

ANXIETY IN YOUNG CHILDREN: DIFFERENCES IN ABILITY TO RECOGNIZE
FACIAL EXPRESSIONS

by

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Abstract

The current study investigated the relationship between shyness in five-year-olds and their ability to recognize facial affect from photographs. Shyness is thought to be a vulnerability for the development of anxiety. The onset of anxiety can occur in early childhood, and often the symptoms can be problematic for very young children upon entry to the school system. A particular line of research experimentation has asked anxious children and adults to identify the emotions of people shown in photographs (Battagila, et al., 2005; Pine et al., 2005; Simonian, Beidel, Turner, Berkes, & Long, 2001). While anxious individuals are less able generally to recognize emotions in others (Simonian et al.), they also have a tendency to over ascribe negative emotions in others. Some research (Pine et al.) also shows significant results indicating slower recognition times for anxious youth

Thirty-six slides from the *Pictures of Facial Affect* (PFA) developed by Ekman and Friesen (1976) were presented to 128 kindergarten children. Four trends emerged between the accuracy of "shy" children and "not-shy" children, as identified by their parent, when identifying sad, mad, scared, and all emotions overall, with the not-shy children being more accurate in their responses. A significant difference also emerged with the reaction time of "shy" children being significantly greater than the reaction time of "not shy" children.

This study found happiness was clearly the most accurately recognized expression by all students (N=118), followed by accurate identification of anger. Finally, all children were significantly less accurate in recognizing sadness, surprise, fear and disgust.

Table of Contents

Abstract	ii
Table of Contents	iii
List of Tables	v
Acknowledgments.....	vi
Introduction.....	1
Statement of the problem	1
Purpose of the study	6
Significance of the study.....	6
Theoretical Perspective	7
Research question	10
Hypothesis.....	10
Definition of terms	10
Literature Review.....	12
Introduction.....	12
Development of Facial Affect Recognition	18
A temperamental predisposition	22
Methodology	24
Introduction.....	24
Participants.....	24
Measures	25
Procedures.....	26
Results.....	30
Overview of Analysis.....	30
Descriptive statistics	31
Demographics	31
Gender Distribution in Shy and Not-Shy Groups Based on Parent or Teacher Identification	32
Separation anxiety symptom (SAS) ratings by parents	33
Shyness Ratings by Informant	33
Teacher ratings.....	33
Parent ratings.....	33
Agreement between parent and teacher rating.....	34
Agreement of Shyness and Separation Anxiety Symptoms.....	35
Inferential Statistics.....	35
Reaction Time	35
Accuracy of emotion identification.....	36
Main effect of emotion.....	38
Main effect of group assignment as shy or not-shy.	39
Based on teacher identified as shy.	40
Based on parent identified as shy.....	40
Based on identified as shy by both parent and teacher.	40
Discussion and Conclusions.....	41
Conclusions.....	41
Separation Anxiety and Shyness.....	43

The need to recognize emotion in others	44
Reaction time in recognition.	44
Accuracy in recognition.	45
Support for the developmental literature.	45
Limitations	46
Conclusion	49
References	51
Appendix A	57
Appendix B	58
Appendix C	61
Appendix D	64
Appendix E	65
Appendix F:	67
Appendix G	68
Appendix H	69

List of Tables

Table 1.....	32
Table 2.....	37

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Introduction

Statement of the problem

Anxiety is the most commonly occurring mental health disorder that affects individuals across the life span. Somers, Goldner, Waraich, and Hsu (2006) reviewed the anxiety literature from 1980 to 2004, and pooled 41 prevalence and five incidence studies from around the world, finding lifetime prevalence rates of any anxiety disorder in the general adult population to be approximately 16.6%. Looking more specifically at children, a review of research by Albano, Chorpita, and Barlow (2003) indicates that “of 15 epidemiological studies, 11 estimate the prevalence of childhood anxiety disorders at greater than 10%. In the United States, four of five large surveys estimated prevalence [of childhood anxiety] to be 12-20%” (p. 302).

The onset of anxiety can occur in early childhood, and often the symptoms can be problematic for very young children upon entry to the school system. Separation anxiety disorder, for example, can have an early onset before six years of age, and is associated with “an acute and early onset...often occurring after a major stressor such as the start of school” (Last, 1989, p.162). Commonly these troubled children do not receive a diagnosis of anxiety disorder or treatment (Zubrick et al., 2000). Currently, programs and support for these young children are limited and under researched. This is concerning considering that cognitive behavioural therapy (CBT) has repeatedly been shown to be effective in treating anxiety in children, with research by Barrett, Duffy, Dadds, and Rapee (2001) “suggesting that the beneficial effects of CBT for childhood anxiety disorders are maintained, even five years to seven years after treatment” (p. 140). Conversely, if left untreated, separation anxiety disorder has been shown to have high comorbidity rates with generalized anxiety

disorder (overanxious disorder) (GAD) and depressive disorder (one third of children with SAD will also report symptoms of GAD and another one third will report depressive disorder within months of the onset of separation anxiety) (Last, p.161). "Girls with SAD are especially at risk for panic disorder and agoraphobia" (Albano et al., 2003, p.299).

Programs that are supported and empirically validated for older children and adults are cognitive-behavioural (CBT) in approach (Manassis, 2000). In these programs, there is often a component that addresses social skills training and support (Simonian, Beidel, Turner, Berkes, & Long, 2001). This component of intervention is based on research that identifies anxious children and youth as less able to read social cues (Battaglia et al., 2005; Beidel, Turner, & Morris, 1999; Eschenbeck, Kohlmann, Dreger, Koller, & Lesser, 2004; Simonian et al.). A particular line of research experimentation has asked anxious children and adults to identify the emotions of people shown in photographs (Battagila et al.; Pine et al., 2005; Simonian et al.). While anxious individuals are less able generally to recognize emotions in others (Simonian et al.), they also have a tendency to over ascribe negative emotions in others (Manassis & Young, 2000). One of the stated goals of this research stream has been to help form treatment programs by training adolescents and adults to recognize subtle emotion cues accurately in others to help reduce anxiety symptoms (Simonian et al.).

This research regarding the ability of people to recognize accurately emotion cues in others has not yet been extended to young children. Although Simonian et al. (2001) note, "The ability to recognize facial emotion is present at age three, with adult competency reached by age ten" (p. 138), there is little research on the development of this ability. Which emotions are most easily recognized by children? Is there a common sequence of

emotion recognition attainment (i.e., do all children learn to recognize anger before they can recognize surprise or disgust)? How much time elapses between the acquisition of the ability to recognize one emotion before the next and eventually all emotions? Are there individual differences in acquisition of this skill? Limited research on what emotions children learn to recognize first (Caron, Caron, & MacLean, 1988) has been conducted with older youth and adults. Typically experiments are refined with older, more cognitively able populations and then extended downward to younger populations. The issue of limited global cognitive and social development complicates the research with young children. Developmental ability appears to have been viewed as a complicating factor in past studies, and may be one reason that young children have not yet been assessed for ability to recognize facial expression.

Kagan, Reznick, and Snidman (1987) have conducted longitudinal research to examine a temperamental construct they term behavioural inhibition (BI). "The original behavioural referent...when the child was in an unfamiliar situation [was that] some children consistently become quiet, vigilant, and restrained while they assess the situation and their resources before acting" (p. 668). Kagan's research has found that, beginning in infancy, between 15% and 20% of infants display this temperamental quality (Prior, Smart, Sanson, & Oberklaid, 2000). The action of withdrawal to a variety of incentives more specifically describes a behaviour pattern largely characterized by social inhibition, discomfort with novelty and heightened physiological arousal. This syndrome has an early onset (as early as four months of age) and persists until at least age seven and one half (Kagan, Snidman, & Arcus, 1992). While behavioural inhibition is used to describe avoidant and hesitant behaviour in infants, young children displaying the same behaviour

are often labelled as shy. Jonathan Oakman (1998) points out that shyness and social anxiety are often described in highly similar terms. Research by Kagan et al. and Turner, Beidel, and Townsley (1990) indicates that an early onset pattern of anxiety, inhibition, and shyness may be a developmental precursor of social phobia. Beiderman et al.'s (2001) study of children between the ages of two and six noted that those children who were labelled as BI were specifically at higher risk for avoidant disorder and social phobia, but no other disorders (p.1676). Turner et al. speculate that shyness may instead be a milder version of social phobia. Other research also supports a relationship between early behavioural inhibition and later development of future social anxiety. Beiderman et al. (1990) looked at offspring at risk for panic disorder and found that children ranging in age from two to six years had a "rate of social anxiety disorder [that] was significantly higher in inhibited children than in children without behavioural inhibition (17% vs. 5%)" (p.1676). Shwartz, Snidman, and Kagan (1999) found that inhibited toddlers develop generalized social anxiety by early adolescence at a rate far higher (34% vs. 9 %, p. 1013) than adolescents at the opposite extreme (who had been identified as uninhibited as toddlers). Shwartz et al. suggest that a new focused interest on young children who display extreme levels of shyness may be informative of future anxiety development.

A link between BI and future social anxiety has been consistent, and there is a question as to whether separation anxiety may also be tied to this potential progression. Battaglia et al. (2005) conducted a study in which they interviewed third and fourth grade children from an inception cohort that had one year previously been identified as shy-behaviourally inhibited, based on a teacher completed questionnaire, and direct observation of children's spontaneous comments made in the presence of an unfamiliar adult. Their

shyness-BI index significantly predicted lifetime symptoms of social phobia, as measured by a semi-structured clinical interview (the Italian version of the Schedule for Affective Disorders and Schizophrenia for School Aged Children, K-SADS, Kaufman, 1997) one year later. The K-SADS interview is a standard structured diagnostic interview used to assess the children's lifetime DSM-IV childhood disorders, and while no other symptoms of mental disorders were predicted by their K-SADS interview, the closest disorder of significance was separation anxiety ($p = .18$) (Battaglia et al., p. 89).

Another line of research suggests that separation anxiety is more closely linked to generalized anxiety disorder in young children. Spence, Rapee, McDonald, and Ingram (2001) administered an anxiety questionnaire to 755 preschool children (ranging from 31 to 83 months of age) to determine if young children's anxiety symptoms reflected those subtypes of anxiety in the DSM-IV (APA, 1994) classification. Although they observed that other anxiety subtypes existed (social phobia, separation anxiety, generalized anxiety, obsessive-compulsive disorder, and fears of physical injury), "it was not clear whether separation anxiety and generalized anxiety represented clearly distinct factors" (p. 1310). The authors concluded, "It is possible that distinct anxiety disorders of generalized anxiety and separation anxiety do not fully emerge until later in childhood" (p. 1311). Last (1989) contends that one third of children with SAD had secondary GAD (p. 161). Returning to a behavioural inhibition-social anxiety-separation anxiety link, Craske (1997) reiterates that "BI bears some resemblance to the construct of separation anxiety... like BI, separation anxiety may be another manifestation of a broader construct such as trait anxiety or neuroticism" (Biological factors, ¶ 15). Behavioural inhibition, shyness, social anxiety, and separation anxiety exist as distinct and measurable conditions for young children. Further

research may answer the question as to the relationship to each other and childhood functioning. An increased understanding of the role of facial affect recognition ability may contribute to this area.

Purpose of the study

The purpose of this study is to determine whether there is a relationship between shyness, or separation anxiety in five-year-olds and their ability to recognize facial affect from photographs. The study used data from kindergarten students attending several public schools in a large suburban school district in the Lower Mainland of British Columbia. The two independent variables were shyness, generally defined by asking parents and teachers to identify children as "more shy, or not, than their peers" and separation anxiety, generally defined by asking parents to identify children as "having difficulty separating from me/my partner/home more often than children of the same age". The eight dependent variables were the six different facial expressions represented in the photographs from *The Pictures of Facial Affect* developed by Ekman and Friesen (1976), overall time taken to complete the measure (response to all 36 photos), and overall accuracy in identifying the correct emotion displayed in the photographs.

Significance of the study

A study of the abilities of shy and non-shy kindergarten students to recognize facial affect from photographs may contribute to the research literature on the relationship between anxiety and ability to recognize facial affect in others. To date, the research has not extended to children this young, and providing a more complete picture of the population may be beneficial to the literature on anxiety and facial affect recognition. The results of this study may also suggest new information such as insight into emotion

recognition development, and potential benefits of early introduction of skill development. Second, this study may also increase awareness in practitioners and early childhood educators, improving program development and intervention for kindergarten age children. Simonian et al. (2001) emphasize the importance for all humans of having the ability to recognize facial affect. "The process of emitting and accurately interpreting non-verbal cues, such as facial affect is critical to effective communication, and is an important component of overall social comprehension" (p. 138). The existing British Columbia personal planning curriculum (British Columbia Ministry of Education, 1999), as described in the Integrated Resource Package, supports identification of and practice in recognizing affect in self and others. In fact, one of the six suggested instructional strategies for Kindergarten and Grade one is, "Have students try to associate facial expressions (yours or those of people in photographs) with the expression of different feelings." Finally, the results of this study may support the current implementation of the FRIENDS program (Barrett, 2004), an anxiety prevention curriculum currently implemented and funded by the Ministry of Child and Family Development (http://www.mcf.gov.bc.ca/mental_health/friends.htm) in cooperation with the Ministry of Education.

Theoretical Perspective

Cognitive developmental theory, developed by Jean Piaget, shaped the study of child psychology. Piaget proposed a model for the mental development of the mind (Crain, 1992). Over 60 years Piaget gathered information supporting this mental development from birth to adulthood (Wadsworth, 1989). Piaget proposed a stage theory of children's cognitive development. This theory suggests that children move through four

developmental stages. Piaget maintained that children could move through the stages at different rates, but that the order of the stages is invariant. He also noted that new activities could be characterized in one of three biologically based ways. Children assimilate, accommodate, and organize new activities. These actions of assimilation, accommodation, and organization are found in all organisms, making them biological tendencies. This recognition of innate biological tendencies, which require the child to interact with the environment, essentially makes the child responsible for his or her own learning and results in an "active construction process" theory of development (Crain, p.103). The child can act on the environment and with objects in the environment, but social knowledge occurs when the child interacts with (rather than acts on) others. "As children interact with each other and with adults, opportunities for the construction of social knowledge are encountered" (Wadsworth, 1989, p. 23).

Piaget viewed intelligence as having two aspects, the cognitive and the affective (Crain, 1992, p. 31). "Continuous with cognitive development is affective development. Affect includes feelings, interests, desires, tendencies, values, and emotions in general" (p. 30). Piaget's first stage of development begins at birth and lasts for approximately the first two years of life. Piaget names this the sensori-motor stage of development. To reflect the extensive amount of change that occurs in the first two years of life, Piaget further divided this first stage into six periods. Much of the knowledge constructed during the sensori-motor stage is physical, and permits the child to learn about objects (including their physical self) in the environment. Concurrently, the child develops feelings and while "the infant is born asocial... by the end of the second year, the typical infant is developmentally at the point where true social interchanges become possible" (p. 56).

The second stage of Piaget's developmental model, the preoperational thought stage, is said to last from approximately two to seven years of age. The relevant aspect of this stage to this study is the social thinking component of cognitive development. Piaget stated that children in this stage are egocentric, "considering everything from their own single viewpoint" (Crain, p. 114). Flavell (1970) notes:

Piaget (1928) believes that the major vehicle for the developmental decline of...cognitive egocentrism is social interaction, especially with peers. Conflicts, arguments, and other dissonant interpersonal experiences gradually compel the child to pay attention to perspective differences, and thereby eventually to generate some conceptions and information gathering skills regarding human psychological processes. (p. 1027)

In the current study, if a child negotiates this second crucial stage poorly and fails to interact socially as predicted, shyness may result. Shy children will have theoretically less practice and less interaction with their peers, fewer opportunities to recognize facial affect, and thus possibly influencing their progress through this stage of social thinking. Shyness inhibits interaction, thus limiting pro-social activity and normative daily practice of social interaction. With less frequent spontaneous social interaction, shy children have less repeated experience in acquiring a normal range of skill acquisition. All of the subjects in this study, enrolled in kindergarten, will theoretically have been in the preoperational stage of cognitive development, all be within a year of each other in chronological age, and all have had the same amount of exposure in the school environment with daily peer interactions.

Research question

The research examined whether shy children (as identified by teachers and parents) differed from non-shy controls, and if the separation anxiety children (as identified by parents) differed from the non-separation anxiety controls in their ability to identify emotions in others, as pictorially represented in photos.

Hypothesis

1) Students identified by both parent and teacher, as shy would differ in their ability to accurately recognize facial expressions, with shy children being more inaccurate than non-shy children.

2) Shy children would take a longer time to identify the emotions of people displayed in photographs.

In addition, an exploratory hypothesis emerged: did parent identification of child separation anxiety would overlap with their rating of shyness, as well as the relationship between separation anxiety and facial recognition.

Definition of terms

Behaviourally inhibited children: React to unfamiliar events with initial avoidance, subdued affect, or distress. The source of the unfamiliarity can be people, situations, or events (Kagan, 1999)

Internalizing disorder: A class of disorders which are considered inner-directed. These disorders are those in which core symptoms are associated with overcontrolled behaviors (Reynolds, 1990).

Shy: A subtype of inhibited behaviour. Children are described as shy when unfamiliar people (as opposed to situations or events) induce initial avoidance, subdued affect, or distress (Kagan, 1999, p. 4).

Separation anxiety: Developmentally inappropriate and excessive anxiety concerning separation from home or from those to whom the individual is attached. Onset is before age 18 years, and lasts more than 4 weeks (DSM-IV, 1994, p. 113).

Literature Review

Introduction

Epidemiological data on the incidence of anxiety disorders in young children are limited, as are the treatment options available (Craske, 1997). While Albano et al. (2003) state, "In the United States, four of five large surveys estimated prevalence [of childhood anxiety] to be 12-20%" (p. 302), Kendall (1994) estimates that fewer than 20% of those with childhood anxiety receive the necessary intervention. Siqueland, Kendall, and Steinberg (1996) theorize that this lack of study and treatment can be explained because, despite the many problems anxious children suffer, anxious children typically demonstrate good behaviour and limited disruptiveness to others. Anxiety is considered an internalizing disorder which is "characterized by covert, inner-directed symptomatology" (Reynolds, 1990, p.137). Albano et al. support this explanation of the limited research and treatment for anxious children with their comment, "Children with internalizing disorders suffer for the most part in silence and are not easily identified as problematic" (p. 281).

A limited literature suggests a familial connection. Some research explains this familial connection from a 'nurture' perspective, suggesting that childhood anxiety may be due to parental factors such as "parental psychopathology, over protectiveness, and family disharmony" (Kearney, Sims, Pursell, & Tillotson, 2003, p. 593). Other authors take a 'nature' perspective, stating that "there is evidence for a genetic contribution [to anxiety disorders]" (Craske, 1997, Biological factors section, ¶ 2). The research confirms that early anxiety, if not treated, can lead to more severe and chronic anxiety later in life (Albano et al., 2003). Specifically, in a 21-year longitudinal study of New Zealand children, "significant associations remained between the number of anxiety disorders reported in

adolescence and young people's later risks of anxiety disorder, major depression, illicit drug dependence, and failure to attend university" (Woodward & Fergusson, 2001, p. 1092).

Determining or quantifying anxiety in children proves elusive, however. Due to the internal nature of anxiety, there is controversy in the field of childhood anxiety with regard to whether parents or teachers make more accurate informants of children's anxiety symptoms. Very often these groups of informants provide widely different information (Achenbach, McConaughy, & Howell, 1987). Achenbach et al. note that rater agreement is most consistent with raters who interact with the child in similar situations, and therefore teachers and parents may disagree in their assessment of child anxiety as they interact with children in vastly different environments. There is a body of literature that supports parents as good and accurate informants, specifically when it comes to internalizing problems such as anxiety. Parents have demonstrated anxiety ratings that closely mirror those of self-report rates of children (Roeser & Midgley, 1997). The familial connection, however, may confound these ratings as the parent may under or over recognize signs in their children due to their own level of anxiety. Conversely, there also exists a rich literature that supports teachers as reliable informants, extolling their understanding of students' psychological health as well as academic ability. Roeser and Midgley note that "[p]revious research has suggested that elementary teachers are good informants concerning student mental health"(p.119). There are some studies that call on both parents and teachers to serve as informants for anxiety, in order to complement each other, as parents and teachers observe the children in different environments (Warren, Emde, & Sroufe, 1999).

Research in the field of the development of facial affect recognition has examined several specific populations, including individuals with depression or disability, adults with brain injuries, the elderly, and abused or neglected children (Brosigle et al., 1983; Fox, 2004; Manassis & Young, 2000; McClure, Pope, Hoberman, Pine, & Leibenluft, 2003). Mrakotsy (2000) led an investigation with 20 preschool children who had symptoms of depression. She found that the preschoolers with depression symptoms were more accurate in identifying negative emotions, but showed no difference in recognizing positive emotions than normal controls. Kahana-Kalman and Walker-Andrews (2001) have documented facial affect awareness and discrimination in infants as young as 3.5 months of age. Caron et al. (1988) suggest that infants master sad-happy discrimination before angry-happy (p. 615). Martin and Rene (2006) exposed 12-14-month-olds and 16-18-month-olds to an adult expressing fear and sadness. While the 12-14-month-olds reacted in a manner that suggested understanding of fear, the 16-18-month-olds appeared to have also gained recognition of the expression of sadness.

There is growing interest in shy/anxious children's ability to recognize facial affect and the significance of deficits in this ability. The limited literature (Battaglia et al., 2005; Eschenbeck et al., 2004; Simonian et al., 2001) that attempts to link anxiety and ability to recognize facial affect examines older children (8-15 years old). While some research shows significant results indicating a bias towards recognizing negative emotions and slower recognition times for anxious youth, other studies have not replicated these findings, thus the results remain mixed (Manassis & Young, 2000 ; McLure et al., 2003; Simonian et al.).

Separation anxiety is developmentally appropriate in infants and toddlers until approximately three or four years of age, and it refers to the “developmentally appropriate distress regarding separation from significant others” (Kearney et al., 2003, p.593). It may become problematic and diagnosed as Separation Anxiety Disorder when it “is developmentally inappropriate distress for at least four weeks regarding separation” (Kearney et al., p. 593); meets three of the nine DSM-IV criteria; impairs daily functioning; and is seen in kindergarten age children or older. While the mean onset of separation is 7.5 years, a significant minority of children (4%, Bernstein, 2005) younger than 7 also meets diagnostic criteria.

A key problem in identifying anxiety in young children is the very internal nature of the disorder. Warren et al. (1999) tried to address this problem by examining play narratives of 5-year-olds, with the aim of predicting internalizing and anxiety symptoms at 6 years of age. The authors used story-stem play narratives and had nonclinical children demonstrate a resolution to the story through their play. The authors rated the children’s resolutions to the story based on specified internal representations of the self and past experience (e. g., Did the child go to a parental figure for help in stressful situations?). The authors also had parents, teacher, and child complete an anxiety-screening questionnaire. The authors found that child internalizing and anxiety symptoms reported by the parents, teacher, and child themselves at age 5 predicted mother reports of child separation anxiety disorder symptoms at age 6. They also found that child negative expectations demonstrated through play narratives measured at age 5 continued significantly to predict symptoms of separation anxiety disorder at age 6.

The findings of Warren et al. (1999) support several important assumptions of the current study. First, although none of the children in the Warren study were diagnosed with an anxiety disorder, parents, teachers, and the child reported symptoms that were predictive of future anxiety disordered behaviour. Second, the child's perception of the world at age 5 was constant a year later and symptoms of anxiety at this age were indicative of anxiety symptoms one year later (Warren et al.).

The assumption of Warren et al. (1999) that symptoms of anxiety in young children would be indicative of a future anxiety disorder has support in the literature. Kagan (1999) looked at the etiology of anxiety from a temperamental perspective. He and his colleagues "regard shyness with unfamiliar children or adults as only one feature of a much broader temperamental category" that they call inhibition to the unfamiliar (p. 4). Research has indicated that a progression can be seen from infants who display an inhibited temperament developing into young children who are described as shy, who then frequently develop into youth and adults who suffer from anxiety disorders. In fact, several studies have examined temperamental features of shyness as predictors of subsequent anxious behaviours (Battaglia et al., 2005; Stemmerger, Turner, Beidel, & Calhoun, 1995). Kagan is careful to say that not all behaviourally inhibited or shy children will develop an anxiety disorder, but rather that behavioural inhibition may predispose a child to the development of anxiety (Stemmerger et al.). This behavioural inhibition appears to have a biological basis. Suomi, Kraemer, Baysinger, and DeLizio (1981) conducted research on rhesus monkeys that also indicates the existence of a group of 'high reactivity' monkeys who consistently respond to stressors in a similar fashion to behaviourally inhibited children (withdrawal). Gray (1987) notes research on rats that has demonstrated that reactivity can be bred in rats (p. 43). There

is also preliminary evidence in humans that indicates BI may reflect a lower threshold in the limbic and sympathetic nervous system (Kagan, 1989). Fox et al. (2005) were able to identify a potential gene-environment interaction, with children identified as behaviourally inhibited having a specific allele: "This study provides initial evidence for an ... (interaction between maternal report of social support and child's 5-HTT [allele] status) in predicting behavioral inhibition in middle childhood" (p. 924). This evidence for behavioural inhibition across species is combined with similar prevalence rates of anxiety reported in behaviourally inhibited children in multiple studies (Beiderman et al., 1990; Kagan, 1999; Turner, Beidel, & Wolff, 1996;). The across species and childhood prevalence rates support the theory that behavioural inhibition represents a generalized genetic or functional neuroanatomical vulnerability for anxiety. Turner and colleagues conclude that behavioural inhibition might represent one, but not the only, factor associated with the development of anxiety disorders. That is to say, "Behavioural inhibition is not necessary nor sufficient for the development of anxiety disorders, although the presence of behavioural inhibition may make an individual more vulnerable to the development of these disorders" (Turner et al., p. 170-171).

Research conducted that supports this progression from behavioural inhibition to shyness to anxiety disordered behaviour includes retrospective self-reports from adult patients with major depression (Gladstone, Parker, Mitchell, Wilhelm, & Malhi, 2005). These researchers found "a relationship between higher behavioural inhibition in childhood and the increased likelihood of having a lifetime diagnosis of social phobia" (p. 109). Stemberger et al. (1995) also found shyness to be reported as a characteristic throughout childhood for a majority (72%) of adults with social phobia (in comparison to 52% of a

normal comparison group). Retrospective studies, while valuable, are subject to memory bias and recall problems. Studying current childhood experience with anxiety overcomes many of these concerns.

Development of Facial Affect Recognition

There are three perspectives on the factors that affect ability to recognize facial affect. They are behavioural, biological, and cognitive in approach. Herba and Phillips (2004) conducted a meta-analysis on the behavioural and neurological perspectives of facial expression recognition development. They note, "To date, there has been no generally accepted theory of emotion processing, nor any generally accepted theoretical framework with which to understand the development of emotion processing and associated neural systems" (p. 1186). The behavioural perspective is reflected in research by Kahana-Kalman and Walker-Andres (2001) on infants as young as 3.5 months who focus longer on their mothers when the mothers are displaying positive affect. Sonnevile et al. (2002) synthesized results from more than eight studies, conducted from 1972 to 2002, finding that positive emotions are both recognized before negative emotions, and are recognized more accurately. Other research that has implications for the current study is Pollak, Cicchetti, Hornung, and Reed (2000), where neglected 3-5-year-olds were more liberal in selecting sadness, compared to physically abused or control peers, and physically abused 3-5-year-old children were more likely to select angry faces compared to a control group (p. 684). This behavioural research supports not only a developmental perspective, where children learn to recognize different emotions, and emotions on the faces of less familiar people as they develop, but it also supports an environmental and experiential perspective. The environment of abuse probably offers more representations of anger (and

thus children more readily recognized this emotion than non-abused children) and similarly one of neglect likely has more facial representations of sadness. Piaget suggests that increased exposure to a stimulus increases assimilation of that concept (Crain, 1992). Fernandez-Dols, Sierra, and Ruiz-Belda (1993) also have determined that the context of the situation affects perception of emotion, and that when there is social interaction taking place, more emotion is assumed.

The biological perspective adds another dimension to the research. Researchers such as Sprengelmeyer, Rausch, Eysel, and Przuntek (1998) have used medical imaging technology to demonstrate specific and separate parts of the brain being activated when patients recognize particular expressions. These studies have sometimes produced conflicting results, with different parts of the brain being indicated as activated between studies. What has been consistent is the finding that different parts of the brain are activated when recognizing different emotions, and damage to the brain can affect the ability to recognize certain emotions and not others. Adolphs, Damasio, Tranel, and Damasio (1996) examined patients with brain damage and found that all patients could recognize happy faces, but patients with deficits to the right hemisphere had deficits in recognizing negative emotions. This research suggests that deficits noted in ability to recognize positive or negative emotions, but not vice versa, might be biologically based and linked to specific areas of the brain.

The cognitive perspective suggests that there are two factors that trigger the perception of emotion: the first is the area of the face that is the focus. Sullivan and Kirkpatrick (1996) suggest that whether the eyebrows (upper part of the face), the eyes (middle), or the nose and mouth (lower) are focused on determines the perception of

emotion. "The component of focus appeared to be specific to emotion, with eyebrows being the salient feature for anger and fear and the mouth being the salient feature for happiness, sadness, surprise, and disgust" (Sullivan & Kirkpatrick, Discussion section, ¶ 1). This raises the question of whether facial expression emphasizing the mouth or the eyebrows offers more information, or if there is a developmental difference in which facial component children learn to look at first.

Another cognitive factor to consider is the time it takes people to recognize facial emotion. Sonnevile et al. (2002) note that there are virtually no data on the speed of facial emotion processing. They note that these data are crucial for understanding and helping individuals with facial emotional processing, "Accurate interpretation of facial information is a prerequisite for successful nonverbal communication, but speed of processing is equally crucial as personal communication proceeds on a time-base" (p. 201). The authors proceeded to collect their own data on this subject. In their preliminary study they concluded that, as with ability to recognize positive affect, the speed of recognition of positive affect increases and develops earlier than that of recognition of negative affect. Second, although there is not a significant increase in accuracy of recognition of facial affect between the ages of 7 to 10, there is a significant increase in speed of recognition.

These theories, or perspectives, offer different explanations of why there are differences in ability to recognize facial affect. They do not appear to be mutually exclusive, and may all offer insight into the current study. The behavioural research in particular supports studying children as young as five, and the biological research offers some support a familial link in anxiety. The possibility of a genetic predisposition to an inhibited temperament and the possibility that the recognition of certain emotions (positive

emotions) develops before the recognition of other emotions supports a developmental approach to facial affect recognition. Further support for the developmental theory is the research on the speed of identifying facial expressions.

A few studies examined facial affect recognition in anxious populations using participants ranging in age from 8 to 15 (Battaglia et al., 2005; Eschenbeck et al., 2004; Manassis & Young, 2000; McClure et al., 2003; Pine et al., 2005; Simonian et al., 2001), but most studies examined adults. The conflicting outcomes were explained by the population being studied, such as clinical populations versus non-clinical, differences in the subtype of anxiety disorder examined, or other methodological issues. Simonian et al.'s study looked specifically at children diagnosed with social phobia. They found that socially phobic children who were shown an array of photographs demonstrating six emotions (happiness, anger, fear, sadness, disgust, and surprise) performed significantly worse than a control group of peers in their ability to correctly recognize happiness, sadness, and disgust. In the study by Manassis and Young, however, the authors looked at a heterogeneous sample of anxious children, some with co-morbid disorders. Their results suggested that anxious children were less able to perceive low intensity visual emotional stimuli, and that these anxious subjects were more accurate in identifying sadness. In Manassis and Young's study, not only was the population varied in diagnosed anxiety subtype, but the method was also confounded by varying the dependent variable and adding auditory stimuli to the visual stimuli.

Another variation of the task was conducted by Eschenbeck et al (2004). They used a Stroop colour-naming task with 92 first and second grade children (a non-clinical population). In this case, rather than having children look at photographs of actual people,

the researchers used caricatures of four variants of angry faces and four variants of happy faces in four different colours. The children's task was to name the colour in which the caricature was drawn, regardless of the emotion being displayed. They observed that children with high trait anxiety took longer to identify negative stimuli. They also noticed a difference in the results of Grade 1 and Grade 2 students, with Grade 1 students showing a weaker relationship between increased responding time and increased error rates. This finding questions whether the developmental age of the children is an important factor in ability.

A temperamental predisposition

The temperamental trait identified by Kagan et al. (1987) as behavioural inhibition in infants has been shown to be quite static and linked to the development of shyness and anxiety in a significant number of children. Very young children can display anxiety disorders and symptoms of anxiety. In fact, separation anxiety is a very real and prevalent issue for children entering school. Early symptoms of anxiety are predictive of future problems with anxiety disorders, often becoming more severe and chronic with age (Kendall & Southam-Gerow, 1996). Social skill programs developed for older children and adolescents have been proven to be effective in treating current anxiety (Dadds & Barrett, 2001). It is, however, unclear whether these programs contain a component of social skills training that addresses correct identification of emotion as expressed both facially and in body language (Simonian et al., 2001).

Longitudinal research by Kendall and Southam-Gerow (1996) suggests that treatment results for a psychosocial intervention for anxiety disordered children were largely maintained two to five years after treatment. Recent developments in testing the

ability of anxious children and adults to recognize facial affect in others has supported these programs and hopes to shape development of these social skills programs (Simonian et al.). While much of this research has indicated that anxious individuals are less able to recognize facial affect in others, there has been a great deal of variation in the results, both in significance and in the particular findings. Some research notes deficits in recognition of only negative emotions, while other research suggests that both positive and negative emotions are affected. The literature indicates more agreement in the findings when the displayed emotion was frequently demonstrated or strongly displayed (Eschenbeck et al. 2004; Manassis & Young, 2000; Simonian et al.). Other research suggests that people with certain subtypes of anxiety, particularly social anxiety, demonstrate greater differences in ability to recognize facial affect when compared to non-clinical peers, and when comparing children suffering from nonspecific anxiety with their non-clinical peers. To date there has not been a consistent measure used to evaluate recognition of facial affect, nor has there been a common criterion for inclusion of subjects in studies.

Methodology

Introduction

This study was designed to compare children identified as shy and their non-shy peers in their ability to recognize emotions accurately in others. Second, children identified as experiencing separation anxiety (SAS) by their parents were compared with those identified as shy by their parents to determine if they examined the same construct, and whether shyness or separation concerns had a greater effect on ability to label emotions. In the examination of shy vs. not-shy children, the amount of agreement between parents and classroom teachers in their determination of children as “shy” was assessed. It was hypothesized that those students identified by both parent and teacher as shy would show both decreased accuracy in facial recognition, and a longer reaction time in the identification of the emotion displayed in the photographs.

Participants

Participants were kindergarten students from four elementary schools in a large suburban school district in the Lower Mainland of British Columbia. The district chosen provided a large demographic base. Four schools were approached, informed of the purpose and the procedures of the study, and all agreed to participate. They represented three of six geographical zones within the district, and represented the variety of school programs being offered in the district, including French Immersion, Montessori, Traditional, Fine Arts, and ‘regular’ track. There were nine kindergarten classes amongst the four schools, with five teachers in total (four teachers taught two half day Kindergarten classes each, with a fifth teacher teaching one half day class). There were a total of 180 students registered in the nine classes.

District and building principal consent were obtained before approaching the five classroom teachers. Once teacher consent and participation was secured ($N=5$), parents of the 180 students in these classes were sent home a consent form with a brief questionnaire attached. Students were provided with parental consent forms describing the nature of the research and the requirements for participation. One hundred and thirty-six parental consent forms were returned, and consent was given for 128 (71.1%) students to participate in the study. Active parent consent was required for a child to be a participant in the study and to collect demographic information. Participating students were released individually from class for 10 minutes each in order to complete the facial expression labelling exercise. The researcher was blind to the child's identification by parent and/or teacher as shy or having separation symptoms. As each child entered the school hallway, the researcher described the study to the child, aware of the age and population, the researcher attempted to comfort the children through tone of voice, warmth and sitting at the child's level. The researcher then asked the children if they would like to try and guess the feelings the person in the photograph was showing. They were told they could return to class if they changed their minds, but if they did want to look at the pictures with the researcher, they were asked to print their name on the child form to indicate assent. The child was then offered to choose a colour of pen they would like to print his/her name in before starting the *Picture of Facial Affect* task. All children (100%) agreed to complete the task.

Measures

Thirty-six slides from the *Pictures of Facial Affect* (PFA) developed by Ekman and Friesen (1976) were presented to all children who had parental consent to participate and who gave personal assent. The PFA consists of 110 pictures, but this original set was

reduced to 36 pictures to account for the young children's shorter attention span. The validity of this subset of photographs is supported by its use in Simonian et al.'s (2001) study. The selection of this subset of photographs was made based on correspondence with researchers in Dr. Ekman's office and the choice of slides was based on his original data (personal communication, November 10, 2005). These photographs were displayed on a 12 x 9 inch laptop monitor. The slides consisted of black and white photographs of adult males and females displaying facial expressions of six basic human emotions (happiness, sadness, anger, fear, surprise, and disgust). The slides have been used in many studies of emotion recognition and with special populations such as children with learning disabilities and children with emotional disturbance (Guthrie & Smouse, 1981; Holder & Kirkpatrick, 1991). The 36 slides were composed of six different individuals, three males and three females, each demonstrating all six basic emotions. The chosen slides consisted of the three male and female models that had a photograph for all six emotions, and that had the highest overall percentage ratings for correctness or accuracy of each emotion portrayed. The inter-rater reliability (collected from college students) for this subset of pictures ranged from .76-1.00, with a mean of .937. The order of the slides was randomly predetermined (by selecting every eighth photograph until all photographs had been selected) prior to the initiation of the study. For the sake of consistency the researcher chose to present the slides in the same order to all students.

Procedures

In late spring of 2006, parents were provided with the consent and information sheet asking them to rate their child on a 5-point, Likert scale as 'much more shy or fearful than other children of the same age'. This question is taken from the work of Canadian early

childhood anxiety researcher Dr. John Walker (personal communication, November 15, 2005). This question was used purposely, rather than a formal diagnostic measure, to reflect the non-clinical nature of the groups, to increase participation, and to decrease ethical concerns regarding labeling children. The parents were also asked to rate their child on a second 5-point Likert scale that asked them specifically about their perception of their child's level of separation anxiety, 'My child has difficulty separating from me/my partner/home more often than children of the same age'. In this study, the parents were asked to answer the question of separation on a 5-point Likert scale, with 1 being not at all true, 2 rarely true, 3 sometimes true, 4 often true, and 5 always true. For the 128 children in the study, parental "shy" scores of 4 or 5 (often or always shy) were classified as "highly-shy". Scores of 1 (not at all shy) were classified as "not-shy", with all scores of 2 or 3 belonging to the middle group.

Teachers were also asked to rate all students as "much more shy or fearful than other children of the same age" on the same 5-point-Likert scale given to parents. In addition, teachers were asked to identify the 5 most and 5 least-shy students in their class. This created three groups of children: a shy group, a middle group, and a non-shy group. Maximum class size is 22 students, which created group composition that was roughly 22.5%, 55%, and 22.5% (or for the total participating sample, teachers identified 33 children in the shy group, 60 in the middle group, 35 in the non-shy group). This resulted in slightly larger inclusion in the two extreme categories than in previous studies, where Beiderman et al. (2001) used scores in the upper 20th percentile to classify behaviourally inhibited (BI) children. Fifteen percent of a population of 1,100 Kindergarten children in Munich, Germany, were identified as extremely shy by teachers using a survey method

(Cranach et al., as cited in Kagan, Gibbons, Johnson, Reznick, & Snidman, 1990). Kagan et al. (1990) replicated approximately the same proportion (15%) of shy students in their U.S. screening of young children. Based on this previous research, and accounting for some discrepancies between parent/ teacher ratings, this study elected to use the slightly larger stated group size or 22.5% of the students screened were categorized into the shy and non-shy groups, in an attempt to relax the inclusion criteria on the part of the teachers and increase the number of children identified by both parent and teacher.

All students individually completed the Pictures of Facial Affect (PFA) assessment with the researcher at the school site. The teachers introduced the researcher and then the teacher allowed the researcher to give a short introduction of the research project to the whole class. The researcher explained that it was the child's choice to participate. Each child with consent then proceeded to go out into the hallway with the researcher and the process for gaining student assent was then followed. The PFA assessment is a forced choice task, and the experimenter explained one-on-one that the people in the picture would be showing one of six expressions: happy, scared, mad, sad, surprise, or disgust. The words scared and mad were substituted for fear and anger to better represent the vocabulary and comprehension of the participants' age group. Disgust is also considered an advanced emotion and concept, therefore, in the initial explanation of the task the experimenter attempted to clarify the concept by informing the children that "disgust is another way of saying someone thinks something is icky or yucky." The experimenter used a data collection sheet with the six choices and a no response option, and listed from numbers 1 to 36. There was also a final column to track time taken. The experimenter circled the answer given by the child, and attempted to record the time at which the response was given (in

order to not sacrifice the child's rhythm and natural speed of response, recording was sometimes skipped between photographs, and therefore, only total time taken to complete the task was utilized in the results). The children were permitted to advance the photographs once they had given a response by pressing the down arrow key, which was covered with a hand print sticker to make the computer key child friendly. This occasionally resulted in the photographs being advanced too quickly (this occurred with eight children), thus the researcher took over advancing the photographs.

The assessment was timed from start to finish. Each photograph was timed on the computer to a 30-second maximum time limit. If the child gave an answer before the 30-second time limit the child advanced to the next photograph to reflect the amount of time they required to name the emotion. When the child did not give a response in the 30 seconds, the picture advanced automatically. The experimenter then recorded 'no response' for that photograph, reassured the child with the statement "let's skip that person, and go on to this one", and then proceeded to the next photograph. Three children had 'no response' recorded for a total of 4 photographs.).

Results

Overview of Analysis

This was a preliminary comparison study designed to differentiate between the ability of children identified as shy, and those identified as not-shy, to label emotions accurately in others. The main hypotheses were: 1) students who were identified by both parent and teacher as shy would differ in their ability to recognize accurately facial expressions, with shy children being more inaccurate than non-shy children, and 2) shy children would take a longer time to identify the emotions of people displayed in photographs. In addition, an exploratory hypothesis was advanced. Since parents were asked to identify their child's level of separation anxiety, any overlap between shyness and separation anxiety, as well as the relationship between separation anxiety and facial recognition, was also explored.

The two main dependent variables were reaction time, as measured by the time each participant took to complete the Pictures of Facial Affect task of naming 36 photographs of facial expressions, and accuracy of facial recognition. The latter variable was categorical in nature. Participant responses were recorded as either accurate in identifying the expressed emotion ("correct"), or inaccurate ("incorrect"). 'No responses' were not included in the data set, however total time taken to complete the measure was still included for the 'no response' cases. In four cases children did not respond to a particular photograph, 30 seconds elapsed and the next picture advanced. Those particular photographs, and the emotion total that they belonged to, were excluded from the accuracy data. The total time for the task was, however, still calculated for these 3 children. (Three children exceeded the 30-second time limit for a total of four pictures [one child for two of the scared

photographs, #3 & #7, one child for the first picture of the measure, happy, and the third child for a sad photograph, photo #20]. Eight of the students also advanced the photos too quickly and skipped several photographs. In these cases their total time taken was also excluded from the results).

Descriptive statistics

Demographics

The demographic variables of gender and language spoken in the home were collected from parents. Of the 128 children participating, there was an almost even gender distribution, with 66 females and 62 males participating (51.6% and 48.4% respectively). Within the reported shy and not-shy groups identified by parents a greater number of girls were identified as shy (9 of 14). The teacher group appeared to also have a greater number of girls identified on the shy side (22 of 33), but had an almost even 'not-shy' gender distribution (See Table1). However, subsequent chi-square analyses were conducted and gender was determined to be non-significant for both the parent ($\chi^2(1) = 2.43$, NS) and teacher ($\chi^2(1) = 1.09$, NS) groups. Ninety-four of the 128 respondents (73%) indicated that English was the primary language spoken in the home. The other primary languages identified by parents were: Spanish (1), Cantonese (2), Punjabi (13), Russian (1), or English and another language (17). Of the 14 students identified as shy by parents, 11 (79%) had English as the primary language spoken in the home, and of the 26 students identified as not-shy by parents, 20 (77%) had English as the primary language spoken in the home. The teacher identified shy students included 22 (67%) English speakers, whereas the not-shy group had 29 (83%) 'English only' speakers. Despite the appearance of a difference in the teacher identified group ratios of English speakers, subsequent chi-square analyses were

Table 1

Gender Distribution in Shy and Not-Shy Groups Based on Parent or Teacher Identification

Informant	Parent		Teacher		Both	
	Shy	Not-Shy	Shy	Not-Shy	Shy	Not-Shy
Female	9(64%)	10 (38%)	22(67%)	19(54%)	4(57%)	6(50%)
Male	5(36%)	16(62%)	11(33%)	16(46%)	3(43%)	6(50%)

conducted and language was determined to be non-significant for both the parent ($\chi^2(1) = 0.01$, NS) and teacher ($\chi^2(1) = 2.38$, NS) groups.

Separation anxiety symptom (SAS) ratings by parents

The determination of students as having a high or low degree of separation anxiety was determined by parental rating. Children were rated as high separation anxiety (HSAS) if parents gave their child a rating of 4 or 5 ("often or always has difficulty separating"), and no separation anxiety (NSAS) if they received a parent rating of 1 ("not at all having difficulty separating"). Children with a score of 2 or 3 were placed in a middle group (moderate separation anxiety). Frequency of parental rating was examined, and it was determined that for the 128 children in the study, 13 children belonged to the high SAS group, 42 belonged to the no-SAS group, and 73 children were in the middle group (10%, 33%, 57%).

Shyness Ratings by Informant

Teacher ratings.

Of the 128 children participating in the study, 33 children were identified as 'shy' by their teacher, 35 were identified as 'not-shy', and 60 belonged to the middle group. The study design created a forced choice category for the teachers as the request was to name the top 5 and bottom 5 students showing shy symptoms, resulting in 25.8% and 27.3% respectively belonging to the shy vs. not-shy groups.

Parent ratings.

To determine parental rating of shyness, scores of 4 or 5 ("often or always shy") were coded as 'shy'. Scores of 1 ("not at all shy") were classified as 'not-shy', with a score of 2 or 3 belonging to the middle group. This resulted in 14 children belonging to the shy

group, and 26 belonging to the not-shy group, and 88 children in the middle group. Despite allowing two scores (always and often) to compose the shy group, and only utilizing the one extreme score of "never" to form the not-shy group, the parent groupings produced a skewed distribution, as there remained almost twice as many children in the not-shy as the shy group (10.9% and 20.3% respectively).

Agreement between parent and teacher rating.

The original aim of the study was to form the final shy and not-shy groups consisting of only students identified by both parent and teacher. However, there was a relatively low degree of parent and teacher agreement. Frequency of parental and teacher agreement for the 128 children in the study resulted in a "shy" group of 7 children, a "not-shy" group of 12 children, and agreement on 42 children in the middle group. Despite the potential of the parent and teacher identified children as being a more accurate and globally-identified group, this low level of agreement and small sample made it difficult to draw any conclusions. Therefore, all results data were analysed for both the parent and teacher identified shy and not-shy children separately. For those results, common statistical practice was followed, and significance levels were determined at the $p < .05$ level, and trends were reported at the $p < .10$ level.

The data for the "both parent and teacher" identified shy group ($n=19$) were also analysed, with the hopes of discovering consistency between the individually identified groups. Due to the low power of this small n , significance levels of $p < .05$ were required to comment on trends and $p < .01$ was required to comment on significant findings, with all of these findings viewed tentatively.

Agreement of Shyness and Separation Anxiety Symptoms.

A further aim of this study was to examine any overlap in the constructs of shyness and separation anxiety, and their influence on accuracy and reaction time in identifying emotions in photographs. Since only the parents provided ratings on both of these constructs, the classification of students as having both a high degree of separation anxiety symptoms and being shy, or conversely, having a low degree of separation anxiety, and being not-shy was determined by parental rating. Parent group composition from the ratings above (13 SAS children and 42 no-SAS children vs. 14 shy and 26 not-shy children) was utilized. The overlap of these two groups resulted in 6 children being identified as having high SAS and being shy, 21 as no-SAS and not-shy, and 62 children (of 73 SAS and 88 shy) in the middle group. This not only resulted in a very small shy/SAS group, but it also indicates that of the 13 children identified by their parents as shy, and 14 children identified as high-SAS, less than half of these were the same children. This lack of agreement in the identification of children as being both shy and showing symptoms of separation anxiety, and the resultant small sample, renders it difficult both to analyze the data (as the power of the analyses would be low) and to draw any generalizable conclusions from such analyses. It was therefore determined that this parent 'shy and SAS' group would not be included in any further analyses.

Inferential Statistics

Reaction Time

Total response time to complete the PFA measure was recorded. The maximum time to complete the photo identification was 18 minutes (36 faces X 30 seconds). Overall group means were determined for the four subgroups: parent identified separation anxiety, parent-identified shyness, teacher identified shyness, or both teacher

and parent identified shyness. Independent sample t-tests were conducted and a significant difference emerged between parent and teacher identified shy or not shy children. The reaction time of shy children as identified by parents was significantly greater than the reaction time of not shy children, with shy children taking a mean time of 4m 11s (SD = 1m 3s) and not-shy children having a reaction time mean of 3m 22s (SD = 47s); $t(35) = 2.70$, $p < .05$. The same finding also emerges for teacher identified children with the identified shy children having a reaction time mean of 4m 28s (SD = 1m 30s) and the not shy children having a mean of 3m 32s (SD = 59s; $t(65) = 3.004$, $p < .01$). (For the children identified by both parents and teacher the difference achieved a significant trend level difference with shy children having a reaction time mean of 2m 29s (SD = 1m 15s) and not-shy children having a mean of 3m 18s (SD = 53s; $t(16) = 2.308$, $p < .05$). However, no significant difference emerged between parent identified separation anxiety symptom children with regard to reaction time. Due to the over representation of girls in the teacher identified sample, univariate gender x group x time ANOVAs were conducted for all three groups (identified by parent, teacher, or both). Those results are reported in Appendix G. There was a gender effect noted for the children identified as shy by their teacher for overall time taken. There was also an interaction effect noted for the children identified as shy by their teacher for overall time taken.

Accuracy of emotion identification

In order to determine whether there was a difference in accuracy of emotion recognition, the frequency of accurate responses to each facial expression was recorded. The means for the number of correct responses for each of the 6 emotions and for overall accuracy are presented in Table 2. This was conducted for all children, parent rated (shy

Table 2

Accuracy of Emotion Recognition (N=128)

Group	Emotions						Total
	Happy	Sad	Scared	Mad	Surprise	Disgust	
Assignment							
All students who completed the measure							
	96.8%	65.2%	48.0%	74.5%	61.7%	40.0%	64.5%
Teacher shy or not-shy groups							
Shy <i>n</i> =32	96.7%	59.8%	52.2%	67.7%	52.0%	41.2%	61.3%
Not-Shy <i>n</i> =34	99.0%	69.2%	49.5%	77.8%	68.7%	41.2%	67.2%
Parent shy or not-shy groups							
Shy <i>n</i> =13	97.5%	58.3%	37.5%	60.7%	64.3%	51.3%	62.8%
Not-Shy <i>n</i> =24	99.3%	79.5%	55.0%	75.8%	71.0%	52.2%	69.6%
Parent separation anxiety symptoms or no-separation anxiety groups							
SAS <i>n</i> =13	93.7%	70.5%	57.7%	71.8%	51.3%	47.5%	65.4%
No-SAS <i>n</i> =39	95.3%	61.3%	53.0%	73.0%	62.0%	42.3%	64.5%

and SAS), and teacher rated (shy) groups. Unanimously across the groups, happiness was the most accurately (93%-99%) identified emotion. Due to the high rate of accuracy by all groups, happiness was removed from the data set (potential ceiling effect) and the same analysis was rerun. Removing happiness scores did not change any of the results significantly, and therefore will not be discussed in any more detail). The least accurately identified emotion was disgust (40%-51%) for all groups, except the parent identified shy children, who were least accurate in identifying fear (38.5%).

Three 2 X 6 repeated measures mixed factorial analyses were conducted. There was a significant difference for all three groups (parent and teacher identified shy, and parent identified SAS), indicating that there is a significant difference in ability to recognize particular emotions compared to others [$F(5,38) = 47.51, p < .001$, $F(5,27) = 54.14, p < .001$, $F(5,54) = 70.75, p < .001$]. There was no interaction effect recorded. In regard to the main effect of group assignment's effect on ability to recognize emotion, there was no significant difference in the Separation Anxiety groups, and it was therefore determined that the SAS groups would not be included in any further analyses.

Main effect of emotion.

The mixed factorial ANOVA indicated that for these kindergarten children, certain emotions were better recognized than others. Therefore one-way ANOVAs were conducted between all 6 emotions for the entire sample of children ($N=118$). Family wise error correction was applied, and $p < .001$ required for significance. Based on this criterion, happiness was significantly different in recognition accuracy than any other emotion, being the most well recognized emotion. Anger was also significantly different in recognition accuracy, being less well recognized than happiness, but more accurately recognized than

all other emotions. Finally, surprise, sadness, scared, and disgust were not significantly different from each other in accuracy of recognition.

Main effect of group assignment as shy or not-shy.

For the children identified by parent as belonging to the shy or not shy groups, there was a trend difference ($p < .10$) noted for the main effect of group assignment. There was a difference in total accuracy of response for shy and not-shy groups [$F(1, 31) = 4.073, p < .10$]. Additional analyses were therefore conducted and results for group differences were determined by conducting t-tests, with shy or not-shy group as the independent variables, and each different emotion as the dependent variable. In an attempt to be exhaustive in the analyses of group differences, and look for common trends, it was decided to run these analyses for the shy and not-shy children identified by teacher, as well as the small 'identified by both teacher and parent' groups.

To ensure that differences between genders did not influence any of the group differences univariate gender x group x emotion ANOVAs were conducted for all three groups (identified by parent, teacher, or both) and for all six emotions. Those results are reported in Appendix G. There were gender effects noted for three of the 21 ANOVAs conducted (the children identified as shy by their parent for accuracy in identifying happy, and for children identified as shy by both their teacher and parent gender effects were noted for happy and mad). There were also interaction effects noted for four of the 21 ANOVAs conducted (the children identified as shy by their teacher for happy and scared, the children identified as shy by their parent, for accuracy in identifying happy, and for children identified as shy by both their teacher and parent gender effects were noted for happy).

Based on teacher identified as shy.

For the children identified as shy or not-shy by their teacher, there were no significant findings, but trends at the $p < .10$ level were found for sad [$t(33) -1.75$, $p < .10$], mad [$t(64) -1.676$, $p < .10$], surprise [$t(61) -1.954$, $p < .10$], and all 6 emotions overall [$t(64) -1.723$, $p < .10$] with not-shy children being more accurate than their shy peers in all cases.

Based on parent identified as shy.

For the children identified as shy or not-shy by their parent, there was a significant difference ($p < .05$) for sad [$t(34) -2.489$, $p < .05$], and 4 trends ($p < .10$) found for scared [$t(33) -1.937$, $p < .10$], mad [$t(34) -1.782$, $p < .10$], and all 6 emotions overall [$t(35) -1.755$, $p < .10$] with not-shy children being more accurate than their shy peers in all cases.

Based on identified as shy by both parent and teacher.

For the overlap group identified by both teacher and parent, there was only complete data for 17 children identified as shy or not-shy. Therefore to account for the low sample size, significance levels of $p < .05$ were required for 'trends' and $p < .01$ were required for significance. With this more stringent inclusion criteria trends were noted for sad [$t(16) -6.793$, $p < .05$], and all 6 emotions overall [$t(16) -2.188$, $p < .05$] with not-shy children being more accurate than their shy peers in all cases.

Discussion and Conclusions

Conclusions

This study investigated the relationship between shyness in five year olds and their ability to recognize facial affect from photographs. Thirty-six slides from the *Pictures of Facial Affect* (PFA) developed by Ekman and Friesen (1976) were presented to 128 kindergarten children. The pictures were composed of six different adults, three males and three females, each demonstrating six basic emotions: happiness, sadness, anger, surprise, fear, and disgust. The accuracy of the children's labeling of the emotions, as well as the overall time taken for each child to identify all 36 emotions was recorded. Teachers had identified the 5 most, and 5 least shy children in their classes, and parents had rated their perception of their child's shyness and these children were divided into three groups, with a 'shy', 'middle', and 'not-shy' group. In accordance with a body of literature (Simonian et al., 2001, Eschenbeck et al., 2004) that examines the two groups of extremes, the shy ($n = 33$, $n=14$) and not-shy ($n = 35$, $n=26$ respectively) groups, as well as a third group that included only the shy and not shy children identified by both the teacher and parent ($n=7$, and $n=12$) were then compared for accuracy and reaction time differences in identifying emotions from pictures of facial affect.

"Shy" children identified by their parents were significantly less accurate in their ability to recognize sadness, than the not-shy children. Several trends emerged between the shy and not-shy groups, whether identified by teacher, parent, or those identified by both. The trends were always in the direction of the not-shy children being more accurate in their identification of emotions. For all three groups there was a difference in overall recognition of emotion ($p < .10$) and for accuracy of recognition of sadness specifically. For

the children identified as shy by the teacher there were also significant trend differences in recognition of mad and surprise, and for the children identified by their parents as shy the significant trend was also apparent for mad, and scared (see Appendix H). In both groups identified either by their teacher or parent a significant difference for reaction time emerged, with the reaction time of shy children being significantly greater than the reaction time of not-shy children. This pattern remained for the 'both' group (children identified by both teachers and parents as shy) as well, but only at a trend level.

This study found that with regard to emotion recognition acquisition there was a significant difference in all children's ($N=118$) ability to recognize certain emotions compared to others. Happiness was the most accurately recognized expression by all students, followed by rates of accuracy of identifying anger. Finally, all children were significantly less accurate in recognizing, sadness, surprise, fear and disgust.

There is a body of literature that suggests that a behavioural preference demonstrated in young children called behavioural inhibition leads to shyness which can lead to anxiety disorders (Kagan et al.1992; Turner et al., 1990). Several studies suggest that between 10-20% of the population on either end of the spectrum are either behaviourally inhibited or behaviourally uninhibited (Prior et al., 2000).

The current study compared teacher identified shy groups with parent identified shy children. The literature in the field of internalizing disorders in children discusses the inconsistencies of informant reporting, between parent and teacher (Roeser & Midgley; 1997; Stanger & Lewis, 1993; Warren et al., 1999). While research indicates that teachers have some knowledge of children's mental health, parents may be better reporters on

internalizing disorders. The results of this study suggest that very few children were identified by both parents and teachers as shy.

The method utilized to form teacher groups, by having teachers identify the top five shy and five least shy students in each class, resulted in larger groups of identified children on either end of the continuum. Despite this method that generated greater inclusion, the anticipated parent teacher agreement did not appear in the results. The parent results may have also been a reflection of the time spent with their own child (e.g., five years), in comparison to teachers who knew the children for eight months. Roeser and Midgley (1997) suggest, "Teachers are less able to perceive what are known as "internalizing problems" such as depressive symptoms and anxiety that do not eventuate in ostensible acting out or disruptive behaviour" (Achenbach et al., 1987; Loeber, Green, & Lahey, 1990). Considering children as self-informants may have aided in the creation of more stable shy and not-shy groups, but this was not included in the study design.

Separation Anxiety and Shyness

Literature indicates older children that suffer from social anxiety are less able to identify facial expressions accurately in others. Fewer than half of the children identified as shy by parents in this study were also seen as having separation anxiety symptoms. This may indicate that shyness and separation anxiety are two different constructs as identified by parents. There is research (Spence et al., 2001) that supports this idea, and suggests shyness may be a predictor of later social anxiety, whereas separation anxiety may actually be a different construct that coincides with later generalized anxiety. The very small sample size of this study makes that a very tentative assumption. With regard to the hypothesis that facial affect recognition would be less accurate and take longer for anxious children, this

study suggests that shyness is relevant to the ability to recognize facial affect, but separation anxiety is not. There was no significant difference between children who displayed symptoms of separation anxiety from those that did not, (for ability to label facial expressions, nor for total amount of time taken to identify the faces).

The need to recognize emotion in others

Reaction time in recognition.

“Accurate interpretation of facial information is a prerequisite for successful nonverbal communication, but speed of processing is equally crucial as personal communication proceeds on a time-base” (Sonneville et al., 2002, p.201). Speed of processing emotion recognition in the literature is limited. The few studies (Sonneville et al.) that do exist indicate that speed of processing could impede social communication and its development as well as accuracy of facial identification. The current finding, of a significant difference in overall speed of facial expression recognition in kindergarten (at approximately five years of age), is worthy of further study, and an exploration of this speed’s impact on social interactions for these children in the present and future. There were three children that took more than the 30-second time allotment to identify four photographs. Of those three children, two were considered shy by the teachers, and one of those two was also considered shy by their parent. The photos that they did not identify were the first, third, and seventh displayed in the series of 36 photographs (the 3rd child that was not identified as shy exceeded the time limit on the 20th photograph). It may be worth noting that, as could be predicted with shy children who may require more time to become comfortable in this setting, the missed photographs were all displayed at the beginning of the measure. It is also worth noting that due to study limitations this study calculated

overall speed of responding. The Sonnevile et al. study recorded speed for each emotion and noted that the speed of emotion recognition was fastest for happiness, and slowest for fear. A follow up study that could record response time for each photo, and therefore each expression, might add further understanding to the field.

Accuracy in recognition.

While the analyses regarding the hypothesis that shy children would be less accurate in recognizing facial affect was only found to reach significance in ability to recognize the sad photographs, several important trends were also found. Shy children tended to be less accurate in their identification of emotions. One significant finding in the parent-identified shy group, when looking at the total correctly identified sad photographs, was that shy children were less accurate in identifying this emotion compared to not-shy children. Both teacher and parent identified shy groups indicated a trend for overall accuracy, but the groups differed on individual emotional differences with parent identified shy children being less accurate in identifying mad and scared faces, and the teacher identified children having difficulty identifying sad mad and surprised faces.

Support for the developmental literature

The ability to accurately recognize unique facial expressions by all children was determined to be significantly different from analysis with repeated measures ANOVAs. This study found happiness was clearly the most accurately recognized expression by all students ($N=128$), followed by rates of accuracy of identifying anger. Finally, children were significantly less accurate in recognizing sadness, surprise, fear and disgust.

This supports the literature that children master recognizing certain expressions before others, and is consistent with the body of literature that indicates "happiness is

recognized earliest and with greatest accuracy, followed by sad or angry expressions, then by surprise or fear” (Hérba & Phillips, 2004, p.1187). Widen (1999) also found facial expression labelling accuracy increased with age and “with the three older age groups (3s, 4s, and 5s [year olds]) the order of correctly labelled faces was consistent with happy recognized more frequently then angry, then sad, surprised, scared, and finally disgust” (p.39).

Piaget’s developmental model of active constructivism discussed the concept of accommodation. He believed that people could only become proficient at a skill through practice and use. The finding that children identified by their teacher or parent as shy, took longer to identify the emotion being displayed in others, and were slightly less accurate in their identification of emotions of others, are supported by Piaget’s developmental model, and the importance of social interactions required to successfully navigate the preoperational thought stage of development.

Limitations

This was a preliminary investigation, noting several limitations. First, the sample size was small, and the population was a sample of convenience, with the schools chosen being ones the researcher had worked at and therefore had access. The families enrolled in the ‘choice’ schools may be unique, as attention to selection of school may have biased the sample.

The method utilized to have teachers identify ‘shy’ and ‘not-shy’ students, by requiring the teachers to name five students as shy and five as not-shy may have resulted in overly inclusive samples of shy and not-shy children. This may have resulted in students who should have been placed in the middle group being analyzed into the upper or lower

extremes of the entire sample. Perhaps asking the children themselves to complete a self-assessment measure would have supported a more robust shy and not-shy group. In one of Kagan et al.'s (1987) longitudinal studies on the stability of behavioural inhibition (BI), 21 month old children identified as either BI or uninhibited were revisited when they were 5 years old, enrolled in kindergarten. Kagan noted that there was "asymmetry in the stability of the two profiles... with about 40% of the original groups of inhibited children became less inhibited at 5 ½ years, while less than 10% of the uninhibited children became more inhibited" (p. 1461). The authors believed this was a reflection of societal values, and socialization experiences. This theory may have some relevance to the findings of the current study that produced a much smaller shy parental identified group (14) than the not-shy group (26). Kagan et al.'s allusion to a societal judgement against shyness may also be an indication that parents are hesitant to label their children as shy. Kagan has indicated that there is a biological basis for shyness. Shyness serves a protective function, and is not inherently problematic. If shyness is, however, perceived as something to be avoided by parents, and yet is not acknowledged in children who truly are shy this may create a problematic situation in family relationships and in helping children learn to approach new situations and people comfortably and confidently. This may be an area for future research.

Another limitation of this study was the measure used. Children were extremely accurate in identifying the happy (97% accurate) faces, and all children were also consistently poor at identifying the disgusted (40%) faces limiting the analysis of those expressions. Many of the remaining specific emotional expressions were difficult to discriminate. For example, sad picture #1 had 95% correct overall, where sad picture #3 had 1.7% correct. The adult normative data from Dr. Ekman (Appendix F) indicates that

some photos were more difficult to recognize than others even for college students. The black and white photographs are also quite dated, and a more up to date photo set may have been more appropriate. It would also be interesting to compare the results in a future study with photographs of peers rather than adults. There is support in the literature for use of children in pictures. Battaglia et al. (2005) chose to use standardized faces of children of a similar age for two reasons. "First, schoolchildren spend most of their time among other children, not adults; second, socially anxious children rate rejection and teasing from peers among the most feared situations" (p.89).

A further limitation was the method used for timing the subjects' responses. While overall time was recorded, in the future it may be beneficial to create a program that accurately times the child's response to each individual picture. This will allow more detailed analysis of reaction time. Eschenbeck et al.'s (2004) research findings suggest anxious children take longer to identify the negative faces, but not the positive expressions. Due to the choice to limit response time some potentially important data may have been lost. In an effort not to penalize the students who exceeded the 30-second time limit per picture, a "no response" was recorded for the emotions they did not identify. For the child identified as shy by both parent and teacher, the time taken to complete the measure contributed to the group differences for time, but the elimination of the child's score for sadness, and overall accuracy further reduced an already small n.

An ethical concern was that asking teachers and parents to label students as shy or anxious may inadvertently have caused an attributional bias and may have influenced how children were treated at school. In an attempt to minimize this potential bias, teachers and parents were given an informal measure to rate their child (student's)

shyness or level of separation anxiety. This may have limited the accuracy of the groups of children identified as shy or not-shy.

Conclusion

This study found that among children that enter the public school system at roughly five years of age, it takes a significantly longer amount of time for those children identified as shy to label the expression they see on an individual's face. There is also a trend for shy children to be less accurate in their recognition of facial expressions. There is a lack of consistency in the findings between parent and teacher-identified groups' affect labeling accuracy. This remains a puzzling finding in the literature, but this may lend support to the suggestion that parents are more accurate informants of internalizing disorders than are teachers, or even that children are the most accurate informants of their own mental health. This study also supports several growing bodies of literature that differentiate between shyness and separation anxiety, as parents did not identify their own children as being both shy and having separation issues. Finally, this study supports the existing developmental literature that suggests children become proficient at recognizing certain emotions before others.

The findings of this study go beyond supporting current findings in the literature, demonstrating that there is a difference in ability and speed of facial affect recognition in not only younger children than had previously been studied, but also in a non-clinical population. Piaget's active constructivism developmental model is supported by literature in the field suggesting that the gap in speed and accuracy of facial affect recognition will continue to grow, both in terms of the severity of social withdrawal for children who struggle to identify what others are feeling, and in terms of the severity of the deficit in

ability to recognize facial expressions. The literature suggests older youth with social anxiety have deficits in facial affect recognition may be expanded to younger children. "Older children with anxiety disorders report significantly higher levels of anxiety (and depression) than do younger children with the same diagnosis, which suggests that the symptoms may worsen over time" (Kendall, 1994). Early awareness may lead to early intervention, which will hopefully increase the opportunity for shy children to engage with their peers and through this practice reduce the level of anxiety around interpreting the emotions of others in social interactions.

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Consent:

Your participation in this study is entirely voluntary. You may refuse to participate or withdraw from the study at any time without jeopardy to your faculty standing or any other school function.

Your signature below indicates that you have received a copy of this consent form for your own records (pages 1& 2).

I consent / do not consent (circle one) to participation in this study.

Name: _____

Date: _____

School: _____

Number of years teaching: _____

Consent:

Your participation, and that of your child's, in this study is entirely voluntary. You may refuse to participate or withdraw from the study at any time without jeopardy to your child's class standing or any other school function.

Your signature below indicates that you have received a copy of this consent form for your own records (pages 1& 2).

Child's name: _____ **Gender:** Male ____ Female ____

Birth date: _____ **Language spoken at home:** _____

Siblings : _____ (age) ____ _____ (age) ____
_____ (age) ____ _____ (age) ____

I consent to my child's participation in this study (please circle) YES NO

How true is the following statement: (please circle the most accurate response)

"My child is much more shy or fearful than other children of the same age"

1	2	3	4	5
Not at all true	Rarely	Sometimes	Often	Always true

My child has difficulty separating from me/my partner/home more often than children of the same age

1	2	3	4	5
Not at all true	Rarely	Sometimes	Often	Always true

Parent (Guardian) Signature: _____

Date: _____

*Please complete this consent form including the informational questions and place in the enclosed envelope. Please seal, with your child's name on the outside **and return it to your child's teacher by Friday.** All responses will be held confidential.*

Appendix D

Student Assent Form

THE UNIVERSITY OF BRITISH COLUMBIA



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Student Assent Form

The purpose of this page is to give you the information you need in order to decide if you want to be in our research study "Anxiety in Young Children: Differences in Ability to Recognize Facial Expressions".

The reason for this study is to learn about how different kindergarten students recognize adult facial expressions, or feelings, when they see photographs of adults' faces. By taking part in this study you will help the researcher to discover if some children have more trouble than others in figuring out what others are feeling. This may lead to helping children learn to recognize others' feelings so that they don't get nervous and worried when they talk to people.

This is NOT a test. THERE ARE NO RIGHT OR WRONG ANSWERS. WE ARE ONLY INTERESTED IN YOUR BEST GUESS AT WHAT THE PERSON IN THE PICTURE IS FEELING. PLEASE ANSWER HONESTLY.

No one at school or in your community (not even your parents, teacher, or school principal) will ever see your answers (they will be confidential).

It is your choice whether or not you want to take part in this activity. At any time during the study you can choose to quit and there will be no consequences, you will not get in trouble. If you choose not to participate, it is OK, and you can just go back to class.

I will be happy to answer any questions you have before signing or later. Please indicate that you have listened to me read this page by printing your name on the line below. You can keep a copy of this consent form to take home.

Thank you for your help with our study.

Date: _____ Name: _____

Appendix E

Data Collection Form

School: _____

Teacher: _____

Child's Name: _____

Date: _____

							Time (0 sec.)
1.	happy	sad	mad	surprised	disgusted	scared	_____
2.	happy	sad	mad	surprised	disgusted	scared	_____
3.	happy	sad	mad	surprised	disgusted	scared	_____
4.	happy	sad	mad	surprised	disgusted	scared	_____
5.	happy	sad	mad	surprised	disgusted	scared	_____
6.	happy	sad	mad	surprised	disgusted	scared	_____
7.	happy	sad	mad	surprised	disgusted	scared	_____
8.	happy	sad	mad	surprised	disgusted	scared	_____
9.	happy	sad	mad	surprised	disgusted	scared	_____
10.	happy	sad	mad	surprised	disgusted	scared	_____
11.	happy	sad	mad	surprised	disgusted	scared	_____
12.	happy	sad	mad	surprised	disgusted	scared	_____
13.	happy	sad	mad	surprised	disgusted	scared	_____
14.	happy	sad	mad	surprised	disgusted	scared	_____
15.	happy	sad	mad	surprised	disgusted	scared	_____
16.	happy	sad	mad	surprised	disgusted	scared	_____
17.	happy	sad	mad	surprised	disgusted	scared	_____
18.	happy	sad	mad	surprised	disgusted	scared	_____
19.	happy	sad	mad	surprised	disgusted	scared	_____
20.	happy	sad	mad	surprised	disgusted	scared	_____
21.	happy	sad	mad	surprised	disgusted	scared	_____
22.	happy	sad	mad	surprised	disgusted	scared	_____
23.	happy	sad	mad	surprised	disgusted	scared	_____
24.	happy	sad	mad	surprised	disgusted	scared	_____
25.	happy	sad	mad	surprised	disgusted	scared	_____
26.	happy	sad	mad	surprised	disgusted	scared	_____
27.	happy	sad	mad	surprised	disgusted	scared	_____
28.	happy	sad	mad	surprised	disgusted	scared	_____

29.	happy	sad	mad	surprised	disgusted	scared	_____
30.	happy	sad	mad	surprised	disgusted	scared	_____
31.	happy	sad	mad	surprised	disgusted	scared	_____
32.	happy	sad	mad	surprised	disgusted	scared	_____
33.	happy	sad	mad	surprised	disgusted	scared	_____
34.	happy	sad	mad	surprised	disgusted	scared	_____
35.	happy	sad	mad	surprised	disgusted	scared	_____
36.	happy	sad	mad	surprised	disgusted	scared	_____

Appendix F:

Normative Data from Emotion Recognition Measure (Ekman)

Normative Data Collected from US College Students

	Happy	Sad	Fear	Anger	Surprise	Disgust	Overall % per poser
FEMALES:							
Poser #5	100	88	88	100	90	100	94.3
Poser #7	100	100	100	79	93	96	94.7
Poser# 8	100	92	79	100	100	94	94.2
MALES:							
Poser a	100	97	92	83	91	97	93.3
Poser d	100	93	96	76	97	88	91.7
Poser f	100	88	88	100	91	97	94.0
Overall % per emotion	100	93	90.5	89.7	93.7	95.3	93.7

Appendix G

Gender and interaction effects from 2 x 2 x emotion and 2 x 2 x time ANOVAs

	Teacher		Parent		Both	
	Gender	Interaction	Gender	Interaction	Gender	Interaction
Happy		***F= 7.87	***F= 6.83	*F= 3.13	***F= 9.33	***F= 9.33
Sad						
Scared		**F= 4.67				
Mad					**F= 5.13	
Surprise						
Disgust						
All						
Time	**F= 4.81	**F= 4.43				

* $p < .10$ ** $p < .05$ *** $p < .01$

Appendix H

Significant group differences as compared to the literature

Group	Happy	Sad	Mad	Scared	Surprise	Disgust	All Emotions
Simonian	X	X				X	
Teacher		+	+		+		+
Parent		X	+	+			+
Both		X	+				X

Note. X = significant at $p < .05$; + = trend at $p < .10$