with SM.

It is important to note, however, that in Study 4 (Chapter 4), I only assessed dyads at one time-point and the children already met the diagnostic criteria for SM and/or one or more anxiety disorders when they participated in the study. Consequently, it is impossible to determine whether joint attention was disrupted prior to the development of the disorder or became disrupted as a result of the disorder. Further longitudinal studies are necessary to clarify this relation. As well, given that SM appears to be present in families as a number of familial studies have found that parents of children with SM report higher rates of anxiety disorders and social difficulties compared to parents of typically developing children (Black & Uhde, 1995; Kumpulainen, 2002), it is likely that some of the parents in our present study also had anxiety disorders. Although we did not have a large enough sample to further divide the dyads into groups as to whether or not the parent had an anxiety disorder, future research should attempt to do so as this may provide further clarification as to the role of parental characteristics in the development and maintenance of joint attention during stressful tasks.

In summary, the present work illustrated that the relations among temperament, joint attention, and socioemotional outcome in a sample of low-risk typically developing children are similar to the relations found in high risk children or children diagnosed with behavioural disorders. Furthermore, it appears that the temperament and joint attention measures that exhibit the strongest cross-sectional and longitudinal relations with socioemotional outcome also show the highest levels of absolute and relative stability

across time and context. This result is consistent with the view that the biological and environmental factors that are most consistent and pronounced throughout development will have an increased influence on socioemotional development due to their additive effects throughout development.

This work provides further insight into the factors that influence typical individual variability in socioemotional outcome. This is an important area of research as a better understanding of typical socioemotional outcome will enable society to better understand individual differences. This increased understanding may impact such areas as education, organized activities, and early parenting practices. Future research is needed to replicate the current findings and to begin to identify the mechanisms that may underlie the shift from typical variability in socioemotional outcome to psychopathology.

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Table 2.1

Demographic characteristics for the participants in Group 1 who participated in the home assessment between the ages of 19 and 37 months and in the laboratory assessment an average of 9-months after the home assessment (n = 18)

	Mean	*SD*
Child Variables		
Sex	10 (56%) male, 8 (44%) female	
Child's age (months)	25.78	5.25
Preschool attendance	8 (47%) yes, 9 (53%) no	
Number of days per week	2.75	1.58
Number of hours per day	6.44	2.47
Maternal Variables		
Age (years)	34	4.68
Highest level of education achieved		
High School	4 (22%)	
Partial College	1 (6%)	
College or University	13 (72%)	
Graduate or Professional School	0 (0%)	
Language spoken at home	18 (100%) English	
First experience being a parent	9 (50%) yes, 9 (50%) no	

Table 2.2

Demographic characteristics for participants in Group 2 who participated in the first visit between the ages of 18 to 37 months and the second visit an average of four years later (n = 30)

	Time 1		Time 2	
	Mean	SD	Mean	SD
Child Variables				
Sex	18 (60%) male, 12 (40%) female			
Child's Age (months)	24	4.61	74.50	4.99
Attendance at Preschool/School	16 (59%) yes, 11 (41%) no		30 (100%) yes	
Grade				
SK/JK			12 (40%)	
Grade 1			15 (50%)	
Grade 2			3 (10%)	
Number of days per week	2.94	1.44		
Number of hours per day	6.19	3.08		
Maternal Variables				
Age (years)	33.23	4.55		
First experience being a parent	15 (50%) yes, 15 (50%) no			

Table 2.2 (continued)

Demographic characteristics for participants in Group 2 who participated in the first visit between the ages of 18 to 37 months and the second visit an average of four years later (n = 30)

	Time 1		Time 2	
	Mean	SD	Mean	SD
Maternal Variables (continued)				
Family Arrangement	30 (100%) married		28 (93%) married, 2 (7%) divorced	
Highest level of education completed				
High School	4 (13%)		2 (7%)	
Partial college	3 (10%)		4 (13%)	
University or college	21 (70%)		18 (60%)	
Graduate or professional school	2 (7%)		6 (20%)	
Language spoken at home	30 (100%) English as first language			
Employment				
Full-time			15 (50%)	
Part-time			8 (26.7%)	
Full-time and Part-time			2 (6.7%)	
None			5 (16.7%)	
Family Income				
$15,000 - $30,000			1 (3.7%)	
$35,000 - $40,000			1 (3.7%)	

Table 2.2 (continued)

Demographic characteristics for participants in Group 2 who participated in the first visit between the ages of 18 to 37 months and the second visit an average of four years later (n = 30)

	Time 1		Time 2	
	Mean	SD	Mean	SD
Family Income				
$15,000 - $30,000			1 (3.7%)	
$35,000 - $40,000			1 (3.7%)	
$45,000 - $60,000			1 (3.7%)	
$60,000 - $75,000			5 (18.5%)	
$75,000 - $90,000			6 (22.2%)	
Over $100,000			13 (48.1%)	

Table 2.3

Corresponding subscales of the Infant Behavior Questionnaire and the Child Behavior Questionnaire

Infant Behavior Questionnaire Subscales	Child Behavior Questionnaire Subscales
Activity Level	Activity Level
Distress to Limitations	Anger/Frustration
Duration of Orienting	Attentional Focusing
Soothability	Falling Reactivity/Soothability
Fear	Fear
Smiling/Laughter	Smiling/Laughter

Table 2.4

Paired-sample t-tests measuring the continuity of the Infant Behaviour Questionnaire (IBQ) across a time span of 9 months in a sample of typically developing children (n = 14) between the ages of 19 and 37 months

IBQ Subscales	Time 1		Time 2		*t*-value	*p*-value	Cohen's *d*
	Mean	SD	Mean	SD			
Activity Level	3.29	.52	3.03	.88	$t(13) = 1.40$	.32	.36
Distress to Limitations	3.27	.80	3.00	.76	$t(13) = 1.03$	.32	.35
Latency to Approach Novel Stimuli	3.02	.93	3.07	.83	$t(13) = -.28$	.78	.06
Duration of Orienting	4.50	1.27	4.91	1.13	$t(13) = -1.42$	.18	.34
Smiling and Laughter	5.69	.41	5.55	.71	$t(13) = 1.06$	.31	.24
Soothability	5.67	.87	5.88	.76	$t(13) = -1.13$	.28	.26

Table 2.5

Partial Correlations controlling for time between visits measuring the short-term stability of the Infant Behavior Questionnaire subscales completed an average of 9 months apart in a sample of typically developing children (n = 14) between the ages of 19 to 37 months

IBQ Subscales	Time 1-Time 2
Activity Level[1]	-.28
Distress to Limitations	.28
Latency to Approach Novel Stimuli	.74**
Duration of Orienting	.60*
Smiling and Laughter	.67*
Soothability	.62*

[1]Controlling for child's sex

*$p < .05$

**$p < .01$

Table 2.6

Intraclass correlation coefficients (ICC) measuring the short-term stability of the Infant Behavior Questionnaire (IBQ) subscales completed an average of 9 months apart in a sample of typically developing children (n = 14) between the ages of 19 to 37 months

IBQ Subscales	Time 1-Time 2
Activity Level	.20
Distress to Limitations	.39
Latency to Approach Novel Stimuli	.85
Duration of Orienting	.73
Smiling and Laughter	.73
Soothability	.76

Table 2.7

Paired-sample t-tests measuring the long-term continuity of temperament through comparisons between corresponding subscales of the Infant Behavior Questionnaire (IBQ) measured between 18 and 37 months of age and the Child Behavior Questionnaire (CBQ) completed approximately four years later in a sample of typically developing children (n = 30)

IBQ and CBQ Subscales	Mean	SD	*t*-test	*p*-value	Cohen's *d*
IBQ – Activity Level	3.52	.64	$t(29) = -8.18$	$p < .001$	1.92
CBQ – Activity Level	4.80	.69			
IBQ - Distress to Limitations	2.99	.71	$t(29) = -8.61$	$p < .001$	1.63
CBQ – Anger / Frustration	4.43	1.03			
IBQ – Fear	2.87	.83	$t(29) = -2.20$	$p = .04$	.55
CBQ – Fear	3.39	1.04			
IBQ – Duration of Orienting	4.64	.95	$t(29) = -1.52$	$p = .14$	.37
CBQ – Attentional Focusing	4.95	.71			
IBQ – Smiling and Laughter	5.81	.52	$t(29) = -1.86$	$p = .07$	.42
CBQ – Smiling and Laughter	6.02	.48			
IBQ – Soothability	5.10	1.02	$t(29) = -.66$	$p = .52$	.14
CBQ - Soothability	5.23	.87			

Table 2.8

Partial Correlations controlling for time between visits measuring the long-term stability of temperament through corresponding subscales of the Infant Behavior Questionnaire (IBQ) completed at 18 to 37 months of age and the Child Behavior Questionnaire (CBQ) completed approximately 4 years later in a sample of typically developing children (n = 30)

	CBQ Subscales					
IBQ Subscales	Activity Level	Anger / Frustration	Fear	Attentional Focusing[1]	Smiling and Laughter	Soothability
Activity Level	.17					
Distress to Limitations		.50**				
Fear			.06			
Duration of Orienting[1]				.05		
Smiling and Laughter					.19	
Soothability						.31

[1]Controlling for child's age at Time 1

*$p < .01$

Table 2.9

Intraclass Correlation Coefficients (ICC) measuring the long-term stability of temperament through corresponding subscales of the Infant Behavior Questionnaire (IBQ) completed at 18 to 37 months of age and the Child Behavior Questionnaire (CBQ) completed approximately 4 years later in a sample of typically developing children (n = 30)

	CBQ Subscales					
IBQ Subscales	Activity Level	Anger / Frustration	Fear	Attentional Focusing	Smiling and Laughter	Soothability
Activity Level	.11					
Distress to Limitations		.34				
Fear			.11			
Duration of Orienting				.15		
Smiling and Laughter					.35	
Soothability						.48

Table 2.10

Paired-sample t-tests measuring the continuity of joint attention across an average period of 9-months and across settings (home and laboratory) in a sample of typically developing children (n = 14) between the ages of 19 to 37 months

Joint Attention Measures	Time 1		Time 2		*t*-test	*p*-value	Cohen's *d*
	Mean	SD	Mean	SD			
Child Initiation Act (CIA)	6.99	3.79	6.77	3.37	$t(12) = .19$	$p = .85$	.06
CIA Established Joint Attention	3.61	2.15	3.53	2.24	$t(12) = .11$	$p = .92$	.04
CIA Success Rate	57.19	32.99	48.69	24.76	$t(10) = .79$	$p = .48$	.29
Maternal Initiation Act (MIA)	20.85	9.13	23.91	13.72	$t(12) = -.66$	$p = .52$	.26
MIA Established Joint Attention	8.56	3.03	7.37	3.31	$t(12) = 1.40$	$p = .19$	.38
MIA Success Rate	47.94	24.63	40.50	22.62	$t(12) = .80$	$p = .44$	.31
Total Joint Attention Span	289.37	115.98	226.03	99.57	$t(12) = 1.61$	$p = .13$	.59

Table 2.11

Partial Correlations controlling for time between visits measuring the stability of joint attention across an average period of 9-months and across settings (home and laboratory) in a sample of typically developing children (n = 14) between the ages of 19 to 37 months

Joint Attention Measures	Time 1 (home) – Time 2 (laboratory)
Child Initiation Act (CIA)[1]	-.06
CIA Established Joint Attention	.24
CIA Success Rate	.28
Maternal Initiation Act (MIA)	.04
MIA Established Joint Attention	.44
MIA Success Rate	.13
Total Joint Attention Span	.26

[1]Controlling for child's sex

Table 2.12

Intraclass Correlation Coefficients (ICC) measuring the absolute stability of joint attention across an average period of 9-months and across setting (home and laboratory) in a sample of typically developing children (n = 14) between the ages of 19 to 37 months

Joint Attention Measures	Time 1 (home) – Time 2 (laboratory)
Child Initiation Act (CIA)	.51
CIA Established Joint Attention	.35
CIA Success Rate	.41
Maternal Initiation Act (MIA)	-.07
MIA Established Joint Attention	.68
MIA Success Rate	.01
Total Joint Attention Span	.22

Table 3.1

Demographic characteristics for mother-child dyads (n = 50) when children were between 18 and 37 months of age.

	Mean	SD
Child Variables		
Sex	31 (62%) male, 19 (38%) female	
Age (months)	24.82	5.51
Attendance at Preschool	25 (53%) yes, 22 (47%) no	
Number of days per week	3.24	1.42
Number of hours per day	6.68	2.56
Maternal Variables		
Age (years)	33.33	4.61
Language spoken at home	49 (98%) English, 1 (2%) other	
First experience being a parent	21 (42%) yes, 29 (58%) no	
Family arrangement	49 (98%) two-parent family, 1 (2%) single parent family	
Highest Level of Education		
High School	8 (16%)	
Partial College	6 (12%)	
College or university	33 (66%)	
Graduate or professional school	3 (5%)	

Table 3.2

Pearson product-moment correlations between the subscales of the Infant Behavior Questionnaire and the Prosocial and Disrupt subscale of the Adaptive Social Behavior Inventory, both completed when children (n = 50) were between 18 and 37 months of age

IBQ Measures	ASBI Prosocial	ASBI Disrupt
Soothability	-.13	.16
Latency to Approach	-.18	.11
Distress to Limitations	-.43**	.37**
Smiling and Laughter	.27+	-.15
Duration of Orienting[1]	.09	-.01

**$p < .01$

+$p < .1$

[1]Controlling for child's age

Table 3.3

Pearson product-moment correlations and partial correlations between the joint attention measures coded from mother-child interactions and the Prosocial and Disrupt subscales of the Adaptive Social Behaviour Inventory, both completed when children (n = 50) were between 18 and 37 months of age

Joint Attention Measures	ASBI Prosocial	ASBI Disrupt
MIA EJA[1]	.40	-.20
CIA EJA (log transformed)	.22	-.07
Total Joint Attention Span	.00	-.04

[1]Controlling for child's sex

Table 3.4

Demographic characteristics for the mother-child dyads (n = 29) that participated in the first visit when the children were between 18 and 37 months of age and the follow-up visit approximately four years later

	Time 1		Time 2	
	Mean	SD	Mean	SD
Child Variables				
Sex	18 (62%) male, 11 (38%) female			
Age (months)	24.10	4.56	74.66	5.00
Attendance at Preschool/School	15 (58%) yes, 11 (42%) no		29 (100%) yes	
Grade				
JK/SK			11 (38%)	
Grade 1			15 (52%)	
Grade 2			3 (10%)	
Maternal Variables				
Age (years)	33.38	4.56	37.45	4.67
Language spoken at home	29 (100%)		29 (100%)	
First experience being a parent	12 (41%) yes, 17 (59%) no			
Family arrangement	29 (100%) two parent family		27 (93%) two parent, 2 (7%) single parent	

Table 3.4 (continued)

Demographic characteristics for the mother-child dyads (n = 29) that participated in the first visit when the children were between 18 and 37 months of age and the follow-up visit approximately four years later

	Time 1		Time 2	
	Mean	SD	Mean	SD
Highest level of education				
High School	4 (14%)	2 (7%)		
Partial College	3 (10%)	4 (14%)		
College or university	20 (69%)	17 (59%)		
Graduate or professional school	2 (7%)	6 (21%)		
Family Income				
$15,000 - $30,000			1 (4%)	
$30,000 - $45,000			1 (4%)	
$45,000 - $60,000			0 (0%)	
$60,000 - $75,000			5 (19%)	
$75,000 - $90,000			6 (23%)	
Greater than $100,000			13 (50%)	

Table 3.5

Partial correlations between the subscales of the Infant Behavior Questionnaire completed when children were between 18 and 37 months of age and the Internalizing and Externalizing subscales of the Child Behavior Checklist (CBCL) completed when children were between 69 and 88 months of age (n = 29) controlling for time between visits

IBQ Measure	CBCL Internalizing[1]	CBCL Externalizing[2]
Soothability[3]	-.28	.08
Latency to Approach	.06	-.08
Distress to Limitations	-.23	.21
Duration of Orienting[4]	.005	-.13

[1]Controlling for CBCL Externalizing

[2]Controlling for CBCL Internalizing

[3]Controlling for child's sex

[4]Controlling for child's age at first visit

Table 3.6

Partial correlations between the subscales of the Child Behavior Questionnaire completed when children were between 69 and 88 months of age and the Internalizing and Externalizing subscales of the Child Behavior Checklist (CBCL) completed when children were between 69 and 88 months of age (n = 29)

CBQ Measure	CBCL Internalizing[1]	CBCL Externalizing[2]
Fear	-.30	.28
Sadness[3]	-.20	.31
Anger	-.39*	.53**
Inhibitory Control	.43*	-.54**
Attentional Focusing	.26	.02
Soothability	.06	-.61**
Child Self Control[4]	.41*	-.68**

*$p < .05$

*$p < .01$

[1]Controlling for CBCL Externalizing

[2]Controlling for CBCL Internalizing

[3]Controlling for child's sex

[4]Child Self Control = (CBQ Inhibitory Control + CBQ Soothability) – CBQ Anger

Table 3.7

Partial correlations between the joint attention measures coded from mother-child interactions when children were between 18 and 37 months of age and the Internalizing and Externalizing subscales of the Child Behavior Checklist (CBCL) completed when children were between 69 and 88 months of age (n = 29) controlling for time between visits

Joint Attention Behaviours	CBCL Internalizing[1]	CBCL Externalizing[2]
MIA EJA	-.46*	.13
CIA EJA	.06	-.12
Total Joint Attention Span	-.36+	.07

*$p < .05$

+$p < .1$

[1]Controlling for CBCL Externalizing

[2]Controlling for CBCL Internalizing

Table 3.8

Hierarchical linear regression assessing the unique contribution of temperament assessed when children were between 69 and 88 months of age and joint attention observed when children were between 18 and 37 months of age for internalizing behaviours after controlling for externalizing behaviours (n = 29)

Variable	*B*	*SEB*	*β*
CBCL Internalizing			
Step 1			
CBCL Externalizing	.36	.09	.64**
Time between visits	.06	.18	.05
R^2 = .37, F(2,25) = 7.37**			
Step 2			
CBQ Inhibitory Control	1.08	.75	.24
R^2 = .48, F(3,24) = 7.41**, ΔR^2 = .11, F change (1,24) = 5.10*			
Step 3			
MIA EJA	-.23	.13	-.28
R^2 = .55, F(4,23) = 6.89**, ΔR^2 = .06, F change (1,23) = 3.24$^+$			

**$p < .01$

*$p < .05$

$^+p < .1$

Table 4.1

Demographic characteristics for full sample (N = 63)

	Selective Mutism (n = 19)		Mixed Anxiety (n = 18)		Community Control (n = 26)		Statistic	p-value
	Mean	SD	Mean	SD	Mean	SD		
Child Sex	58% female, 42% male		33% female, 67% male		38% female, 62% male		$X^2(2) = 2.63$	$p = .27$
Child Age (months)	76.32	10.69	75.44	12.49	72.88	9.24	$F(2, 60) = .64$	$p = .53$
Primary Caregiver Age (years)							$X^2(4) = 2.47$	$p = .65$
19 – 39	11 (58%)		11 (61%)		15 (58%)			
40 – 64	8 (42%)		7 (39%)		11 (42%)			
65 +	0 (0%)		0 (0%)		0 (0%)			
Primary Caregiver Employment							$X^2(6) = 9.55$	$p = .15$
Full-time	8 (42%)		4 (22%)		15 (58%)			
Part-time	8 (42%)		7 (39%)		7 (27%)			
Full-time and part-time	0 (0%)		0 (0%)		1 (4%)			
No employment	3 (16%)		7 (39%)		3 (12%)			

Table 4.1 (continued)

Demographic characteristics for full sample (N = 63)

	Selective Mutism (n = 19)		Mixed Anxiety (n = 18)		Community Control (n = 26)		Statistic	p-value
	Mean	SD	Mean	SD	Mean	SD		
Primary Caregiver Education							$X^2(12) = 28.03$	$p < .01$
Secondary School	0 (0%)		4 (22%)		1 (4%)			
Some community college or nursing	5 (26%)		0 (0%)		1 (4%)			
Community college or nursing degree	4 (21%)		6 (33%)		5 (19%)			
Some university	0 (0%)		3 (17%)		1 (4%)			
University degree or teacher's college	10 (53%)		3 (17%)		13 (50%)			
Postgraduate degree	0 (0%)		2 (11%)		5 (19%)			
Family Income							$X^2(10) = 17.91$	$p = .06$
Less than $15,000	0 (0%)		0 (0%)		0 (0%)			
$15,000 - $30,000	2 (11%)		2 (12%)		0 (0%)			
$30,000 - $45,000	1 (6%)		2 (12%)		0 (0%)			
$45,000 - $60,000	0 (0%)		4 (24%)		1 (4%)			
$60,000 - $75,000	5 (28%)		2 (12%)		4 (15%)			
$75,000 - $90,000	5 (28%)		3 (18%)		13 (50%)			
Greater than $100,000	5 (28%)		4 (24%)		8 (31%)			

Figure 3.1

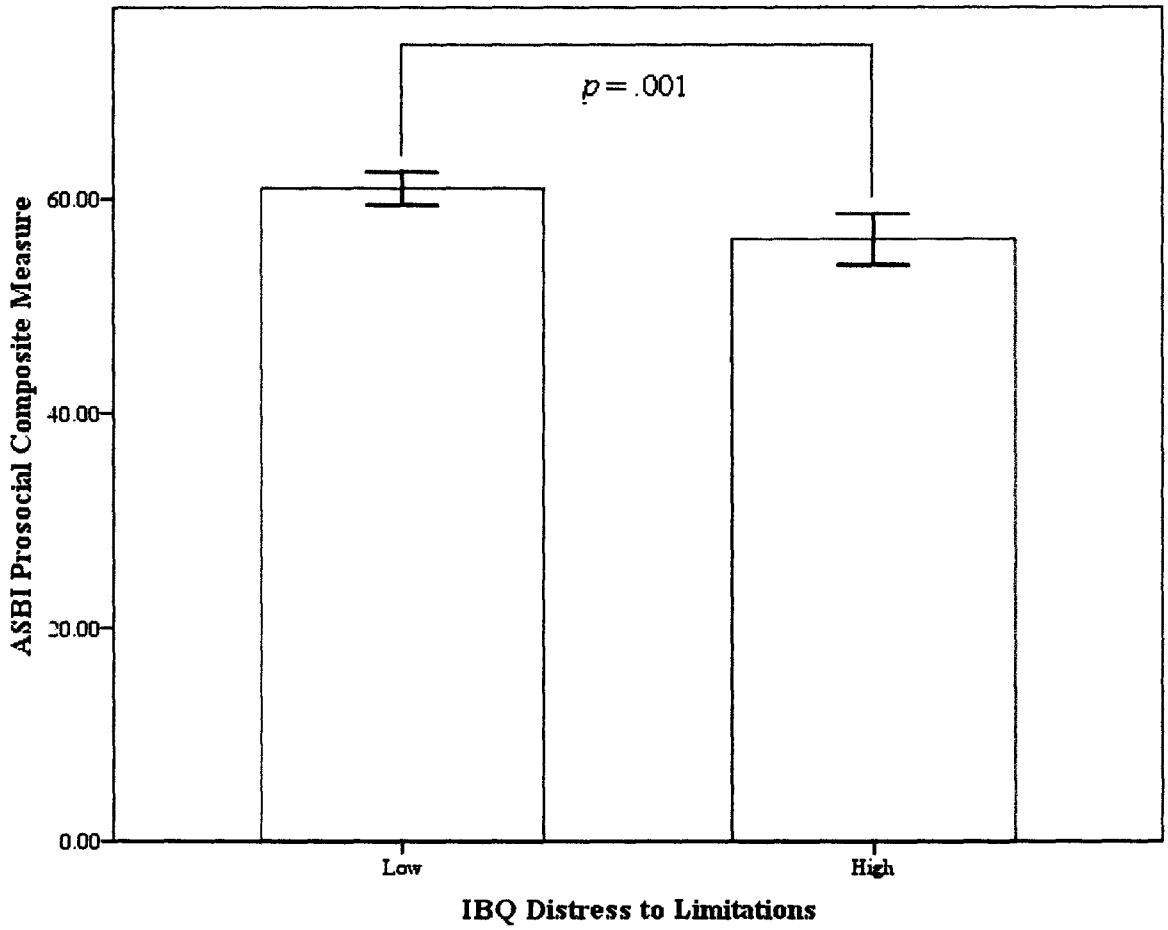

p = .001
60.00
40.00
20.00
0.00
ASBI Prosocial Composite Measure
Low
High
IBQ Distress to Limitations

Figure 3.2

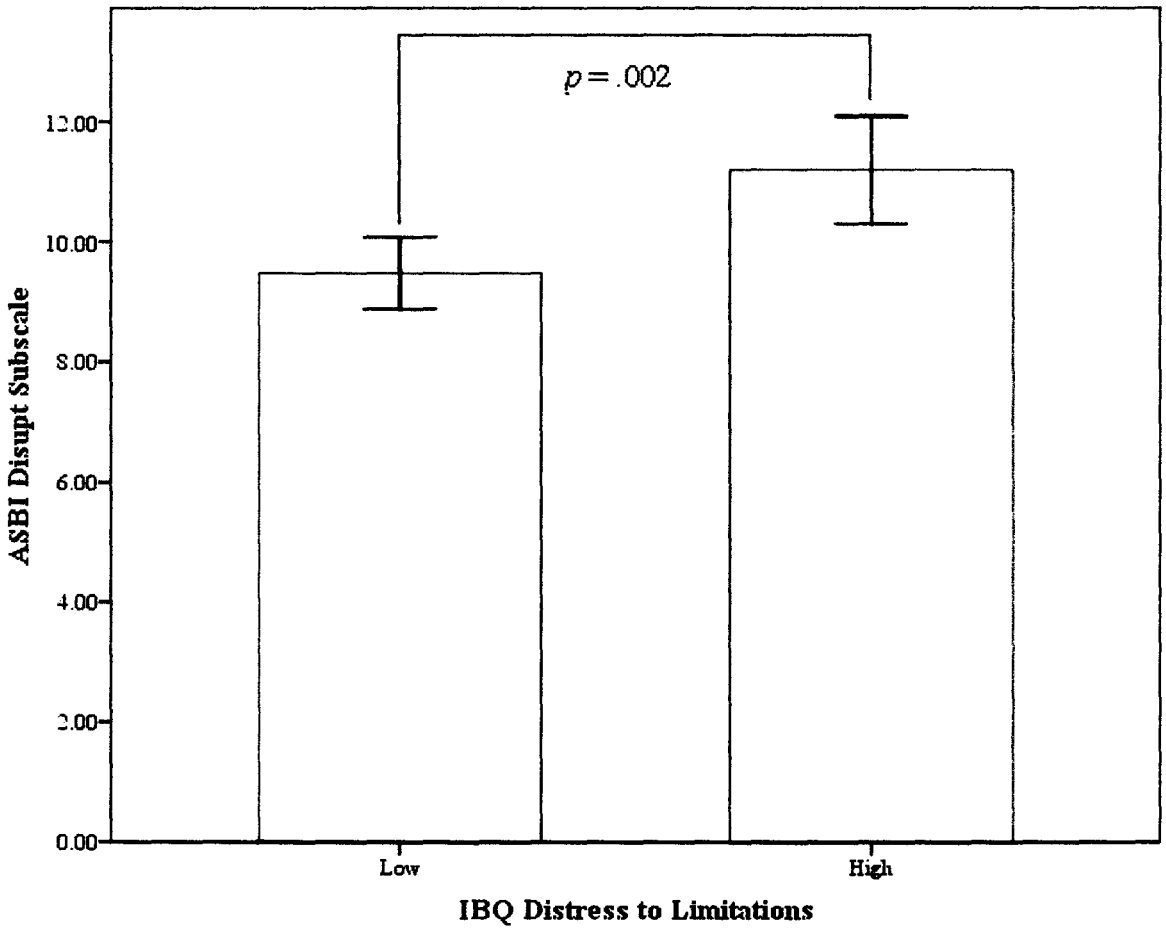

p = .002
12.00
10.00
8.00
6.00
4.00
2.00
0.00
ASBI Disupt Subscale
Low
High
IBQ Distress to Limitations

Figure 3.3

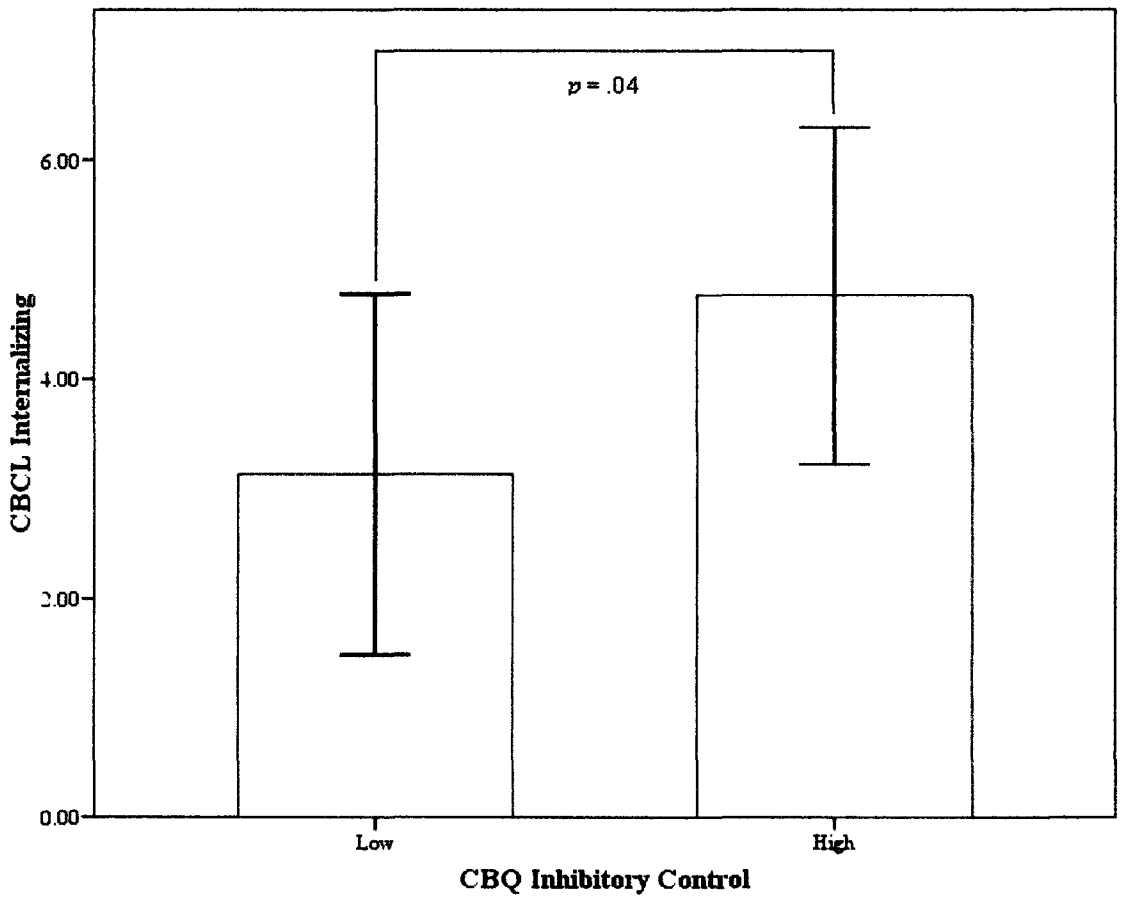

p = .04
6.00
4.00
2.00
0.00
CBCL Internalizing
Low
High
CBQ Inhibitory Control

Figure 3.4

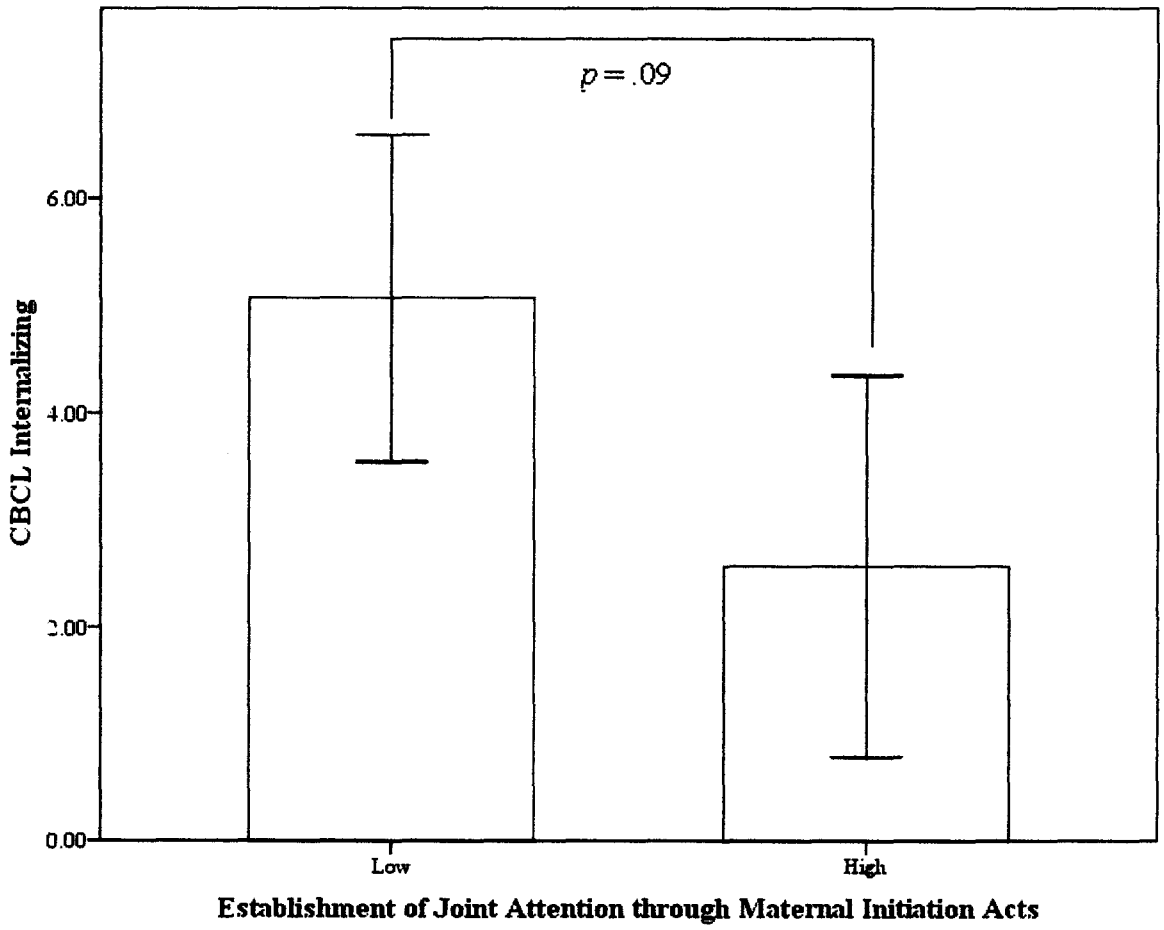

p = .09
6.00
4.00
2.00
0.00
CBCL Internalizing
Low
High
Establishment of Joint Attention through Maternal Initiation Acts

Figure 3.5

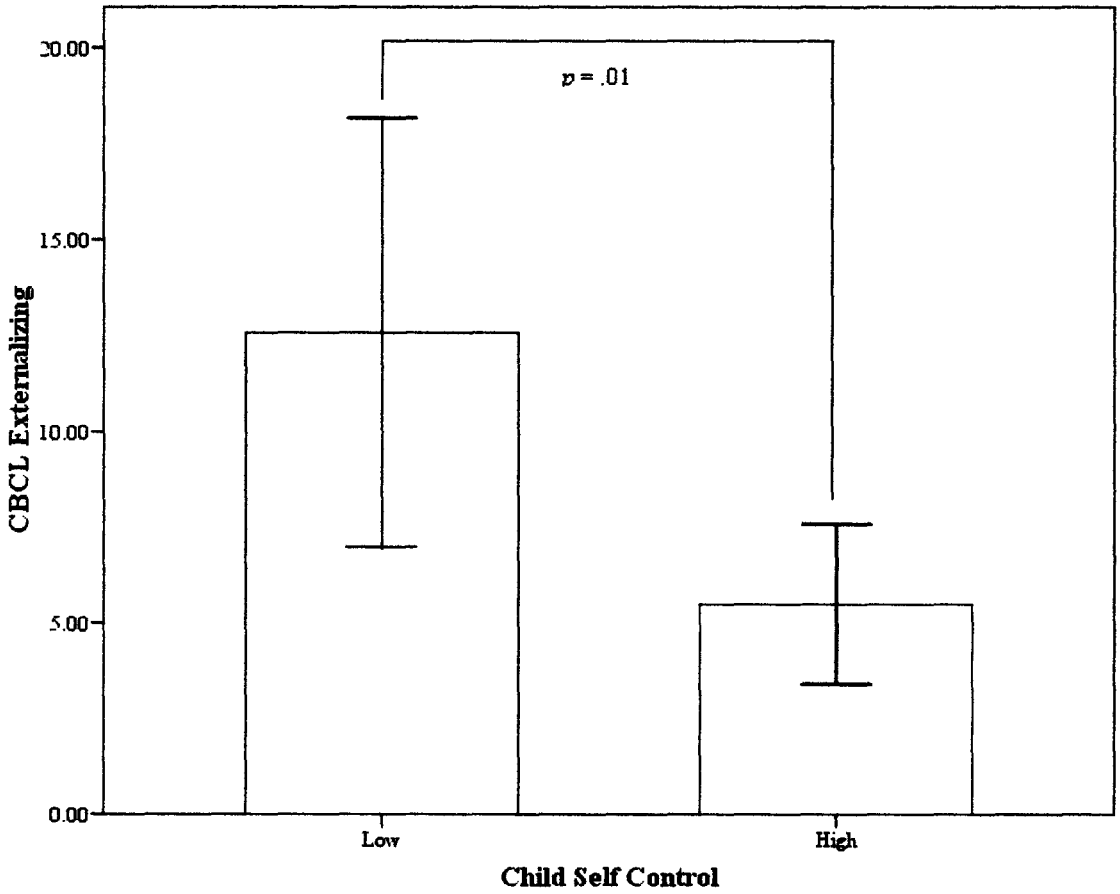

20.00
15.00
10.00
5.00
0.00
CBCL Externalizing
p = .01
Low
High
Child Self Control

Figure 4.1

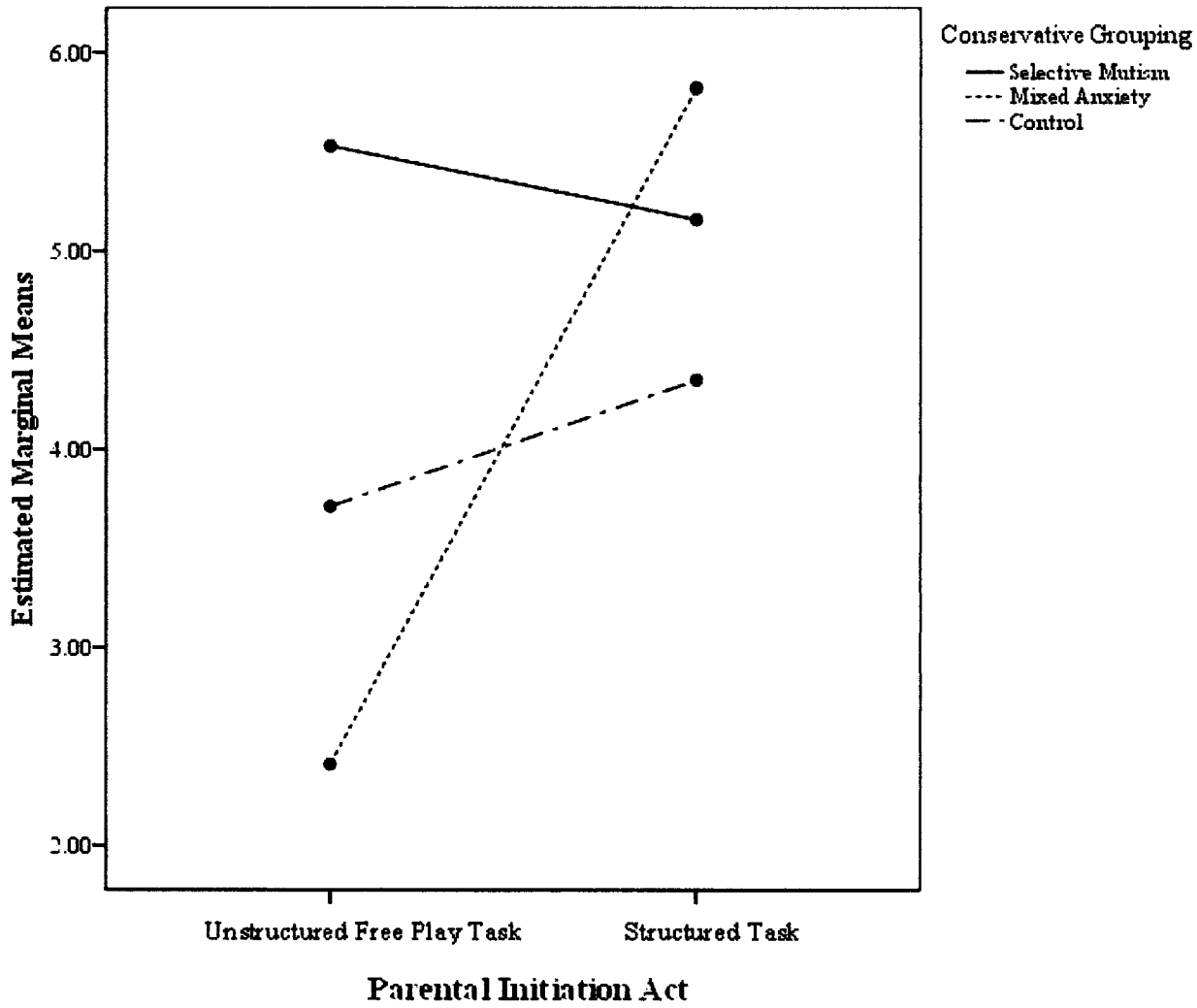

Conservative Grouping
Selective Mutism
Mixed Anxiety
Control
6.00
5.00
4.00
3.00
2.00
Estimated Marginal Means
Unstructured Free Play Task
Structured Task
Parental Initiation Act

Figure 4.2

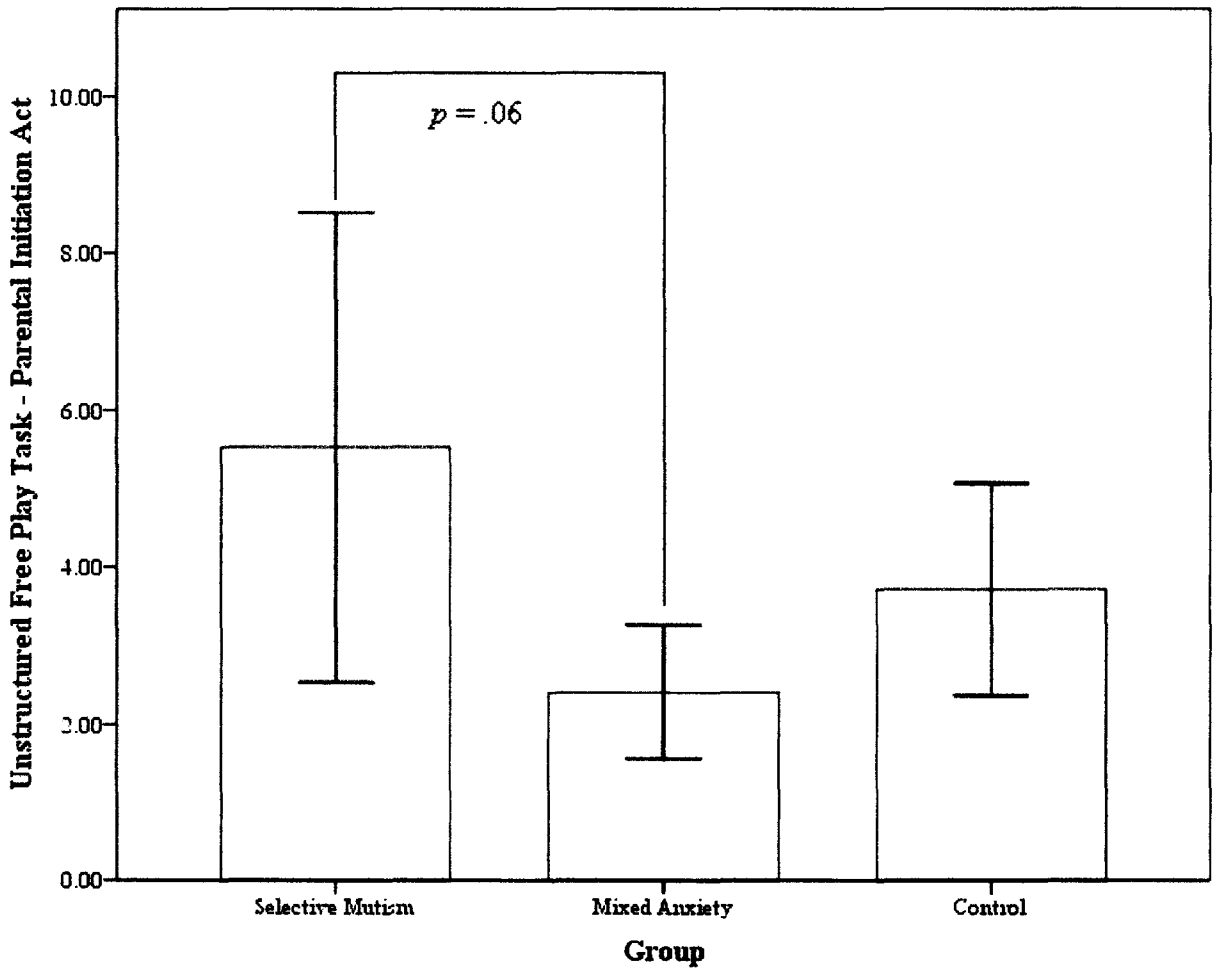

Unstructured Free Play Task - Parental Initiation Act
10.00
8.00
6.00
4.00
2.00
0.00
p = .06
Selective Mutism
Mixed Anxiety
Control
Group

Figure 4.3

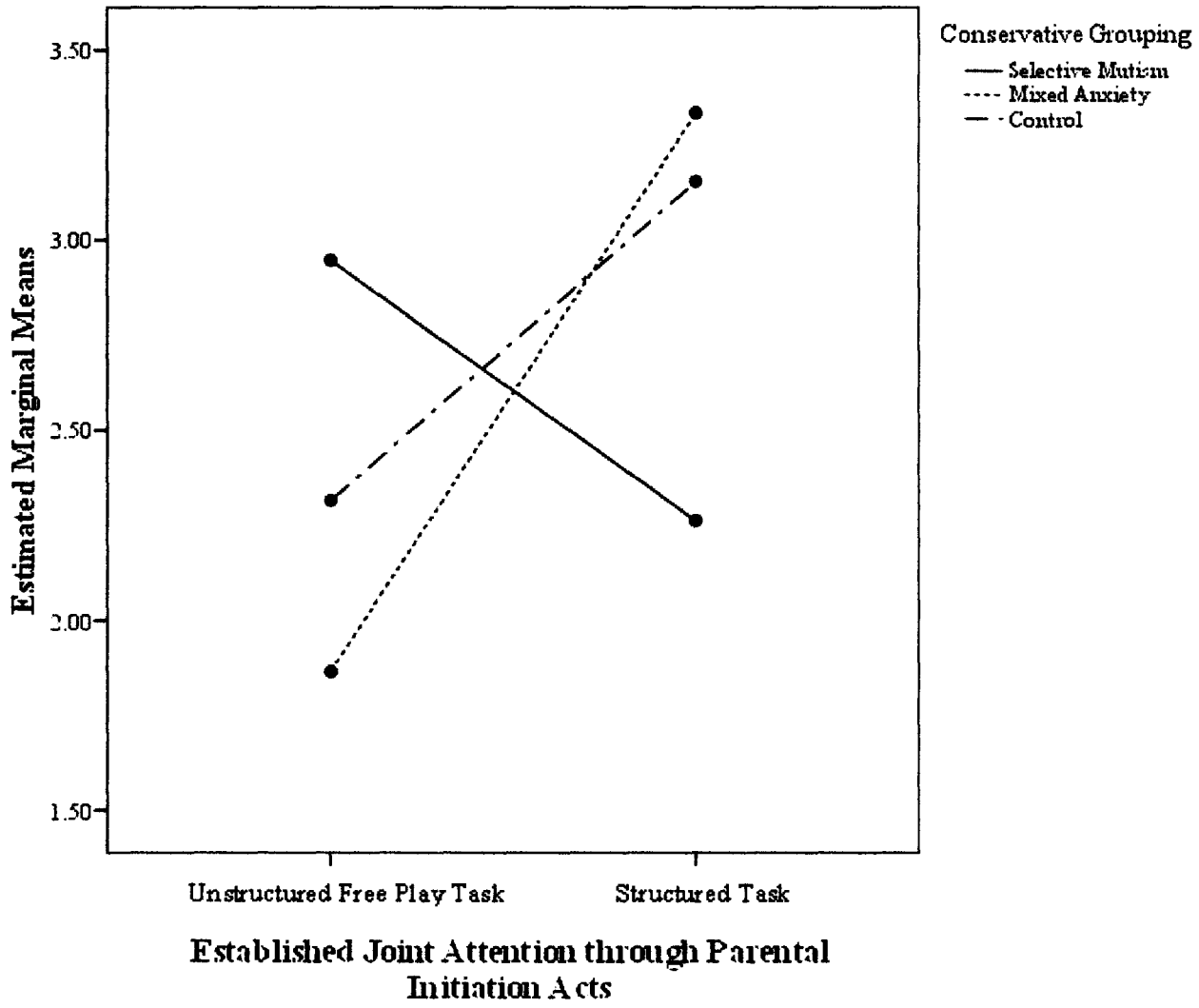

Conservative Grouping
Selective Mutism
Mixed Anxiety
Control
3.50
3.00
2.50
2.00
1.50
Estimated Marginal Means
Unstructured Free Play Task
Structured Task
Established Joint Attention through Parental Initiation Acts

Figure 4.4

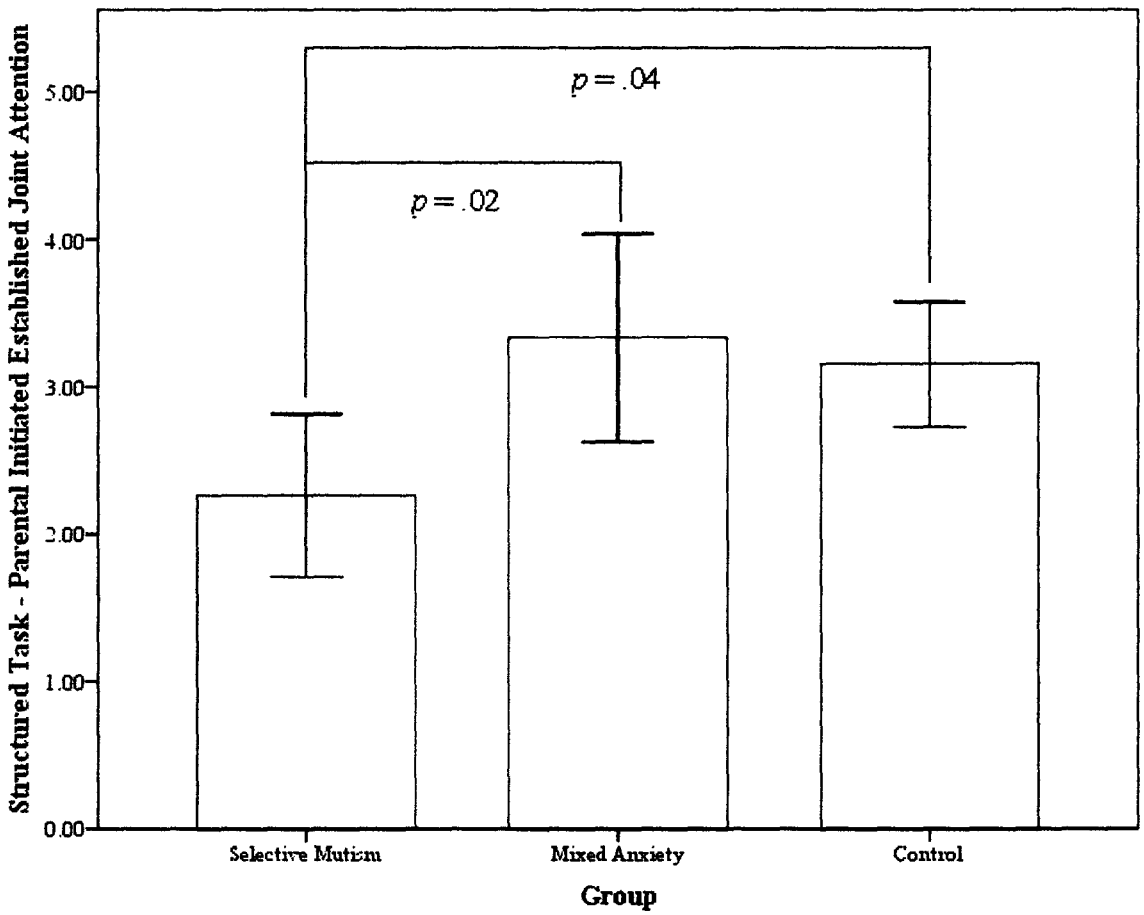

Structured Task - Parental Initiated Established Joint Attention
5.00
4.00
3.00
2.00
1.00
0.00
p = .04
p = .02
Selective Mutism
Mixed Anxiety
Control
Group

Figure 4.5

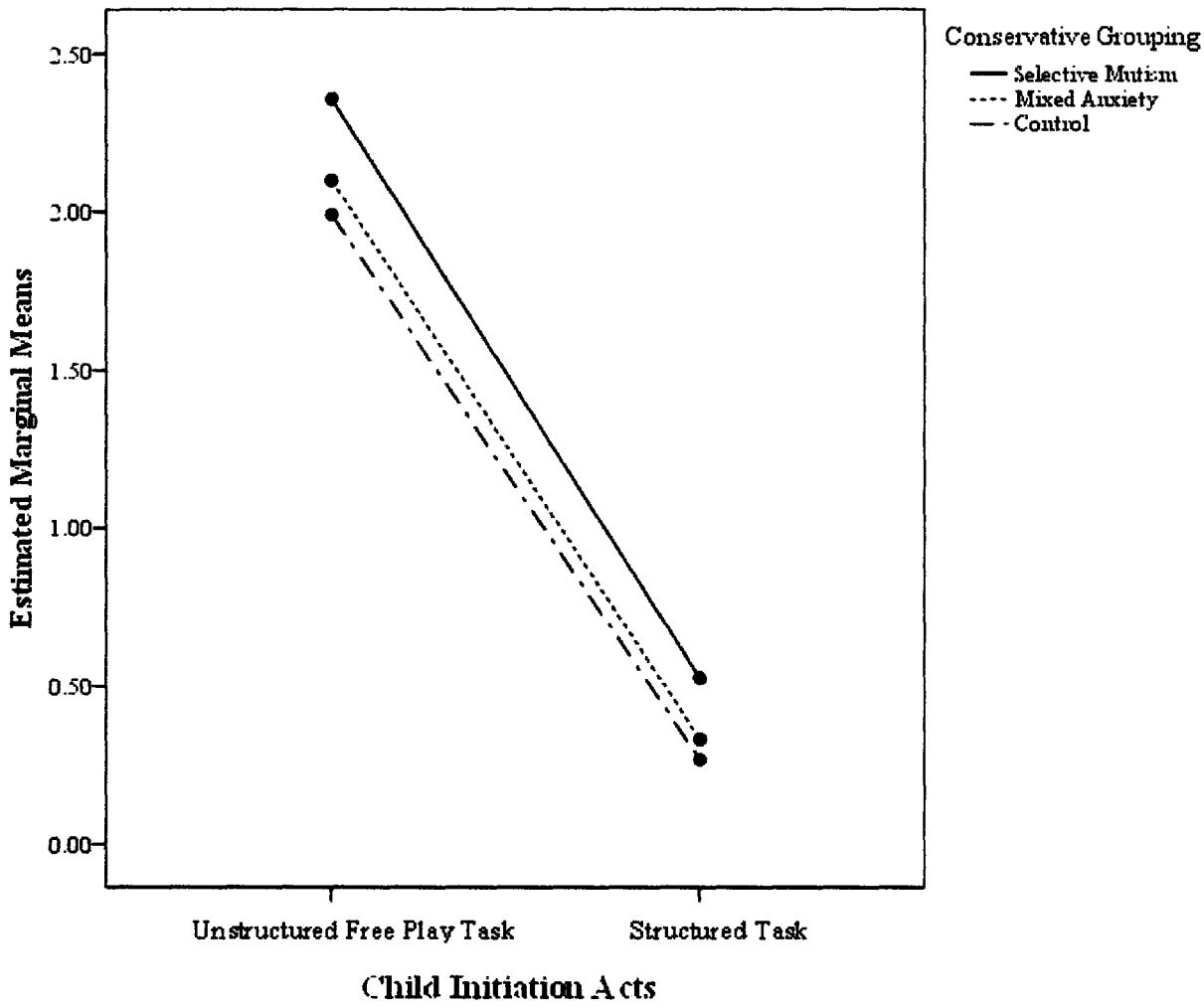

Conservative Grouping
Selective Mutism
Mixed Anxiety
Control
2.50
2.00
1.50
1.00
0.50
0.00
Estimated Marginal Means
Unstructured Free Play Task
Structured Task
Child Initiation Acts

Figure 4.6

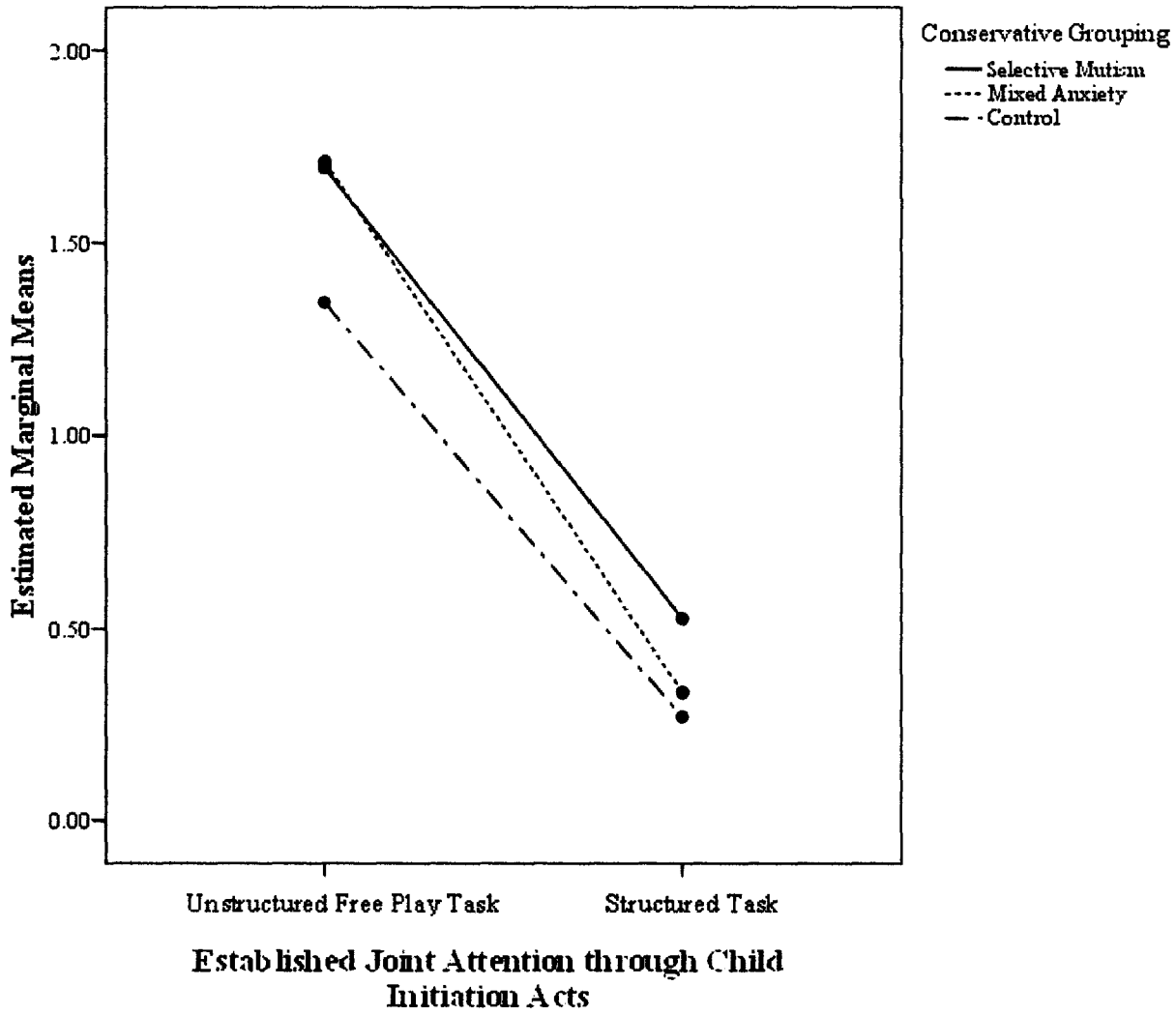
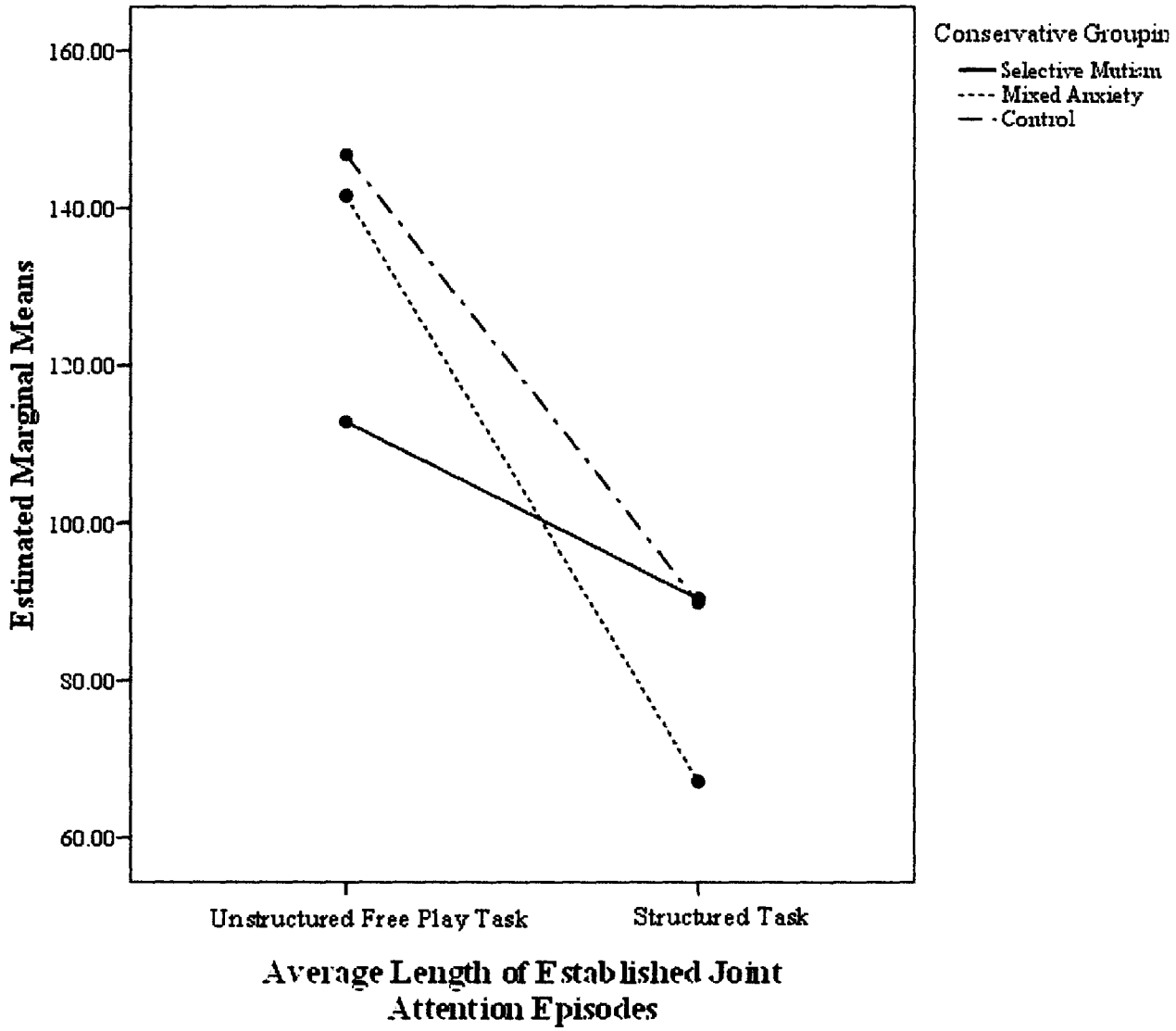

Conservative Grouping
Selective Mutism
Mixed Anxiety
Control
2.00
1.50
1.00
0.50
0.00
Estimated Marginal Means
Unstructured Free Play Task
Structured Task
Established Joint Attention through Child Initiation Acts

Figure 4.7


Conservative Groupin
Selective Mutism
Mixed Anxiety
Control
160.00
140.00
120.00
100.00
80.00
60.00
Estimated Marginal Means
Unstructured Free Play Task
Structured Task
Average Length of Established Joint Attention Episodes