Maternal Responses to Preschoolers' Success and Struggle during a Teaching Task:

Links to Family-Level Factors and Academic and Cognitive Outcomes


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A Thesis

in

The Department

Of

Psychology



Presented in Partial Fulfillment of the Requirements

For the Degree of Master of Arts (Psychology) at

Concordia University

Montreal, Quebec, Canada



May 2016

**CONCORDIA UNIVERSITY**

**School of Graduate Studies**

This is to certify that the thesis prepared

By:                  Saskia Ferrar

Entitled:            Maternal responses to preschoolers' success and struggle during a
                     teaching task: Links to family-level factors and cognitive and academic
                     outcomes

And submitted in partial fulfillment of the requirements for the degree of
                     **Master of Arts (Psychology)**
complies with the regulation of the University and meets the accepted standards with respect to
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**Abstract**

Maternal Responses to Preschoolers' Success and Struggle during a Teaching Task:
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The present study examined mothers' responses to their preschool-aged children's successful and unsuccessful actions during a semi-structured puzzle task. Associations between mothers' responses and the familial context were examined. In addition, children's cognitive and academic abilities were assessed at two subsequent time points, in relation to the parenting behaviors they were exposed to at the preschool age. Participants were drawn from the Concordia Longitudinal Risk Project, a longitudinal and intergenerational study of families from disadvantaged neighborhoods in Montréal, Québec. At Time 1, participants were 156 mothers and their preschool-aged children (1-6 years). At Times 2 and 3, 124 and 98 of these mother-child dyads participated when the children were aged six to 11 years, and nine to 13 years, respectively. Maternal responses to their children's successful actions were divided into three categories: process-focused praise, person-focused praise, and neutral acknowledgments. Responses to children's unsuccessful actions were divided into four categories: encouragement or helping, discouragement, neutral indications of mistake, or taking over.

Results revealed that mothers' responses were associated with the quality of their home environment, child characteristics, as well as maternal characteristics, including their histories of childhood aggression and social withdrawal. Furthermore, a lower frequency of mothers' taking over, as well as higher frequencies of encouragement or helping and neutral indications of mistakes, were associated with greater child cognitive and academic outcomes at subsequent time points. These results have implications for the development of parenting interventions that could promote adaptive responding to children's success and struggle in academic and associated learning contexts.

**Acknowledgements**

I would first like to extend my deepest gratitude to my research supervisor, Dr. Dale Stack, whose unwavering support, valuable insight and contagious enthusiasm have been indispensable. I would also like to thank my committee members, Drs. Nina Howe and Diane Poulin-Dubois for their important contribution to this project. To all the families who have graciously participated in the Concordia Project for so many years, we cannot thank you enough.

My fellow Stackies, I feel so fortunate to have scored the most amazing labmates around. Ciara, thank you for answering my many questions with a smile − but more importantly, for ensuring that our lab supply of chocolate is never depleted. Kelly, thanks for passing on your wisdom from one step ahead; I am almost grateful that we have so many years of grad school left together, as I know I'll rarely be alone on my eternal hunt for free food. Irene and Elana, thank you for your kindness and invaluable advice. Marisa, it has been great getting to know you, and I look forward to the many good times ahead of us.

Thank you also to all the staff and volunteers who have put so much hard work into this study. Joelle and Catherine, you are both such bright and generous people, and your dedication to this lab does not go unnoticed. Kathleen, thank you for the many hours you put into the reliability coding for my thesis. I am also indebted to Brenda Harvey, whose work inspired the development of my coding system.

To my awesome cohort, I cannot imagine going through this journey without all of you. Thanks for the support, the laughs, and the lunches.

Mum, Dad, Joe, Fred and Grandma, thank you for your endless supply of love and support, and for believing in me from the very beginning.

Finally, Max: my best friend, my love, my everything. You inspire me, you entertain me, you put up with me. Coming home to you is my favourite part of every day, and without you, none of this would have been possible.

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Parenting practices play one of the most crucial roles in child development (Bempechat, 1992; Spera, 2005; Lugo-Gil & Tamis-LeMonda, 2008). As early as the preschool age, approaches that respect children's autonomy and minimize the use of control foster the development of cognitive, academic and social competence into adolescence (Bernier, Carlson, & Whipple, 2010; Joussemet, Koestner, Lekes, & Landry, 2005; Matte-Gagné, Harvey, Stack, & Serbin, 2015; Harvey et al., 2016). An important context in which socialization takes place is instances during which children either experience success in a task that they are engaged in, or struggle to achieve their goals. It has been theorized that parents' responses in these key moments help shape their children's motivation, self-efficacy and perseverance (e.g., Kamins & Dweck, 1999; Lutkenhaus, 1984). The present study examined the full range of behaviors that mothers exhibit in response to their preschool-aged children's successful and unsuccessful actions during a semi-structured teaching task. Associations between mothers' responses and the familial context were examined in order to better understand the circumstances in which these behaviors occur. In addition, children's cognitive and academic abilities were assessed at two subsequent time points (at six to 11 and nine to 13 years of age), in relation to the parenting behaviors they were exposed to at the preschool age.

The use of psychologically controlling parenting strategies has consistently been shown to undermine children's socioemotional, cognitive and academic development. For example, controlling parenting has been associated with decreased perseverance in infants (Frodi, Bridges, & Grolnick, 1985), decreased attentional and behavior regulation in toddlers (Taylor, Eisenberg, Spinrad, & Widaman, 2013), increased physical aggression in middle childhood (Joussemet et al., 2008), and increased depression and substance use in young adults (Schiffrin et al., 2014; Aquilino & Supple, 2001). Mothers' sensitivity and contingent responsiveness also play an important role in the development of social and emotional competence as well as cognitive and academic abilities (e.g., Haley & Stansbury, 2003; Stams, Juffer, & van IJzendoorn, 2002; Leerkes, Blankson, & O'Brien, 2009). The use of hostile parenting strategies (e.g., having a short temper) is negatively associated with academic abilities in kindergarteners, while the inverse is true of displays of acceptance (Hill, 2001; Stack et al., 2012). Moreover, these associations are negatively associated with socioeconomic status (SES; Hill, 2001).

One way to understand how parents influence their children's academic and cognitive development is in terms of autonomy support. This refers to the degree to which parents

encourage independent problem-solving in their children, versus the use of control and pressure in trying to promote achievement (Ryan, Deci, Grolnick, & La Guardia, 2006). According to self-determination theory (SDT), humans have an intrinsic desire to explore that allows them to learn about their environments (Deci & Ryan, 1991; Ryan & Deci, 2000). However, when their sense of autonomy is disturbed due to the presence of controlling environmental forces, this motivation is undermined (Deci, Koestner, & Ryan, 1999) and their natural propensity towards learning is weakened (Ryan & Deci, 2000). Indeed, numerous studies have shown that when intrinsic motivation is encouraged in educational contexts, students' involvement and learning are enhanced (for a review, see Niemiec & Ryan, 2009). During the preschool period, parents are often the primary educators of their children. This is particularly true in families of lower SES, where the use of formal childcare services is less common (Geoffroy et al., 2012). Parental displays of autonomy support and decreased control are positively associated with children's intrinsic motivation, perceived competence, academic performance and socio-emotional development, both concurrently and later on (Grolnick & Ryan, 1989; Joussemet et al., 2005; Matte-Gagné et al., 2015). Autonomy support is generally studied in the context of compliance and choice of activities, rather than in relation to children's behaviors during specific learning tasks. However, it is quite likely that the degree of autonomy support versus control displayed when parents are involved in their children's educational activities are particularly important in predicting cognitive and academic abilities later on.

Dweck and colleagues have constructed a theoretical model positing that parents socialize their children's attitudes towards challenges in the ways they respond to their success and failure in academic endeavors (Kamins & Dweck, 1999). Specifically, they argue that individuals either have *fixed* or *growth* mindsets. Those with fixed mindsets display an essentialist way of thinking, believing that intelligence and skills are static. As a result, they perceive challenging tasks as threats to their abilities, and will shy away from them in order to avoid appearing unskilled or unintelligent. Those with growth mindsets, on the other hand, believe that abilities develop through hard work and effort. They see difficult tasks as opportunities to improve their abilities, and thus take enjoyment from them (Blackwell, Trzesniewski, & Dweck, 2007; Dweck, 1999; Dweck, 2007). These different attitudes towards challenge have large impacts on individuals' ultimate achievement. For example, growth mindsets are directly linked to students obtaining higher grades, and teaching students to adopt

them leads to improvements in achievement (e.g., Blackwell et al, 2007; Good, Aronson, & Inzlicht, 2003).

Dweck and colleagues' motivational model states that the ways in which parents respond to their children's success and failure play a major role in determining the mindsets they adopt. It is believed that there are two major forms of praise and criticism that children receive after completing a task successfully: person-focused praise or criticism, which is directed at their traits (e.g., "You're so smart; You're so dumb), and process-process praise, which is directed at their efforts and their actions (e.g., "You worked hard", "You should try another way"; Kamins & Dweck, 1999). Children who experience a greater proportion of process-focused praise and criticism would be expected to develop growth mindsets, as they will come to believe that their performance is a result of their effort. Conversely, children who experience a greater proportion of person-focused praise would be expected to develop a fixed mindset, as they will learn that their performance is due to their inherent characteristics. While they will feel good as long as they continue to succeed, their self-concept will be damaged when they experience failure, which they will interpret as meaning that they lack intelligence or skill (Gunderson et al., 2013). These hypotheses have been supported in experimental settings (Kamins & Dweck, 1999). However, longitudinal studies that utilize observational methods to record parents' natural use of praise have produced mixed results (Pomerantz & Kempner, 2013; Gunderson et al., 2013). Pomerantz and Kempner (2013) reported that only the maternal use of person-focused praise, and not their use of process-focused praise, predicted children's fixed mindsets six months later, while Gunderson et al. (2013) instead found that only mothers' use of process-focused praise predicted their children's mindsets five years later. In addition, the parental behaviors studied empirically have for the most part been restricted to these two forms of praise. No study to our knowledge has examined parents' natural use of person- and process-focused criticism, and few have examined a wider range of behaviors, including responses to children's unsuccessful behaviors.

Results from the few studies that have looked into other types of parental responses to children's successful behaviors are in line with predictions made by both SDT and Dweck's motivational model. Jose and Bellamy (2012) found that parents who report encouraging their children more and offering them new strategies when they face frustration in difficult tasks have children who are more persistent. Hokoda and Fincham (1995) coded mothers' behaviors while their 3rd grade children completed solvable and insolvable puzzles. Results showed that mothers

of children with growth mindsets displayed more teaching behaviors than children with fixed mindsets during unsolvable puzzles. In addition, they more were more likely to respond to their children's statements of helplessness or low self-efficacy by redirecting them towards focusing on their effort or offering new strategies. Moorman and Pomerantz (2008) observed interactions between 4-year-old children and their mothers in the context of a cognitively challenging task. While they did not specifically assess responses to children's unsuccessful actions, they did code mothers' controlling and autonomy supportive behavior throughout the task. They found that the more mothers behaved in controlling ways (i.e. gave commands or took over the task) and the less they displayed autonomy support, the less their children exhibited persistence, both over the course of the task and six months later. While certainly valuable, even these studies focused on only a few types of responses at a time, rather than exploring the full range of behaviors shown by parents in response to their children's successful and unsuccessful actions.

**Contextual Factors**

Determining the factors that influence the ways in which different parents respond to their children in times of success or struggle is important, and has received relatively little attention. Aspects of families' backgrounds, such as SES and parental histories of psychosocial risk, have been demonstrated to have well-established and enduring effects on child outcomes (e.g., Brooks-Gunn & Duncan, 1997; Stack, Serbin, Enns, Ruttle, & Barrieau, 2010), and this is likely largely due to their influences on parenting. Through patterns of family interactions, economic and psychosocial disadvantage are passed across generations (Stack, Serbin, Mantis, & Kingdon, 2015). As such, assessing how parent-child interactions contribute to this intergenerational cycle is of utmost importance. Results from a recent study revealed that low SES, maternal histories of psychosocial problems and increased presence of stressors are associated with mothers using less autonomy support and more control in their interactions with their preschool-aged children (Harvey et al., 2016). Similar factors may be affecting how mothers respond to their children's success and struggle. Indeed, there is ample evidence that many of these same risk factors interfere with a number of other parenting behaviors (e.g., Prelow, Weaver, Bowman, & Swenson, 2010; Serbin, Peters, McAffer, & Schwartzman, 1991; Serbin et al., 1998; Stack et al., 2012).

Individuals from lower SES backgrounds often attain lower levels of education, and the consequences of this, such as insecure employment and high levels of stress, can manifest

themselves in the decreased use of positive parenting strategies (e.g., monitoring of child activities, disciplinary consistency, academic involvement; Kotchick, Dorsey, & Heller, 2005; Prelow et al., 2010; Serbin, Stack, Kingdon, Mantis, & Enns, 2011; Stack et al., 2015; Stack et al., accepted).  The quality of the home environment is a related contextual factor that is likely associated with parenting. The Home Observation for Measurement of the Environment (HOME; Caldwell & Bradley, 1984) is used to assess many aspects of the home, including the physical environment and the types of stimulation offered to the child.  In numerous studies, HOME scores have been found to predict children's cognitive, emotional and social development (for a review, see Totsika & Sylva, 2004).  As the measure reflects in large part the parents' efforts to provide an educational and supportive environment for their children, HOME scores would be expected to be associated with parents' more specific parenting practices, such as their responses to their children's success and struggle in the context of a learning task.

Parental histories of psychosocial difficulty are another risk factor associated with a number of adverse parenting outcomes.  Intergenerational studies have demonstrated that mothers who displayed elevated levels of aggression or social withdrawal during childhood are more unresponsive, use more severe discipline, less supportive parenting behaviors (Serbin et al., 1991; Serbin et al., 1998), and display impaired request strategies (Grunzeweig, Stack, Serbin, Ledingham, & Schwartzman, 2009), problem-solving approaches (Martin, Stack, Serbin, Ledingham, & Schwartzman, 2012), and conflict resolution (Temcheff et al., 2009) when interacting with their own children.  Despite strong evidence that contextual and familial risk factors can interfere with parenting, the specific variables that influence maternal responses to their children's success and struggle remain largely unknown.

It is critical to examine parenting practices and contextual factors in our examination of children's successful and unsuccessful actions. However, it is also important to consider children's own role in influencing the type of parenting that they receive.  Leading models in developmental psychology agree that children are active players in their own socialization (Belsky, 1984; Sameroff, 2009; Kuczynski & De Mol, 2015).  Belsky (1984) argues that socialization practices are determined by the interplay of a parent's psychological resources and the child's individual characteristics, as well as contextual factors.   According to the Transactional Model, child development is the result of the reciprocal relationships between the child, his or her family, and the larger environment (Sameroff, 2009).  Similarly, Kuczynski and

De Mol's (2015) Social Relational Theory states that the socialization process is dynamic, moving in changing directions as a result of the bidirectional influences between parent and child. As such, parenting behaviors must be studied in the context of the child's characteristics, as well as the mother's perceptions of their child (Pardini, 2008). Bidirectional influences between parent and child behavior are most often studied in terms of positive feedback loops, whereby maladaptive child characteristics (e.g., externalizing behaviors) predict worsening of parental responses over time (e.g., Burke, Pardini & Loeber, 2008; Barbot, Crossman, Hunter, Grigorenko, & Luthar, 2014). However, there is evidence that parents sometimes respond to increased levels of child need with added support. For example, Serbin, Kingdon, Ruttle, and Stack (2015) found that internalizing symptoms in children predicted an increase in mothers' positive parenting over time, which in turn led to decreases in children's internalizing symptoms. Furthermore, results of a study by Pomerantz and Eaton (2001) revealed that children's low achievement in elementary school led to maternal worry, which in turn predicted increases in support. As a result, the role of child characteristics in predicting maternal responses to their successful and unsuccessful actions needs to be assessed, in addition to other familial risk factors. Whether mothers of more difficult children provide more or less support in the context of a teaching task remains to be seen.

**The Present Study**

The present study was designed to examine the full range of maternal responses to children's successful and unsuccessful actions in an at-risk, disadvantaged sample. As such, our data may include a wider range of optimal to sub-optimal patterns of responding than would be present in a low-risk sample. This may help to identify mechanisms through which children become at greater risk of academic difficulties, as this sample performs at a sub-optimal level academically (Serbin, Stack, & Kingdon, 2013). The Concordia Longitudinal Risk Project (Concordia Project; Schwartzman, Ledingham, & Serbin, 1985; Serbin et al., 1998; Stack et al., 2015) has followed children from low socioeconomic neighborhoods in Montréal, Québec since 1976. These participants were recruited when they were in Grades 1, 4 and 7 and were screened for peer-reported levels of aggression and social withdrawal. As these original participants moved into adulthood and many became parents, their children were recruited into the project in order to assess risk and protective factors over time and the intergenerational transfer of risk. The sample used in the current study represents a subset of these second generation participants,

along with their mothers (some of whom were original participants, and others who were spouses of original male participants). These dyads were observed in the context of a semi-structured puzzle task.

The objectives of the present study were to: 1) explore the full range of behaviors that mothers expressed in response to their preschool-aged children's successful and unsuccessful actions, as well as to examine how the family environment (e.g., quality of the home, maternal education) is associated with the types of responses used; 2) examine the role of maternal childhood histories of aggression and social withdrawal in predicting types of responses used by mothers who were original participants in the Concordia Project; and 3) assess the relations between types of maternal responses during the preschool age (Time 1) and children's subsequent cognitive and academic abilities at six to 11 (Time 2) and nine to 13 (Time 3) years of age.

## Methods

### Participants

The participants in the current study represent a subset of the Concordia Project, a longitudinal, prospective study of at-risk individuals from Montréal, Québec. In 1976-1977, 4109 children in grades 1, 4, and 7 attending inner-city elementary schools were screened on measures of peer-nominated aggression and social withdrawal, using the Peer Evaluation Inventory (PEI; Pekarik, Prinz, Liebert, Weintraub, & Neale, 1976). Oversampling of participants with aggression and social withdrawal scores at the upper extremes was conducted to arrive at a sample of 1774 participants composed of equal groups of children across the continua of aggression and social withdrawal scores. These original participants were then followed until adulthood and into parenthood. At this time, many of their own children were recruited into the project.

**Preschool sample**. The subsample used in the present study was composed of 175 offspring of the original Concordia Project participants and their mothers. At the time of initial testing, the children were between one and six years of age. Of these 175 mother-child dyads, 10 were excluded due to incomplete video segments, 1 was excluded due to the dyad speaking a language other than French or English, and 8 were excluded due to the dyad not actively engaging in the task while being videotaped. Thus, data from 156 dyads were coded. The mean

age of the mothers was 30.41 years (SD = 3.41).  The mean age at which they had their first child was 24.81 years (SD = 3.44) and their mean level of education was 11.80 years (SD = 2.30). Dyads had a mean maximum family prestige score (Standard International Occupational Prestige Scale; Treiman, 1977) of 38.37 (SD = 11.29), which represents occupations such as manufacturing labourers and service workers.  The children's mean age was 3.60 years (SD = 1.53), and there were 82 girls and 74 boys. The children had a mean of .99 siblings (SD = .91). Ninety-eight of the mothers involved in the study were original participants of the Concordia Project, and 58 were spouses of original participants.

**School-aged samples**. Time 2 data were collected once the child participants had reached six to 11 years of age ($M$ = 7.69, SD =1.02), approximately three years later.  Of the 156 children who participated at Time 1, data were available for 125 (80.12%) at Time 2.  There were no significant differences between families who participated in the study at Time 2 and those who did not on any of the demographic variables (all $p$s > .05).

Time 3 data were collected once the child participants had reached nine to 13 years of age ($M$ = 10.88, SD = 0.91), approximately three years after Time 2 data was collected.  Of the 156 children who participated at Time 1, data were available for -98 (62.82%) at Time 3. There were no significant differences between families who participated in the study at Time 3 and those who did not on any of the demographic variables (all $p$s > .05).

**Procedure**

**Time 1**.  This study was conducted as part of a larger project, in which naturalistic observations, questionnaires, and interviews were administered to parents, children, and children's teachers over six time points.  When the children were of preschool age, home visits were conducted by a PhD-level researcher and a research assistant, both of which were trained to administer a standard protocol and were blind to families' histories of risk.  Mothers were first explained the protocol and asked to provide their consent (see Appendix A). Next, the researchers and mothers chose a location in the home where they could videotape mother-child interactions without being disturbed.  Mothers and children sat on a mat on the floor, and were provided with a set of standardized toys.  Researchers then left the room while dyads engaged in four tasks.  All interactions were videotaped using a Sony 8AF camera with a directional microphone that was fixed to a tripod placed in front of the dyad.

The task of interest in the present study was a four or eight-minute puzzle task (four minutes for 1 to 3 year olds, seven minutes for 4 to 6 year olds), which was the third of four tasks engaged in by the mother-child dyads. Dyads were provided with four age-appropriate puzzles that ranged in difficulty. Mothers were instructed to work on the puzzles with their children for the entire duration of the task.

**Times 2 and 3**. Measures of cognitive and academic abilities were administered to children in a standardized manner, as part of school visits made by the trained researchers.

**Measures**

**Observational Coding**

Observational coding of maternal responses to children's successful and unsuccessful actions in the puzzle task was conducted using Mangold Interact 14, a software that allows researchers to code behaviors as they occur in videotaped observational data. Each time a behavior is recorded, it is time stamped to allow for subsequent analyses of frequencies and durations of each type of behavior.

**Maternal responses to children's successful and unsuccessful actions (Ferrar & Stack, 2015).** During the puzzle task, maternal responses were coded each time the child displayed a behavior that represented a successful or unsuccessful action. Specifically, a successful action was defined as the child correctly placing a puzzle piece or finding a match between a puzzle piece and empty spot. An unsuccessful action was defined as a child placing or attempting to place a puzzle piece in an incorrect spot, or struggling to find the correct spot for a piece for at least three seconds.

The goal of the coding system was to ensure that all types of responses displayed by mothers were coded, rather than to limit the coding to those types of responses that had previously been identified by any one a priori theory. As such, the author first observed a sample of mother-child interactions and noted all types of maternal responses shown, and subsequently created categories that would span the entire range of natural maternal responses.

Maternal responses to their child's successful actions were divided into three categories (see Table 1): person-focused praise, process-focused praise and neutral acknowledgment. The distinction between person-focused praise and process-focused praise was based on Dweck and colleagues' conceptualization of forms of praise (Kamins & Dweck, 1999; Cimpian, Arce,

Markman, & Dweck, 2007). Person-focused praise was represented by a compliment implying a stable characteristic in the child. Process-focused praise was represented by verbal or non-verbal positive feedback that was directed at the specific action performed by the child. A neutral acknowledgement was characterized by any indication given by the mother that she had noticed the correct action, without expressing any emotion.

Maternal responses to their child's unsuccessful actions were divided into four categories (see Table 1): encouragement or helping, discouragement, neutral indication of mistake, or taking over. Encouragement or helping was represented by any action or statement used to motivate the child to continue trying, any tip or hint given, or any instance of teaching. Process-focused criticism was included as encouragement or helping. Discouragement was characterized as any comment that served to dissuade the child from continuing to try, and included person-focused criticism. A neutral indication of mistake was defined as any utterance that signaled to the child that he or she had made a mistake, without any attempt to encourage, teach or discourage the child. Taking over was coded when the mother responded to the child's difficulty by completing the attempted action for him or her.

Mothers' scores for each response type were calculated as the proportion of their children's successful or unsuccessful actions in which that response type was used, in order to control for each child's total frequency of successful and unsuccessful actions. That is, each response score represents the number of times the mother used the given response divided by the total number of times that her child displayed the appropriate action (i.e. either a successful or an unsuccessful action). As such, scores on the responses to successful actions variables could range from 0 (never used this type of response) to 1 (used this type of response each time the child displayed a successful action), and scores on the response to unsuccessful actions variables could range from 0 (never used this type of response) to 1 (used this type of response each time the child displayed an unsuccessful action). As mothers did not respond to every successful or unsuccessful action taken by the child, the sum of the proportion scores for each type of child action was less than 1.

Reliability coding was conducted by a BA level research volunteer who was blind to the research objectives and hypotheses. For codes to be considered a match between the author and the reliability coder, they had to occur within three seconds of each other. Once the reliability coder was trained on the coding system, she and the author double-coded 30% of the sample ($n =$

47). Cohen's kappas ranged from .69 to .87 (see Table 1). Both the reliability coder and the author were blind to the risk status of each dyad.

**Demographic Information.** The children's age and sex, the mothers' level of education, and other demographic information were collected using the Demographic Information Questionnaire. This measure has been used effectively in past studies from the Concordia Project (Grunzeweig et al., 2009; Martin et al., 2012).

**Home Environment**. The quality of the dyads' home environments was evaluated using the Home Observation for Measurement of the Environment (HOME; Caldwell & Bradley, 1984). The HOME is an observational tool used by a trained researcher that assesses the level of stimulation and support available to a child. In the present study, the Preschool version was administered during home visits. The Preschool version is composed of 55 items that fall into eight subscales: toys and learning materials, language stimulation, physical environment, pride and affection, stimulation of academic behavior, encouragement of maturity, variety of stimulation, and punishment. In the present study, the standardized total scores were used, where a higher score is indicative of a higher quality home environment. The psychometric properties of the HOME range from satisfactory to excellent (Caldwell & Bradley, 1984).

**Maternal Perception of the Child's Difficultness**. The Parental Stress Index – Short Form (PSI-SF; Abidin, 1995) is a self-report measure used to assess distress experienced by parents as a result of their interactions with their children. It is scored on a Likert-type scale (1 = *strongly disagree* to 5 = *strongly agree)*, and is comprised of three subscales of 12 items each: Parental Distress (i.e. perceived child-rearing competence, spousal conflict, social support, etc.), Parent-Child Dysfunctional Interaction (i.e. extent to which child meets the parent's expectations; reinforcing nature of parent-child interactions) and Difficult Child (parent-perceived child temperament, defiance, noncompliance and demandingness). In the present study, the Difficult Child subscale score was used, where a higher score reflects higher rating of the child's difficultness. Use of the PSI in low-SES populations has been well supported (Reitman, Currier, & Stickle, 2002; Whiteside-Mansell et al., 2007), and its psychometric properties are excellent.

**Maternal histories of aggression and social withdrawal.** Mother's levels of aggression and social withdrawal were assessed using the PEI (Pekarik et al., 1976) in 1976-1978, when they were in Grades 1, 4 or 7. The PEI is a peer-nomination tool composed of 34 items that load

onto three factors: Aggression (a tendency to attempt to physically or verbally injure others or property, e.g., "those who start a fight over nothing"), Social Withdrawal (a tendency to socially isolate oneself in a way that evokes avoidance, shyness and fear, e.g., "those who are too shy to make friends easily") and Likeability (not used in the current study). Children were asked to nominate up to four boys and four girls who most resembled each item. The number of nominations received by each child was summed to create Aggression and Withdrawal scores. These scores were then subjected to a square root transformation in order to reduce skewness. Transformed scores were then standardized for each sex within each classroom to control for class size and sex differences in aggression and withdrawal (see Serbin et al., 1998 for further detail).

Time 2 Child reading skills. Children's reading abilities at Time 2 were assessed using the Bilan Qualitatif de l'Apprentissage de la Lecture (BQAL; Campeau-Filion & Gauthier, 1989). This tool is used to measure sound-letter correspondence, decoding and reading comprehension in children from Grades 1 to 3, and has been shown to reliably predict the development of learning disabilities (Campeau-Filion & Gauthier, 1989). The BQAL is made up of ten subtests of increasing difficulty, from letter recognition to the comprehension of short texts. Each subtest is made up of ten multiple-choice questions. Total BQAL scores from all subtests were used in the present study.

Time 2 Child verbal reasoning. The fourth edition of the Stanford-Binet Intelligence Scale (SB-IV; Thorndike, Hagen, & Sattler, 1986) is used to evaluate the cognitive functioning of children and adults. It is composed of 15 subtests, which can be used to derive a general intelligence score as well as four specific intelligence factors: verbal reasoning, quantitative reasoning, abstract visual reasoning and short-term memory. In the present study, children were administered three subtests (vocabulary, comprehension and absurdities) of a standardized French translation of the test at Time 2 in order to compute their verbal reasoning (VR) scores. The SB-IV has been shown to have strong psychometric properties (Thorndike et al., 1986).

Time 3 Child cognitive functioning. Children's cognitive abilities at Time 3 were assessed using the Wechsler Intelligence Scale for Children, Third Edition (WISC-III; Wechsler, 1991). The WISC-III is a well-validated standardized intellectual test made up of 10 subtests that generate a full-scale intelligent quotient (IQ) as well as a Verbal IQ and a Performance IQ (pIQ). In the present study, a standardized French translation of the WISC-III was administered

*Table 1. Brief Operational Definitions for Maternal Responses to Children's Successful and Unsuccessful Actions (Ferrar & Stack, 2015).*

| | **Operational Definition** | **Example** | **Kappa** |
|---|---|---|---|
| **Successful Child Action** | | | |
| Person-focused praise | Praise that attributes a stable characteristic to the child. | "You're great!", "You're a smart girl!" | .83 |
| Process-focused praise | Praise directed at the child's action or nonverbal positive reinforcement. | "You got it!", "Continue like that!", offers a high-five | .87 |
| Neutral acknowledgement | An indication that the mother has registered the child's successful action, without any praise. | "Yes", "Okay." | .78 |
| **Unsuccessful Child Action** | | | |
| Encouragement or helping | A statement used to motivate the child to continue trying, a tip or hint, or any instance of teaching. | "You can do it!", "Try somewhere else", "Do you see anywhere with similar colours?" | .81 |
| Discouragement | A comment that serves to dissuade the child from continuing to try. | "You're not very good at this", "Of course it doesn't go there!" | .69 |
| Neutral indication of mistake | An utterance that signals to the child that he or she made a mistake, without any attempt to encourage, teach or discourage the child. | "No", "It doesn't go there." | .82 |
| Taking over | Mother completes the action for the child. | Mother takes a puzzle piece out of the child's hand and places it in the correct spot, or shows the child exactly where the piece goes. | .83 |

to children, and the pIQ was used. The pIQ is an indicator of a child's visual-spatial and nonverbal reasoning skills.

## Results

Prior to conducting statistical analyses, data were screened in order to assess the normality of each variable's distribution. Outliers were identified and converted to the next most extreme value in the dataset that was not an outlier (Kline, 2009; Tabachnick & Fidell, 2013). After correcting for outliers, none of the variables showed any significant kurtosis. Many maternal response variables remained positively skewed. However, this was not surprising, as they represented proportions (i.e. the number of times the response type was used divided by the total number of child successful or unsuccessful actions); because most mothers used a variety of response types, it would be expected that scores tend to fall closer to the minimum (i.e. 0) than to the maximum (i.e. 1). In addition, these maternal response variables were not independent of each other, as an increased proportion on one variable necessarily leads to decreased proportions on the other variables. For this reason, in analyses in which response types were included as predictor variables, raw frequencies of each response type were used instead of proportions.

**Objective 1(a).** In order to explore the types of responses used by mothers in each task, means and standard deviations of each type of response were calculated. Results are shown in Table 2. The most common response to children's successful actions was process-focused praise, and the least common response was person-focused praise. The most common response to children's unsuccessful actions was encouragement or helping, and the least common response was discouragement.

**Objective 1(b).** Hierarchical multiple regressions were used to examine the relationships between maternal and family characteristics and maternal response types. In each regression analysis, child sex and child age were entered as control variables in Step 1. In Step 2, predictor variables were entered (i.e. HOME scores, child difficultness and maternal education). The outcome variable in each analysis was a maternal response proportion score.

**Predicting maternal responses to successful child actions.** The regression model predicting mothers' use of person-focused praise accounted for 6.4% (2.8% adjusted) of the total variance (Table 3). Child sex was a statistically significant predictor of person-focused praise ($\beta$

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*Table 2. Means and standard deviations of mothers' responses to child behavior and proportions of mothers' responses*

|  | Raw number M | Raw number SD | Proportion M | Proportion SD |
|---|---|---|---|---|
| **Successful Child Action** | | | | |
| Person-focused praise | .71 | 1.45 | .05 | .07 |
| Process-focused praise | 5.60 | 4.24 | .45 | .30 |
| Neutral acknowledgement | 1.87 | 2.63 | .13 | .15 |
| No response | 6.26 | 7.03 | .37 | .29 |
| **Unsuccessful Child Action** | | | | |
| Encouragement or helping | 7.06 | 5.98 | .30 | .20 |
| Discouragement | .53 | 1.08 | .03 | .07 |
| Neutral indication of mistake | 3.18 | 3.10 | .14 | .14 |
| Taking over | 3.91 | 3.67 | .17 | .14 |
| No response | 8.10 | 7.73 | .36 | .25 |

= .18, $t$ = 2.16, $p$ < .05), with mothers using more person-focused praise with girls than with boys. The regression model predicting mothers' use of process-focused praise accounted for 22.6% (19.6% adjusted) of the total variance (Table 4). Child age was the only statistically significant predictor ($\beta$ = -.46, $t$ = -6.03, $p$ < .001), with mothers using more process-focused praise with younger children. The regression model predicting mothers' use of neutral acknowledgments accounted for 1.9% (1.8% adjusted) of the total variance (Table 5). No predictors were statistically significant in this model.

**Predicting maternal responses to unsuccessful child actions.** The regression model predicting mothers' use of encouragement or helping accounted for 13.3% (10.1% adjusted) of the total variance (Table 6). Child age was a statistically significant predictor ($\beta$ = -.28, $t$ = -3.56, $p$ < .01), with mothers encouraging or helping younger children more often. Mothers' ratings of child difficultness was also a significant predictor ($\beta$ = .17, $t$ = 2.00, $p$ < .05), with mothers who rated their children as more difficult demonstrating more encouragement or helping. The regression model predicting mothers' use of discouragement accounted for 8.8% (5.5% adjusted) of the total variance (Table 7). The families' home environment, as measured by HOME scores, was a significant predictor ($\beta$ = -.32, $t$ = -3.34, $p$ < .01), with higher quality home environments predicting less use of discouragement. Mothers' level of education was also a significant predictor ($\beta$ = .24, $t$ = 2.63, $p$ < .05), with mothers with more years of education using more discouragement. The regression model predicting mothers' use of neutral indications of mistakes accounted for 1.2% (0.0% adjusted) of the total variance (Table 8). No predictors were statistically significant in this model. Finally, the regression model predicting mothers' taking over accounted for 13.4% (10.3% adjusted) of the total variance (Table 9). Child age was a significant predictor ($\beta$ = -.30, $t$ = -3.74, $p$ < .001), with mothers of younger children taking over more often. Mothers' ratings of child difficultness also significantly predicted taking over ($\beta$ = -.20, $t$ = -2.37, $p$ < .05), with mothers who rated their children as more difficult taking over less. **Objective 2.** Hierarchical multiple regressions were used to assess the relationship between maternal histories of aggression and social withdrawal and maternal response types, above and beyond the role of child age, child sex, and the maternal and family characteristics included in Objective 1(b). To do so, these control variables were entered as predictors in Step 1, and mothers' childhood levels of aggression and withdrawal were entered as predictors in Step 2. The outcome variable in each analysis was a maternal response proportion score. For this set of

*Table 3. Contextual Variables Predicting Mothers' Use of Person-Focused Praise (Successful Child Action)*

| Variable | B | β | t |
|---|---|---|---|
| **Model 1** | | | |
| Child age | -.00 | -.02 | -.26 |
| Child sex | .03 | .19 | 2.19* |
| **Model 2** | | | |
| Child age | -.00 | -.03 | -.30 |
| Child sex | .03 | .18 | 2.16* |
| Home environment (HOME) | .01 | .07 | .68 |
| Difficult child (PSI) | .00 | .10 | 1.19 |
| Mothers' years of education | .00 | .10 | 1.00 |
| | | $R^2 = .064$ | $R^2$ (adj.) = .028 |

*$p < .05$, **$p < .01$, *** $p < .001$

*Table 4. Contextual Variables Predicting Mothers' Use of Process-Focused Praise (Successful Child Action)*

| Variable | B | β | t |
|---|---|---|---|
| **Model 1** | | | |
| Child age | -.09 | -.46 | -6.06*** |
| Child sex | .02 | .03 | .38 |
| **Model 2** | | | |
| Child age | -.09 | -.46 | -6.03*** |
| Child sex | .01 | .02 | .23 |
| Home environment (HOME) | .02 | .06 | .62 |
| Difficult child (PSI) | .00 | -.08 | -.95 |
| Mothers' years of education | -.01 | -.05 | -.56 |
| | | $R^2 = .226$ | $R^2 \text{ (adj.)} = .196$ |

$* p < .05, **p < .01, *** p < .001$

*Table 5. Contextual Variables Predicting Mothers' Use of Neutral Acknowledgement (Successful Child Action)*

| Variable | B | β | t |
|---|---|---|---|
| **Model 1** | | | |
| Child age | .01 | .08 | .98 |
| Child sex | -.02 | -.05 | -.58 |
| **Model 2** | | | |
| Child age | .01 | .08 | .97 |
| Child sex | -.02 | -.05 | -.62 |
| Home environment (HOME) | .01 | .03 | .27 |
| Difficult child (PSI) | -.00 | -.05 | -.61 |
| Mothers' years of education | -.01 | -.09 | -.85 |
| | | $R^2 = .019$ | $R^2$ (adj.) = -.018 |

*$p < .05$, **$p < .01$, *** $p < .001$

*Table 6. Contextual Variables Predicting Mothers' Use of Encouragement or Helping (Unsuccessful Child Action)*

| Variable | B | β | t |
|---|---|---|---|
| **Model 1** | | | |
| Child age | -.04 | -.28 | -3.40** |
| Child sex | -.01 | -.02 | -.27 |
| **Model 2** | | | |
| Child age | -.04 | -.28 | -3.56** |
| Child sex | -.01 | -.02 | -.26 |
| Home environment (HOME) | .03 | .12 | 1.26 |
| Difficult child (PSI) | .01 | .17 | 2.00* |
| Mothers' years of education | .01 | .12 | 1.30 |
| | | $R^2 = .133$ | $R^2$ (adj.) = .101 |

*$p < .05$, **$p < .01$, *** $p < .001$

*Table 7. Contextual Variables Predicting Mothers' Use of Discouragement (Unsuccessful Child Action)*

| Variable | B | β | t |
|---|---|---|---|
| **Model 1** | | | |
| Child age | .00 | .05 | .64 |
| Child sex | .01 | .05 | .56 |
| **Model 2** | | | |
| Child age | .00 | .07 | .87 |
| Child sex | .01 | .06 | .67 |
| Home environment (HOME) | -.03 | -.32 | -3.34** |
| Difficult child (PSI) | .00 | .05 | -.588 |
| Mothers' years of education | .01 | .24 | 2.63* |
| | | $R^2 = .088$ | $R^2$ (adj.) = .055 |

$* p < .05, **p < .01, *** p < .001$

*Table 8. Contextual Variables Predicting Mothers' Use of Neutral Indications of Mistake (Unsuccessful Child Action)*

| Variable | B | β | t |
|---|---|---|---|
| **Model 1** | | | |
| Child age | .00 | -.00 | -.01 |
| Child sex | .01 | .05 | .56 |
| **Model 2** | | | |
| Child age | .00 | -.01 | -.06 |
| Child sex | .01 | .05 | .59 |
| Home environment (HOME) | .01 | .05 | .54 |
| Difficult child (PSI) | .00 | -.02 | -.25 |
| Mothers' years of education | -.01 | -.12 | -1.19 |
| | | $R^2 = .012$ | $R^2$ (adj.) = -.023 |

\* $p < .05$, \*\*$p < .01$, \*\*\* $p < .001$

*Table 9. Contextual Variables Predicting Mothers' Use of Taking Over (Unsuccessful Child Action)*

| Variable | B | β | t |
|---|---|---|---|
| **Model 1** | | | |
| Child age | -.03 | -.31 | -3.84*** |
| Child sex | -.00 | -.01 | -.10 |
| **Model 2** | | | |
| Child age | -.03 | -.30 | -3.74*** |
| Child sex | -.00 | -.02 | -.20 |
| Home environment (HOME) | -.02 | -.12 | -1.32 |
| Difficult child (PSI) | -.00 | -.20 | -2.37* |
| Mothers' years of education | .00 | .02 | .18 |
| | | $R^2 = .134$ | $R^2$ (adj.) = .103 |

\* $p < .05$, \*\* $p < .01$, \*\*\* $p < .001$

analyses, only dyads in which the mothers were the original Concordia Project participants were included ($n = 98$). Results are shown in Tables 10 to 16. As many of the results were similar to those in Objective 1, only differences in statistically significant predictor variables are described below. In the regression model predicting mothers taking over, maternal histories of aggression ($\beta = .24$, $t = 2.22$, $p < .05$) and maternal histories of social withdrawal ($\beta = .24$, $t = 2.27$, $p < .05$) both significantly predicted taking over; higher childhood levels of both aggression and social withdrawal were associated with more taking over. Child age ($\beta = -.22$, $t = -2.14$, $p < .05$) and child difficultness ($\beta = -.33$, $t = -2.96$, $p < .01$) also remained statistically significant predictors (Table 16). No differences were found in the statistical significance of predictor variables in any of the other models.

**Objective 3**. In order to examine the relationships between maternal responses at Time 1 and child cognitive and academic abilities at Times 2 and 3, hierarchical multiple regressions were conducted. Child sex and age at Time 1 were entered in Step 1, and each maternal response type was entered in Step 2. However, coding maternal response type scores as the proportion of child successful or unsuccessful actions that a given response type elicited led to significant multicollinearity, because a high proportion score for one response type necessarily lowers the proportion scores of all other response types. Therefore, raw counts of the number of times a mother showed each response type were used in these regressions. As such, it is important to underscore that these results may be confounded by the number of successful or unsuccessful actions that each child demonstrated. The outcome variables were BQAL scores and VR scores at Time 2, as well as pIQ scores at Time 3.

The regression model predicting Time 2 BQAL scores accounted for 33.0% (27.7%) of the total variance (Table 17). Child age ($\beta = .55$, $t = 6.11$, $p < .001$) and child sex ($\beta = .24$, $t = 2.95$, $p < .01$) both significantly predicted Time 2 BQAL scores, with older children and girls scoring higher. Mothers' tendency to encourage or help also significantly predicted higher scores ($\beta = .38$, $t = 3.18$, $p < .01$). In addition, mothers' taking over significantly predicted lower scores ($\beta = -.25$, $t = -2.97$, $p < .01$).

The regression model predicting Time 2 VR scores accounted for 15.4% (8.7% adjusted) of the total variance (Table 18). The only statistically significant predictor was taking over ($\beta = -.30$, $t = -3.15$, $p < .01$), with mothers' increased use of taking over predicting lower VR scores.

*Table 10. Maternal Childhood Histories of Aggression and Social Withdrawal Predicting Use of Person-Focused Praise (Successful Child Action)*

| Variable | B | β | t |
|---|---|---|---|
| **Model 1** | | | |
| Child age | .00 | -.03 | -.30 |
| Child sex | .03 | .18 | 2.16* |
| Home environment | .01 | .07 | .68 |
| Difficult child | .00 | .10 | 1.19 |
| Mothers' years of education | .00 | .10 | 1.00 |
| **Model 2** | | | |
| Child age | .00 | -.02 | -.26 |
| Child sex | .03 | .20 | 2.37* |
| Home environment | .00 | .05 | .45 |
| Difficult child | .00 | .14 | 1.54 |
| Mothers' years of education | .00 | .06 | .552 |
| Maternal histories of aggression | -.01 | -.14 | -1.55 |
| Maternal histories of social withdrawal | -.01 | -.09 | -1.02 |
| | $R^2 = .084$ | $R^2 \text{ (adj.)} = .035$ | |

$* p < .05, **p < .01, *** p < .001$

*Table 11. Maternal Childhood Histories of Aggression and Social Withdrawal Predicting Use of Process-Focused Praise (Successful Child Action)*

| Variable | B | β | t |
|---|---|---|---|
| **Model 1** | | | |
| Child age | -.08 | -.38 | -3.67*** |
| Child sex | .01 | .01 | .12 |
| Home environment | .04 | .13 | 1.05 |
| Difficult child | .00 | -.04 | -.326 |
| Mothers' years of education | -.02 | -.12 | -.99 |
| **Model 2** | | | |
| Child age | -.08 | -.38 | -3.59** |
| Child sex | .00 | .00 | .03 |
| Home environment | .04 | .14 | 1.08 |
| Difficult child | .00 | -.05 | -.473 |
| Mothers' years of education | -.01 | -.11 | -.83 |
| Maternal histories of aggression | .01 | .05 | .46 |
| Maternal histories of social withdrawal | .01 | .03 | .27 |
| | | $R^2 = .167$ | $R^2$ (adj.) = .093 |

*$p < .05$, **$p < .01$, *** $p < .001$

*Table 12. Maternal Childhood Histories of Aggression and Social Withdrawal Predicting Use of Neutral Acknowledgement (Successful Child Action)*

| Variable | B | β | t |
|---|---|---|---|
| **Model 1** | | | |
| Child age | .00 | .00 | -.03 |
| Child sex | -.04 | -.13 | -1.18 |
| Home environment | -.01 | -.04 | -.31 |
| Difficult child | .00 | -.03 | -.26 |
| Mothers' years of education | .00 | -.04 | -.32 |
| **Model 2** | | | |
| Child age | .00 | -.01 | -.12 |
| Child sex | -.05 | -.15 | -1.29 |
| Home environment | -.01 | -.04 | -.30 |
| Difficult child | .00 | -.05 | -.42 |
| Mothers' years of education | .00 | -.02 | -.12 |
| Maternal histories of aggression | .01 | .10 | .78 |
| Maternal histories of social withdrawal | .00 | -.02 | -.18 |
| | | $R^2 = .033$ | $R^2$ (adj.) = -.052 |

\* $p < .05$, \*\* $p < .01$, \*\*\* $p < .001$

*Table 13. Maternal Childhood Histories of Aggression and Social Withdrawal Predicting Use of Encouragement or Helping (Unsuccessful Child Action)*

| Variable | B | β | t |
|---|---|---|---|
| **Model 1** | | | |
| Child age | -.04 | -.25 | -2.48* |
| Child sex | -.02 | -.06 | -.55 |
| Home environment | .04 | .21 | 1.78 |
| Difficult child | .01 | .24 | 2.28* |
| Mothers' years of education | .01 | .07 | .57 |
| **Model 2** | | | |
| Child age | -.04 | -.26 | -2.56* |
| Child sex | -.02 | -.04 | -.41 |
| Home environment | .04 | .19 | 1.58 |
| Difficult child | .01 | .28 | 2.47* |
| Mothers' years of education | .00 | .04 | .34 |
| Maternal histories of aggression | -.02 | -.09 | -.77 |
| Maternal histories of social withdrawal | -.02 | -.09 | -.85 |
| | | $R^2 = .172$ | $R^2$ (adj.) = .102 |

$* p < .05, ** p < .01, *** p < .001$

*Table 14. Maternal Childhood Histories of Aggression and Social Withdrawal Predicting Use of Discouragement (Unsuccessful Child Action)*

| Variable | B | β | t |
|---|---|---|---|
| **Model 1** | | | |
| Child age | .00 | -.01 | -.12 |
| Child sex | .01 | .06 | .56 |
| Home environment | -.03 | -.37 | -3.01** |
| Difficult child | .00 | -.043 | -.402 |
| Mothers' years of education | .01 | .30 | 2.53* |
| **Model 2** | | | |
| Child age | .00 | -.01 | -.11 |
| Child sex | .01 | .05 | .45 |
| Home environment | -.03 | -.36 | -2.90** |
| Difficult child | .00 | -.06 | -.55 |
| Mothers' years of education | .01 | .31 | 2.57* |
| Maternal histories of aggression | .01 | .07 | .58 |
| Maternal histories of social withdrawal | .00 | .01 | .12 |
| | | $R^2 = .122$ | $R^2$ (adj.) = .047 |

$* p < .05, **p < .01, *** p < .001$

*Table 15. Maternal Childhood Histories of Aggression and Social Withdrawal Predicting Use of Neutral Indications of Mistake (Unsuccessful Child Action)*

| Variable | B | β | t |
|---|---|---|---|
| **Model 1** | | | |
| Child age | .00 | -.03 | -.26 |
| Child sex | .03 | .13 | 1.26 |
| Home environment | .00 | -.03 | -.22 |
| Difficult child | .00 | -.17 | -1.58 |
| Mothers' years of education | -.01 | -.15 | -1.26 |
| **Model 2** | | | |
| Child age | .00 | -.04 | -.34 |
| Child sex | .04 | .14 | 1.32 |
| Home environment | -.01 | -.04 | -.34 |
| Difficult child | .00 | -.15 | -1.23 |
| Mothers' years of education | -.01 | -.17 | -.1.36 |
| Maternal histories of aggression | -.01 | -.06 | -.50 |
| Maternal histories of social withdrawal | -.01 | -.08 | -.67 |
| | | $R^2 = .075$ | $R^2$ (adj.) = -.003 |

$* p < .05, **p < .01, *** p < .001$

*Table 16. Maternal Childhood Histories of Aggression and Social Withdrawal Predicting Use of Taking Over (Unsuccessful Child Action)*

| Variable | B | β | t |
|---|---|---|---|
| **Model 1** | | | |
| Child age | -.02 | -.25 | -2.38* |
| Child sex | .00 | -.01 | -.10 |
| Home environment | -.02 | -.11 | -.91 |
| Difficult child | .00 | -.22 | -2.06* |
| Mothers' years of education | .00 | -.03 | -.26 |
| **Model 2** | | | |
| Child age | -.02 | -.22 | -2.14* |
| Child sex | -.01 | -.05 | -.48 |
| Home environment | -.01 | -.06 | -.49 |
| Difficult child | -.01 | -.33 | -2.96** |
| Mothers' years of education | .00 | .04 | .35 |
| Maternal histories of aggression | .03 | .24 | 2.22* |
| Maternal histories of social withdrawal | .04 | .24 | 2.27* |
| | $R^2 = .187$ | $R^2$ (adj.) = .119 | |

$* p < .05, **p < .01, *** p < .001$

*Table 17. Maternal Response Types during Interactions at Time 1 Predicting Time 2 BQAL Scores*

| Variable | B | β | t |
|---|---|---|---|
| **Model 1** | | | |
| Child age | 4.30 | .46 | 5.72*** |
| Child sex | 4.96 | .17 | 2.18* |
| **Model 2** | | | |
| Child age | 5.19 | .55 | 6.11*** |
| Child sex | 6.88 | .24 | 2.95** |
| Person praise | .24 | .02 | .19 |
| Process praise | -.59 | -.18 | -1.82 |
| Neutral acknowledgement | -.54 | -.11 | -1.22 |
| Encouragement, helping | .93 | .38 | 3.18** |
| Discouragement | -.53 | -.04 | -.46 |
| Neutral indication of mistake | -.01 | -.00 | -.02 |
| Taking over | -1.00 | -.25 | -2.97** |
| | | $R^2 = .330$ | $R^2$ (adj.) = .277 |

$* p < .05, ** p < .01, *** p < .001$

*Table 18. Maternal Response Types during Interactions at Time 1 Predicting Time 2 VR Scores*

| Variable | B | β | t |
|---|---|---|---|
| **Model 1** | | | |
| Child age | 1.94 | .16 | 1.83 |
| Child sex | -2.75 | -.08 | -.86 |
| **Model 2** | | | |
| Child age | .94 | .08 | .78 |
| Child sex | -2.64 | -.07 | -.80 |
| Person praise | -2.87 | -.15 | -1.57 |
| Process praise | .46 | .11 | .99 |
| Neutral acknowledgement | .64 | .10 | 1.01 |
| Encouragement, helping | -.13 | -.04 | -.32 |
| Discouragement | 1.59 | .09 | .98 |
| Neutral indication of mistake | .90 | .15 | 1.26 |
| Taking over | -1.49 | -.30 | -3.15** |
| | | $R^2 = .154$ | $R^2$ (adj.) = .087 |

$* p < .05, **p < .01, *** p < .001$

*Table 19. Maternal Response Types during Interactions at Time 1 Predicting Time 3 pIQ*

| Variable | B | β | t |
|---|---|---|---|
| **Model 1** | | | |
| Child age | -.76 | -.09 | -.85 |
| Child sex | 4.45 | .17 | 1.66 |
| **Model 2** | | | |
| Child age | -2.01 | -.23 | -2.00* |
| Child sex | 1.60 | .06 | .53 |
| Person praise | .62 | .04 | .35 |
| Process praise | .06 | .02 | .15 |
| Neutral acknowledgement | 1.54 | .34 | 3.03** |
| Encouragement, helping | -.50 | -.22 | -1.24 |
| Discouragement | -.07 | -.00 | -.03 |
| Neutral indication of mistake | .34 | .08 | .53 |
| Taking over | -.05 | -.01 | -.10 |
| | | $R^2 = .142$ | $R^2$ (adj.) = .054 |

$* p < .05, ** p < .01, *** p < .001$

The regression model predicting Time 3 pIQ scores accounted for 14.2% (5.4% adjusted) of the total variance (Table 19). Child age significantly predicted pIQ scores ($\beta$ = -.23, $t$ = -2.00, $p <$ .05), with older children receiving lower scores. In addition, mothers' use of neutral acknowledgements ($\beta$ = .34, $t$ = 3.03, $p <$ .01) was a significant predictor, with increased use predicting higher pIQ scores at Time 3.

**Discussion**

The present study was designed to examine maternal responses to their preschool-aged children's success and struggle while engaging in a puzzle task. There were three main objectives: 1) to observe the relative frequencies of the types of maternal responses, and to explore their relations to elements of the family context; 2) to examine the associations between mothers' responses and their histories of childhood aggression and social withdrawal; and 3) to assess the relations between maternal responses and children's cognitive and academic abilities at two subsequent time points.

Pertaining to the first objective, results showed that mothers used process-focused praise most often in response to their children's successful actions, and used person-focused praise the least often. This is in line with Gunderson et al. (2013)'s finding that parents offer their preschool-aged children process-focused praise more often than person-focused praise. As neutral acknowledgements have not been included in any other studies to our knowledge, this was the first to show that they occur at a rate that is inferior to process-focused praise but greater than person-focused praise. In response to their children's unsuccessful actions, mothers most often offered encouragement or help, and least often discouraged their children. Past research has demonstrated that autonomy-supportive responses to challenge, such as encouragement, helping and refraining from criticizing children's abilities, are associated with better outcomes in terms of child motivation (Kamins & Dweck, 1999; Jose & Bellamy, 2012; Hokoda & Fincham, 1995; Moorman & Pomerantz, 2008). However, this was the first study to show that in naturalistic settings, mothers use these positive parenting strategies most often, even in an at-risk sample.

Results also revealed that certain child and family characteristics are related to the types of responses that mothers show. First, mothers of girls used person-focused praise in response to successful child actions more often than mothers of boys. This is in line with results from Pomerantz and Kempner's (2013) study of mothers' daily use of praise with their elementary-school aged children. Although this was not found in the present study, Gunderson et al. (2011)

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similarly reported that boys heard more process-focused praise than girls at 1 to 3 years of age. In turn, boys had more growth mindsets than girls five years later (Gunderson et al., 2011), a result that is consistent with previous research (Dweck, Davidson, Nelson, & Enna, 1978). It is possible that given that girls tend to perform better at school than boys (Buchmann & DiPrete, 2006; Voyer & Voyer, 2014) parents are biased to expect greater global abilities from their daughters, whereas boys' effort is seen as more important in predicting their success. Relatedly, if parents expect greater performance from their daughters, they might be more likely to perceive their successful actions as evidence of their abilities. Indeed, research suggests that girls are more likely to be thought of as high-achievers than boys (Jones & Myhill, 2004). However, if girls do indeed receive more person-focused praise than boys, and as a result, develop more fixed mindsets than boys, it would be expected that over time, boys would begin to outperform girls academically. Contrary to this prediction, however, are recent results that indicate that the advantage of girls over boys in academic realms actually appears to increase with age (Entwisle, Alexander, & Olson, 2007; Serbin et al., 2013; Kingdon, Serbin, & Stack, 2016). Further research is warranted in order to explain these conflicting results.

Child age was another important predictor of maternal behavior. In response to children's successful actions, mothers of younger children used process-focused praise more often than mothers of older children, a finding that has not previously been reported. It may be that mothers recognize to some degree the motivational function of process-focused praise (e.g., Kamins & Dweck, 1999), and thus utilize it more often with their younger children in order to foster an interest in educational activities that they are less familiar with than older children. In response to unsuccessful child actions, mothers of younger children encouraged, helped and took over more often. Overall, mothers of younger children also responded to unsuccessful actions more often than mothers of older children. Thus, as children develop, mothers may become more likely to let them try to resolve their own challenging situations, without getting involved. These findings are consistent with developmental models of parent-child interactions, whereby parents scaffold their children's learning by gradually adjusting their behavior to respond to their children's increasing abilities (Vygotsky, 1978; Wood, 1980; Youniss, 1983). Indeed, past research has shown that parents decrease the frequency of their contingent responses to their children's task-related behaviors not only in response to their children's increasing age, but also in response to their growing competency (Kindermann, 1993).

Finally, results showed that mothers who rated their children as being more difficult on the PSI (i.e. having a difficult temperament and being more defiant, noncompliant and demanding) responded to their unsuccessful actions with more encouragement and help, as well as less taking over. These results are in line with transactional models of child development (Sameroff, 2009; Kuczynski & De Mol, 2015), as well as Belsky's model of socialization (Belsy, 1984), which both argue that parenting is determined not only by the parent, but also by the child's own characteristics. While there is a large body of literature on the ways in which problematic child behavior elicits more maladaptive parenting (e.g., Burke et al., 2008), less attention has been paid to instances in which higher levels of child need are responded to with more positive parenting (e.g., Pomerantz and Eaton 2001; Serbin et al., 2015). Children with more difficult temperaments also tend to show difficulties in intellectual and academic contexts (Bramlett, Scott, & Rowell, 2000; Lemelin, Tarabulsy, & Provost, 2006). It may be that mothers of children who were perceived as more difficult were aware that they required additional support. Thus, their increased use of encouragement and helping and decreased use of taking over may represent an attempt to offset their children's difficulties.

Other environmental factors were associated with maternal responses to children's unsuccessful actions. Mothers who provided higher quality home environments also used less discouragement when their children struggled in the puzzle task. The quality of the home has been associated with a number of negative child outcomes, spanning from behavior problems, decreased social competence, as well as academic difficulties (for a review, see Totsika & Sylva, 2004). Furthermore, a more stimulating home environment is predictive of increased academic intrinsic motivation in school-aged children (Gottfried, Fleming, & Gottfried, 1998). As the HOME assesses the amount of stimulation offered to the child, it may be tapping into mothers' attitudes towards their children's learning opportunities. Indeed, actively discouraging children from persevering may be one way of preventing them from engaging in learning opportunities. The increased use of discouragement was also associated with higher levels of maternal education. This finding was unexpected, given the large body of evidence that maternal education is associated with more positive parenting (e.g., Fox, Platz, & Bentley, 1995; Kalil, Ryan, & Corey, 2012). However, mothers with higher levels of education also hold higher expectations of their children's success (Davis-Kean, 2005). As such, they may have been more likely to experience and express disappointment in response to their children's unsuccessful

actions.  Further research should attempt to replicate this finding, and explore the mechanisms behind it.

Relating to the second objective, histories of psychosocial risk did play a role in predicting the ways in which mothers responded to their children's unsuccessful actions, but not to their successful actions.  Higher levels of aggression as well as social withdrawal in childhood were associated with mothers taking over more often in response to their children's struggles.  These results are consistent with past research showing that histories of aggression and social withdrawal are associated with increased use of controlling, versus autonomy supportive parenting (Harvey et al., 2016), as well as a number of other less adaptive childrearing practices (Serbin et al., 1991; 1998; Grunzeweig et al., 2009; Temcheff et al., 2009). Mothers who displayed aggressive behavior as children may have decreased levels of patience or inhibitory control, and this could manifest itself in more controlling parenting behaviors.  Conversely, those who experienced social withdrawal may have had fewer opportunities to develop socially competent behavior through interacting with others.  As a result, these mothers may be less skilled in helping their children in sophisticated ways and instead choose to take over the child's task themselves. These findings point to a potential important mechanism by which psychosocial risk is transferred across generations, through its strong influence on parenting.

The final objective was to explore associations between maternal responses to children's actions and their later academic and cognitive outcomes.  First, children whose mothers offered encouragement or help more often had greater reading abilities at six to 11 years of age. This result is consistent with previous evidence that parents' ability to facilitate child's learning predicts children's cognitive abilities at school entry (Parker, Boak, Griffin, Ripple, & Peay, 1999).  It may be that by encouraging and offering help, mothers promote the development of persistence and growth mindsets in their children (Jose & Bellamy, 2012; Hokoda & Fincham, 1995) which in turn leads to opportunities for enhanced learning. It is encouraging to note that this was the most common type of maternal response to unsuccessful actions observed.

Results also revealed that higher levels of mothers' taking over were associated with lower reading abilities and lower verbal reasoning skills in children at six to 11 years.  The literature has consistently shown that controlling parenting strategies are associated with a myriad of negative child outcomes that span the social, emotional, cognitive and academic realms (e.g., Frodi et al., 1985; Taylor et al., 2013; Bean, Bush, McKenry, & Wilson, 2003).

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Indeed, the use of encouragement and help as well as the minimal use of control represent important aspects of autonomy supportive parenting, which predicts greater cognitive and academic skills in children (Bernier et al., 2010; Joussemet et al., 2005), likely by promoting intrinsic motivation (Grolnick & Ryan, 1989). This was the first study to observe mothers' controlling actions in response to each individual unsuccessful child action while engaged in a learning task. It may be that in such a context, controlling behaviors undermine children's cognitive development not only through their impact on motivation, but also by preventing children from learning from their mistakes (Piaget, 1973; Ginsburg, 2006; Dawson & Guare, 2010).

Finally, children's performance IQ at nine to 13 years was positively predicted by mothers' use of neutral acknowledgements during the preschool period. Although this finding was not expected, it may suggest that mere parental monitoring of child performance, as opposed to offering praise, is beneficial to the child's learning. This is in line with training programs designed for parents of disruptive children, which promote the use of verbal behavioral descriptions of children's actions (McNeil & Hembree-Kigin, 2010). These statements serve the purposes of maintaining children's engagement in their activities as well as demonstrating to them that their parents are paying attention to their behavior (McNeil & Hembree-Kigin, 2010). Similarly, neutral acknowledgements may signal to children that their progress in the task is worth their mothers' attention. Parents' involvement in children's schooling has been associated with increased achievement insofar as it teaches children positive attitudes towards school and enhances their perception of self-efficacy (Hill & Tyson, 2009; Kingdon et al., 2016). As such, mothers neutrally noting when correct actions are made may similarly communicate to the child that their attempts are worth attending to. This may then increase the child's interest in and motivation towards learning tasks, which, by extension, would lead to increased cognitive abilities (Ryan & Deci, 2000; Ainley, 2006). Further attention should be placed on uncovering the mechanisms by which neutral parental acknowledgements predict the development of cognitive abilities, should this finding be replicated. If it is, this type of response may in fact not represent a neutral remark on the part of the parent, and might instead function as an adaptive form of parental monitoring.

Contrary to expectations, mothers' use of person- versus process-focused praise did not differentially predict children's subsequent cognitive and academic outcomes. In experimental

research, school-aged children who received person-focused praise displayed more helplessness following failure than children offered process-focused praise (Kamins & Dweck, 1999).  In turn, children's motivation level has been associated with their subsequent academic achievement (e.g., Blackwell et al, 2007; Good, Aronson, & Inzlicht, 2003).  However, results from naturalistic studies on the outcomes of maternal praise on children's motivation towards challenges have been mixed.  Pomerantz and Kempner (2013) reported that the maternal use of person-focused praise predicted 10-year-old children's fixed mindsets six months later, whereas the use of process-focused praise was not associated with children's mindsets.  The opposite effect was found in Gunderson et al. (2013)'s study, where mothers' use of process-focused praise with their 1- to 3-year olds predicted the children's growth mindsets at 7 to 8 years, while there was no effect of person-focused praise.  Further complicating these results is the finding that younger children may be less susceptible to the effects of subtle differences in praise. Henderlong Corpus and Lepper (2007) reported that while person- and process-focused praise had opposite effects on school-aged children's subsequent motivation, preschool-aged children showed enhanced motivation in response to all forms of praise. Preschool-aged children might lack the cognitive sophistication required to make causal inferences based on slight differences in language and meaning. This could explain why no effects of types of praise were found in the present study.  Instead, it may be that at this age, simply acknowledging children's successful behaviors in a neutral fashion is a beneficial response. Further research will be needed to elucidate this issue, given inconsistencies in the findings to date.

There are a number of directions that future research could take in order to gain a greater understanding of the factors that influence the ways mothers respond to their children's success and failure, as well as how these responses affect children's cognitive and academic development.  It will be important to explore how mothers' responses change depending on the context of the interaction.  For instance, mothers have been found to interfere with their children's task completion in more controlling ways when the pressure to succeed is greater (Grolnick, Gurland, DeCourcey, & Jacob, 2002). As no specific instructions were given in the task used in the present study as to the importance of completing the puzzles, the level of perceived pressure may have differed across dyads.  Second, results suggested that mothers' responses are associated with their perceptions of their child.  Future studies should further examine the mechanisms by which child characteristics affect mothers' responding.  For

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example, mothers who viewed their children as more difficult responded in more adaptive ways to their unsuccessful actions.  Did these children require more assistance or did these mothers assume so, given their interpretation of their children's difficultness? Were they instead more sensitive to the effects of their behavior on their children's emotional reactions, who may be more likely to become visibly upset if they responded in unhelpful ways?  Along related lines children may be differentially influenced by parenting behaviors. Ng, Kenney-Benson, and Pomerantz (2004) found that lower-achieving children benefited more from autonomy-supportive parenting and decreased control during challenging tasks than higher-achieving children.  Future studies could use methodologies that allow for the mapping of parent-child interactions over time to examine how children's and mothers' responses mutually influence each other.  This type of approach would allow for a more complete understanding of how these bidirectional relationships play out in natural environments.

Alongside a number of important contributions, the results of the present study should be considered in light of a few limitations. First, child behaviors were restricted to successful and unsuccessful actions.  Measuring responses to a wider range of child behaviors, such as bids for help or statements of self-efficacy could have allowed for a broader perspective.  Relatedly, when assessing the relations between maternal responses and children's later outcomes, raw frequencies of maternal responses were used instead of proportions, to avoid multicollinearity. As such, it is possible that children's skill in the task could have confounded the results. However, this does not seem to have been the case, given that certain responses to both children's successful actions (neutral acknowledgements) and their unsuccessful actions (encouragement or helping) predicted better outcomes.  It is also possible that the operationalization of discouragement was insufficient.  This code was meant to capture responses that would discourage perseverance, but its positive association with maternal education and its lack of associations with child outcomes suggest that it may not have done so. Lastly, the present study focused only on maternal responses to children's actions.  Although mothers remain the primary caregivers in most households, the inclusion of fathers' reactions would have had added benefits (Tamis-LeMonda, Shannon, Cabrera, & Lamb, 2004; Pougnet, Serbin, Stack, & Schwartzman, 2011; Pougnet, Serbin, Stack, Ledingham, & Schwartzman, 2012), and represent an avenue for future research.

Notwithstanding these limitations, results from the present study make a significant contribution to the literature on mothers' responses to children's success and struggle and mothers' role in influencing the development of children's academic and cognitive abilities. This study was the first to use rich observational methods to record the full range of behaviors that mothers show in moments of success and struggle. The at-risk nature of the sample likely allowed for a wider range of both maternal responses and child outcomes. Taken together, results showed that mothers adjust their responding to their children's needs (e.g., age, difficultness), and their behavior is associated with factors such as psychosocial risk and the family environment. Furthermore, children whose mothers limited their use of controlling behaviors, and instead encouraged them, gave them tips or monitored their progress in a neutral fashion, showed increased cognitive and academic abilities years later. The findings from this study can be applied in important ways. Understanding how parents' responses to their children's success and struggle can help or hinder their cognitive and academic development will allow for the promotion of adaptive responding. Knowing which elements of the family environment influence parental responses will help identify parents who are at risk of monitoring their children's activities in maladaptive ways. Together, these findings have the potential to support parents in their efforts to offer their children the greatest chances at success.

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**Appendix A**

**Consent Forms**

**L'INDIVIDU DANS SON MILIEU: Les parents et leurs enfants**
Directeurs du projet: - Lisa A. Serbin, Ph.D.
- Dale M. Stack, Ph.D.
- Alex E. Schwartzman, Ph.D.

FORMULAIRE DE CONSENTEMENT

Je,_____, m'engage volontairement avec mon enfant, _____, à participer à l'étude "L'individu dans son milieu: Les parents et leur enfant" de l'Université Concordia. Les buts du projet m'ont été expliqués. L'étude comprend une série de questionnaires, une évaluation du fonctionnement intellectuel de mon enfant, ainsi que trois périodes de jeux lors desquelles nous serons observés et filmés. L'étude comporte deux sessions d'une durée maximale de 3 heures chacune et une rémunération totale de $50.00 me sera allouée aussitôt que les questionnaires seront remis. En signe de courtoisie, les résultats sommaires de l'évaluation de mon enfant me seront communiqués par téléphone. De plus, les chercheurs seront prêts à effectuer une ou deux visites additionnelles, au besoin, pour terminer l'évaluation, discuter de résultats problématiques, ou m'offrir un service de référence.

Je comprends que toutes les informations que nous fournissons, qu'elles soient écrites ou filmées, sont strictement confidentielles et qu'elles ne serviront qu'à des fins de recherche. Dans toutes les circonstances, je suis assuré(e) que l'anonymat sera conservé. Cependant, selon la loi sur la protection de la jeunesse, toute information indiquant de l'abus physique ou sexuel devra être divulguée à l'Office de la Protection de la Jeunesse.

Je comprends aussi que je suis libre de cesser notre participation à n'importe quel moment. Comme le projet "L'individu dans son milieu" est à long terme, je comprends que je pourrais être appelé(e) dans l'avenir pour participer à d'autres étapes de ce projet. Je me réserve le droit de décider, à ce moment, de donner suite ou non à la demande de participation.

Signature:_____

Nom:_____ Date:_____

Assistant(e) de recherche:_____

**L'INDIVIDU DANS SON MILIEU: Les parents et leurs enfants**
Directeurs du projet: -Lisa A. Serbin, Ph.D.
-Dale M. Stack, Ph.D.

Numéro d'identification:

**Formulaire de consentement (SSHRC-1)**

Je, soussigné(e), autorise les chercheurs du projet *L'individu dans son milieu* de l'université Concordia à rencontrer mon enfant _____, à l'école durant la période de classe et à avoir accès à son dossier scolaire. Je suis informée que durant la rencontre, mon enfant aura à remplir quelques questionnaires permettant d`évaluer son rendement scolaire et aussi, à répondre à différentes questions portant sur sa vie à l'école. Je comprends que toute l'information recueillie demeurera confidentielle et qu'elle ne servira qu'à des fins de recherche.

Dans l'éventualité où j'aurai des questions concernant cette recherche, je pourrai m'adresser soit à Nadine Girouard ou bien à Christina Saltaris au (514) 848-2253.

Nom: _____     Date:
     EN LETTRES MOULÉES

Signature:

***************************

Nom de l'enseignant/e:

Nom du directeur/de la directrice:

Nom de l'école:

Numéro de téléphone:

Adresse:

_____

**L'INDIVIDU DANS SON MILIEU: Les parents et leurs enfants**
Directeurs du projet: -Lisa A. Serbin, Ph.D.
-Dale M. Stack, Ph.D.


Numéro d'identification:

**Formulaire de consentement (SSHRC-2)**


Je, soussigné(e), autorise les chercheurs du projet *L'individu dans son milieu* de l'université Concordia à rencontrer mon enfant _____ à l'école, en deux sessions, durant la période de classe. Je comprends que mon enfant remplira des tests de fonctionnement intellectuel et académique ainsi que des questionnaires sur son comportement et son tempérament. J'autorise également les chercheurs à recueillir des informations sur la vie scolaire de mon enfant de la part de son professeur et à avoir une copie du dernier bulletin de l'année en cours. Finalement, lors d'une troisième visite, je consens à rencontrer les chercheurs de l'université Concordia à la maison avec mon enfant afin de remplir des questionnaires additionnels portant sur notre vie familiale et de recueillir des échantillons de salive sur moi-même, lors de la rencontre, et sur mon enfant, lors de la rencontre et pendant deux jours de la semaine. J'accepte aussi d'être filmé(e) avec mon enfant lors d'une session incluant un jeu et des discussions portant sur des résolutions de problèmes.

Je comprends que toute l'information recueillie demeurera confidentielle et qu'elle ne servira qu'à des fins de recherche. Cependant, si après évaluation des examens votre enfant raquerait une attention spéciale, les chercheurs de l'université Concordia s'engagent à faire le suivi de la rencontre afin de référer les services nécessaires.

Dans l'éventualité où j'aurais des questions concernant cette recherche, je pourrai m'adresser soit à Julie Martin ou bien à Nadine Girouard au (514) 848-2424 extension 2254.

Nom: _____    Date_____

Signature:_____

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Nom de l'enseignant/e:

Année: _____

Nom du directeur/de la directrice: _____

Nom de l'école: _____

Numéro de téléphone: (_____) _____

Adresse: _____

**Appendix B**

**Intercorrelation Matrix**

# Intercorrelation Matrix

**Correlations**

| | | SEX OF CHILD | AGE OF CHILD TESTED | HOME ENVIRONMENT (HCAN) | DIFFICULT CHILD MOTHER | D2 MOM'S EDUCATION IN YEARS | Correct - proportion no response | Correct - proportion neutral acknowledgement | Correct - proportion process praise | Correct - proportion person praise | Incorrect - proportion encouragement/helps | Incorrect - proportion takes over | Incorrect - proportion neutral indication mistake | Incorrect - proportion discouragement | Incorrect - proportion no response | T2 TOTAL SCORE BQAL | T2 STANFORD-BINET RAISONN VERBAL | T3 WISC3 PERFORMANCE IQ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEX OF CHILD | Pearson Correlation | 1 | -.054 | .092 | -.082 | .024 | -.080 | -.030 | .053 | .164* | -.021 | .033 | .057 | .038 | -.043 | .142 | -.088 | .176 |
| | Sig. (2-tailed) | | .499 | .256 | .324 | .766 | .338 | .722 | .526 | .047 | .792 | .682 | .479 | .642 | .598 | .116 | .330 | .083 |
| | N | 156 | 156 | 154 | 148 | 156 | 147 | 147 | 147 | 154 | 154 | 154 | 154 | 154 | 154 | 124 | 124 | 98 |
| AGE OF CHILD TESTED | Pearson Correlation | -.054 | 1 | -.007 | .022 | -.036 | .457** | .086 | -.483** | -.014 | -.275** | -.313** | -.012 | .053 | .376** | .446** | .169 | -.102 |
| | Sig. (2-tailed) | .499 | | .930 | .792 | .653 | .000 | .301 | .000 | .866 | .001 | .000 | .879 | .517 | .000 | .000 | .061 | .319 |
| | N | 156 | 156 | 154 | 148 | 156 | 147 | 147 | 147 | 154 | 154 | 154 | 154 | 154 | 154 | 124 | 124 | 98 |
| HOME ENVIRONMENT (HCAN) | Pearson Correlation | .092 | -.007 | 1 | -.257** | .486** | -.079 | -.003 | .051 | .113 | .122 | -.068 | .001 | -.181* | -.007 | .134 | .226* | .268** |
| | Sig. (2-tailed) | .256 | .930 | | .002 | .000 | .346 | .969 | .543 | .174 | .135 | .402 | .986 | .026 | .936 | .140 | .012 | .008 |
| | N | 154 | 154 | 154 | 146 | 154 | 145 | 145 | 145 | 145 | 152 | 152 | 152 | 152 | 152 | 123 | 123 | 98 |
| DIFFICULT CHILD MOTHER | Pearson Correlation | -.082 | .022 | -.257** | 1 | -.028 | .111 | -.060 | -.092 | .062 | .124 | -.177* | .010 | .018 | -.009 | -.055 | -.025 | -.193 |
| | Sig. (2-tailed) | .324 | .792 | .002 | | .732 | .192 | .483 | .282 | .464 | .136 | .033 | .907 | .834 | .911 | .555 | .788 | .060 |
| | N | 148 | 148 | 146 | 148 | 148 | 140 | 140 | 140 | 140 | 146 | 146 | 146 | 146 | 146 | 118 | 118 | 95 |
| D2 MOM'S EDUCATION IN YEARS | Pearson Correlation | .024 | -.036 | .486** | -.028 | 1 | .013 | -.081 | -.003 | .128 | .187* | -.046 | -.083 | .094 | -.102 | .042 | .096 | .219* |
| | Sig. (2-tailed) | .766 | .653 | .000 | .732 | | .874 | .332 | .973 | .122 | .021 | .568 | .309 | .247 | .209 | .641 | .287 | .030 |
| | N | 156 | 156 | 154 | 148 | 156 | 147 | 147 | 147 | 147 | 154 | 154 | 154 | 154 | 154 | 124 | 124 | 98 |
| Correct - proportion no response | Pearson Correlation | -.080 | .457** | -.079 | .111 | .013 | 1 | -.156 | -.856** | -.149 | -.412** | -.252** | -.199* | .051 | .548** | .159 | .110 | -.137 |
| | Sig. (2-tailed) | .338 | .000 | .346 | .192 | .874 | | .060 | .000 | .073 | .000 | .002 | .016 | .541 | .000 | .089 | .239 | .194 |
| | N | 147 | 147 | 145 | 140 | 147 | 147 | 147 | 147 | 147 | 145 | 145 | 145 | 145 | 145 | 116 | 116 | 92 |
| Correct - proportion neutral acknowledgement | Pearson Correlation | -.030 | .086 | -.003 | -.060 | -.081 | -.156 | 1 | -.322** | -.145 | .046 | .166* | -.074 | -.031 | -.081 | .098 | .048 | .211* |
| | Sig. (2-tailed) | .722 | .301 | .969 | .483 | .332 | .060 | | .000 | .080 | .580 | .045 | .375 | .711 | .334 | .296 | .607 | .044 |
| | N | 147 | 147 | 145 | 140 | 147 | 147 | 147 | 147 | 147 | 145 | 145 | 145 | 145 | 145 | 116 | 116 | 92 |
| Correct - proportion process praise | Pearson Correlation | .053 | -.483** | .051 | -.092 | -.003 | -.856** | -.322** | 1 | -.024 | .366** | .198* | .195* | -.056 | -.481** | -.190* | -.108 | .026 |
| | Sig. (2-tailed) | .526 | .000 | .543 | .282 | .973 | .000 | .000 | | .771 | .000 | .017 | .019 | .503 | .000 | .042 | .248 | .805 |
| | N | 147 | 147 | 145 | 140 | 147 | 147 | 147 | 147 | 147 | 145 | 145 | 145 | 145 | 145 | 116 | 116 | 92 |
| Correct - proportion person praise | Pearson Correlation | .164* | -.014 | .113 | .062 | .128 | -.149 | -.145 | -.024 | 1 | .037 | -.162 | .146 | .093 | -.033 | -.060 | -.106 | .061 |
| | Sig. (2-tailed) | .047 | .866 | .174 | .464 | .122 | .073 | .080 | .771 | | .660 | .051 | .079 | .267 | .693 | .525 | .255 | .561 |
| | N | 147 | 147 | 145 | 140 | 147 | 147 | 147 | 147 | 147 | 145 | 145 | 145 | 145 | 145 | 116 | 116 | 92 |
| Incorrect - proportion encouragement/helps | Pearson Correlation | -.021 | -.275** | .122 | .124 | .187* | -.412** | .046 | .366** | .037 | 1 | -.070 | .021 | -.140 | -.709** | -.003 | .040 | .015 |
| | Sig. (2-tailed) | .792 | .001 | .135 | .136 | .021 | .000 | .580 | .000 | .660 | | .391 | .798 | .083 | .000 | .975 | .663 | .884 |
| | N | 154 | 154 | 152 | 146 | 154 | 145 | 145 | 145 | 145 | 154 | 154 | 154 | 154 | 154 | 122 | 122 | 96 |
| Incorrect - proportion takes over | Pearson Correlation | .033 | -.313** | -.068 | -.177* | -.046 | -.252** | .166* | .198* | -.162 | -.070 | 1 | -.185* | -.099 | -.367** | -.303** | -.295** | .016 |
| | Sig. (2-tailed) | .682 | .000 | .402 | .033 | .568 | .002 | .045 | .017 | .051 | .391 | | .022 | .223 | .000 | .001 | .001 | .877 |
| | N | 154 | 154 | 152 | 146 | 154 | 145 | 145 | 145 | 145 | 154 | 154 | 154 | 154 | 154 | 122 | 122 | 96 |
| Incorrect - proportion neutral indication mistake | Pearson Correlation | .057 | -.012 | .001 | .010 | -.083 | -.199* | -.074 | .195* | .146 | .021 | -.185* | 1 | -.079 | -.426** | .021 | .042 | .107 |
| | Sig. (2-tailed) | .479 | .879 | .986 | .907 | .309 | .016 | .375 | .019 | .079 | .798 | .022 | | .330 | .000 | .817 | .644 | .299 |
| | N | 154 | 154 | 152 | 146 | 154 | 145 | 145 | 145 | 145 | 154 | 154 | 154 | 154 | 154 | 122 | 122 | 96 |
| Incorrect - proportion discouragement | Pearson Correlation | .038 | .053 | -.181* | .018 | .094 | .051 | -.031 | -.056 | .093 | -.140 | -.099 | -.079 | 1 | -.077 | .053 | .121 | -.131 |
| | Sig. (2-tailed) | .642 | .517 | .026 | .834 | .247 | .541 | .711 | .503 | .267 | .083 | .223 | .330 | | .343 | .565 | .184 | .204 |
| | N | 154 | 154 | 152 | 146 | 154 | 145 | 145 | 145 | 145 | 154 | 154 | 154 | 154 | 154 | 122 | 122 | 96 |
| Incorrect - proportion no response | Pearson Correlation | -.043 | .376** | -.007 | -.009 | -.102 | .548** | -.081 | -.481** | -.033 | -.709** | -.367** | -.426** | -.077 | 1 | .131 | .063 | -.056 |
| | Sig. (2-tailed) | .598 | .000 | .936 | .911 | .209 | .000 | .334 | .000 | .693 | .000 | .000 | .000 | .343 | | .149 | .490 | .587 |
| | N | 154 | 154 | 152 | 146 | 154 | 145 | 145 | 145 | 145 | 154 | 154 | 154 | 154 | 154 | 122 | 122 | 96 |
| T2 TOTAL SCORE BQAL | Pearson Correlation | .142 | .446** | .134 | -.055 | .042 | .159 | .098 | -.190* | -.060 | -.003 | -.303** | .021 | .053 | .131 | 1 | .219* | .065 |
| | Sig. (2-tailed) | .116 | .000 | .140 | .555 | .641 | .089 | .296 | .042 | .525 | .975 | .001 | .817 | .565 | .149 | | .015 | .541 |
| | N | 124 | 124 | 123 | 118 | 124 | 116 | 116 | 116 | 116 | 122 | 122 | 122 | 122 | 122 | 124 | 124 | 92 |
| T2 STANFORD-BINET RAISONN VERBAL | Pearson Correlation | -.088 | .169 | .226* | -.025 | .096 | .110 | .048 | -.108 | -.106 | .040 | -.295** | .042 | .121 | .063 | .219* | 1 | .331** |
| | Sig. (2-tailed) | .330 | .061 | .012 | .788 | .287 | .239 | .607 | .248 | .255 | .663 | .001 | .644 | .184 | .490 | .015 | | .001 |
| | N | 124 | 124 | 123 | 118 | 124 | 116 | 116 | 116 | 116 | 122 | 122 | 122 | 122 | 122 | 124 | 124 | 92 |
| T3 WISC3 PERFORMANCE IQ | Pearson Correlation | .176 | -.102 | .268** | -.193 | .219* | -.137 | .211* | .026 | .061 | .015 | .016 | .107 | -.131 | -.056 | .065 | .331** | 1 |
| | Sig. (2-tailed) | .083 | .319 | .008 | .060 | .030 | .194 | .044 | .805 | .561 | .884 | .877 | .299 | .204 | .587 | .541 | .001 | |
| | N | 98 | 98 | 98 | 95 | 98 | 92 | 92 | 92 | 92 | 96 | 96 | 96 | 96 | 96 | 92 | 92 | 98 |

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).