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**Child Temperament, Social Play, and Early Academic Achievement in the Kindergarten
Classroom**

by

Dana L. Stimpson, B. A.

**A thesis submitted to
the Faculty of Graduate Studies and Research
in partial fulfillment of
the requirements for the degree of**

Master of Arts

Department of Psychology

Carleton University,

Ottawa, Ontario

May 1, 2001

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Abstract

The associations and gender differences among temperament, play, and achievement in 116 kindergarten students were investigated. Temperament was assessed through the Colorado Child Temperament Inventory (Rowe & Plomin, 1977) and play was assessed using a modified version of the Play Observation Scale (Rubin, 1989). Achievement was assessed using a shortened Metropolitan Readiness Test (Nurss & McGauvran, 1986). As expected, the results indicated that temperamental shyness was positively related to reticent behaviours and emotionality was negatively related to achievement. Unexpectedly, temperamental activity was positively related to solitary-passive play but this may be explained by teacher direction. Gender analyses revealed that shyness was negatively related to social play for boys. Soothability was positively related to solitary-passive play for girls and to social play for boys. Attention was positively related to academic achievement for girls. These results suggest that gender differences in associations among temperament, play, and academic achievement merit more research.

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CHILD TEMPERAMENT, SOCIAL PLAY, AND EARLY ACADEMIC ACHIEVEMENT IN THE KINDERGARTEN CLASSROOM

It is now widely accepted that children enter the world with a set of predisposed characteristics that contribute towards the development of personality and influence a myriad of developmental outcomes. These biologically-based traits are commonly referred to as temperament. Whereas most researchers have focused on the relations between child temperament and indices of social and emotional adjustment, there is recent research to suggest that temperament may also be related to academic achievement. Of particular interest to the present study were the inter-relations among temperament, social adjustment (i.e., play), and academic achievement in kindergarten. In addition, interactions with gender in the relation among these variables were also explored. According to Chess, Thomas, and Cameron (1976), the beginning of school marks the intensification of peer relationships and a more structured demand for intellectual achievement. As such, kindergarten represents an ideal environment to study how dimensions of temperament contribute towards the incidences of different types of play behaviours and to academic achievement.

Child Temperament

According to Rothbart and Bates (1998), child temperament can be viewed as a subset of personality. Temperament includes differences in physiological processes which constitute the affective, activational, and attentional core of personality. Personality also includes other components such as skills, values, and

social cognition (Rothbart & Bates, 1998). There is a high degree of correlation between temperament dimensions and the development of the “Big Five” personality dimensions (extraversion, neuroticism, openness to experience, agreeableness, and conscientiousness, McAdams, 1994), suggesting that temperament may not only be a component of personality, but the foundation of personality (Digman & Shmelyov, 1996; Martin, Wisenbaker, & Huttunen, 1994).

Defining Temperament

Researchers have conceptualized temperament in a variety of different ways. Most researchers agree that temperament involves less the '*what*' and more the '*how*' of behaviour (Buss & Plomin, 1975). The *what* refers to the response made by the person to a situation, such as aggression, affection, or problem-solving. The *how* of temperament includes components such as the speed, the intensity, and the complexity of the response. Once seen as stable over time, recently researchers have stressed the developmental aspect of temperament and genetically related individuals have been found to show similar temperamental changes over time (Rothbart & Bates, 1998). Moreover, "changes" in temperament may be predictable. For example, Asendorpf (1994) reported that children who were shy but more intelligent improved in their adaptive development more than their less intelligent shy peers. This indicates that temperament is biologically based but is a dynamic rather than static phenomenon.

According to Goldsmith et al. (1987), there are a few points of consensus among current researchers of temperament. First, it is generally agreed that

temperament itself is not a trait, but rather a heading for a group of related traits such as irritability, fearfulness, and activity level. Temperamental dimensions are also thought to reflect behavioural tendencies, which have continuity relative to other aspects of behaviour. Another aspect of temperament that most researchers agree upon is that it is biologically based. Finally, temperament is thought to reflect individual differences rather than species-general characteristics.

Goldsmith et al. (1987) also set out some points of divergence among temperament researchers including the boundaries for temperament and the actual dimensions of temperament. Temperament theorists differ with regard to the boundary between temperament and personality; some see this boundary as clearly defined whereas others do not. Activity level and emotionality are commonly accepted as dimensions of temperament but theorists have differing views on other dimensions. Because of the differences among theorists, Hinde (1987, cited in Goldsmith et al., 1987) suggested that temperament should refer to a field of study rather than a specific group of dimensions.

Temperament traits are seen as modifiable by the environment, to an extent. Plomin (1975) referred to the inherited traits of temperament as a "reaction range" because behaviour also depends upon the environment. Researchers have also come to believe that temperament is not only dependent upon the environment, but that the environment can be influenced by temperament. To illustrate this, Plomin (1975) gives the example of two people waiting for a third person. The first person is calm and collected while the second is upset and restless. Each person has established a very different environment for the third person. In this

sense, temperament and the environment interact with and can modify one another (Thomas, Chess, & Birch, 1968). This interactional view of temperament is generally agreed upon by researchers in this field.

Thomas and Chess Approach to Temperament

Groundbreaking work in the study of child temperament was conducted by Thomas et al. (1976) in the New York Longitudinal Study (NYLS). These researchers defined temperament as a set of broad, theoretical constructs that reflect individual differences in behavioural style. Examining the data from the NYLS, Thomas et al. (1968) identified nine different dimensions of temperament. These included activity, rhythmicity, adaptability, approach/withdrawal, threshold of response, intensity, mood, distractibility, and persistence.

Activity level refers to the amount of motor activity present in the individual and the diurnal proportion of active and inactive periods. *Rhythmicity* is the predictability and/or unpredictability in time of any function. It is usually assessed in terms of the sleep-wake cycle, hunger, feeding pattern, and elimination schedule. *Adaptability* assesses the speed and ease of adjustment to novel social environments. The trait of *approach/withdrawal* refers to the reaction of the individual to novel stimuli. Thomas and Chess (1977) considered approach responses to be positive and withdrawal responses to be negative, both being demonstrated by mood expression and/or motor activity. *Threshold of responsiveness* is the intensity level of stimulation that is required to evoke a discernible response. *Intensity of reaction* refers to the intensity level of the response. The amount of pleasant, joyful, and friendly behaviour as opposed to

unpleasant, crying, and unfriendly behaviour describes the temperament trait *quality of mood*. *Distractibility* refers to the effectiveness of extraneous environmental stimuli in interfering with ongoing behaviour. Finally, *attention span and persistence* concern the length of time an activity is pursued and the continuation of that activity in the face of obstacles to that activity.

It is important to note that the behavioural style exhibited is not fixed but interacts with different environments to produce different behaviours. Thus, there will still be some stability in terms of reaction to stimuli but reactions will vary somewhat in different environments. Through their work, Thomas and Chess (1977) have shown that the dimensions of temperament with the greatest stability are activity and adaptability. McDevitt (1976) reported similar findings but added threshold and intensity to the list of reasonably stable dimensions of temperament.

Through both qualitative and quantitative analyses of the nine dimensions of temperament identified in the NYLS, Thomas and Chess (1977) identified three temperamental constellations. The first was the easy child. This individual is characterized by regularity, positive approach responses to novel stimuli, high adaptability to change, and mild or moderately intense mood which is mostly positive. The group of children identified using this criteria comprised about 40% of the study sample.

The second group, opposite in temperament of the easy children, was termed the difficult child group. These children were reported as having irregularity in biological functions, withdrawal responses to novel stimuli, non-adaptability or

slow adaptability to change, and intense mood expression which is frequently negative. Difficult children comprised about 10% of the sample in the NYLS.

The third temperamental constellation was termed slow-to-warm-up. This group of children was characterized as having mild intensity reactions (both positive and negative) and was less likely than the difficult group to exhibit irregularity of biological functions. The mild, negative initial response to novel stimuli usually would change to positive interest if given the opportunity to re-experience the stimuli. Approximately 15% of the sample was classified as being slow-to-warm-up. The rest of the sample (35%) did not fit into any of these constellations. These classifications will be further discussed as some researchers use these temperament constellations to delineate groups in their own research concerning temperament.

The EAS Approach to Temperament

Developed by Buss and Plomin (1977), the EAS approach to temperament includes heritability of temperamental traits; we are born with a small number of traits that will determine the individual differences seen in personality. These inherited tendencies are modifiable by the environment and can modify the environment by setting the tone, initiating behaviour, and through reinforcement. Buss and Plomin (1977) theorized that there are four temperamental traits; emotionality, activity, sociability, and impulsivity (EASI). *Emotionality* refers to the intensity of reaction displayed to stimuli. The individual with high emotionality is easily aroused and tends to have an excess of affect. This is

comparable to the temperament trait of intensity of reaction, as defined by Thomas et al. (1968).

Level of *activity* is also similar to the trait of the same name described by Thomas et al. (1968). This refers to the total energy output of the individual. Typically, an individual high in activity is busy and his speech and actions are vigorous.

Sociability is described as consisting mainly of affiliativeness. This refers to the individual's desire to be with others. The sociable person is happiest when she is with others and may be more responsive to others than someone with low levels of sociability. Buss and Plomin (1977) extend the trait of sociability to include extraversion.

The fourth and final temperament described by Buss and Plomin (1977) is *impulsivity*. This involves the tendency to respond quickly to a stimulus. The impulsive individual gives into urges, impulses, and motivational states rather than resisting them and responds immediately and impetuously to a stimulus rather than planning before acting. Buss and Plomin (1986) later discarded this temperamental characteristic from their model because its heritability still has not been established and these researchers include genetic origin in their definition of temperament. Hence, the EAS theory of temperament was formed.

There may be some advantages to using the EAS approach to temperament over that of Thomas and Chess. Researchers have consistently reported fewer dimensions than the nine reported in the NYLS study (e.g., Pullis & Caldwell, 1982; Rowe & Plomin, 1977; Sanson, Smart, Prior, Oberklaid, & Pedlow, 1991).

Results from factor analyses have revealed three different dimensions consistent with the three temperaments identified by Buss and Plomin (emotionality, activity, sociability, 1986), supporting the EAS model. According to Buss and Plomin (1977), these three temperament traits have also demonstrated stability over time and each of these three traits has been observed in older children and adults. Thus, a theory consisting of fewer dimensions may be better than one with nine dimensions. There may be too much overlapping of dimensions in the Chess et al. (1968) theory.

Temperament and Academic Achievement

Theoretical Underpinnings

Although there are not a large number of studies where researchers have examined the relation between temperament and achievement, temperament has been hypothesized to be a mediating factor in the learning environment and therefore a predictor of intellectual achievement (Palisin, 1986). The concept of goodness of fit is a predominant factor in this area of research. Chess and Thomas (1996) outlined the concept of goodness of fit from the data they analyzed in the NYLS. This concept stemmed from the theory that a child's temperament interacts with his/her environment. Logically, it follows that some temperaments will be more suitable for certain environments than others. Therefore, a 'good fit' occurs when the child's capacities and motivational styles are in accord with the environmental demands and expectations. This consonance between the individual and the environment promotes positive development. If temperament and environment are dissonant, poorness of fit is the result and this

can lead to maladaptive functioning and distorted development. This illustrates that high or low levels of temperamental dimensions are not always uniformly positive or negative, rather the meaning changes depending on the environment and/or what is being measured.

Of particular relevance to the present study, Chess, Thomas, and Cameron (1976) discussed the significance of various temperamental traits (in relation to goodness of fit) in early schooling. For example, a child with a low threshold may be highly tuned to nonverbal cues and unable to filter out extraneous variables. A child with a high threshold may grasp the bigger picture but may tune out the fine points. Therefore, in order to adjust to their classroom environment, low-threshold children would have to focus on the general principle while high-threshold children would need to focus on the minutiae.

A child high in distractibility has a short attention span and must learn to focus while in the school environment in order to do well academically. According to Chess et al. (1976), the child who is highly distractible and low in persistence is the most at risk academically. If this child is simply forced to sustain average periods of unbroken concentration, she may develop further behavioural difficulties (Chess et al., 1976).

Initial withdrawal and low adaptability may also cause difficulties in adapting to the environmental demands of a school setting. A child with these characteristics may take a long time to make transitions and incorporate new material. If this child becomes discouraged in the school environment, he/she

may withdraw completely and never achieve what he/she could, either academically or socially.

According to Chess et al. (1976), negative mood and low intensity may also give the child difficulties in the classroom. A child with these characteristics may irritate the teacher and other children in the classroom and may not express feelings even when feeling something deeply. In contrast, the highly intense child may be overly expressive and react extremely with rage, pleasure, deep sadness, or disgust. This could also lead to difficulty in the academic environment.

Finally, although a child with high persistence and low distractibility sounds like an ideal candidate for the structured classroom, this child may have trouble deviating from the task at hand when it is time to switch activities. When forced to change activities, this child may become angry, sulky, or may ignore the teacher.

Many of the researchers examining temperament in young children have examined relations between temperament and adjustment in various structured environments such as kindergarten classrooms, preschools, and day cares. Logically, the child who is better able to adjust to his/her environment is more likely to work to his/her potential in academic achievement (Klein, 1982). Hall and Keogh (1977) stated that the adjustment status of the child includes academic aptitude and behavioural adaptability. If the child can adjust to the classroom environment, that child is expected to have an easier time academically than one who does not adjust well. Therefore, children with levels of temperament that allow them to easily adjust to their environment should experience academic

success. Jewsuwan, Luster, and Kostelnik (1993) suggested that the transition to school was important to later academic success because positive experiences will increase the likelihood that the child will be happy and do well academically.

Temperament and teachers' appraisals. Temperament may be associated with academic achievement through the way teachers respond to certain dimensions. If the child is perceived as less intelligent than she really is, she may come to expect less of herself. Also, the child whose ability is overestimated by the teacher may expect too much of himself and become frustrated. In this way, teachers' estimations of children may be a mediating factor between temperament and academic achievement. Temperament may be indirectly affecting achievement through the expectations and behaviours of teachers.

Pullis and Caldwell (1982) examined the relation between academic achievement and temperament through the association between child temperament and the decision strategies used by teachers. The participants in this study were kindergarten, first-grade, and third-grade students. Pullis and Caldwell (1982) divided up the nine temperament traits defined by Thomas et al. (1968) into three clusters of behaviours they labeled as task orientation, adaptability, and reactivity. Children were considered task oriented if they had high levels of persistence and low levels of activity and distractibility.

Pullis and Caldwell (1982) found that temperament appeared to influence the educational decisions made by teachers. Task orientation was the most important piece of information used in teachers' decisions. The children who were able to sit quietly and attend to a task without being distracted were more likely to be

rated as needing little supervision or interference from the teacher than those who were low in task orientation. If task orientation is positively related to achievement, the teacher's response to a child high in task orientation may be the mechanism through which the variations in temperament affect academic achievement. Both the teacher and child come to believe the child is competent and can perform well academically. This could also simply be that children high in task orientation perform better because task orientation facilitates learning.

In a study of the appraisals of teachers with respect to their students' intelligence, Gordon and Thomas (1967) found that the judgments teachers made were significantly distorted by temperament dimensions. The dimensions that were the greatest influence on these teachers' appraisals were approach/withdrawal and adaptability. These temperamental dimensions were assessed by how the children participated in activities with other children rather than by a standardized measure of temperament. Even though there was no difference intellectually between the two groups, the children who jumped into new activities and assimilated into the group with ease and quickness were rated as more intelligent than children who tended to initially withdraw and adapt to the situation only after some time had passed.

Lerner, Lerner, and Zabski (1985) attempted to test the goodness of fit model between temperament and academic achievement. The participants in this study were fourth-grade children who rated themselves on a temperament measure. Lerner et al. (1985) found that teachers expected successful students to have low activity level, reactivity, and distractibility as well as high adaptability, approach,

and rhythmicity. The nine teachers in the Lerner et al. (1985) study differed very little with respect to their expectations. If we can extend this research to assume that most teachers would have similar expectations of their students, we may use this to help children who look like they will have a poor fit with the scholastic environment.

Children who met or exceeded the expectations of teachers with regards to distractibility (i.e., were low in distractibility) received significantly higher ability and adjustment ratings than those who showed more distractibility than was demanded. Children who displayed more reactivity than was expected by their teachers received significantly lower ability and adjustment ratings than those children who displayed low levels of reactivity. This illustrates that the “fit” in an environment is very much dependent on the expectations of others in that environment. In the academic environment, the expectations of teachers influences which dimensions of temperament will best facilitate the child’s ability to learn and perform well academically.

Specific Temperamental Traits and Academic Achievement

NYLS constellations. Korn (1977) analyzed the data from the NYLS to explore the relation between children's temperament traits and academic achievement. Results indicated that the traits of non-adaptability and withdrawal (associated with slow-to-warm-up and difficult children) were negatively correlated with academic achievement. The traits of intensity, negative mood, and arrhythmicity (associated with difficult children) did not significantly correlate with academic achievement. Thomas and Chess (1977) suggested that the slow-

to-warm-up child was, therefore, more at risk academically than the difficult child. The slow-to-warm-up child may have been withdrawn and anxious at the beginning of a new demand and this child did not do well on standardized tests as they were new to her (Chess et al., 1976). Scores from such tests may not reflect the child's true abilities as she may perform better after she has had some time to adjust to the novel situation. Teachers may also see these children as slower intellectually and set lower standards of achievement for them.

In fact, the characteristics of low adaptability and withdrawal were significantly correlated with lower academic achievement regardless of the scores that children achieved on intelligence tests (Chess et al., 1976). Carey, Fox, and McDevitt (1976) found that low adaptability was significantly related to the amount of difficulty children experienced in a problem-solving task. These researchers did not find significant results with approach/withdrawal but did find that low persistence was related to difficulty in the problem-solving task.

These findings are consistent with the conclusions of Maziade, Cote, Boutin, Boudreault, and Thivierge (1986), who reported that "difficult" children were qualitatively the same academically as "easy" children. Maziade et al. (1986) conducted a longitudinal study to examine the effects of temperament on achievement for 39 primary school children. These researchers identified a group of difficult children and a group of easy children. The two groups were found to be significantly different in terms of academic achievement such that the easy children were significantly higher academically. However, a closer look at the data revealed that only two of the 24 difficult children had repeated a year while

one of the 15 easy children repeated a year. Also, many of the difficult children maintained high achievement despite the qualities that are suspected of interfering with learning. Maziade et al. (1986) concluded that some temperament traits might be relevant to academic achievement with regard to teachability, but that there is essentially no difference with respect to achievement between easy and difficult children.

The results of these studies using clusters of dimensions (easy, difficult, and slow-to-warm-up) to determine academic outcomes suggest that it may be better to use individual traits rather than groupings of them to study associations between temperament and achievement. In particular, the overlapping of some traits (e.g., adaptability) in different clusters makes it difficult to interpret results. We also do not know if any significant results are due to the group of dimensions or to one particular dimension.

Task orientation. A number of researchers have grouped three of the NYLS dimensions together to form the construct of task orientation. As stated above, a child high in task orientation is high in persistence, and low in distractibility and activity level. In a review of the research, Tramontana, Hooper, and Selzer (1988) found that the dimensions involved in task orientation were correlated significantly with academic achievement. The dimensions related to attention span (distractibility and persistence) in particular, were the most predictive of later achievement in both reading and math.

Orth and Martin (1994) reported that children rated as high in task orientation exhibited less off-task behaviour than their low task orientation counterparts in

both teacher-directed and computer-directed groups. The low task orientation children, however, displayed significantly more off-task behaviour in the teacher-directed group than in the computer-directed group suggesting that the use of computers in the classroom could facilitate learning for children low in task orientation. These researchers did not find any differences between the two task orientation groups with respect to problem-solving performance when controlling for age, gender, SES, and cognitive ability. Although these findings seem to indicate that task orientation is not directly associated with academic achievement, it may be that those children appearing to be on task were not 'cognitively' on-task, and those children appearing to be off-task could have been on-task cognitively. Moreover, the children appearing off-task could also have grasped the problem quickly and no longer needed to be on-task to perform well (Orth & Martin, 1994). It could also mean that grouping these dimensions of temperament may be masking a relation that could be there. If these dimensions were examined separately, an association between one or two of them with academic achievement may be revealed.

An important difference between the Orth and Martin (1994) study and other studies finding significant relations between temperament and academic achievement is the measure of achievement employed. In most studies, standardized tests are used to assess achievement while Orth and Martin's study used problem-solving tasks. This leads to the possibility that task orientation influences academic achievement through the demands of the testing environment; the children had to be able to focus more for the time constraints of

the standardized testing. Another possibility that Orth and Martin (1994) raised is that task orientation may be related more to the performance of familiar tasks and less so for unfamiliar tasks.

Again, it would seem that the best way to examine the dimensions of temperament is to leave them separate and not cluster them together. In grouping together certain dimensions, we may overlook important differences that can be captured by leaving them as separate entities.

Keogh (1986) and Martin (1988) bring the task orientation grouping of temperamental traits together with the goodness of fit theory to explain how task orientation may contribute to goodness of fit in the educational context and, thus influence academic achievement. These researchers hypothesized that individual differences in task orientation may serve as a generalized learning set for school readiness, be behaviour manifested as a result of demands of the assessment situation, an influence on task-specific performance, and a variable in teacher-student relationships. Martin (1988) adds that these individual differences may serve as a halo effect of teachers' ratings. From these hypotheses, Orth and Martin (1994) stated that it is unclear to what degree the temperament variables affect the learning process itself, affects performance on previously learned material, reflects a self-fulfilling prophecy from teacher expectations, or indicates a bias on the part of teachers in the ratings of student performance.

Persistence/attention and distractibility. Of all the temperamental dimensions, persistence/attention has been demonstrated to have the most consistent association with academic achievement. Logically, a child that can remain on

task will be better able to attend to what is being taught and, therefore, better able to perform academically. Because distractibility is conceptually opposite to persistence/attention, the findings with regard to it will be outlined in this section.

Several researchers have reported persistence to be significantly and positively associated with academic achievement in preschool children (Palisin, 1986; Moller, 1993; Martin, Drew, Gaddis, & Mosley, 1988). Palisin (1986) and Moller (1993) used standardized tests to assess achievement whereas Martin et al. (1988) used both a standardized measure and teacher-assigned grades. Martin et al. (1988) reported positive associations with persistence and grades in Reading, Number Concepts, and Written Performance. They suggested that the lack of relations between the standardized test and persistence is because the standardized measure was administered individually. In this situation, the tester is given more control over the attention the child puts toward the task, thus differences may not have been captured that would have been in a more natural (group) testing environment. A group environment is more natural to the classroom. Palisin (1986) did not report whether the children were tested individually or in groups but Moller (1983) tested the children on an individual basis. Therefore, the explanation put forth by Martin et al. (1988) may not sufficiently explain why they did not find significant associations with the standardized test..

In a few studies, researchers have examined the relation between persistence and achievement in kindergarten children. For example, Schoen and Nagle (1994) reported a positive and significant relation between persistence and prereading skills in kindergarten children. Martin et al. (1988) found strong

relations between persistence and standardized tests of academic achievement as well as with teacher-assigned grades in a sample of kindergarten children. These relations were somewhat weakened when the variance from a basic skills test was removed but they remained significant. This suggests that temperament can predict achievement above and beyond intelligence. Coplan, Barber, and Legace-Seguin (1999) also found that temperament was predictive of academic skills in junior kindergarten children. Attention/persistence was positively and significantly associated with early literacy and numeracy skills (with the variance due to gender, parental education, and vocabulary partialled out).

Studies of first grade children have also yielded strong associations between persistence and achievement. Both Martin, Nagle, and Paget (1983) and Martin and Holbrook (1985) found that persistence was positively associated with teacher-assigned grades and to standardized measures of achievement with a first-grade sample. When Martin and Holbrook (1985) removed the variance due to IQ, the relation between persistence and achievement remained significant.

Distractibility can be considered the opposite of persistence. Results from studies of the temperamental dimension of distractibility have yielded consistent negative associations between distractibility and academic achievement (Martin & Holbrook, 1995; Martin et al., 1983). These negative associations remained significant when the variance due to IQ was removed. Like persistence, the link between distractibility and achievement is conceptually straightforward. A child who is highly distractible may have the cognitive capabilities to do well, but this

lack of focus may interfere with both the learning process and performance in the classroom.

Martin et al. (1988) found that distractibility was negatively related to achievement in a sample of preschoolers, kindergarten children, and first-grade children. For kindergarten children, the relation between distractibility and achievement remained significant after the variance from a basic skills test was removed suggesting that distractibility has predictive power beyond that of IQ alone.

In summary, researchers have found that persistence is positively associated with achievement scores. This temperamental dimension uniquely predicts achievement even when the variance due to IQ, gender, parental education, and vocabulary skills is removed. Though less studied, distractibility has also yielded consistent results. As such, these two dimensions remain important with regard to their relations with academic achievement.

Activity. Many researchers have found significant negative correlations between level of activity and academic performance. Halverson and Waldrop (1976) reported that high activity levels at age 2 ½ years and at age 7 ½ years were negatively correlated with intellectual performance in the classroom.

Palisin (1986) and Maziade et al. (1986) also reported negative relations between activity and standardized achievement measures, in preschoolers and seven-year-olds, respectively. Schoen and Nagle (1994) reported similar findings with kindergarten children's performance on a reading readiness test. Martin et al. (1988) also reported a negative relation between activity and both standardized

measures and teacher-assigned grades in kindergarten children. These relations remained significant when cognitive ability was partialled out. Martin et al. (1988) reported similar results for a sample of first-graders. Martin and Holbrook (1985) also reported a negative relation between activity and both standardized measures of achievement and grades for first-grade children. Coplan et al. (1999) reported that higher activity was associated with poorer performance on indices of early literacy, numeracy, and counting skills. This correlation remained significant when the effects due to gender, parental education, and vocabulary were removed.

Weithorn, Kagen, and Marcus (1984) divided a group of 90 second-graders into four different groups. Each group was categorized on the dimensions of hyperactive or not hyperactive and reflective or impulsive. Close to half of the sample classified as high activity also were classified as reflective and were capable of good task performance and school achievement. Moller (1983) found that preschool children who were mildly active were more likely to have good cognitive development. Weithorn and colleagues (1984) concluded that the children at the greatest risk are those classified as both highly active and impulsive. These children may reflect those who can be classified as clinically hyperactive.

In general, it appears that activity is negatively associated with achievement. The expectations for the present study are that high levels of activity will be negatively associated with academic achievement.

Approach/withdrawal (shyness). Approach is conceptually similar to temperamental shyness because both constructs refer to the way a child reacts to an unfamiliar or novel environment (Coplan, 2000). Because the present study employs a measure which assesses shyness rather than approach/withdrawal and these two dimensions of temperament are very similar, the results regarding approach will be used to indicate what is expected for shyness.

Children viewed as high in approach are reported to perform better on achievement measures than children low in approach (Martin et al., 1983; Moller, 1983; Palisin, 1986). Martin and Holbrook (1985) reported that high approach was significantly related to achievement measures. Once the variance attributed to IQ was partialled out, however, the relation was reduced and was no longer significant. Similar findings were reported by Martin et al. (1988) in their studies of kindergarten children and first-grade children. Approach was significantly related to achievement but this relation did not stay significant when the variance from a cognitive screening test was removed. This would seem to suggest that approach does not have any unique predictive power above that which can be explained by IQ.

In a study of preschoolers, however, Martin et al. (1988) found that approach was positively correlated with the Reading Recognition, Reading Comprehension, and Spelling subtests of an achievement test. When the variance due to IQ was removed, these correlations were reduced but remained significant suggesting that there is a unique contribution from the dimension of approach in prediction of

academic achievement. Approach was also positively correlated with teacher-assigned grades in Number Concepts and Written Performance.

Although Palisin (1986) and Moller (1983) have reported that the more approachable child has better academic performance, they did not remove the variance due to IQ. There may be an overlap with IQ in these studies that was not discovered. The dimension of approach may be inexorably tied to IQ and may not contribute significantly more than IQ to the prediction of achievement.

Emotionality and related constructs. Very few researchers reported significant relations between constructs of temperament related to emotionality and academic achievement. Results from studies of related constructs (e.g., mood, intensity, emotionality, soothability) do suggest some possible associations between emotionality and academic achievement.

Moller (1983) reported that children who had more positive mood reached more advanced levels of cognitive development in their preschool years. Maziade et al. (1986) also reported that positive mood was associated with higher scores in academic achievement for children at age seven and also at age 12.

Martin and Holbrook (1985) reported that the relation between emotional intensity and math grade and a standardized reading subscale increased to reach significance once IQ was partialled out in their study of first-grade children. The relation was such that the more emotional intensity, the less well the child performed on these measures of achievement. Martin et al. (1988) also reported that intensity was negatively correlated with a standardized achievement measure when the variance due to the basic skills test was partialled out. These same

researchers found that intensity was correlated with achievement but that this correlation did not remain significant once the variance due to the basic skills test was removed for a sample of preschoolers. Emotionality was reported by Coplan et al. (1999) as negatively related to literacy and numeracy skills. Finally, a study with a sample of first-graders revealed that intensity was negatively related to achievement before and after the variance due to IQ was removed (Martin et al., 1988). This indicates that the dimension of intensity has predictive power for achievement above IQ and a basic skills measure.

Due to the relatively few studies examining the dimension of intensity/emotionality, there is a need for more research into this area. This dimension is consistent with respect to the direction of the relation indicating that the child who is more easily aroused and upset may have more difficulties learning and attending to tasks than one who is generally happy.

In a similar vein, the child who is easily soothed and calmed will have less trouble attending to tasks than one who is not. Only one researcher reported a significant correlation between the dimension of soothability and academic achievement. Palisin (1986) found that the child who was more soothable was more likely to do better on academic achievement tests. This result was significant but not particularly strong because more than one temperament measure was used to assess soothability and these measures were not in agreement along the dimension of soothability. Each had different criteria to determine the level of soothability present in the child.

Summary. Various temperamental characteristics have been shown to be associated with academic achievement. Some temperament characteristics have unique predictive power over and above that of IQ, basic skills, gender, parental education, and vocabulary. Persistence and activity level were especially strong predictors of achievement. They are also among the dimensions that are the most studied. The dimension of emotionality, however, is not often included in research as it is not a dimension from the NYLS. As such, it is important to further investigate the relations of these dimensions with academic achievement.

Temperament and Play Behaviours in Early Childhood

Researchers have also found links between temperament and social adjustment. In most of the research concerning temperament and adjustment, the term adjustment is used to mean either social competence or lack of behavioural problems. For the purposes of this study, children's social adjustment was assessed through the observation of free play behaviours with peers. Because much of the research on temperament and social adjustment has not been examined using play behaviours, the research with temperament and its relation to social competence and a lack of behavioural problems will be briefly outlined. This may give a better understanding of what to expect in terms of the relation of temperament to play behaviours.

Temperament and Social Adjustment

According to Martin (1994), children who are high in adaptability, low in inhibition, low in negative mood, and high in persistence will have the least difficulty in making a good fit with their environment. Conceptually, high levels

of persistence will enhance the learning of these children and the more socially attractive child (low inhibition and low negative Mood) will receive more social support. These children will have an easier time engaging peers in play situations and will be easier for the teacher to deal with.

According to Martin et al. (1988), temperaments that result in a poor fit with the environment increase the possibility that children will develop a behaviour disorder. Martin et al. (1988) indicated that high distractibility, low persistence, and high activity level were the dimensions of temperaments that placed the child most at risk for not fitting with the environmental demands placed on them. They likened this cluster of traits to the behavioural disorder called Attention Deficit Disorder with Hyperactivity (ADD-H) and claimed that if the temperament characteristics described become too severe, the child is more likely to be diagnosed as ADD-H. This clearly illustrates the need to better understand the relation between temperament and fit with the environment in order to help children maximize their scholastic potential.

Klein (1980, 1982) examined the relation between adjustment to daycare, kindergarten, and Head Start settings and temperament. In both studies, adjustment was assessed by a measure of behavioural problems in the child. Additionally, a significant adult in the child's life (teacher or parent, depending upon the study) was asked to give a more subjective rating of the child's overall adjustment compared to other children in similar circumstances. Klein (1980) reported that high activity level was related to poorer adjustment ratings. Klein (1982) reported that kindergarten children who were high in threshold of

responsiveness were perceived as having adjustment difficulties. Persistence and approach were positively correlated with perceived adjustment. Therefore, the kindergarten child with the poorest adjustment, as defined by behavioural problems, was one who was low on persistence, high in threshold of responsiveness, and tended to withdraw from new situations.

Klein (1982) also evaluated children in a Head Start program. In contrast to the kindergarten children, the Head Start children who were low in persistence were better adjusted than those who were high in persistence. The children in this study also experienced more adjustment difficulties if they were high in intensity. The discrepancy of the findings across settings with regards to persistence may be explained by the different goals laid out by the different programs. In the kindergarten setting, the children were expected to work towards clear, well-defined goals such as letter mastery and number skills whereas in the Head Start program children were expected to pick their own tasks. Hence, children in Head Start may have been more poorly adjusted if they persisted for a long period of time at an activity because these children may be perceived as having poor social skills. The different findings for persistence in different environments clearly illustrates the goodness of fit theory. In one environment, high persistence is related to better adjustment to the environment and in the other, it is related to poorer adjustment. No one set of temperaments will be a good fit with every environment.

Because the studies assessing the relation between temperament and adjustment use different measures, generalizing across studies must be done with

caution. Also, some studies assess social competence while others assess a lack of behavioural difficulties to indicate adjustment.

In a study using social competence to indicate adjustment, Slee (1986) found that kindergarten children with the temperamental dimensions of positive mood, low intensity, and high approach were better adjusted to their classroom environment than children with negative mood, high intensity, and low approach. Jewsuwan et al. (1993) also used a measure of social competence to indicate adjustment. These researchers reported that children with low emotionality and high soothability and sociability were well adjusted to preschool. Jewsuwan et al. (1993) also found that children high in activity were more likely to be in conflict with other children and had more behavioural difficulties than their less active peers.

Researchers using a lack of behavioural difficulties to indicate adjustment have consistently reported that low activity, positive mood and high approach are positively related to adjustment (Nelson, 1987; Skarpness & Carson, 1987; Zajdeman & Minnes, 1991). Nelson (1987) also reported that low approach and low persistence were positively related to difficult behaviours and Skarpness and Carson (1987) found that low distractibility was positively related to school adjustment.

Taken together, the studies examining adjustment and temperament indicate that the dimensions of mood, intensity/emotionality, approach, and activity are most consistently related to adjustment. The relations between these dimensions and adjustment are consistent across both measures of social competence and of

behavioural difficulties. In the present study, the focus is on the relation between temperament and social play with peers. Various forms of social and nonsocial play have been employed in past research as indices of social functioning.

Social and Nonsocial Play With Peers

According to Piaget (1962), play is used by children to assimilate and practice their existing knowledge and is a reflection of their development. Play experiences encourage perspective-taking skills, moral judgment, and negotiation skills (Asendorpf, 1990a). The skills that children develop through play are very important; children not involved in social play may be at later risk for poor social-cognitive skills which may lead them to negative views of themselves and to emotional problems (Parker & Asher, 1987). Social withdrawal from early through late childhood is associated with negative self-perceptions, dependency, and internalizing problems in adolescence (Rubin, Chen, McDougall, Bowker, & McKinnon, 1995).

Social play behaviours. Parten (1932) identified *group* (or social) play as the most mature form of play. This consists of children playing together with a common goal. There has not been a lot of research linking child temperament characteristics and social play in early childhood.

Schultz, Carson, and Herold (1986) reported that 2-year-olds who were rated by their mothers as having greater attention span/persistence and greater soothability were considered to be more "sociable" children. Keogh and Burstein (1988) found that high approach and high persistence were positively related to peer interaction. Positive mood and high adaptability were also related to peer

interactions in this study (Keogh & Burstein, 1988). These results suggest that the child who is quick to adapt and reacts positively to new situations will be more likely to play with other children as opposed to playing alone.

Fox and Field (1989) reported that children with high activity level and low distractibility exhibited more solitary behaviour during the first two weeks of the school year but these same children also showed a significant decrease of solitary, and therefore increase in interactive behaviours across the first six weeks of school. This study illustrates that the timing of the observations may be very important to the findings. If the children are observed as soon as they start school, the associations between temperament and play may be influenced by the novelty of the environment.

Nonsocial play behaviours. There has been a recent increase in the study of different forms of nonsocial play. It was once believed that all children who played alone were at risk for developing subsequent problems. However, it has become apparent that nonsocial behaviours in children represent a heterogeneous construct (e.g., Asendorpf, 1990; Rubin, 1982) and these different types of play were not all a cause for concern (e.g., Coplan, 2000; Rubin, 1982).

Nonsocial play forms can be grouped into three distinct clusters of behaviours: reticent, solitary-active, and solitary-passive play. These three groups can be viewed as relatively independent of one another, with each representing something different than the other two (Coplan et al., 1994). Moreover, each of the three forms of nonsocial play have been associated with different temperamental traits and different social adjustment outcomes.

Reticent behaviours. *Reticent* behaviours encompass onlooking and unoccupied behaviours (Asendorpf, 1991; Coplan et al., 1994). *Unoccupied* behaviour refers to things such as wandering around and aimlessly staring off into space (Parten, 1932). Children engaged in *onlooking* behaviour are watching other children play but not engaging in any activity themselves (Parten, 1932). These children may be experiencing an approach-avoidance conflict where the child would like to participate but for some reason, cannot seem to bring him/herself to join in (e.g., shy or rejected children) (Asendorpf, 1990). Because Piaget (1962) stressed action in cognitive levels, we might assume that unoccupied and onlooking behaviours are related to lower cognitive functioning but this may be an incorrect assumption. This would depend upon what processes are engaged while the child is in this state. For example, the unoccupied child may be engaged in rich fantasies and, therefore, processing at higher levels than expected (Asendorpf, 1990a). Reticent behaviours are thought to be representative of social anxiety and wariness (Coplan et al., 1994).

Reticent behaviours have been related to maternal ratings of temperamental shyness (Coplan et al., 1994) and emotionality (Coplan, 2000; Coplan & Rubin, 1998). Thus, in the present study, reticent behaviour is predicted to be associated with temperamental shyness and emotionality.

Solitary-active behaviours. Children engaged in *solitary-active* behaviours may be involved in either solitary-functional and solitary-dramatic types of play (Rubin, 1982). *Functional* or sensorimotor activity refers to a repetitive action that is performed because the child finds it satisfying (Parten, 1932). There is no

goal associated with this behaviour. Solitary-dramatic play refers to the child playing make-believe on her own. When observed, solitary-functional and solitary-dramatic play look very similar to one another. These behaviours are thought to be associated with peer rejection (Rubin, 1982). They are difficult to study as only about four percent of the play behaviours observed include these types of play (Coplan et al., 1994). Solitary-active behaviours are thought to be representative of immaturity, impulsivity, and externalizing problems (Coplan, 2000; Coplan & Rubin, 1998). Coplan (2000) reported a positive relation between activity level and the display of solitary-active behaviours as well as a negative and significant association with shyness. As such, in the current study, solitary-active behaviour is expected to be associated with temperamental activity and low levels of temperamental shyness.

Solitary-passive behaviours. *Solitary-passive* behaviours involve the child exploring or playing constructively by himself (Rubin, 1982). *Constructive* activities do have a goal involved and the child is working to produce something. Examples of this type of play would be artwork and puzzle construction. Although early views of nonsocial play held that it was maladaptive, this form of solitary play does not seem indicative of any maladaptation in the younger child (Rubin, 1982). The child engaging in constructive play alone is thought to be simply object-oriented rather than person-oriented (Coplan et al., 1994). As such, the child displaying these types of behaviours may be characterized by low approach and low avoidance motivation (Asendorpf, 1990). The child described as often playing alone with a constructive goal can play with other children when

interested but often chooses to play alone. It has been reported that between 40% and 60% of all nonsocial play behaviours in preschool and kindergarten-aged children consist of constructive play (Rubin, Maioni, & Hornung, 1976). Once the child reaches an older age, however, a child who engages in solitary-passive behaviours the majority of the time may be viewed by peers as outside the norms of social behaviour and that child may become rejected by her peers. As children age, solitary-passive and reticent behaviours merge to become one group of behaviours characterized by wariness, fearfulness, and social anxiety (Asendorpf, 1991).

Field, Adler, Vega-Lahr, Scafidi, and Goldstein (1987) found a positive relation between persistence and solitary-constructive play in infants. Coplan (2000) reported similar results with a sample of preschool children. Finally, in their study of temperament and classroom behaviour with first-grade children, Martin, Nagle, and Paget (1983) found solitary constructive play was positively related to adaptability and persistence. It was negatively related to activity and distractibility. Intuitively, in order to play constructively alone, it is expected that a child will have high persistence, low distractibility, and low activity level. This will allow the child to complete the task at hand effectively and competently. In the present study, solitary-passive behaviour is expected to be associated with temperamental attention, but will not be viewed as an index of maladjustment.

Play and Academic Achievement

The kindergarten classroom gives researchers the unique opportunity to observe groups of children at play in their learning environment. Play offers

children the opportunity to try out new things, to learn from their peers, and to expand their abilities.

Parten (1932) assumed that more mature forms of play involved higher levels of cognitive functioning. Thus, children engaging in more social play will be better able to perform on tests of achievement. Parten's (1932) hierarchy of play makes the assumption that the degree of social involvement is more important than the level of cognitive involvement in terms of maturity (Asendorpf, 1990a).

Dramatic play, as defined by Smilansky (1968), involves make-believe fantasies acted out by the child(ren) and is considered to be one of the highest forms of play in terms of cognitive maturity. Much of the research in children's play has focused on group dramatic play because it has been connected to such specific phenomena as literacy development (Christie, 1998), development of mathematical skills (Jarrell, 1998), scientific skills through exploration (Wolfe, Cummins, & Meyers, 1998), and language development (Davidson, 1998; Shore, 1998).

Literacy skills. Christie (1998) illustrated how children can develop literacy skills through sociodramatic play. As an example, he outlined a play episode where some children were pretending to take a trip to France. The children scribbled on a ticket to indicate writing and pretended to read signs while on their train ride. Not only did this scenario demonstrate that the children had already developed concepts about print, but it also allowed them to further develop in that it gave them the opportunity to experiment with the concept of reading and writing.

Mathematical skills. According to Jarrell (1998), simply playing with dried beans, plastic chips, clay, or blocks helps the child to develop concepts about relations like *more than*, *less than*, *take away*, *equals*, and *heavier than*. Play at the water table also helps develop mathematical concepts such as fractions, counting, the effect of volume on weight, and the constancy of number (Jarrell, 1998). Development of mathematical skills can progress through both group play and solitary play. Children can play and learn on their own or make comparisons with other children to enhance these skills.

Sociodramatic skills, too, can have an impact on mathematical learning as demonstrated by Yawkey (1981). In this study, 96 five-year-old children were placed in either experimental or control groups. The experimental group was led through sociodramatic play by a facilitator while the control group could play in any way they wanted. Children from the treatment group achieved significantly higher scores on mathematical readiness behaviours. The children with the lowest pre-test scores were the ones who exhibited the greatest increases in scores indicating that teaching children to play in this way can have particular importance for children who are lagging.

Language Skills. Language development is one of the more obvious correlates of play as children will interact verbally when playing in groups. In the instances of sociodramatic play, children use language to enact roles and give directions to other children about the roles they are playing. This stepping out of pretend character to give directions or information about the play scenario requires sophisticated language skills (Davidson, 1998). Sociodramatic play may also be

the first area where children talk about language itself, including tone, form, and content (Davidson, 1998).

Shore (1998) outlined a possible link between language and play through similar underlying cognitive skills. The knowledge that one thing can symbolize another is one such skill common to both play and language. If there is a common cognitive skill underlying language and play, then children showing language deficits should also show play deficits. This was supported in the research of Rescorla and Goossens (1992) who studied toddlers with expressive specific language impairment (SLI-E). The pretend play displayed by the SLI-E group was less advanced developmentally and less rich in content than the normal language group.

Christie and Johnsen (1983) reported that sociodramatic play involves two kinds of communications: pretend communications, which are used to enact the scenarios, and metacommunications, which are used to structure and sustain the play scenarios. It is hypothesized that language skills are enhanced by this type of play but the research to date has been limited by some design flaws. Fein (1981) also concluded that the evidence for language skill enhancement from sociodramatic play was limited. Finally, Christie and Johnsen (1983) and Christie (1994) reported that there was some support for play training in effecting an increase in IQ. If sociodramatic play training does effect a change in the child's language development, this form of play should be expected to increase the academic performance of children engaging in it.

Cognitive Development. In their review of the literature, Christie and Johnsen (1983) outlined some of the important findings in the area of play and intellectual development. There is a definite relation between play and creativity but the direction of this relation remains to be determined; it is not known whether play influences creativity or vice versa. Sociodramatic play training, in particular, has been shown to lead to improvements on measures of creativity. In Christie and Johnson's (1987) review, it was also reported that play with objects can facilitate problem-solving but researchers remain unsure whether it is play or exploration that children are engaging in when interacting with these objects. Fein (1981), in her review of the literature on pretend play, reported that children engaged in solitary-passive activities do better than other children when asked to solve problems related to the objects they have played with.

Johnson (1976) examined the relation between symbolic play and cognitive capabilities with disadvantaged preschoolers. This researcher reported a significant relation between sociodramatic play and test performance on a standardized test of expressive language and on the Picture Completion (PC) Subtest of the WPPSI. This same behaviour was also reported to be related to divergent thinking. Children who scored above the median mental age scored equally high and low on sociodramatic play incidences meaning that relatively half of the children scoring above the mean also scored high on incidences of social play. Children who scored below the median mental age, however, scored mostly in the low range of sociodramatic play incidences. Johnson (1976)

concluded that a certain level of intelligence is necessary but not sufficient for group dramatic play.

Rubin (1982) coded a sample of four-year-olds in preschool on play behaviours to examine the relation between types of play and a number of cognitive measures. Rubin's study is especially pertinent because the different types of nonsocial play were explored. Therefore, the context of nonsocial play was taken into account.

Solitary-functional play was negatively correlated with Mental Age (MA) and complexity of object constructions, the latter of which is associated with problem-solving proficiency (Cheyne & Rubin, 1981). Solitary-dramatic play was also negatively correlated with the complexity of object constructions. Although these two types of nonsocial play were associated with poorer functioning, solitary-constructive play was not, suggesting that this is not an "at risk " behaviour for this age. This is consistent with the findings of Asendorpf (1990a) who found that these children did not lack in social competence or knowledge. Jennings (1975) found that the more children engaged in these behaviours, the more physical knowledge they displayed. Onlooker behaviour was negatively correlated with MA and complexity of object constructions but there were no significant results for unoccupied behaviours and measures of ability (Rubin, 1982).

Consistent with past research results, social play was expected to be positively related to academic achievement. The skills that children get to learn and practice through interaction with one another are valuable to both their ability to learn and to perform academically. Some of these same skills can also be developed

through solitary-passive play behaviours but the research here is less abundant. Children engaging in this type of behaviour should do well on tests of academic achievement. In contrast, children engaging in solitary-active types of behaviours seem less likely to enhance skills necessary for the learning environment. This less mature form of play was expected to be negatively related to academic achievement.

Gender Differences

In the research area of temperament, academic ability, and children's play, there have been mixed and conflicting results reported regarding gender differences. Moreover, gender differences have most often been examined as afterthoughts and are rarely examined in terms of the differences in the relations between temperament and play, temperament and academic achievement, and play and achievement. Because there have been gender differences reported in the amount of certain characteristics and behaviours, it is a possibility that there are gender differences in the relations between temperament, play, and achievement.

Gender and Temperament

Gender differences in temperamental characteristics are not typically reported (Field et al., 1987; Lerner, Lerner, & Zabski, 1985; Palisin, 1986; Weithorn, Kagen, & Marcus, 1984). Of those studies finding differences, the most consistent result is that boys are reported to be more active than girls (Buss & Plomin, 1975; Coplan, Barber, & Legace-Seguin, 1999; Nelson, 1987; Rowe & Plomin, 1977; Schoen & Nagle, 1994). Other sporadic results are evident. For

example, Schoen and Nagle (1994) and Klein (1982) both reported that boys were higher in distractibility and emotionality/threshold of responsiveness scales than girls. Girls were reported as higher in mood and adaptability by Nelson (1987). Finally, Sanson, Prior, and Oberklaid (1985) reported that males were significantly higher in approach than females and Coates, Lord, and Jakabovics (1975) reported that females were more socially oriented than males.

Shyness. Little research has been conducted with regard to gender differences in the relation between temperamental dimensions and adjustment. However, there is some evidence that temperamental shyness may have different implications for boys versus girls. Evidence for this assumption is derived from recent findings suggesting that parents respond differently to shy boys and girls. For example, Stevenson-Hinde (1989) reported that mothers had more positive feelings towards their shy daughters than to their shy sons. Radke-Yarrow, Richters, and Wilson (1988) also reported that mothers had more affectionate relationships with their shy daughters than they did with their shy sons. Mothers of shy boys were less pleased with and less accepting of their shy sons. Finally, Engfer (1993) reported that boys who displayed shy characteristics were described as less socially competent by both mothers and fathers.

Further support for the notion that shyness has different meanings for boys and girls is derived from the differential associates of shyness for boys and girls across the lifespan. For example, during middle childhood and adolescence, boys but not girls, who were more withdrawn or shy perceived themselves as less socially

competent and had lower self-esteem than their non-withdrawn counterparts (Morison & Masten, 1991; Rubin, Chen, & Hymel, 1993).

In a study of adults who were assessed as shy by their teachers in middle childhood, Caspi, Elder, and Bem (1988) reported that males who were considered withdrawn were “off-time” in the developmental tasks of early adulthood. Withdrawn men only were delayed, compared to their non-withdrawn peers, in terms of entering a stable career, marrying, and becoming a parent, and more likely to divorce and separate.

Given these findings, it was hypothesized that shyness would be more strongly related to play behaviours for boys than girls. For example, shy boys but not shy girls might be expected to engage in less social play. Since we already know that temperamental shyness is more accepted in girls than boys, it is also expected that shyness will have a different relation with achievement for girls and boys. Boys who are high in temperamental shyness are expected to perform less well than boys who are low in shyness. Girls who are temperamentally shy are expected to show no differences academically compared to their less shy peers.

Soothability. There is some evidence to suggest gender differences in the correlates of soothability. Fabes, Shepard, Guthrie, and Martin (1997) found that emotionally arousable boys who had difficulty regulating their arousal were less popular than boys who did not have these difficulties. Regulation of arousal is similar to the temperamental dimension of soothability. Fabes et al. (1997) reported high emotional arousability and low regulation was not related to social acceptance in girls. Because of this research, it was expected that soothability

must be differentially related to social play for boys and girls. Examining the relations with the other dimensions will be mostly exploratory.

Summary of Hypotheses

The data collected for this study allowed for the investigation of the relations between temperament, play, and academic achievement. All of the analyses were tested for interactions with gender to see if any relations were different for boys and girls. Based on a review of the relevant literature, the following hypotheses were made.

Temperament and Academic Achievement

The dimensions of activity and emotionality were expected to be negatively related to academic achievement whereas attention was expected to be positively related to achievement.

Temperament and Play

It was expected that solitary-passive behaviours would be positively related to attention and negatively related to activity. In contrast, solitary-active behaviour was hypothesized to be associated with higher activity and lower ratings of shyness. Finally reticent types of behaviours were expected to be positively associated with shyness and emotionality.

Play and Academic Achievement

Solitary-passive behaviour was expected to be positively associated with academic achievement. In contrast, it was expected that solitary-active behaviours would be negatively associated with academic achievement. Past research has indicated that reticent behaviours are indicative of social

maladjustment. However, the relation between reticence and academic achievement has not been extensively studied so the examination of this relation was mostly speculative. Social play was expected to be positively associated with academic achievement.

Gender Differences

Because of the lack of consistent findings with regards to gender, gender differences were examined at all levels of analyses. Both main effects of gender and interactive effects of gender were explored. The temperamental dimension of shyness was expected to have different relations with social play and academic achievement for boys versus girls. Temperamental shyness was expected to be negatively related to social play and achievement for boys while no relation was expected for girls. Soothability was expected to be positively related to social play for boys and no relation was expected between soothability and social play for girls.

Method

Participants

The participants in this study were 116 children (61 females, 55 males) who were between the ages of 60 and 83 months ($M_{\text{age}} = 66.2$ mos., $SD = 3.9$ mos.) at the commencement of the study. The children were enrolled in 22 half-day kindergarten classrooms in nine public schools in a mid-sized city in Ontario, Canada. The participants were part of a longitudinal study which began a year earlier when the children were attending Junior Kindergarten classes. Classrooms from a variety of different schools were included (e.g. English, Alternative, French Immersion), drawn from various parts of the city. Student populations consisted of a varied range of demographic, socioeconomic, and ethnic backgrounds. However, school board policy did not allow for the data collection of the exact ethnic and racial composition of the sample. Only children who spoke English as a first language were included in the sample.

Procedure

Child temperament. Near the beginning of the school year (October), parents completed the Colorado Child Temperament Inventory (CCTI) (Rowe & Plomin, 1977) (See Appendix A). The CCTI was developed by merging the EASI approach with the NYLS dimensions and factor analyzing to come up with one measure. Of particular interest to the present study were the subscales of (1) Emotionality, (2) Activity, (3) Attention span/Persistence, (4) Soothability, and (5) Shyness. Parents were asked to rate their child on each descriptive item of the CCTI on a five point Likert scale in terms of how much the characteristics

described were 'like their child'. Rowe and Plomin (1977) reported moderate to high internal consistency estimates ranging from .73 (Soothability) to .88 (Sociability). One-week test-retest reliability coefficients for these sub-scales were moderate to high except soothability, which had a retest coefficient of .43. In the current sample, Cronbach's alphas for the subscales ranged from $\alpha = .77$ to $\alpha = .90$.

Play observations. A modified version of the Play Observation Scale (POS, Rubin, 1989) was employed in the present study and the data for this measure were collected in January. This scale assesses the different levels of cognitive play nested within the levels of social participation. In the modified version used here, children could be coded as unoccupied, onlooking, transitional, solitary-functional, solitary-constructive, solitary-dramatic, parallel, group play/peer conversation, sociodramatic, or teacher- or child-initiated contact (with teacher) (see Appendix B for coding sheet). Observations of play were recorded during free-play periods in the kindergarten classrooms. Each of the different classrooms was equipped with several areas for the children to play, including areas that encouraged solitary and group play. Each of the classrooms also had a corner with a playhouse or some other props which were intended to stimulate dramatic play. Children were randomly observed for ten-second intervals for up to two minutes at a time. For each ten-second interval, the behaviour that was considered to be the predominant behaviour was recorded on the coding sheet. Raw scores were proportionalized by dividing the total number of coding intervals. No more than four minutes of play behaviours for any one child was

recorded on the same day. A total of 12 minutes were collected for each child included in the study. Observational data were collected by six trained observers. Inter-rater reliability was computed for pairs of researchers based on 720 codes of data (120 minutes) collected before the commencement of the study. For a complete variable matrix, Cohen's Kappa between pairs of observers ranged from .80 to .86.

Achievement measure. The children were interviewed and administered a modified version of the Metropolitan Readiness Test (MRT), Nurss & McGauvran, 1986) in the spring following the administration of the temperament questionnaires and play observations. This assessment was developed by the school board and covers basic skills including word knowledge, word analysis, reading, and mathematics. Gronlund (1978) reported internal consistency about .90 and higher for each of the various tests of the MAT at each grade level.

There were 38 test items in this modified measure (see Appendix C). A total of 10 questions involved identifying letters. For example, the participants were shown a group of four letters and asked to put a mark below the letter "h". There were 14 questions involving the sounds that letters make. For these questions, participants were asked to identify the letters that make certain sounds, the picture that has the same beginning sound as another word, and the picture that has the same ending sound as another word. For example, the participants were shown and told the names of three pictures; a clown, a tiger, and a cage. They were then asked to put a mark under the picture that ends with the sound "oun", as in the word "town". The final group of questions consisted of 14 basic concepts

questions. The participants were asked questions which tested concepts such as shape, size, and counting. One question from this section asked the participants to mark under the third horse from the fence. Another involved circling "half of the mittens". Results from factor analyses revealed that all 38 items loaded onto a single factor. Cronbach's alpha for this scale was .88. An aggregate score representing achievement was thus created.

This measure was administered to small groups of children by trained researchers in the kindergarten classroom. Children were directed to answer each of the questions by circling or writing their answers in the appropriate spaces on the test. Each question was read to the children and they were given a short period of time to fill in the answers. Once every participant was at the appropriate space, the researcher continued with the next question. In order to ensure that each answer was original, participants were encouraged to try to keep the answers to themselves and to look only at their own sheets. At the end of the testing period, participants were thanked for their time and were assured that their answers were not counted towards classroom grades.

Results

Overview of Analyses

In this section, the results of the correlations between temperament and play variables with parental education and age of the participant are reported. Gender differences are then examined with respect to play, temperament, and academic achievement as are the correlations between play, temperament, and achievement. Hierarchical regressions are conducted to assess the effect of gender on the relations between these variables.

Because solitary-activity occurred so infrequently ($M = .01$, $SD = .02$), findings related to it will be reported in a separate section. The play variable of solitary-activity is examined for gender differences and relations between temperament and achievement.

Although the Bonferroni correction was calculated for these analyses, it was not performed. There were a large number of analyses conducted because of the exploratory nature of many of them and if the Bonferroni correction is performed, associations are reduced and do not remain significant.

Demographic Variables

The means and Standard Deviations for play variables are displayed in Table 1. The average proportion of time that children engaged in solitary-active play behaviours is similar to the proportion of time reported by Coplan et al. (1994). These researchers reported incidences of .03 and .05 for solitary-active behaviours for two play periods. The incidence of solitary-play in the present study is .01 so these results are comparable. There is more solitary-passive play reported in this study than was reported by Coplan et al. (1994). The average proportion of time spent in solitary-passive play by children in

this study is .29 while Coplan et al. reported incidences of .17 and .16. Finally, there was a discrepancy for reticent behaviours as the children in this study averaged 9% of their time engaged in reticent behaviours and Coplan et al. (1994) reported that their participants engaged in reticent behaviours 20% and 19% of the time. These differences in proportion may be due to the fact that the Coplan et al. (1994) study was conducted in an unfamiliar or novel environment and the present study was conducted in a classroom familiar to the participants. The observations for the present study were performed after the children had been in the classroom for four to five months. Because children will be more hesitant and anxious in an unfamiliar environment they may engage more in reticent types of behaviour than they would in a familiar environment. This would also apply to solitary-passive play. The more relaxed and familiar environment may be more conducive to constructive play. Hence the much higher incidences of reticence and lower incidences of solitary-passive play in the Coplan et al. (1994) study.

To begin with, a series of correlations was performed to examine the relations between parental education (an indicator of SES) and age, and the measures of temperament, play, and academic achievement. Parental education scores were computed by averaging paternal and maternal ratings. If information was only available for one parent, then that score was used. In total, parental education scores were available for 111 participants.

Results from the correlational analyses between temperament, play, and demographic variables are displayed in Table 2. As indicated, parental education was found to be significantly related to achievement ($r = .28, p < .01$). With respect to age, there were some trends seen but no significant results. Age was found to be negatively related to

shyness ($r = -.18$, $p < .10$) and to time spent in solitary-passive play ($r = -.18$, $p < .10$) and was found to be positively related to soothability ($r = .16$, $p < .10$) and social play ($r = .18$, $p < .10$). Although there were some trends in the correlations between age and some temperament and play variables, age was not related to academic achievement. Parental education was significantly related to achievement but not with any of the temperament or play variables. As such, age was not controlled for in any subsequent analyses and parental education was controlled only in analyses involving achievement.¹

¹ In order to be sure that age and parental education did not influence any of the relations between temperament and play variables, partial correlations were run. Partial correlations were conducted for temperament and play and for temperament, play, and academic achievement while controlling for age, for parental education, and then controlling for both of these variables. The pattern of these results is comparable. Therefore, age, and parental education were not controlled for in subsequent analyses involving temperament and play variables.

Table 1

Proportions for Observations of Play Variables

	<u>M</u>	<u>SD</u>
Social	.46	.22
Solitary-Passive	.29	.18
Reticent	.09	.08
Solitary-Active	.01	.02

Table 2

Correlations Between Temperament and Play Variables and Parental Education and Age

	Demographic Variables	
	Parental Education	Age
Temperament		
Shyness	-.13	-.18+
Emotion.	-.15	.03
Activity	.01	-.02
Attention	.13	.03
Soothability	.13	.16+
Play		
Sol.-Passive	.06	-.18+
Reticent	-.05	-.10
Social	.10	.18+
Achievement	.28**	.10
+p < .10. *p < .05. **p < .01.		

Gender Differences

A series of Independent Samples T-tests were performed to assess the differences, if any, between males and females for measures of temperament, play, and academic achievement. Results are shown in Table 3. There were no significant differences found between these two groups with respect to all variables.

Correlational Analyses

A series of correlations was computed between child temperament characteristics, different forms of play, and academic achievement. Results are displayed in Table 4 and Table 5. Among the findings, reticence was significantly and positively related to shyness ($r = .21, p < .05$), activity was significantly and positively related to solitary-passive behaviour ($r = .20, p < .05$) and there were also trends for attention to be positively related to social play ($r = .17, p < .10$) and emotion to be negatively related to academic achievement ($r = -.19, p < .10$).

Hierarchical Regression Analyses

A series of hierarchical regression equations was conducted to assess interactions with gender in the relations between temperament, play, and academic achievement. Three sets of equations were computed. The first was to assess the interaction between temperament and gender in the prediction of play. The next was to assess the interaction between gender and temperament in the prediction of academic achievement. Finally, the third set of equations was to assess the interaction between gender and play in the prediction of academic achievement. Variables were entered into the equation in the following order: Step 1, sex and the z-scores of a temperament or play variable; Step 2, the interaction term which was calculated by multiplying the standardized gender and

appropriate temperament or play variables together. The R^2_{change} of the interaction term is assessed to determine if the interaction added to the predictiveness of the overall equation. To interpret the interaction term when it was found to be significant, the regressions were rerun separately for males and females.

Temperament, Gender, and Play

The gender X shyness interaction in the prediction of social play was significant ($R^2_{\text{change}} = .07$, $F_{\text{change}} = 8.06$, $p < .01$). The regression was then run separately for males and females in order to assess the simple effects. Among males, shyness was negatively and significantly related to social play ($\beta = -.36$, $p < .01$). There was no significant relation between shyness and social play among females ($\beta = .12$, ns).

The sex X soothability interaction in the prediction of social play was also significant ($R^2_{\text{change}} = .05$, $F_{\text{change}} = 5.36$, $p < .05$). Among males, soothability was positively and significantly related to social play ($\beta = .32$, $p < .05$). There was no significant relation between soothability and social play among females ($\beta = -.16$, ns).

Finally, the sex X soothability interaction in the prediction of solitary-passive play was found to be significant ($R^2_{\text{change}} = .04$, $F_{\text{change}} = 3.97$, $p < .05$). Among females, soothability was positively related to solitary-passive play ($\beta = .22$, $p < .10$). There was no significant relation between soothability and solitary-passive play among males ($\beta = -.14$, ns). The results for these regression analyses are displayed in Table 6.

Table 3

T-Test Results of Sex Differences in Temperament, Play, and Achievement

	Male		Female		
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>t</u>
Temperament					
Activity	3.93	.73	3.76	.63	-1.39
Attention	3.44	.68	3.62	.71	-1.37
Emotion	2.71	.84	2.68	.89	.18
Shyness	2.54	.66	2.56	.87	-.10
Soothability	3.43	1.14	3.40	.66	.13
Play					
Reticence	.09	.09	.08	.08	.54
Social	.47	.23	.46	.20	.31
Sol-Passive	.28	.18	.30	.18	-.59
Achievement	22.52	4.26	23.54	4.73	-1.13

Table 4

Correlations Between Temperament Variables and Play Variables

<u>Play</u>	<u>Temperament</u>				
	Shyness	Emotion.	Activity	Attention	Sooth.
Sol-Passive	-.08	-.14	.20*	-.02	.00
Reticent	.21*	-.10	.06	.03	-.13
Social	-.09	.03	-.14	.17 ⁺	.14

⁺p < .10. *p < .05.

Table 5

Correlations Between Academic Achievement and Temperament and Play Variables

	Achievement
Temperament	
Shyness	-.13
Emotion.	-.19 ⁺
Activity	.14
Attention	.11
Soothability	-.06
Play	
Sol-Passive	-.11
Reticent	-.10
Social	.18

⁺p < .10.

Table 6

Summary of Hierarchical Regression Analyses of Play on Temperament and Sex

<u>DV</u>	R^2_{change}	F_{change}
Social Play		
Shyness X Sex	.07	8.06**
Sooth. X Sex	.05	5.36*
Emotion. X Sex	.01	.84
Activity X Sex	.00	.14
Attention X Sex	.00	.17
Sol-Passive		
Shyness X Sex	.01	1.14
Attention X Sex	.01	.56
Activity X Sex	.00	.02
Emotion. X Sex	.00	.35
Sooth. X Sex	.04	3.97*
Reticent		
Emotion. X Sex	.00	.05
Sooth. X Sex	.00	.00
Shyness X Sex	.02	2.08
Attention X Sex	.00	.01
Activity X Sex	.01	.66

⁺p < .10. *p < .05. **p < .01.

The results from the analyses of temperament and gender to predict achievement are displayed in Table 7. There was a trend found for the sex X attention interaction in the prediction of achievement ($R^2_{\text{change}} = .04$, $F_{\text{change}} = 3.62$, $p < .10$). The regression was then run separately for males and females in order to assess the simple effects. Among females, attention was positively related to achievement ($\beta = .26$, $p < .10$). There was no significant relation between attention and achievement among males ($\beta = -.10$, ns).

Play, Gender, and Achievement

The last set of regressions analyzing the interactions between sex and play variables to predict achievement showed no significant results. The results for these analyses are displayed in Table 8.

Table 7

Summary of Hierarchical Regression Analyses of Achievement on Temperament and Sex

<u>DV</u>	R^2_{change}	F_{change}
Achievement		
Shyness X Sex	.00	.01
Activity X Sex	.00	.15
Sooth. X Sex	.00	.01
Attention X Sex	.04	3.62 ⁺
Emotion. X Sex	.00	.27

⁺ p < .10.

Table 8

Summary of Hierarchical Regression Analyses of Achievement on Play and Sex

<u>DV</u>	R^2_{change}	F_{change}
Achievement		
Social X Sex	.00	.31
Sol-Passive X Sex	.01	.78
Reticent X Sex	.02	2.16

Solitary-Active Behaviours

As mentioned earlier, the incidence of solitary-active types of behaviours was found to be very low ($\underline{M} = .01$, $\underline{SD} = .02$) so correlations and regressions were not an appropriate way to analyze this data. Instead, the variable was dichotomized to create two groups. The individuals comprising the first group displayed a relatively extreme amount of solitary-activity ($n = 15$, $\underline{M} = .06$, $\underline{SD} = .02$) defined as a score on solitary-activity above one SD above the mean. The individuals in the second group displayed no solitary-active behaviours ($n = 73$).

A t-test was performed to assess the difference between these groups with respect to parental education. There was a difference such that the solitary-active group had significantly lower scores of parental education than the non solitary-active group ($t = 2.34$, $p < .05$).

Gender. A chi square analysis was conducted to examine whether the distribution of boys and girls differs as a function of whether or not they displayed solitary-active behaviours. There was a trend found ($\chi^2(1) = 3.66$, $p < .06$), indicating that sex and group were not independent. Based on an examination of the observed frequencies of sex in each group, it appears that the solitary-active group (67%, ($n = 10$) were male) had more males than were expected and, therefore, (33%, ($n = 5$) were female) had fewer females.

Temperament and achievement. A series of 2 X 2 ANOVAs were run to examine the relations between temperament and play and achievement for the solitary-active and no solitary-active behaviours groups. When achievement was involved in the analyses, 2 X 2 ANCOVAs were run controlling for parental education. Age was not a significant covariate in any of the analyses so it was not controlled for in these analyses. There were

no significant differences found between these two groups in terms of temperament variables or academic achievement. The means and SD's are displayed in Table 9.

Table 9

Demographics of Solitary-Active and Non Solitary-Active Groups With Play and**Achievement Variables**

	<u>M</u>	<u>SD</u>
Solitary-Active		
Activity	3.8	.79
Attention	3.3	.63
Emotionality	2.6	1.06
Shyness	2.8	.96
Soothability	3.2	.93
Achievement	22.9	4.70
Non Solitary-Active		
Activity	3.9	.66
Attention	3.6	.68
Emotionality	2.7	.80
Shyness	2.5	.72
Soothability	3.5	.98
Achievement	23.2	4.76

Discussion

The goal of the present study was to examine the relations among dimensions of temperament, play behaviours, and academic achievement. Although there were some significant relations found between temperament and play, few significant associations emerged between these variables and academic achievement. Some possible explanations for the lack of findings are outlined below. Results did reveal some interesting gender differences in the links between child temperament and play behaviours. Possible interpretations of these results are also postulated.

Temperament and Play

Results from the present study suggest that various dimensions of temperament were related to play behaviours displayed by children in kindergarten. Each of these temperamental dimensions is discussed in turn.

Shyness. The temperamental dimension of shyness was positively related to the display of reticent behaviours. This was an expected finding as children engaging in reticent behaviours are thought to be experiencing an approach-avoidance conflict (Asendorpf, 1990). The present findings were also consistent with past research indicating relations between maternal ratings of shyness and the display of reticent behaviour in both unfamiliar and familiar settings (Coplan, 2000; Coplan et al., 1994; Coplan & Rubin, 1998).

Children who are temperamentally shy may want to play with other children but are too anxious to do so. Therefore, they may watch other children play without joining in or may not know what to do with their free time. Thus, onlooking or unoccupied behaviours may provide a behavioural resolution to an approach-avoidance conflict (Asendorpf,

1990a). Children engaging in mostly reticent behaviours during play time may not be experiencing a “good fit” with their environment. Though they want to interact with their peers, their inability to overcome their anxiety leaves them engaging in less mature forms of play. Subsequently, these children can become rejected or ostracized by the other children and, therefore may always experience a “poor fit” in a social environment.

Gender differences in shyness. Shyness was expected to be negatively related to the frequency of social play, as it is conceptually consistent that the shy child would have more difficulty in engaging in play with his/her peers. Results indicated that shyness was negatively related to time spent in social play for boys but not for girls. These findings add to the growing body of research suggesting differential outcomes for shyness in boys versus girls.

As discussed previously, results from research have indicated that mothers react more negatively to shyness in their sons than their daughters (Stevenson-Hinde, 1989; Radke-Yarrow et al., 1988). Shyness was demonstrated to be a coveted trait for daughters while it was an unwanted trait for sons and mothers were less accepting of their “shy” sons. Engfer (1993) found that both mothers and fathers viewed shyness in their sons as an unfavourable trait and thought these boys were less socially competent. For daughters, however, displaying shyness was seen as indicative of social competence.

Other researchers (Rubin et al., 1993; Morison & Masten, 1991) have found that shyness is perceived differently by boys and girls as well as by parents. Both in middle childhood and in adolescent years, girls who recognized shy characteristics in themselves did not have a lower self-esteem. Boys with similar levels of shyness viewed themselves in a more negative light. Caspi et al. (1988) reported that boys who were assessed as shy

in middle childhood were more likely to experience social difficulties well into adulthood but girls who were assessed similarly displayed no ill effects into adulthood.

From this research, shyness in girls appears to be more acceptable than shyness in boys. Engfer (1993) went so far as to hypothesize that shy behaviours may be actively discouraged in boys but rewarded in girls in early childhood. This would lead to very different outcomes of being shy for boys and girls. If this is true, then it may explain why being shy was not associated with less social play for girls in the present study. Because shyness is more of an acceptable trait for girls, it stands to reason that it may not be as related to social competence in girls.

In terms of goodness of fit, this may be more a “fit” that has been built by preconceptions of how boys and girls should act in any environment. It can be speculated that high levels of shyness would be a better fit for girls in a social setting because shyness is more acceptable for girls. Because of this, boys with high levels of shyness would not ‘fit’ as well in social settings and might be expected to display less social play.

Attention. In the current study, temperamental attention was found to be positively related to the proportion of time spent in social play. There is some support for this finding in the literature. Schulz et al. (1986) reported that two-year-olds rated by their mothers as having a greater attention span were also considered to be “sociable” children. Keogh and Burstein (1988) reported a similar finding in that persistence (similar to attention span) was positively related to peer interactions.

An ability to attend to tasks and surroundings may make a child more attractive as a playmate or may allow them to focus enough to participate in group play with other children. A child who cannot stay on task or attend to what the other children are doing

may be annoying or distracting to other children and therefore may not be welcome to engage in social play with other children. Similarly, it may be that children unable to focus simply flit about the classroom and do not try to play with other children for any extended period of time. Again, the goodness of fit theory may illustrate the difficulties children low in attention have in engaging in social play. An inability to focus on interactions with peers results in a “poor fit” with the social environment and this may lead to later difficulties.

Activity. An unexpected finding from the current study was the positive relation between activity and the frequency of solitary-passive play. At first glance, this relation seems like a conceptual contradiction. Children with lower levels of activity would seem more likely to play in a solitary-passive manner. Although solitary-passive play is typically conceptualized in terms of quiet activities, it does also include other forms of constructive and exploratory activities.

In this regard, Fagot and O’Brien (1994) assessed activity levels of children across different play situations. Various types of activities that encourage high levels of activity were identified. While books and puzzles rated fairly low in terms of amount of activity elicited, blocks/legos rated at the higher end in terms of eliciting activity from the children. Similarly, the blocks area was deemed a high activity area and the books area was deemed a low activity area. Therefore, high levels of activity and solitary-passive behaviours may not be conceptually mutually exclusive phenomena. This may explain why there was not a negative relation between activity and solitary-passive play, but it does not necessarily explain the positive association between these two variables. There are a couple of possible explanations for this finding.

One possibility is that children who consistently display high levels of activity may be encouraged by teachers in the classroom and parents at home to engage in more constructive, quiet types of play. A child who is highly active may be directed to the puzzle table or the computer area in order to get that child to focus on a task and, therefore, be less disruptive to the other children during free play. An assessment of teacher interactions with the children during free play periods would then be beneficial to evaluate this possibility.

A second possible explanation to why high levels of activity are related to solitary-passive play could be that these children are rejected by their peers. If the high levels of activity are disruptive to the other children while they are trying to play, they may not allow the disruptive child to play with them. These children then may choose to engage in constructive play behaviours by themselves. Peer ratings or an assessment of peer initiations would be helpful in determining if this is a possible explanation of the behaviour of these highly active children.

The finding that activity was positively related to time spent in solitary-passive play was unexpected but not impossible to interpret. This finding suggests that there is a need for more research with regard to the relation between activity and the frequency of solitary-passive play. Of course, replication will allow for conclusions about whether the current findings merely represented a statistical artifact.

Gender differences in soothability. Results indicated that soothability was positively related to time spent in solitary-passive play behaviours for girls but was unrelated for boys. Soothability was also negatively related to the proportion of time spent in social play for boys but showed no relation for girls. The differences seen for soothability and

social play and solitary-passive play may be explained by the relation of soothability to arousability. In terms of temperamental dimensions, arousability is described through the dimensions of emotionality and soothability (Fabes, Shepard, Guthrie, & Martin, 1997). A highly arousable child is one who is highly emotional and difficult to soothe (Rubin, Coplan, Fox, & Calkins, 1995). Fabes et al. (1997) reported that boys are more likely than girls to become overaroused when playing with other boys and have more difficulty regulating their arousal than do girls. This regulation of arousal is where the dimension of soothability fits in. The less soothable child is the child who is having more difficulty regulating his/her arousal.

Fabes et al. (1997) reported that boys who were easily aroused and had difficulty regulating that arousal were at increased risk of becoming overaroused and dysregulated when playing with other boys. These researchers also reported that boys high in arousability and low in regulating the arousability were the least popular in terms of peer status. The peer status of these boys decreased even more as they increasingly played with same-sex peers. These results may explain why boys who are low in soothability do not often play in social groups. These boys are not accepted by their peers because of the disruptions they cause to the play environment and, therefore, are not encouraged to play with the other children.

Fabes et al. (1997) found that girls who were low in soothability did not display the same negative effects that boys did. First of all, girls did not seem to get as aroused as boys in similar social situations so there was less regulation or soothability needed to control this arousability. Girls' play is oriented toward the maintenance of cooperative play with same-sex peers and this should promote positive adjustment (Fabes et al.,

1997). Indeed, Fabes et al. (1997) reported that the more that highly arousable girls played with same-sex peers, the lower their level of rated problem behaviours. What they found was that in order to play with other girls, highly arousable girls were forced to adjust their style. These girls had to learn to become more soothable or regulated if they wanted to play with other girls and this may explain why soothability is not related to social play for girls.

Because soothability may have different meanings for boys and girls, soothability may be positively related to the frequency of solitary-passive behaviours for girls but not related for boys. Boys who were not very soothable engaged in less social play than boys who were soothable. Girls who were low in soothability engaged in less solitary play than girls who were high in soothability. Soothability may have different meanings for boys and girls but social and solitary-passive play may also have different meanings as well. Add this finding to the results for gender differences in shyness and it may be that goodness of fit should be applied in terms of gender as well as environment. What is a good fit for boys in the academic setting may be very different than what is a good fit for girls.

Gender and social play. The interactions between gender and temperament in the prediction of social play suggest that social play may have different meanings for boys and girls. Research in the area of gender differences and social play has focused on an environmental and biological base for the gender differences reported in socialization. Roggman and Peery (1989) conducted a study on the interactions between parents and infants to examine the possible gender differences in these interactions. These researchers established that mothers and fathers interact differently with their sons and

daughters in social play situations. Both the sex of the parent and the sex of the infant affected the type of behaviour displayed in these interactions. Roggman and Peery (1989) found that mothers tended to touch their infant sons more if the sons looked at them less. Mothers looked at their daughters more if their daughters looked at them more. Fathers tended to touch their sons for longer periods of time when the boys gazed at them less. This suggests that there may be differential socialization for males and females in the infant years and distinct social environments are being created. This, in turn, may contribute to the gender differences seen in the socialization of young children.

Researchers have also acknowledged that a biological explanation for the gender differences displayed in peer interactions is possible. Meaney (1988) outlines the biological foundations for differences in social interactions for males and females. He suggested that there is an interaction between biological and social events, which give rise to the sex differences seen in social play. The biological component comes from the neuroendocrine system, specifically androgens (Meaney, 1988). There are also sex-differences observed across cultures and economic-subsistence systems (Meaney, 1988). This biological data, along with the support for an environmental component, suggests that social play may have different meanings for boys and girls and this may partially explain the differences seen in this study with regard to gender.

Temperament and Academic Achievement

Results. The correlations from the present study indicated only one significant finding in terms of the relation between child temperament and academic achievement. As was hypothesized, emotionality was negatively related to academic achievement. This finding is supported by a study by Coplan et al. (1999) where emotionality was reported

to be negatively related to literacy and numeracy skills. These researchers also reported a trend in the same direction for vocabulary ability and emotionality. Also, some researchers (Martin & Holbrook, 1985; Martin et al., 1988) using intensity rather than the dimension of emotionality reported that the more emotional intensity the child displayed, the less well that child performed on measures of achievement. Taken together, these findings indicate that the dimension of emotionality merits more research in regard to its relation with academic achievement.

Employing the goodness of fit theory to understand these results, we can see that the academic testing environment and the classroom require a lower level of emotionality in order for the child to perform well. High levels of emotionality are, therefore, not a good “fit” with the classroom environment. A child who is easily aroused and upset performs less well academically as this high emotionality may be interfering with his/her ability to learn and/or perform academically. Perhaps the testing environment arouses so much emotion that the child is unable to perform well. A child who does not experience this high arousability and emotionality will not experience the same interference with learning and will, therefore, perform better academically. Similarly, high levels of emotionality may interfere with the child’s ability to learn in the classroom environment and this may be why the child does not perform well on the measure of academic achievement.

Gender differences in attention. Attention was positively related to academic achievement for girls but not for boys. As this relation was a trend only, this result must be interpreted with some caution. However some speculation is possible. Because parents feel differently about boys and girls with regard to shyness, finding shy traits in girls desirable, perhaps they also feel differently with regard to attention. It may be that a

high level of attention in girls is important but not as important in boys. Similarly, if parents have these expectations, teachers may also expect girls to have higher levels of attention. Together, this may contribute to girls with higher levels of attention performing better than girls with lower levels. If parents have little expectation for their sons in terms of attention levels, this may explain why there was no relation found.

Play and Academic Achievement

There were no significant relations found between measures of play and academic achievement in the present study. Given the past research supporting links between these variables, this was somewhat of a surprise. Though the relations were not significant, most were in the expected direction. Reticence was related in a negative direction and social play was in a positive direction. It is also important to note that when the Bonferroni correction was applied to all the analyses that were conducted, none of results remained significant. There are several possibilities as to why there were no significant relations between the play variables and academic achievement in the present study as well as why the results discussed above did not remain significant once the Bonferroni correction was used.

The first possible explanation for the lack of results may be the achievement measure itself. These children were assessed using a modified version of the Metropolitan Readiness Test (MRT) (MRT, Nurss & McGauvran, 1986) by an outside interviewer and achievement was measured on a one-scale aggregate. A more detailed assessment of achievement may have yielded different results. Instead of one scale, separate and detailed scales assessing the different skills such as literacy, numeracy, vocabulary, and basic concepts would have been more beneficial. An assessment of the children's

abilities by the teacher may have added to the ability to capture differences that may have been there may also have helped this study. Another possible change to the academic measure would have been to have a measure of achievement in the home.

A similar study examining the relation of play and academic achievement using an older sample of children may yield some significant relations. Solitary-active and reticent behaviours were hypothesized to be related to poor academic performance but this relation was not found in this study. It has been established that solitary-active behaviours in early childhood are related to future externalizing difficulties (Coplan, 2000; Coplan & Rubin, 1998) and reticent behaviours in early childhood are related to future internalizing difficulties (Coplan, 2000; Coplan & Rubin, 1998). Because the difficulties associated with these nonsocial play behaviours do not show up until middle childhood, it may be that any adverse effects on academic achievement also will not show up until later years. In kindergarten, these play behaviours may not be associated with any concurrent negative effects. This would indicate that a longitudinal study would be beneficial to assess the negative effects associated with these play behaviours. Gender

Differences in Play

Solitary-active play behaviours were the only form of play behaviours that showed any gender differences. Because of the low incidence of solitary-active behaviours displayed, the participants were dichotomized into an extreme group and a group of participants who displayed no solitary-active behaviours at all. A chi square analysis indicated that there were more males in the solitary-active group than was expected. In a study by Maziade, Cote, Boudreault, Thivierge, and Caperaa (1984), it was reported that there were significantly more boys in an extremely difficult group than were expected.

This extremely difficult group is similar to the solitary-active group in the present study in that they both are associated with future difficulties on the externalizing dimension if the behaviours characterizing these groups persist into middle childhood. Also, solitary-active types of behaviours such as loud, repetitive noises and high levels of motor activity are more gender stereotypically male. As such, it may be more acceptable for males to engage in these behaviours while girls may be discouraged from acting in these ways. Together, these results may indicate that boys are at a greater risk for developing externalizing problems. Identifying children engaging in solitary-active behaviours early on may allow for early intervention with children who may later develop externalizing difficulties.

Conclusion

Future research is required to better understand the relations between child temperament, play behaviours, and academic achievement. Although only a small proportion of the hypotheses were supported (14 predictions, four supported indicating 29% of hypotheses supported), the current study did, provide some insight into the relations between temperament and play and to the interactions of gender for temperament and play. These latter results are particularly interesting as previous research tended to neglect gender differences.

The differences in gender may be explained through the goodness of fit theory. The theory behind goodness of fit is that certain dimensions of temperament fit better with some environments. As such, some dimensions of temperament are likely more conducive to learning and some are better for socializing than others. The present findings differentiated dimensions in terms of gender. This may indicate that there are

different good “fits” for boys and girls in the academic and social environment. More research into the different dimensions for boys and girls that facilitate learning and social play is needed to better understand this phenomenon. In today’s society it is difficult to accept that there are different criteria for boys and girls but the reality is that they are present. Using information such as that found in this study, we can identify some of the differences and work to change them or at least use the information to help change their meaning. For example, because we know that solitary-active types of behaviours are more acceptable in males than in females and that these behaviours may be linked to future externalizing disorders, we can work to change the perceptions/expectations of parents and teachers. Encouraging different forms of play may help children to change the future development of other difficulties.

Certain temperaments may predispose a child to play a certain way, and the nature of that play may be a contributor towards the relations with achievement. For example, a child low in shyness and high in attention may often engage in social play. In turn, social play allows for the development of many important skills such as literacy, language, and mathematical skills. The development of these skills should positively influence learning and performance on measures of achievement. With stronger measures of achievement, it is possible that researchers will find that play behaviours are mediating factors in the relations between temperament and academic achievement.

Because the kindergarten classroom is important to the early development of social and academic abilities, it is important to be able to understand the underlying mechanisms to this development. If researchers can establish who is at risk for future social and

academic difficulties, then we are closer to early identification, and early intervention will be possible.

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Appendix A

Colorado Child Temperament Inventory

		How much is your child like that?				
		<u>Not at All</u> (Strongly DISAGREE)			<u>A Lot</u> (Strongly AGREE)	
16.	Child finds people more stimulating than anything else.	1	2	3	4	5
17.	Child often fusses and cries.	1	2	3	4	5
18.	With a difficult toy, child gives up easily.	1	2	3	4	5
19.	Child is very sociable.	1	2	3	4	5
20.	Child is very energetic.	1	2	3	4	5
21.	Child takes a long time to warm up to strangers.	1	2	3	4	5
22.	Child plays with a single toy for long periods of time.	1	2	3	4	5
23.	Child gets upset easily.	1	2	3	4	5
24.	Child is something of a loner.	1	2	3	4	5
25.	Child prefers quiet, inactive games to more active ones.	1	2	3	4	5
26.	When alone, child feels isolated.	1	2	3	4	5
27.	Child tolerates frustration well.	1	2	3	4	5
28.	Child reacts intensely when upset.	1	2	3	4	5
29.	Child stops fussing whenever someone talks to him/her or picks him/her up.	1	2	3	4	5
30.	Child is very friendly with strangers.	1	2	3	4	5

name of child (please print)

Please answer the items on these pages about the behavior of your child by *circling* one of the numbers following each item. We know that no item will apply to the child in every situation, but try to consider his/her usual or general behavior. Please answer all questions—there are no right or wrong answers.

	How much is your child like that?				
	<u>Not at All</u> (Strongly DISAGREE)			<u>A Lot</u> (Strongly AGREE)	
1. Child persists at a task until successful.	1	2	3	4	5
2. Child gives up easily when difficulties are encountered.	1	2	3	4	5
3. Child tends to be shy.	1	2	3	4	5
4. Child cries easily.	1	2	3	4	5
5. When upset by an unexpected situation, child quickly calms down.	1	2	3	4	5
6. Child goes from toy to toy quickly.	1	2	3	4	5
7. Child likes to be with people.	1	2	3	4	5
8. Child is always on the go.	1	2	3	4	5
9. Whenever child starts crying, he/she can be easily distracted.	1	2	3	4	5
10. Child prefers playing with others than alone.	1	2	3	4	5
11. Child tends to be somewhat emotional.	1	2	3	4	5
12. When child moves about, he/she usually moves slowly.	1	2	3	4	5
13. If talked to, child stops crying.	1	2	3	4	5
14. Child makes friends easily.	1	2	3	4	5
15. Child is off and running as soon as he/she wakes up in the morning.	1	2	3	4	5

Appendix B

Play Observation Scale

(modified version)

date: _____

a.m. _____ p.m. _____

coded by: _____

[illegible]

Appendix C

**Metropolitan Readiness Test
(modified version)**

TEST 9A (duration 16½ mins. approx.)**Q E D ADMINISTRATION DIRECTIONS,**

Pencil and Paper Tests to be Completed by Students

Letters

SAY:

Now we are going to see how many letters we know. As I say the letter, you are to mark under it. Sometimes you may not know the answer. If you do not know the answer to a question, just skip it and wait for the next one.

Put your finger under the first box where you see a picture of a horn. Mark under the letter - O.

CHECK TO SEE THAT EACH CHILD HAS MARKED THE RIGHT LETTER. CLARIFY THE DIRECTIONS IF THERE IS ANY MISUNDERSTANDING.

IN THE ITEMS BELOW, SAY THE LETTER NAME, NOT THE SOUND. REPEAT THE LAST SENTENCE IN EACH ITEM.

1. Now move your finger under the next box in the same row. Mark under the letter - B.
2. Move your finger under the first box in the next row, where you see a shoe. Mark under the letter - H.
3. Now move your finger under the next box in this row. Mark under the letter - S.
4. Move your finger under the first box in the next row, where you see a truck. Mark under the letter - T.
5. Now move your finger under the next box in this row. Mark under the letter - Y.

6. Move your finger under the first box in the next row, where you see an umbrella. Mark under the letter - a.
7. Move your finger under the next box in this row. Mark under the letter - c.
8. Move your finger under the first box in the next row, where you see a pie. Mark under the letter - e.
9. Now move your finger under the next box in this row. Mark under the letter - i.
10. Move your finger under the box in the next row, where you see an owl. Mark under the letter - m.

Sounds

SAY:

Now look at the pictures in the first box. You see a flower, a squirrel, and a rabbit. I am going to say a sound and then a word with the same sound. You are to mark the space under the picture that starts with the same sound as the sound I say. The sound is "s" - as in the word SOME. Now fill in the space under the picture whose name begins with the sound "s".

Which space did you mark?

ENCOURAGE REPLY.

Yes, the space under the picture of the squirrel, because squirrel begins with the sound "s" as in the word SOME.

PRONOUNCE EACH BEGINNING SOUND AS YOU WOULD IF YOU WERE SAYING THE EXAMPLE WORD ITSELF.

Hands up if you do not know what to do.

CHECK TO BE SURE THAT ALL CHILDREN KNOW WHAT TO DO AND HAVE MARKED THE SPACE CORRECTLY.

Remember, if you do not know the answer just skip it and wait for the next question.

READ EACH ITEM TO THE CLASS, STRESSING THE WORD TO BE MARKED. ALLOW ENOUGH TIME FOR PUPILS TO MARK EACH WORD (ABOUT 10 SECS); THEN CONTINUE WITH THE NEXT WORD.

1. Now move your finger under the next box in the same row. Here you see scissors, a needle, and a button. Mark under the picture that begins with the sound "b" as in the word BIG. Mark under the picture that begins with the sound "b".

PAUSE FOR ABOUT TEN SECONDS AFTER EACH ITEM IN THIS PART.

2. Move your finger under the first box in the next row. Here you see soap, an apron, and a broom. Mark under the picture that begins with the sound "a" as in the word AGE. Mark under the picture that begins with the sound "a".
3. Move your finger to the next box in the same row. You see pictures of a telephone, a rug, and a vase. Mark under the picture that begins with the sound "v" as in the word VERY. Mark under the picture that begins with the sound "v".
4. Move your finger under the first box in the next row. Here are pictures of a bee, a butterfly, and a snake. Mark under the picture that begins with the sound "s" as in the word SIX. Mark under the picture that begins with the sound "s".
5. Move your finger under the next box in the same row. You see a slide, a puzzle, and a swing. Mark under the picture that begins with the sound "p" as in the word PARADE. Mark under the picture that begins with the sound "p".
6. Move your finger under the box in the next row. Here you see a whale, a lion, and a turtle. Mark under the picture that begins with the sound "wh" as in the word WHEEL. Mark under the picture that begins with the sound "wh".

THEN SAY:

Put your finger under the first box at the top of the page.

CHECK TO SEE THAT ALL THE CHILDREN HAVE FOUND THE RIGHT PLACE ON PAGE 3.

THEN SAY:

This time you are going to mark the space under the picture that ENDS with the same sound as the word I say. Now let's do the first sound together. In this box you see some pictures of fun things. They are a hat, a doll, and a block. Mark under the picture that ends with the sound "k" as in the word BRICK. Mark under the picture that ends with the sound "k". Which space did you mark?

ENCOURAGE REPLY.

THEN SAY:

Yes, the space under the block, which ends with the same sound "k" as in the word BRICK.

PRONOUNCE EACH ENDING SOUND EXACTLY AS IF YOU WERE SAYING THE SAMPLE WORD ITSELF. PAUSE ABOUT 10 SECONDS AFTER EACH ITEM IN THIS PART.

7. Move your finger under the next box in the same row. Here are some things which can be bought at a store. They are a soda, a cone, and gum. Mark under the picture that ends with the sound "um" as in the word THUMB. Mark under the picture that ends with the sound "um".
8. Move your finger under the first box in the next row. Here you see pictures of a man, a boy, and a girl. Mark under the picture that ends with the sound "oi" as in the word JOY. Mark under the picture that ends with the sound "oi".
9. Now move your finger under the next box in the same row where you see pictures of things at the circus. They are a clown, a tiger, and a cage. Mark under the picture that ends with the sound "oun" as in the word TOWN. Mark under the picture that ends with the sound "oun".
10. Move your finger under the box in the next row. You see some pictures of animals that have feathers. They are a bird, a chicken, and a duck. Mark under the picture that ends with the sound "urd" as in the word HEARD. Mark under the picture that ends with the sound "urd".

Now move your finger under the first box in the next row in the bottom half of the page.

DEMONSTRATE

Now we are going to mark under the letter that stands for the beginning sound in a word.

IN THE FOLLOWING EXERCISE BE SURE TO REPEAT THE LAST SENTENCE IN EACH ITEM.

You see four letters. They are h, d, l, r. You are to mark under the letter that makes the BEGINNING sound in the word - DAY.

Which space did you mark?

ENCOURAGE REPLY.

THEN SAY:

Yes, the space under the letter d, which is the letter that begins the word - DAY.

We are going to do the same thing for the next four questions, so listen carefully as I tell you what to do in each box.

11. Move your finger under the next box in the same row. The word is: JAR. Mark under the letter that makes the BEGINNING sound in the word - JAR.

PAUSE ABOUT 10 SECONDS AFTER EACH ITEM IN THIS PART.

12. Now move your finger under the next box in the same row. The word is: SAD. Mark under the letter that makes the BEGINNING sound in the word SAD.
13. Now move your finger under the first box in the next row. The word is: RAG. Mark under the letter that makes the BEGINNING sound in the word - RAG.
14. Move your finger under the next box in the same row. The word is: KEEP. Mark under the letter that makes the BEGINNING sound in the word - KEEP.

Test 9A

Child Temperament 99

Sample:

A S T

1.

R D B O

2.

E H X L

3.

S C Z G

4.

I J F T

5.

V W Y K

6.

a n o l

7.

k c d h

8.

f s e r

9.

y j u i

10.

m r w v

2

Test 9A (cont.)

Sample:

1.

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Test 9A (cont.)

Child Temperament 101

7.

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9.

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11.

12.

13.

14.

TEST 10A (duration 11 mins.approx.)

Q E D ADMINISTRATION DIRECTIONS,

Pencil and Paper Tests to be Completed by Students

SAY:

Listen carefully while I tell you what to do with these pictures. Sometimes you may not know the answer to the question. If you do not know the answer to a question, just leave it and wait for the next question.

Now put your finger under the picture of the train at the top of the page. Find the first car from the engine and mark under it. Mark under the first car from the engine.

CHECK TO SEE THAT ALL CHILDREN HAVE MARKED THE CORRECT SPACE. CLARIFY THE DIRECTIONS IF THERE IS ANY MISUNDERSTANDING.

READ TO THE CLASS EACH OF THE DIRECTIONS BELOW. ALLOW ENOUGH TIME FOR THE CHILDREN TO MAKE THEIR CHOICE (ABOUT 10-15 SECONDS); THEN CONTINUE WITH THE NEXT QUESTION.

1. Move your finger to the next row, where you see a picture of a duck. Mark under the square.
2. Move your finger to the next row. In this row, you see some boys. Mark under the tallest boy.
3. Move your finger to the next row. Look at the large numeral. Mark under the number of dots that this large numeral says.
4. Move your finger under the next row. Look at the horses. Mark under the third horse from the fence.
5. Move your finger under the next row. See the cups and saucers. Mark under the group with the same number of saucers as there are cups.

6. Put your finger under the first row. See the pears. I will put 9 of them in my basket. Put a mark on each of the 9 pears I will put in my basket.
7. Move your finger to the next row. Mark under the nest with the most eggs.
8. Move your finger under the next row. See the men. How many men are there? Mark under the correct numeral.
9. Now move your finger under the first box in the next row, the one that starts with a picture of a pencil. Mark under the number that is one less than 10.
10. Move your finger to the next box in this row. The top bed has four kittens in it. The numeral 4 is written in the box next to the bed. How many kittens does the bottom bed have? In the box write the numeral that tells how many kittens are in the bottom bed.
11. Move your finger under the first box in the next row. Mark under the smallest figure.
12. See the mittens in the next box in this row. Draw a ring around half of the group of mittens.
13. See the clocks in the next row. Jeff has dinner at 6 o'clock. Mark under the clock which shows 6 o'clock.
14. Look at the ice cream cones in the next box. Write in the box the numeral that tells how many ice cream cones there are.

Sample:

1.

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2.

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3.

6

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