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An investigation of physical health in high-risk mothers and their preschoolers: An inter-generational study

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Abstract

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An investigation of physical health in high-risk

mothers and their preschoolers: An inter-generational study.

Health is a result of both internal (biological) and external (e.g. environmental) factors, and it has effects on both child development and the parent-child relationship. The present study examined the role of physical health in high-risk families with young children. The Concordia Longitudinal Risk Project includes a sample of mothers who were identified in childhood as being highly aggressive and/or socially withdrawn. Previous findings from this prospective, inter-generational project suggest that the offspring might be at risk for both health and academic problems by the time they reach school-age. Mothers and their preschool children were visited at home on several occasions in order to collect data on their health and maternal parenting stress. The results indicated that maternal childhood aggression and social withdrawal as well as substance abuse play a role in health of the next generation from the prenatal period to the preschool years. There was also evidence for continuity of physical health from birth until early childhood, with neonatal status emerging as a marker for colic and illness in early childhood. More mature newborns who did not need medical treatment before leaving the hospital were less likely to have common childhood illnesses. Children who were ill more often during early childhood had mothers who reported higher levels of parenting stress. The role of health in family functioning is discussed within the context of the literature and models of inter-generational transfer of risk. Finally, implications for clinicians and public health policy are discussed.

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An investigation of physical health in high-risk mothers and their preschoolers: An inter-generational study.

Child physical health is more than a personal resource: it is also an expression of the genetic legacy as well as the physical environment provided by parents. Child health is included by Wyman and his colleagues (1999) in their organizational-developmental model of resilience as one of two child resources that interacts with parenting and adaptation (the regulated dyadic relationship) to influence stage-salient tasks such as affect regulation and attachment. Despite including it in their model and acknowledging its bidirectional effects on parenting, the authors place more focus on parenting and the parent-child relationship than the contributions of child heath to resiliency.

Health is often overlooked and rarely the primary focus of research and theories on child development. For example, child health is completely omitted from Goodman and Gotlib's (1999) otherwise comprehensive developmental model for understanding the mechanisms of transmission of risk for psychopathology from depressed mothers to offspring. Risk for aberrant cognitive and social development from environmental influences such as poverty, maternal education, and quality of the home environment have been well documented. Yet, little is known concerning how various risk factors interact with child health, how good health may actually buffer a child from environmental risk, and how much of inter-generational transfer of risk might be attributable to transmission of biological vulnerabilities. In a recent special section on inter-generational transfer of risk in *Developmental Psychology*, Rutter (1998) warned against the tendency of many investigators to ignore the influence of genetics and

reminded them that there is greater continuity for genetic than for environmental influences. If children share an average of half their parents' genetic material, it can be assumed that they are the recipients of certain hereditary physical vulnerabilities. At the same time, parents may expose their children to environmental factors such as good nutrition or toxins that will predispose them to good health or illness.

Despite the lack of attention paid to physical health in developmental psychology, there is a place for it in several important models of development and inter-generational risk. The transactional model (Sameroff & Chandler, 1975) posits that child development is influenced by the child, parent and environmental factors and that risks may accumulate over time. Therefore, the effects of family poverty on child development will be more detrimental if the situation is chronic than if the family is simply experiencing a temporary financial setback (Korenman, Miller, & Sjaastad, 1995). How parents cope with financial difficulty will also determine child outcomes. For example, parents that prioritize good nutrition and regular health care for their children, while cutting back on buying new clothes or taking a vacation, are promoting their child's health despite budgetary constraints. The child is also an important player in family dynamics and child health affects more than the target child. Parents of an allergic and asthmatic child may think differently about their child's opportunities to enjoy sleep-overs, planning family camping trips, and acquiring a pet, than parents whose children breathe easily in any environment.

Bronfenbrenner's (1979) ecological theory emphasizes an expanding circle of influences (micro-, meso-, exo- and macro-systems) that interact with each other to influence child development. Growth takes place in a nested set of social contexts that

change over time (chronosystem) beginning with the child's body (microsystem), the child's family (mesosystem), the family's social network (exosystem), and the cultural background within which they live (macrosystem). All of these systems can have an impact on and in turn be influenced by physical health. For example, the care that a sick child will receive may be determined by factors such as the child's ability and/or personal willingness to communicate distress, the family's access to adequate health care, maternal pre-occupation with employment that may drain her emotional resources, and her culture's approach to the treatment of various symptoms. Therefore, it is necessary to examine child health in the broader context of family and society.

Dynamic systems theory postulates that not only is context important, but that child development also occurs as a result of constantly evolving interactions among elements that are themselves dynamic (Fogel & Thelen, 1987). Whereas development was previously conceptualized as occurring in a coordinated manner across domains, the systems model of communicative development posits that developmental change may be elicited in different ways depending on age, context and task. For example, a preterm infant that remains in neonatal intensive care (NICU) for 2 months following delivery will not have the same opportunities to nurse and communicate with mother as a full-term infant who returns home with mother a day after delivery. A mother's ability to cope and nurture her medically-fragile preterm infant may change from day to day and even moment to moment, and this will evolve as the infant reacts to or does not seem to react to her presence. It is important for researchers to recognize that health is not only an important element of mother-child functioning in high-risk families, but also contributes to the dynamic nature of the developmental process.

Health as a Risk and a Protective Factor

Early risk status does not necessarily lead to negative outcomes; many children reared in disadvantaged environments manage to climb out of poverty and dangerous neighborhoods to become successful adults and rear their own families in a different context (Caspi & Elder, 1988; Furstenberg, Brooks-Gunn, & Morgan, 1987; Rutter, 1987; Werner & Smith, 1982). Variables such as maternal resources (e.g., education, mental health) and the child's own constitution (e.g., health, temperament) can moderate risk factors (Wyman, Cowen, Work, Hoyt-Meyers, Magnus & Fagen, 1999). However, the effects of risk or buffers may be cumulative and have long-term effects on development. An analysis of the British Cohort Study on health across the lifespan studied a group of people at numerous time points in their lives. They found that children who were growing slowly at age 7, not read to consistently before age 7, and were not socio-emotionally well-adjusted at ages 11 and 16, were 5 times more likely to report poor health at age 33 than those who were growing quickly, read to more often and were well-adjusted (Hertzman, 2000). As many authors point out, the current focus is not strictly the identification of risk or protective factors but rather of elaborating the process: *how* do predictors meaningfully link to negative and positive outcomes in children at risk and what mediates continuity or discontinuity (Serbin & Stack, 1998; Rutter, 1998; Freitas & Downey, 1998; Masten, 1994).

Most of the research that has been conducted on risk and associated trajectories has used concurrent or retrospective designs but it is longitudinal and prospective research that can best examine the continuity of risk over time and across generations (Luthar & Zigler, 1991). Fagot, Pears, Capaldi, Crosby and Leve (1998) studied boys

from high-crime areas first identified in Grade 4 and found that those boys who became teenage fathers had offspring that were significantly more likely to suffer from health problems. These results indicate that there are also physical effects in the offspring of teen parents. However, not all children from disadvantaged families show negative outcomes and thus, it is clear that some children manage to break the cycle. Research into the genesis of developmental psychopathology has recently been extended from the identification of risk factors to the investigation of protective factors or elements that may buffer children in less than optimal environments (Masten, 1994; Rutter, 1998).

Physical health may be an important buffer against a less than optimal environment for resilient children from high-risk families, however it is important to consider child physical health from conception onward. Developmental timing is important when studying physical health, since expressions of illness and their effects on mothers will depend on the age of the child. Most mothers first show concern over fetal health and normal development during visits to their obstetricians for examinations and diagnostic tests such as ultrasound and amniocentesis. Early and regular prenatal care help prevent negative reproductive outcomes such as low birth weight, still birth, and post-partum complications (Gilbert & Harmon, 1986). Mothers are also already providing their child with either a healthy or vulnerable foundation for future health by such things as genetics, nutrition, smoking, and stress.

At childbirth the focus turns to delivery and neonatal status: children born early are more likely to experience more traumatic deliveries and remain in hospital longer in order to receive medical interventions (Minde, 2000). Children from the Johns Hopkins Collaborative Perinatal Study (JHCPS) who did not experience fetal/neonatal

complications were more likely to enjoy good mental health and have higher incomes 30 years later. This early biological risk interacted with family income and maternal treatment at 4 and 8 months of age so that prediction models including those maternal characteristics were more powerful (Fan, 2000). However, some infants develop colic despite being at no visible biological risk, and their mothers must cope with their regular inconsolable bouts of crying and fussing. Furthermore, as children enter the preschool years they become exposed to a number of contagions and some children will begin to suffer from chronic conditions such as allergies and asthma. Therefore, child age is an important factor to consider in longitudinal studies, and different variables are more appropriate to examine at different points in the lifespan.

The present study was designed to examine physical health as both a predictor and outcome measure for mothers and children in a high-risk inter-generational study. Health was examined in chronological order, beginning with the pre-natal and post-natal periods, continuing into health in early childhood, and finally addressing current maternal physical complaints. Maternal smoking, neonatal health status, infant colic and chronic child illness were particularly emphasized.

Prenatal Health: Effects of Maternal Smoking

The US Department of Health and Human Services (1990) reported that smoking during pregnancy is the most important modifiable cause of poor pregnancy outcome among women in the US. Similar conclusions have been drawn about Australian women (Walsh, 1994). Millar and Chen (1998) found that maternal education and smoking had independent effects on small-for-gestational age Canadian neonates after controlling for

other risk variables in the 1994-1995 National Longitudinal Survey of Children and Youth (NLSCY) sample. There is evidence that smoking not only retards fetal growth, but may also lead to long term effects on the physical and mental development of offspring (Walsh, 1994). The link between smoking in pregnancy to problems for offspring into childhood may be partially due to the fact that nearly all women who smoke during pregnancy continue to smoke post-partum (Hjalmasson, Hahn, & Suanberg, 1991). Moreover, infants not in contact with smokers immediately following birth are increasingly likely to be exposed to passive smoke by one year of age (Greenberg, Bauman, Strecher, Keyes, Glover, Haley, Stedman, & Loda, 1991).

Some researchers speculate that highly emotional mothers may resort to unfavourable coping strategies (use of alcohol, smoking) in reaction to stress during pregnancy and may also be more likely to become insensitive parents, thus transmitting their behavioural reactivity and negative health outcomes to offspring (Ponirakis, Susman & Stifter, 1997). There is also evidence that depressed pregnant women have a higher likelihood of smoking cigarettes and using other toxic substances (Zuckerman, Amaro, Bauchner, & Cabral, 1989). Therefore, it is important to examine psychosocial variables that may lead to smoking in pregnancy, that preventable yet common cause of aversive infant outcomes, as well as possible long-term effects in offspring from a community-based, high-risk sample in Canada.

The Concordia Longitudinal Risk Project (CLRP) began 25 years ago when a sample of children from inner-city schools in Montreal were identified as highly aggressive or socially withdrawn or high on both dimensions. Now that the original participants are adults and many have become parents, it is possible to examine the

transfer of risk or resilience to the next generation. Research on mother-infant interactions within Concordia Longitudinal Risk Project families (Cooperman, 1996; Bentley, Stack & Serbin, 1998; De Genna, Stack, Serbin, Schwartzman & Ledingham, 2000) indicate that maternal childhood risk status may lead to atypical behaviour patterns and poor health in offspring. It is likely that these patterns and negative health outcomes begin with conception. It is not only the external home environment that contributes as a package of risk or protective factors, but also the internal, fetal environment the mother provides for the child's start in life. This environment may be affected by such factors as maternal nutrition, stress, and teratogenic agents such as nicotine, alcohol, disease, and lead exposure. Factors such as maternal age, education and poverty are highly correlated with these factors and place younger, poorer, and less educated mothers at higher risk for providing an early impoverished environment for their unborn child.

There is also evidence that suggests that these environmental risks may be present repeatedly across generations in a cycle of disadvantage (Kopp & Kaler, 1989). In their 30-year longitudinal study of poor Hawaiian families, Werner and Smith (1977, 1992) found that pre- and peri-natal complications (that did not result in serious CNS damage) were only predictive of negative developmental outcomes in combination with chronic poverty, parental psychopathology, or persistently poor parenting. Therefore, it is important to follow families across generations in order to determine in which circumstances pre- and post-natal health play a critical role in child development.

Neonatal Health Status and Colic

Neonatal health status (as measured by birth weight, gestational age, and post-

natal health problems) is a pivotal moment in the life course because it is the cumulation of effects dating from the mother's own conception and an important marker of subsequent life course outcomes (Spencer, 2001). Medically-fragile infants may be more likely to give confusing social signals and be perceived as less responsive (Wyly, 1997). In Canada, as in many countries, there are persistent income-related disparities in low birth weight and infant mortality, and children of parents with low SES are also more likely to have poorer perceived health in early childhood (Wilkins, Houle, Berthelot, & Ross, 2000). Preterm low birth weight is associated with poor health in early childhood and asthma (Chen & Millar, 1999), but less is known about the sources and long-term effects of neonatal health status in a community-based high-risk sample.

Mothers whose newborns have health problems that require intensive care and extended hospital stays will have very different experiences from mothers with uneventful deliveries who are able to see their infant as often as they like and bring them home within 48 hours of birth. Affleck, Tennen and Rowe's (1991) study of parents' experiences with an American NICU suggest that most mothers had no warning that they were going to have a premature or hazardous delivery, and it was a shocking violation of their assumptions about childbirth. Follow-up of these families 6 months afer discharge revealed that this early experience continued to influence the infant-caregiver relationship. When asked about difficulties, one in four mothers cited their infants' continuing medical problems and another 25% described caregiving problems associated with their infants' unpredictable sleep schedules, feeding problems and inconsolable crying and distress. It is possible, perhaps even likely in some cases, that these early patterns of caregiving difficulties would carry over into childhood, especially if the high-

risk neonate develops into a fragile, sickly child.

Even parents of healthy full-term infants may have to re-adjust their perceptions of infant behaviour and experience parenting stress related to newborn distress. Although all parents are prepared for their newborn infants to cry, 13-26% of families (incidence depends on operational definition of colic) must learn to live with an otherwise healthy infant that cries excessively frequently over a prolonged period of time (Neu, 1997). Colic may be related to neonatal status: infants born later and larger and who were breast-fed may be less prone to colic than less mature, lighter and bottle-fed infants (Escallier, 1995). There is also evidence to suggest that infantile colic may be related to temperament and be a marker for future behavioural problems: Neu (1997) found that colicky infants were more active, less persistent, more sensitive to sensory stimuli, and more negative in mood in first and second grade than children who had not suffered from colic as infants. Barr (1998) reports that a subgroup of mothers whose infants had colic may go onto experience "persistent mother-infant distress" syndrome, particularly if the colic is accompanied by additional risk factors. Colic is an interesting post-natal phenomena and an example of an early child factor that has an impact on later development, as well as parenting and family dynamics. It is often the first time that parents are concerned that their infant may be ill or suffering and may be a significant source of parenting stress.

Health in Early Childhood

Illnesses are a common occurrence in the first years of life, with an average of 8 or 9 episodes per year (Denny & Clyde, 1983), and for some children these bouts

develop into chronic problems. A study comparing a high risk sub-population of children from the National Longitudinal Survey of Children and Youth with a markedly antisocial behaviour profile found that these children were not only disadvantaged across a wide variety of environmental factors but also suffered from poorer health (Wade, Pevalin, & Brannigan, 1999). There is evidence that a child's environment will lead to differential expression of illness in normative populations. Chen and Millar (1999) found that poor maternal health and low maternal education were predictors of childhood asthma in mothers of children under 3 years of age from the National Longitudinal Survey of Children and Youth. Millar and Hill (1998) found that histories of allergies, parental asthma, and residence in Quebec were all related to higher incidence of asthma in Canadian children.

Interestingly, Klinnert and her colleagues (1994) found that good parenting buffers children from stress and may prevent early onset of asthma in vulnerable children. In addition, Meinart, Frischer and Kuehr (1995) found a positive association between bronchial hyper-reactivity and maternal smoking before pregnancy, during pregnancy, and in the child's first year of life, but not for the child's eighth year of life. In asthmatics, these associations were even more pronounced. Meinert et al's results indicate that mothers of children with bronchial hyper-reactivity (especially if their children had also received a diagnosis of asthma) were less likely to take up smoking and more likely to quit smoking. Clearly, maternal reactions to illness play an important role in a child's physical well-being, and sensitive parenting may be even more crucial for children with respiratory illness from high-risk populations.

A recent Australian study (Najman, Bor, Andersen, O' Callaghan & Williams,

2000) showed that the best predictors of preschool behavioural problems were child and maternal health and mother's mental state/childrearing practices. Maternal lifestyle and SES made little or no contribution to the prediction models for this sample. Although the cumulative risk literature is certainly a step forward, Storm (1998) points out that despite the fact that more attention is being paid to the effects of severe and chronic child illnesses on family functioning, much less is known about the effects of the more common minor illnesses in childhood. She found that even minor child illnesses predict parenting stress. More research on the role of normative child health in community samples of high-risk families is clearly warranted.

The general objective of the present thesis was to investigate how physical health interacts with maternal variants such as maternal childhood risk status, educational attainment, maternal health, and parenting stress, in order to better predict development in offspring from a high-risk sample. Each period of health (pre-natal, post-natal, and early childhood) was examined separately to illuminate the issues in a developmentally-sensitive manner. Mothers were the focus of this study for a variety of reasons. One consideration was sample size, since fewer fathers were available for participation during the home visits. Another more important reason was that mothers provide the pre-natal environment and every substance they ingest (e.g., food, nicotine, controlled substances) is passed into the bloodstream of their unborn child. Mothers were also much more likely than fathers to be the primary caregivers. Finally, aggressive girls have not been followed in many longitudinal studies because they are less likely to present a physical threat to society (e.g., delinquency, violent crime). However, the present study includes a unique sample of highly aggressive girls who have reached the normative age of

motherhood, which affords an invaluable opportunity to examine an important transition in the life-course and a possible mechanism for transmission of risk.

The Concordia Longitudinal Risk Project

The Concordia Longitudinal Risk Project offers the opportunity to study the transfer of risk and examine resiliency across generations in a longitudinal, prospective design. Mothers were originally classified in 1977 when they were schoolchildren. A peer nomination technique placed them into one of the following categories: aggressive, withdrawn, both aggressive and withdrawn, or in a contrast group of children low on these two dimensions. The entire sample of families in this study can be considered at environmental risk because the parents grew up in low SES, inner-city neighbourhoods. A subset of the offspring are being raised by mothers who were highly aggressive or socially withdrawn as children. Unlike anti-social boys, most anti-social girls do not grow up to become criminals. However, some of them may suffer from poor mental health and a majority of them will become mothers. It is important to study the impact of health on mothers and children from disadvantaged families in general and offspring of aggressive girls in particular in order to clarify the process of the transfer of risk from one generation to the next via parenting.

Now that the original participants have become adults and are having children of their own, it is possible to examine how their childhood difficulties might have affected their approaches to parenting and the resulting outcomes in their offspring. An early study of reproductive outcomes in this sample showed that adolescent girls who were highly aggressive as children were more likely to engage in high-risk sexual behaviour

leading to higher rates of gynecological problems, sexually-transmitted diseases (STDs) and teenage pregnancy (Serbin, Peters, McAffer & Schwartzman, 1991). Subsequent research on some of these risk mothers' school-age offspring suggest that their children are at risk for multiple negative outcomes including poor health and low academic achievement. Serbin and her colleagues (1996) obtained Medicare records for 94 first-born children of mothers who had become pregnant before age 21. Mothers identified as aggressive or aggressive and socially withdrawn as children were more likely to bring their offspring to the emergency room in the first four years of life. This was especially true for sons of aggressive mothers, who were also at higher risk of hospitalization for asthma, and daughters of aggressive/withdrawn mothers, who were more than twice as likely to be treated for severe injuries than daughters of the contrast group mothers. When the medical records of 483 mothers were recently examined, it was discovered that mothers who were both aggressive and withdrawn as children were almost twice as likely to suffer from delivery complications (Serbin, Cooperman, Peters, Lehoux, Stack & Schwartzman, 1998).

Early findings from the Concordia Longitudinal Risk Project suggest that there are different health trajectories for offspring of mothers who were considered to be at psychosocial risk in childhood and who became mothers at a young age. One limitation of this previous research was that many of the women from the original sample of 1,774 women had not yet become mothers. Thus, this was not a representative sample of all mothers from the Concordia Longitudinal Risk Project, but rather an especially high-risk subsample of women who became mothers before turning 21 (Serbin, Peters & Schwartzman, 1996; Serbin et al., 1998). The present study included women who

became mothers at a normative age and involved maternal reports of prenatal and child health, maternal self-reports of health, and maternal parenting stress. The goal of the present study was to examine the effects of obstetric health and neonatal health status on health in early childhood and maternal parenting stress. Children whose parents were themselves identified in childhood as being at risk were the focus of the current investigation. What qualities of the prenatal, psychosocial and physical environments lead to good health in early childhood? While the effects of the home environment and parenting stress in high-risk families have all been studied to some extent, the role of physical health as a moderator of these variables very early in life has largely been neglected in current developmental models of risk and resilience. Mothers with histories of childhood psycho-social risk who are heavy smokers may experience more difficult pregnancies and have sickly offspring. Poor health may place a child at even greater risk for developmental delay, even within an already high-risk sample. Conversely, good health might buffer a child from environmental risk.

This project investigated the role that physical health plays in families with high-risk mothers. Information on Concordia Longitudinal Risk Project mothers and their young offspring were gathered in the homes when children were 1-6 years old, allowing for assessment of the relative contributions of maternal childhood risk status and perinatal health to health in early childhood and maternal parenting stress. The sample (n = 114) available for this study permitted the division of the mothers into the separate risk groups that they were originally classified as children in 1977: aggressive, socially withdrawn, both aggressive and withdrawn, and a contrast group that was low on these two dimensions. Maternal childhood risk may place Concordia Longitudinal Risk

Project offspring at increased risk for physical health problems. The present study was designed to investigate the nature of that vulnerability as well as the role of good health in maintaining normal development in a high-risk, inter-generational sample.

Hypotheses

There were three general hypotheses that were examined in the present study. The first was that maternal childhood characteristics would predict physical health in both mother and offspring. The second general hypothesis was that demographic variables would mediate those effects. The third general hypothesis was that there would be continuity over time for health so that pre- and post-natal health status would predict early childhood health.

1. Maternal Childhood Risk Status

a. Pre- and post-natal health. Based on previous studies with Concordia Longitudinal Risk Project families, mothers who were at psychosocial risk in childhood were expected to have children with more health problems than mothers from the contrast groups, beginning with pregnancy. Aggressive mothers in particular were expected to be more likely to expose their unborn children to teratogens.

b. Health in early childhood. Maternal childhood risk status was also expected to predict child health. More health problems were expected in offspring whose mothers were highly aggressive or withdrawn in childhood compared to mothers who were low on these dimensions.

c. Maternal health. Risk mothers were expected to report poorer health for

themselves.

d. Maternal parenting stress. Mothers who had a history of childhood aggression or withdrawn behaviour were expected to report more parenting stress than mothers from the contrast group. Furthermore, mothers with sicker children were expected to report more stress.

2. Demographic Moderating Variables. Several demographic variables were expected to mediate the effects of maternal childhood risk status on health outcomes. Maternal education was expected to be a buffer against pre- and post-natal health problems. Child age and gender were expected to be predictors of health in early childhood. Epidemiological studies and perinatal risk indices suggest that boys may be more vulnerable to physical health problems than girls (Siegel, 1982). Findings from the Concordia Longitudinal Risk Project itself with children under the age of 3 indicate that sons of young mothers were not brought to the emergency room for more infections and acute illness, however sons of aggressive mothers and daughters of aggressive-withdrawn mothers were more likely to visit the ER for injuries (Serbin et al, 1996). In the present study boys (1-6 years old) were expected to experience more illnesses than girls. Finally, it was predicted that older children were more likely to have had time to experience chronic illness and would be more likely to have been exposed to infection. Therefore maternal report of child illness was expected to increase with child age.

3. Continuity in Physical Health. Continuity was expected from the prenatal period to early childhood. Neonatal status (as measured by gestational age and medical treatment

following delivery) was expected to predict health in early childhood. It was hypothesized that mothers whose children were born earlier and experienced health problems before leaving the hospital would report more childhood illness.

Method

Original Participants

The participants were recruited from a subject pool of 1,774 individuals (864 male, 910 female) followed in the Concordia Longitudinal Risk Project (Ledingham, 1981). This project began in 1977 when 4,109 Francophone school children were screened from Grades 1, 4, and 7 in inner-city public schools (Schwartzman & Ledingham, 1976). Unlike many longitudinal studies, this study included participants from a normative, community-based low SES sample as opposed to a clinical one. The children were screened using a peer nomination technique (Pekarik, Prinz, Leibert, Weintraub & Neale, 1976) to identify those that were aggressive or socially withdrawn compared to their classmates. Children's raw scores were transformed into z-scores for each sex and within each age group so that each child was scored according to norms for both sex and age. Children were assigned to the Aggressive group if they obtained scores at the 95th percentile or higher on Aggression and below the 75th percentile on Withdrawal. The opposite criteria were used to form the Withdrawn group. Children who obtained a z-score above the 75th percentile on both dimensions were classified as Aggressive/Withdrawn. A lower cut-off score was used to create this group in order to ensure a large enough sample because of the low probability of scoring very high on both scales. At that time a comparison group of children (who scored between the 25th and 75th percentile on both dimensions) from the same schools and neighborhoods was also identified. Appendix A provides sample items from the peer nomination instrument and summarizes how the sample was originally formed.

Participants

There are 909 traceable women in the Concordia Longitudinal Risk Project and 472 of the original participants (men and women) had become parents at the time of testing. This study included those women who had become mothers and had a child aged 12-72 months living with them within an hour and a half's drive from Concordia University in Montreal. The final sample included 114 families: 65 mother-daughter and 49 mother-son dyads. Half of the mothers came from one of the maternal childhood risk groups (18 were highly aggressive children, 19 were socially withdrawn children, and 19 were both aggressive and withdrawn as children). The other 58 mothers formed a contrast group recruited from the same inner-city schools that were low on these risk dimensions.

The demographic characteristics of the current sample of 114 dyads are presented in Table 1. At the time of testing these participants ranged in age from 25-35 years old for the mothers and 1-6 years old for the children. Eighty-eight of the women were married or living with a common-law partner and 26 were single parents. In terms of SES, the mothers had an average of 11.64 years of education (27% of these mothers failed to complete high school) and family income ranged from $8,430-198,380.

Procedure

Families were contacted by telephone and appointments for two home visits were arranged for all participants who fit the criteria of child age and residence. Participants were told they would receive $60 upon completion of the study. The Demographics Information Questionnaire (DIQ: see Appendix B) was completed over the telephone when the first visit was scheduled.

Table 1

Demographic Information

	n	M	SD	Range
Mother's age at testing	114	30.41	2.58	25.71-34.52
Mother's age at first childbirth	114	24.35	3.48	15-35
Target child's age at testing	114	3.56	1.58	1.01-6.12
Maternal years of education	114	11.64	2.35	5-17
Family income	114	$ 38,851	$ 28,425	$ 8,430-198, 380

One experimenter (MA level health professional) and one research assistant/graduate student, both blind to maternal childhood risk status, visited each home for an average of three hours per visit for 2 visits. This study was part of a much larger project that included standardized testing and filmed parent-child observations. A consent form was first signed by the mother (see Appendix C) and the research assistant interviewed the mother about obstetric and child health (see Appendix D for questionnaire). The mother also completed a medical questionnaire for herself (Appendix E) and the short form of the Parenting Stress Index (PSI: see Appendix F) as part of the testing protocol.

Measures

(1) Demographic Information Questionnaire. This questionnaire was typically completed over the telephone when the mother was contacted to participate in the study. Mother's current age, age at the birth of her first child, marital status, educational level, current occupation and income were obtained using this measure.

(2) Obstetric and Child Health Questionnaire. This questionnaire was developed by the principal investigators of the Concordia Longitudinal Risk Project and

completed as an interview during the first home visit. Mothers were asked open-ended questions pertaining to all aspects of the pregnancy, delivery and health status of the target child.

(3) Maternal Health Questionnaire. This questionnaire was also developed for the purposes of the home visits. Mothers completed the questionnaires themselves. They were first asked about any physical symptoms/medical complaints they had experienced in the last 3 months from a comprehensive list. Next, mothers were asked to describe their current cigarette and alcohol intake, as well as any previous abuse of alcohol or past use of any controlled substances.

(4) Parenting Stress Index (PSI). Maternal parenting stress was measured with the short form of the Parenting Stress Index (Abidin, 1995). This is a 36-item inventory designed to assess significant sources of maternal stress in the parent-child system arising from both child (Child Domain) and maternal characteristics (Parent Domain) using maternal report. The PSI-short form offers a Total Index Score as well as the following subscales: parent-child dysfunction, parenting distress and difficult child.

Results

Preliminary Analyses and Data Screening

All variables were examined for accuracy of data entry and missing values before descriptive statistics were conducted. Cases with missing values were replaced by the mean of the group on that particular variable (Tabachnick & Fidell, 1996). Normality of the distributions and presence of skewness and/or outliers were then assessed as part of the data screening process. Some low-frequency variables were not expected to be distributed normally (e.g., serious illness such as epilepsy, cancer) and as a consequence, they were recoded as dichotomous variables since presence or absence of these conditions was considered to be useful information. There were always at least 19 subjects per predictor in order to ensure adequate power in the regression analyses. More details about specific variables (including transformation and recoding) are presented under the specific section for that set of analyses.

Reduction of the Variables and Data set

Due to the nature of the analyses planned, the questionnaire data were reduced to aggregate dependent measures for purposes of statistical analysis. This reduction was largely based on theoretical relevance to the hypotheses under investigation and ensured that the number of predictors in a regression was appropriate with regard to sample size. Preliminary analyses were conducted for each outcome measure and correlations between potential predictors and criterion variables were assessed. There were necessarily different predictors in each regression equation because predictors were selected for the final analyses based on the strength of the relationship with the outcome measure (e.g.,

statistical significance) as well as theoretical relevance and empirical support in the literature.

Since intergenerational transfer of psychosocial risk was of particular interest, maternal childhood levels of Aggression and social Withdrawal were included in the analyses in order to determine their influence on more recent outcomes such as smoking during pregnancy, child health, and maternal parenting stress. Mothers' actual z-scores for Aggression and Withdrawal were used in the multiple regression analyses rather than group membership. Although the interaction between levels of Aggression and Withdrawal was also included in preliminary analyses to check for a nonlinear effect, it was removed when it was not shown to be a significant predictor. When it was included in the final analyses, it was always entered in the final step. In the case of a significant interaction, the regression was conducted with the single dimensions entered in the first step and then the interaction term entered in the second step. Post-hoc analyses using group membership were then conducted in order to isolate the source of a significant interaction. Details for the post-hoc analyses are included in the sections where significant interactions are reported.

Demographic variables were also used as predictors in the following analyses. Maternal education and early motherhood have been linked to maternal and child outcomes in many studies, including the Concordia Longitudinal Risk Project (Auerbach, Lerner, Barasch & Palti, 1992; Bentley et al, 1998; Serbin et al, 1998) and were included in the present analyses to determine if the proportion of variance accounted for was due to risk factors above and beyond these important variables. Child age was also included as a predictor because age of offspring ranged from 12-72 months. However, age effects

were not evident for this sample and child age was subsequently dropped from analyses. Gender is often investigated in epidemiological studies and has predicted different health outcomes in Concordia Longitudinal Risk Project offspring (Serbin et al, 1996), therefore it was also used as a predictor in the current study. In line with previous findings, it was anticipated that boys would be more susceptible to health problems than girls. Appendix G provides the results of analyses that included both child age and gender as predictors (Tables 20-25).

Inclusion or exclusion of demographic variables from a set of analyses was also determined by theoretical relevance. For example, based on the epidemiological literature boys seem more vulnerable to illness than girls, thus child gender was always included as a predictor in analyses investigating early childhood health. However, it was not deemed relevant to maternal behavioural outcomes such as age at first delivery or smoking during pregnancy, thus it was not included in those regressions. Outcome variables chosen for analysis were also selected for their parsimony and relevance to the research questions.

Design. Multiple hierarchical regressions conducted with the Statistical Package for Social Sciences (SPSS; Norussis, 1990) were conducted for each of the 4 sets of outcomes in this study: pre- and post-natal health, early childhood health, maternal health, and maternal parenting stress. Regressions were used to examine the relations among variables in the current study because it is possible to see the effects of a single predictor while holding the effects of other influential predictors constant. Thus a single regression per outcome measure was used to investigate the three hypotheses on maternal risk status, moderating influences and the continuity of health over time. Variables were entered in chronological order in order to determine if maternal childhood risk status

remained significant after more recent predictors such as demographics or health status were included in the equation. According to Tabachnick and Fidell (1989), independent variables that are presumed to be logically or causally prior are given priority of entry in hierarchical regressions. This approach also allowed an examination as to whether predictors had a direct or a moderating influence on the outcome in question, because their relative importance to the equation is seen at different steps. The alpha level was set at .05 but due to the new direction that this project explored, variables at the .10 level were also reported.

Pre- and post-natal Health

The effect of maternal risk status on maternal age at first birth, maternal smoking during the pregnancy, and pre- and post-natal health problems were investigated in this section. The variable for pre- and post-natal problems was created by summing the health problems reported by the mother from conception until the infant's release from hospital and ranged from 0-7 complaints. No transformations were undertaken as there was only mild positive skew for the variable. Bleeding during pregnancy, unusual test results (e.g., ultrasound, amnioscentisis) fever greater than 100F, gestational diabetes, hypertension, and exposure to toxic chemicals were the prenatal health problems reported. Neonatal health problems included any medical problems (e.g., jaundice, respiratory distress) that required treatment or observation before the infant's release from hospital. Intercorrelations among predictors were conducted in order to assess multicollinearity and singularity. Intercorrelations among predictors are shown in Table 2. Most correlations were small to moderate (r =.01- .29) indicating that these variables were not redundant (Tabachnick & Fidell, 1996). The correlations between maternal

childhood Aggression and Withdrawal and the interaction term Aggression x Withdrawal were high since this interaction term is composed of scores on Aggression and Withdrawal. Correlations among predictors and criterion variables are depicted in Table 3.

The hierarchical regression examining maternal age at first birth is presented in Table 4. The total variance accounted for by the equation was 13%. Together the predictors combined to produce a significant multiple R, $F\ (2,111) = 5.15$, $p < .01$. All steps were significant: Aggression and Withdrawal, $F\ (2, 111) = 3.42$, $p < .05$; Maternal education, $F\ (2, 111) = 4.89$, $p < .01$; the interaction between Aggression x Withdrawal, $F\ (2, 111) = 5.15$, $p < .01$. In the final equation, only the t-values for maternal education and the interaction term remained significant, indicating that a childhood history of aggression and withdrawal ($sr^2 = -.22$) , as well as the level of education ($sr^2 = .27$) attained by a mother predicted early motherhood.

To isolate the source of the interaction between Aggression and Withdrawal, an analysis of variance was conducted using group membership was used as a predictor with four levels: Aggression, Withdrawal, Aggression/Withdrawal, Contrast. Next, Tukey's tests were conducted in order to establish significant mean differences. As illustrated in Figure 1, only mothers who were high on both childhood aggression and social withdrawal (M = 21.70 years old) were significantly different from mothers in the 3 other risk groups (M range = 24.77-25.38 years old). Mothers who were high on both risk dimensions as children were significantly more likely to become mothers at an earlier age than the other mothers in the current sample.

Table 2

Intercorrelations Among Predictors of Pre- and Post-natal Health

	Aggression	Withdrawal	Aggression Withdrawal	Maternal Education	Previous Maternal Drug Use
Maternal Childhood Aggression	-	-.09	.82***	-.24**	.19*
Maternal Childhood Withdrawal	-	-	.44***	-.17'	-.10
Aggression/ Withdrawal Interaction	-	-	-	-.29**	.14
Maternal Education	-	-	-	-	.01

Note. 'p < .10 *p < .05 **p < .01 ***p < .001

Table 3

Intercorrelations Among Predictors and Outcomes of Pre- and Post-natal Health

	Maternal Age At First Birth	Maternal Smoking during pregnancy	Pre- and Postnatal Health Problems
Maternal Childhood Aggression	-.16	.29**	-.08
Maternal Childhood Withdrawal	-.17^{t}	-.22*	.21*
Aggression/ Withdrawal Interaction	-.27**	.12	.06
Maternal Education	.31***	-.32***	.01
Previous Maternal Drug Use	.04	.22*	.00

Note. $^{t}p < .10$ $*p < .05$ $**p < .01$ $***p < .001$

Table 4

Results of Hierarchical Regression Analysis Predicting Maternal Age at First Birth

Variables	Beta	sr^2	t	R^2 change	F change
Step 1					
Aggression	-.18	-.17	-1.90^t	.06	3.42*
Withdrawal	-.18	-.18	-1.97^t		
Step 2					
Aggression	-.11	-.10	-1.17		
Withdrawal	-.13	-.13	-1.50		
Maternal Education	.26	.24	2.72*	.06	7.42**
Step 3					
Aggression	.63	.18	1.90^t		
Withdrawal	.31	.13	1.50		
Maternal Education	.27	.25	2.88*		
Aggression x Withdrawal	-.84	-.20	-2.31*	.04	5.36*

$R = .40$ R^2 Adj= .13 $F(4,109) = 5.15$**

Note. $^tp < .10$ $*p < .05$ $**p < .01$

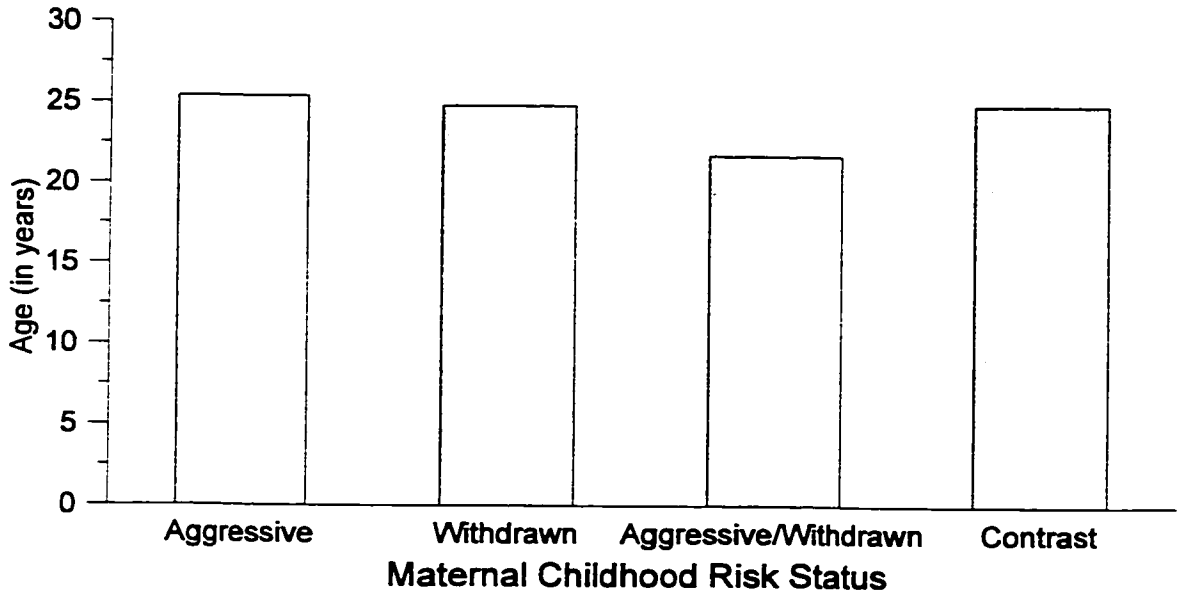

Figure 1. Maternal age at first birth as a function of maternal childhood risk status.

Table 5

Results of Hierarchical Regression Analysis Predicting Smoking while Pregnant

Variables	Beta	sr^2	t	R^2 change	F change
Step 1					
Aggression	.27	.27	3.05**		
Withdrawal	-.19	-.19	-2.12*	.12	7.63**
Step 2					
Aggression	.25	.24	2.72**		
Withdrawal	-.18	-.18	-2.02*		
Drug Use	.16	.16	1.75^t	.02	3.06^t
Step 3					
Aggression	.16	.16	1.79^t		
Withdrawal	-.24	-.26	-2.78**		
Previous Drug Use	.17	.19	2.01*		
Maternal Education	-.32	-.33	-3.66**	.09	13.39**
	R = .49		R^2 Adj= .21		F (4, 109) = 8.53**

Note. $^t p < .10$ $*p < .05$ $**p < .01$

The hierarchical regression on maternal smoking while pregnant is shown in Table 5. The total variance accounted for by the equation was 21%. Together the predictors combined to produce a significant multiple R, F (3,110) = 8.53, p < .001. The initial step with Aggression and Withdrawal entered together was significant (F = 7.64, p < .01). There was only a trend for previous maternal substance abuse (F ch = 3.07, p < .10). Maternal education was entered in a final step which was significant (F ch = 13.39, p < .001). By the final step, there were trends for maternal childhood Aggression and maternal substance abuse whereas maternal childhood Withdrawal and educational attainment remained significant. Mothers who were highly withdrawn in childhood (Beta = -.24) and mothers who were better educated (Beta=-.32) were less likely to smoke while pregnant. Conversely, there was a tendency for mothers who had been highly aggressive as children (Beta=.16) or who had a previous history of substance abuse (Beta= .17) to smoke more cigarettes during the target pregnancy.

The hierarchical regression on pre- and post-natal health problems is shown in Table 6. The total variance accounted for by the equation was 4%. Together the predictors combined to produce a multiple R, F (3,110) = 2.39, p < .10. The initial step with Aggression and Withdrawal entered together was a trend (F = 2.73, p < .10) and maternal childhood withdrawal appeared to be the more important predictor (t = 2.18, p < .05). Maternal education was entered in the next step, which was not significant (F ch = 13.39, p < .001). Mothers who were highly withdrawn in childhood (Beta = .18) may be more likely to have infants with pre- or post-natal health problems.

Table 6

Results of Hierarchical Regression Analysis Predicting Pre- and Post-natal Health Problems

Variables	Beta	sr^2	t	R^2 change	F change
Step 1					
Aggression	-.06	-.06	-0.65		
Withdrawal	.20	.20	2.18*	.05	2.73^t
Step 2					
Aggression	-.03	-.03	-0.26		
Withdrawal	.18	.18	1.88^t		
Smoking in Pregnancy	-.13	-.12	-1.30	.02	1.69
	R = .25	R^2 Adj= .04		F (3, 110) = 2.39^t	

Note. $^t p < .10$ $^* p < .05$ $^{**} p < .01$

Health in early childhood

Maternal childhood risk status, potential moderators (i.e., child gender) and continuity of health status over time (from the neonatal to the preschool period) were investigated for 4 early childhood health outcomes: reported duration of colic in infancy, total number of child illnesses, number of respiratory problems (e.g., asthma, bronchitis, upper respiratory infections, nasal allergies), and presence of severe illness (e.g., cancer, epilepsy, lupus, thyroid, kidney or heart problems). For all regressions, predictors were entered in chronological order, so that maternal childhood risk and prenatal events such as smoking during pregnancy were entered in the steps preceding indices of neonatal health status.

There was a univariate outlier in the duration of colic data (this mother reported 64 weeks of colic, sample $\underline{M} = 4.97$ weeks) so it was recoded as missing data and the mean was substituted for that score. All of the scores for colic were then transformed using a square root in order to remove positive skew. Only 10 of the offspring suffered from a severe illness thus it was recoded as a dichotomous variable and analysed using logistic regression.

Intercorrelations among predictors were conducted in order to assess multicollinearity and singularity and are shown in Table 7. With the exception of maternal Aggression and Withdrawal and the interaction term including both dimensions of maternal childhood risk status, most correlations were small to moderate ($\underline{r} = .02$-$.29$) indicating that these variables were not redundant (Tabachnick & Fidell, 1996). Correlations between predictors and criterion variables are depicted in Table 8.

Table 7
Intercorrelations Among Various Predictors of Health in Early Childhood

	Maternal Childhood Aggression	Maternal Childhood Withdrawal	Child Gender	Smoking during Pregnancy	Gestational Age	Neonatal Respiratory Problems	Neonatal Medical Treatment	Duration of Colic
Maternal Childhood Aggression	-	-.09	.06	.29**	.07	.09	-.08	-.05
Maternal Childhood Withdrawal	-	-	-.02	-.22*	-.15	-.07	-.07	.25**
Child Gender	-	-	-	-.03	.11	-.07	.03	.14
Smoking in Pregnancy	-	-	-	-	.05	-.08	-.05	.03
Gestational Age	-	-	-	-	-	-.29**	-.33***	-.12
Neonatal Respiratory Problems	-	-	-	-	-	-	.29**	.07
Neonatal Medical Treatment	-	-	-	-	-	-	-	.19*

Note $^{t}p < .10$ $*p < .05$ $**p < .01$ $***p < .001$

Table 8
Intercorrelations Among Various Predictors and Early Childhood Health Outcomes

	Duration of colic	Total child illnesses	Respiratory Illness	Severe Illness
Maternal Childhood Aggression	-.05	-.07	-.03	-.01
Maternal Childhood Withdrawal	.25**	-.06	-.14	.20*
Child Gender	.14	-.22*	-.17'	-.04
Smoking in Pregnancy	.03	.18'	.20*	.03
Gestational Age	-.12	-.32***	-.22*	-.26**
Neonatal Respiratory Problems	.07	. 29**	.18'	.14
Neonatal Medical Treatment	.19*	.14	.17'	.02
Duration of Colic	1.00	-.03	. 01	.28**

Note 'p < .10 *p < .05 **p < .01 ***p < .001

The hierarchical regression examining duration of colic is presented in Table 9. Together the predictors accounted for 8% of the variance with a significant multiple R, F (3,110) = 4.18, p < .01. Maternal childhood Aggression and Withdrawal were entered first, F = 3.66, p < .05. Whether or not the newborn needed medical treatment was entered in a second step, F ch= 4.97, p < .05, and was also a significant predictor of duration of colic reported by mother, even after accounting for maternal childhood risk status. Mothers who were highly socially withdrawn as children (Beta= .26) were more likely to report longer periods of colic in their children. Mothers were also more likely to report more colic if they had newborns requiring medical treatment prior to discharge from the hospital (Beta = .20)

The regression on number of overall number of childhood illnesses in Concordia Longitudinal Risk Project offspring is shown in Table 10. The predictors accounted for 12% of the explained variance and produced a significant multiple R, F (4, 109) = 4.84, p < .001. Maternal childhood Aggression and Withdrawal were entered on the first step, which was not significant. Child gender was entered on the second step and was a significant predictor (F ch = 5.23, p < .05). Weeks gestation was entered last and it also emerged as a significant predictor of child illness (F ch =12.42, p < .01). The best predictor of childhood illness seems to be gestational age (Beta= -.31). Child gender (Beta = -.18) was also a predictor. Babies born later were less likely to have numerous childhood illnesses and boys were more vulnerable to child illnesses than girls in this sample.

The hierarchical regression examining maternal risk status and respiratory illness in offspring is presented in Table 11. Together the predictors accounted for 10% of the

Table 9

Results of Hierarchical Regression Analysis Predicting Duration of Colic

Variables	Beta	sr^2	t	R^2 change	F change
Step 1					
Aggression	-.03	-.03	-0.30		
Withdrawal	.25	.24	2.65**	.06	3.65*
Step 2					
Aggression	-.01	-.01	-0.11		
Withdrawal	.26	.26	2.86**		
Neonatal Treatment	.20	.20	2.23*	.04	4.97*
	R = .32		R^2 Adj= .08		F (3, 110) = 4.18**

Note. $^{t}p < .10$ $*p < .05$ $**p < .01$

Table 10

Results of Hierarchical Regression Analysis Predicting Number of Childhood Illnesses

Variables	Beta	sr^2	t	R^2 change	F change
Step 1					
Aggression	-.08	-.08	-0.80		
Withdrawal	-.06	-.06	-0.70	.01	.50
Step 2					
Aggression	-.06	-.06	-0.70		
Withdrawal	-.07	-.07	-0.72		
Child Gender	-.21	-.21	-2.29*	.05	5.23*
Step 3					
Aggression	-.05	-.05	-0.55		
Withdrawal	-.11	-.11	-1.25		
Child Gender	-.18	-.18	-2.04*		
Gestational Age	-.32	-.31	-3.53**	.10	12.42**

$R = .39$ R^2 Adj= .12 $F(4, 109) = 4.53^{**}$

Note. $^{t}p < .10$ $^{*}p < .05$ $^{**}p < .01$

Table 11

Results of Hierarchical Regression Analysis Predicting Respiratory Illnesses

Variables	Beta	sr^2	t	R^2 change	F change
Step 1					
Aggression	-.04	-.04	-0.47		
Withdrawal	-.17	-.14	-1.50	.02	1.18
Step 2					
Aggression	-.04	-.04	-0.38		
Withdrawal	-.14	-.14	-1.55		
Child Gender	-.17	-.17	-1.81^t	.03	3.27^t
Step 3					
Aggression	-.09	-.08	-0.92		
Withdrawal	-.11	-.11	-1.14		
Child Gender	-.16	-.16	-1.73^t		
Smoking in Pregnancy	.19	.19	1.97^t	.03	3.87^t
Step 4					
Aggression	-.10	-.10	-1.02		
Withdrawal	-.12	-.13	-1.31		
Child Gender	-.13	-.14	-1.42		
Smoking in Pregnancy	.21	.21	2.21*		
Gestational Age	-.19	-.19	-2.02^t		
Neonatal Respiratory Problems	.13	.13	1.37	.07	4.21*

$R = .40$ R^2 Adj= .10 $F(6, 107) = 3.12^{**}$

Note. $^tp < .10$ $^*p < .05$ $^{**}p < .01$

explained variance and produced a significant multiple R, F (6, 107) = 3.12, p < .01. The maternal childhood risk variables were entered in the initial step, which was not significant.

Table 12

Results of Logistic Regression Analysis Predicting Severe Childhood Illness

Variables	Beta	SE	Wald	Odds Ratio
Step 1				
Maternal Childhood Aggression	-.54	.48	1.27	0.58
Maternal Childhood Withdrawal	.36	.40	0.83	1.44
Step 2				
Child Gender	.02	.80	0.00	1.02
Step 3				
Gestational Age	-.19	.12	2.55	0.83
Step 4				
Duration of Colic	.51	.24	3.72*	1.67
Step 5				
Current Child Age	.63	.33	3.72^{t}	1.87

Note. $^{t}p < .10$ $*p < .05$ $**p < .01$

Current Maternal Health

In this section maternal childhood risk status and other maternal history variables such as substance abuse and educational level were examined for their contribution to current maternal smoking and recent health complaints. Intercorrelations among predictors were conducted in order to assess multicollinearity and singularity. Intercorrelations among predictors are shown in Table 13. Most correlations were small to moderate (r = .01-.37) indicating that these variables were not redundant (Tabachnick & Fidell, 1996). Correlations between predictors and criterion variables are depicted in Table 14.

The hierarchical regression examining current maternal smoking is presented in Table 15. The total variance accounted for by the equation was 27%. Together the predictors combined to produce a significant multiple R, F (4,109) = 11.21, $p < .001$. Maternal childhood Aggression and Withdrawal were entered in the initial step (F = 7.16, $p < .001$). Maternal use of controlled substances was entered next (F ch = 9.06, $p < .01$) and the final step was maternal educational attainment (F ch = 16.90, $p < .001$). All predictors were significant at the final step except for maternal childhood Withdrawal (Beta=-.14) which was only a trend. The strongest predictor was maternal education (Beta = -.35), which was a protective factor and maternal previous use of controlled substances (Beta = .28) which was a risk factor for smoking. Maternal childhood Aggression (Beta = .18) was also a risk factor. Mothers who were highly aggressive as children, achieved less education, and used controlled substances in the past were much more likely to be smokers as parents than mothers who were not aggressive as girls, completed more education and did not use controlled substances.

Table 13

Intercorrelations Among Predictors of Maternal Health

	Aggression	Withdrawal	Maternal Education	Previous Maternal Alcohol Abuse	Previous Maternal Drug Use
Maternal Childhood Aggression	-	-.09	-.24**	.14	.19*
Maternal Childhood Withdrawal	-	-	-.17^{t}	-.07	-.10
Maternal Education	-	-	-	-.15	.01
Previous Maternal Alcohol Abuse	-	-	-	-	.37***

Note. $^{t}p < .10$ $*p < .05$ $**p < .01$ $***p < .001$

Table 14

Intercorrelations Among Predictors and Maternal Health Outcomes

	Current Maternal Smoking	Number of Maternal Physical Complaints
Maternal Childhood Aggression	.32***	.04
Maternal Childhood Withdrawal	-.13	.14
Maternal Education	-.37***	-.14
Previous Maternal Alcohol Abuse	.13	.20*
Previous Maternal Drug Use	.32***	.21*

Note. $^{t}p < .10$ $^{*}p < .05$ $^{**}p < .01$ $^{***}p < .001$

Table 15

Results of Hierarchical Regression Analysis Predicting Current Maternal Cigarette Use

Variables	Beta	sr^2	t	R^2 change	F change
Step 1					
Aggression	.32	.32	3.52**		
Withdrawal	-.10	-.10	-1.07	.11	7.16**
Step 2					
Aggression	.27	.28	3.05**		
Withdrawal	-.07	-.08	-0.84		
Previous Drug Use	.27	.28	3.01**	.07	9.06**
Step 3					
Aggression	.18	.19	2.05*		
Withdrawal	-.14	-.14	-1.67^{t}		
Previous Drug Use	.28	.27	3.40**		
Maternal Education	-.35	-.33	-4.11**	.11	16.90**

$R = .54$ R^2 Adj= .27 $F(4, 109) = 11.21$**

Note. $^{t}p < .10$ $*p < .05$ $**p < .01$

The hierarchical regression examining total number of health complaints is shown in Table 16. The total variance accounted for by the equation was 6%. Together the predictors combined to produce a significant multiple R, F (5, 108) = 2.39, p < .05. Neither maternal childhood risk status nor maternal education were significant steps. Previous alcohol abuse and use of controlled substances were entered last and this final step was significant (F ch = 3.92, p < .05). However, in the final equation there was only a trend for maternal use of controlled substances (Beta = .18). Mothers who reported that they had used drugs were also more likely to report a greater number of recent illnesses.

Maternal Parenting Stress

A hierarchical regression was conducted on mothers' global scores from the Parenting Stress Index (PSI). Maternal childhood Aggression and Withdrawal were entered in the first step of the regression, followed by maternal history of psychological consultations. Total number of maternal physical complaints reported in the last 3 months was entered in a third step. The next step was a chronic child illness variable that included mothers who reported more than 2 illnesses or health problems for her child. Finally, the interaction term of Aggression and Withdrawal was included in the final step. Intercorrelations among predictors were conducted in order to assess multicollinearity and singularity. Intercorrelations among predictors are shown in Table 17. With the exception of maternal Aggression x Withdrawal, most correlations were small (r =.04-.17) indicating that these variables were not redundant (Tabachnick & Fidell, 1996). Correlations between predictors and criterion variables are depicted in Table 18.

Table 16

Results of Hierarchical Regression Analysis Predicting Recent Maternal Health Complaints

Variables	Beta	sr^2	t	R^2 change	F change
Step 1					
Aggression	.05	.05	0.52		
Withdrawal	.15	.14	1.53	.02	1.25
Step 2					
Aggression	.02	.02	0.19		
Withdrawal	.12	.12	1.05		
Maternal Education	-.12	-.11	-1.19	.01	1.40
Step 3					
Aggression	-.03	-.02	-0.26		
Withdrawal	.14	.14	1.49		
Maternal Education	-.11	-.10	-1.10		
Previous Alcohol Abuse	.13	.13	1.31		
Previous Drug Use	.18	.17	1 .83'	.07	3.92*

$R = .32$ R^2 Adj= .06 $F (5, 108) = 2.39^*$

Note. 'p < .10 *p < .05 **p < .01

Table 17

Intercorrelations Among Various Predictors of Maternal Parenting Stress (PSI)

	Aggression	Withdrawal	Aggression Withdrawal	Psychological Consultations	Chronic Child Illness	Maternal Illnesses
Maternal Childhood Aggression	-	-.09	.82***	.12	-.03	.04
Maternal Childhood Withdrawal	-	-	.44***	.07	-.17'	.14
Aggression/ Withdrawal Interaction	-	-	-	.15	-.11	.09
Psychological Consultations	-	-	-	-	.02	.05
Chronic Child Illness	-	-	-	-	-	.08

Note. 'p < .10 *p < .05 **p < .01 ***p < .001

Table 18
Intercorrelations Among Predictors and Total Maternal Parenting Stress (PSI)

	Total Maternal Parenting Stress
Maternal Childhood Aggression	.21*
Maternal Childhood Withdrawal	.15
Aggression/ Withdrawal Interaction	.30***
Psychological Consultation	.24**
Chronic Child Illness	.26**
Maternal Illnesses	.20*

Note. $^{t}p < .10$ $*p < .05$ $**p < .01$ $***p < .001$

The hierarchical regression predicting total maternal parenting stress is presented in Table 19. Together the predictors accounted for 21% of the total variance for parenting stress, F (6,107) = 5.84, $p < .001$. Maternal childhood risk status was entered in the first step, which was significant (F = 4.32, $p < .05$). Number of maternal psychological/psychiatric consults was entered next, F ch= 5.18, $p < .05$. Illness in the target child was also a significant contributor to the equation, F ch = 11.46, $p < .001$. Recent maternal illness was entered next and it was not a significant predictor. Maternal childhood Aggression/Withdrawal was entered last and it was a significant predictor of total parenting stress (F ch = 5.25, $p < .05$). Child illness (sr^2 = .27) seemed to be the most significant predictor of parenting stress, followed by maternal psychological consults (sr^2 = 18). Thus, mothers who reported more child illness and who sought out psychological expertise in the past were currently experiencing more overall parenting stress.

Post-hoc analyses were conducted in order to investigate the nature of the interaction of maternal childhood Aggression/Withdrawal (sr^2 = .17) as a predictor of maternal parenting stress. Analysis of variance with maternal risk group membership as a 4-level predictor of stress scores was not possible because there was heterogeneity of variance. More specifically, there was significantly more variability in the parenting stress scores for the Aggressive/ Withdrawn mothers than in the scores for the other mothers in the sample: Bartlett-Box F (3, 12, 254) = 4.79, $p < .01$. Because the mothers who were Aggressive/Withdrawn in childhood were clearly over-represented in the higher stress scores, it was deemed important to examine the data at the case level. A tail

Table 19

Results of Hierarchical Regression Analysis Predicting Maternal Parenting Stress

Variables	Beta	sr^2	t	R^2 change	F change
Step 1					
Aggression	.22	.22	2.42*		
Withdrawal	.17	.17	1.88^t	.07	4.32*
Step 2					
Aggression	.20	.19	2.16*		
Withdrawal	.16	.16	1.73^t		
Psych Consults	.21	.20	2.28*	.04	5.18*
Step 3					
Aggression	.21	.21	2.42*		
Withdrawal	.21	.21	2.39*		
Psych Consults	.20	.19	2.26*		
Child Illness	.30	.29	3.39**	.08	11.46**
Step 4					
Aggression	.20	.20	2.36*		
Withdrawal	.19	.18	2.12*		
Psych Consults	.19	.19	2.23*		
Child Illness	.28	.27	3.22**		
Maternal Illness	.14	.14	1.61	.02	2.58
Step 5					
Aggression	-.42	-.11	-1.34		
Withdrawal	-.19	-.08	-0.93		
Psych Consults	.19	.18	2.18*		
Child Illness	.28	.27	3.20**		
Maternal Illness	.15	.15	1.74^t		
Aggression/ Withdrawal	.72	.17	2.06*	.03	4.25*
	R = .50	R^2 Adj= .21			F (6, 107) = 5.84**

Note. $^t p < .10$ $*p < .05$ $**p < .01$

ratio for the higher end of the distribution was created for each group by calculating the percentage of members who scored in the clincal range of the PSI (upper 10th percentile). As seen in Figure 2, although only 2% of the Control mothers and 5% of the Withdrawn mothers had such high stress scores, 17% of the Aggressive mothers and almost a third (32%) of the mothers who were both highly Aggressive and Withdrawn as children reported high parenting stress.

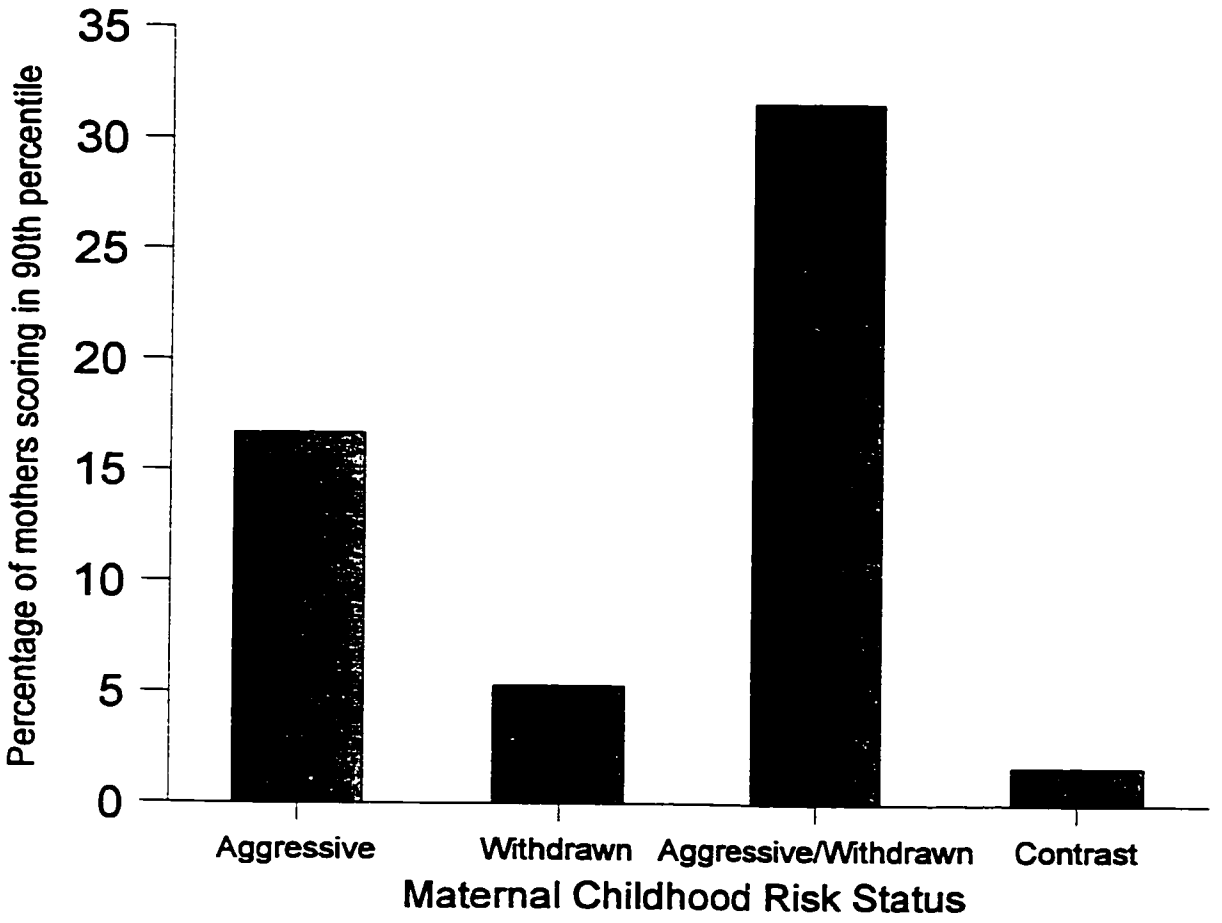

Figure 2. Percentage of mothers scoring in the clinical range (90th percentile) of the Parenting Stress Index as a function of maternal childhood risk status

Discussion

Physical health is a child resource that reflects the interaction of internal resiliency or risk and the environment, provided first *in utero* and then in the family context. One goal of the present study was to describe the physical health of mothers and children from a unique high-risk sample. Although not every hypothesis was fully supported, there was evidence for inter-generational transfer of risk, demographic moderators of that risk, and continuity in health from the neonatal to the preschool period within this high-risk sample. Based on previous studies with Concordia Longitudinal Risk Project families, mothers who were at psychosocial risk in childhood were expected to have children with more health problems than mothers from the comparison groups, beginning with pregnancy. Maternal childhood withdrawal seemed to be as important as maternal childhood aggression for child health outcomes. Mothers who were aggressive as children were more likely to expose their children to secondhand smoke and mothers who were both highly aggressive and withdrawn were more likely to become mothers at a younger age. Mothers who were highly withdrawn as children were more likely to report long periods of colic for their infants. This indicates that childhood risk behaviour may have more than a psychosocial impact on the next generation and that the ramifications of having an aggressive or withdrawn mother may extend beyond transmitting a certain behavioural style.

Two more hypotheses were investigated in the current study. The hypothesis that demographic variables such as maternal education, child gender and age at testing might act as moderators in the transmission of risk from mother to child was partially supported. The analyses were conducted so that the moderating effects of variables such

as maternal education, previous drug and alcohol use, child gender and age at testing were taken into account. The potentially moderating variables were always entered after maternal childhood risk status in order to test for indirect effects of these more recent predictors. The strongest proof for a moderating variable in the current study was found in the results for maternal smoking. The effects of maternal childhood withdrawal as a buffer significantly decreased as previous drug use and level of education were added to the equation. In the case of illness in early childhood, child gender was more important than maternal childhood aggression or withdrawal. The third hypothesis was to examine the continuity of health problems from conception into the preschool years and the impact of both child and maternal health on various indicators of family functioning such as parenting stress. Neonatal health status (gestational age) was a marker for health problems in early childhood which suggests that there was continuity for health over the first few years of life. There was also evidence that both current maternal health as well as child health history were contributors to maternal parenting stress.

The findings are presented below by each set of outcome measures as they were for the Results section: pre- and post-natal health, health in early childhood, maternal health, and maternal parenting stress. The hypotheses about maternal risk status, moderating variables, and continuity are examined as a function of the results. Finally the results are discussed within the context of the literature and future directions for research are presented.

Pre- and post-natal health

Childhood aggression seems to be the an important risk factor for negative fertility patterns in adolescent girls (Cairns & Cairns, 1994; Serbin et al, 1998). The results of analyses on pre- and post-natal health problems on offspring from the present study do not indicate that childhood aggression is a direct risk factor for mothers who delay childbirth until their twenties. However, mothers who were both highly aggressive and withdrawn as children were more likely to have their first child at a younger age, when they were only 21 years old on average. The effects of maternal risk status were partially moderated by maternal education, which is consistent with the literature. Although maternal risk status was still a significant predictor of age at first birth even after maternal education was entered, it is clear that maternal education was a protective factor against early motherhood in the present study.

The hypothesis that risk mothers would have children who required more neonatal care was only partially supported. There was a trend for maternal childhood withdrawal to predict more pre- and post-natal health problems. Socially withdrawn girls may be more likely to experience poor pre-natal health and/or have newborns with health problems. However, one limitation of this study is the retrospective nature of the information. Mothers were asked to remember the details of a pregnancy and delivery that occurred 1-6 years ago. Nevertheless it is interesting that maternal childhood withdrawal is linked to increased pre- and post-natal health problems in this older sample of mothers.

Maternal childhood withdrawal was a protective factor for smoking whereas there was a trend for childhood aggression to be a risk factor for that maternal health outcome.

Mothers who were highly aggressive as children were more likely to smoke during pregnancy, which supports the hypothesis that they would expose their children to more prenatal toxins. Consistent with the literature on maternal smoking (Hjalmasson, Hahn & Suanberg, 1991), mothers who smoked during pregnancy were also more likely to currently smoke, thus children who experienced the prenatal effects of smoking *in utero* were also likely to be exposed to passive smoke in their homes. Although only a few of the mothers admitted to taking any drugs while pregnant, their professed previous drug use was also predictive of smoking while pregnant. Maternal education was also a moderator for maternal smoking during pregnancy. Consistent with the smoking literature (Millar & Chen, 1998), the more highly educated mothers in our sample were less likely to smoke during their pregnancy.

It is clear from previous Concordia Longitudinal Risk Project studies that childhood aggression which was once physical and overt on the playground is manifested differently across situations and changes over time. It is not socially acceptable for a mother to display overt aggression toward her children. There is evidence to suggest that aggression in mothers may be expressed as dysfunctional parenting and it is possible that the maternal unresponsiveness and hostility seen in interactions with offspring (Cooperman, 1996; Bentley, et al., 1998) may be physically manifested during pregnancy through poor health habits. This effect may be magnified in the case of younger and less educated risk mothers.

Mothers who were highly withdrawn as children were less likely to currently smoke and were less likely to have smoked during their pregnancy with the target child, even after controlling for maternal education. Smoking may be related to social and/or

physiological stimulation that these mothers avoid. Smoking is a social habit that is generally formed by the time a person reaches adulthood and therefore it is not counterintuitive that childhood social behaviour is a predictor of this behaviour. A child that avoids social contact with peers and that is perhaps more sensitive to outside stimulation may be less likely to take up smoking. Maternal childhood withdrawal is a buffer for this negative health habit, illustrating yet another example of the different trajectories for the health of anti-social girls and providing support for the hypothesis that risk may be transferred to the next generation via health.

Maternal education was expected to be a buffer for pre- and perinatal health and this hypothesis was partially supported. As predicted by the literature, maternal education was a buffer for current cigarette use, smoking while pregnant and early motherhood. All of these factors tend to contribute to a healthier family environment so maternal education may indirectly promote child health through delayed parenthood and the provision of a healthier environment. However, mothers who were less educated in our sample did not have more complicated birth histories or neonates who required more medical treatment. Maternal education may be working indirectly through risk: maternal childhood risk status precedes and predicts maternal level of education and health habits that will in turn provide a more or less healthy physical environment for the child. It is also possible that a mother's genetic contributions to her child's health outweigh any potential protection offered by maternal educational attainment. Finally, it is also possible that the range of education in this sample was too restricted such that the mothers who were extremely poorly or well-educated were not numerous enough to provide sufficient power to test this hypothesis.

Health in early childhood

Aggression has not only been tied to negative fertility patterns, but it has also been linked to poor health in the offspring of adolescent parents (Fagot et al, 1998; Serbin et al, 1998). In the present study, mothers who had been aggressive children yet were adults when they began families did not report more illness in their offspring. One possibility is that aggressive children who manage to postpone childbirth (and perhaps complete more years of education) do not put their children at additional risk for health problems. Another possibility is that mothers who were highly aggressive as children are less likely to accurately report their child's health record to experimenters during home visits. One limitation of the present study is that child health was measured using retrospective maternal report. Access to actual pediatric or Medicare records would be preferable and may be obtained in future studies.

Mothers who were highly withdrawn as children reported more weeks of colic for their infants. This finding presents an interesting early link between maternal childhood social withdrawal and problem behaviour in the next generation. One possible explanation is that mothers who avoid social contact find the normal crying of their infant to be less bearable and are more likely to label it as colic. Another possibility that does not rule out the first explanation is that these mothers may actually be transmitting their own temperament genetically and a very early manifestation of this would be intense and frequent bouts of crying in infancy. The literature on colic suggests that this very early problem behaviour may indeed be a precursor to difficult temperament (Neu, 1997). In this case, both mother and child may be irritated by early interactions with each other.

The results for the effects of child age and gender on health in early childhood were mixed. Mothers of older children were not more likely to report a greater number of illnesses or more respiratory illnesses in their offspring. However, there was a trend for them to be more likely to have a child with a severe illness which is consistent with the hypothesis that older children would have had more time to develop a health problem. Child gender was a significant predictor of overall number of illnesses, which was consistent with the hypothesis that boys would be more physically vulnerable than girls. This was not the case for duration of colic, respiratory illness, or severe illness as girls in this sample were as equally likely as boys to experience those problems. Taken together these findings suggest that it is worthwhile to consider child age and gender in future studies of offspring from the Concordia Longitudinal Risk Project.

Support was found for the hypothesis that there would be continuity between pre- and post-natal health and health in early childhood. Prematurity and gestational age are known risk factors for various negative developmental outcomes (Chen & Millar, 1999; Fan, 2000) and although there were only a few cases of clinical prematurity in this study, neonatal health status was a strong predictor of health in the preschool years. Gestational age was a predictor of total number of common child illnesses in general and respiratory illness in particular. This finding suggests that neonatal maturity may be an important risk factor not only for premature infants, but also infants born closer to term in a community sample. Although gestational age did not predict duration of colic, infants who needed medical treatment before leaving the hospital were more likely to have mothers who reported more colic. This is consistent with studies concluding that neonatal health status may be a marker for colic (Escallier, 1995).

Mothers who smoked during pregnancy were more likely to report respiratory problems such as asthma, bronchitis, nasal allergies and upper respiratory infections in their children even after controlling for gestational age. This is consistent with findings that smoking during pregnancy may have longterm effects on children (Walsh, 1994) and may be explained by the fact that smoking during pregnancy is generally continued after the child is born, compounding the risk from smoke exposure (Greenberg et al, 1991; Hjalmasson et al, 1991). Taken together, these findings suggest that health is an important child resource that should not be ignored in current theories and models of child development and that there is continuity from infancy into early childhood.

Current maternal health

As previously mentioned, mothers who were highly aggressive as children and/or who had a previous history of drug use were more likely to be smokers as parents. In contrast, mothers who were socially withdrawn as children and/or who completed more years of education were more likely to be non-smokers. This partially supports the hypotheses that maternal childhood risk status would have an effect on adult health and that maternal education would mediate those effects.

It was hypothesized that risk mothers would report poorer health for themselves than mothers from the contrast group and this was not supported by the results. In the questionnaire that mothers completed about their current medical symptoms the high-risk mothers were not significantly more likely to report more recent health problems. However, the overall regression equation was significant and there was a trend for more health problems reported by mothers who had previously used drugs. This finding

presents is an interesting link between a previous maternal behaviour and current physical health status.

Maternal parenting stress

The bidirectional nature of the mother-child relationship is not restricted to behaviour and it was expected that the health status of their children would have an impact on mothers. Based on Storm's (1998) findings, it was hypothesized that mothers with children who were frequently ill would report more parenting stress. Maternal childhood risk status was also expected to predict parenting stress because mothers who had social difficulties in childhood were expected to find parenting more challenging than mothers without childhood difficulties in the social sphere. The results supported both of these hypotheses.

Within this high-risk, community-based sample, child illness did predict more total parenting stress in mothers. This additional stress may be caused by concern about their child's discomfort and future health as well as more demanding and whiny behaviour from the sick children. Illness of a child may put a strain on a relationship that is already vulnerable due to other risk factors. Moreover, mothers who were both highly aggressive and withdrawn as children as well as mothers who had previously consulted a psychologist or a psychiatrist were also more likely to report parenting stress. Women with maladaptive behavioural styles may be at particular risk if they have a child who is frequently ill. A mother whose personality leads to inter-personal conflict may be tested more severely by chronic illness in a child that demands not only more attention, but also medical treatment that forces the mother to negotiate treatment of her child at the local

clinic. The present results indicated that a much higher percentage of women who were both highly aggressive as well as socially withdrawn as children reported scores in the 90th percentile on the Parenting Stress Index.

Theoretical and conceptual context

Although some models of developmental psychopathology are beginning to include health as a child resource and/or potential risk factor in early childhood (e.g., Wyman et al, 1999), little is known about the way that health impacts child development and the mother-child relationship in families that are at risk for abnormal development. Child health may be one more risk factor that accumulates over time in the case of a chronically ill child being raised in an impoverished environment. Health may also be a strength that promotes resilience in children from disadvantaged backgrounds. Child factors and the environment are as important as parenting in transactional models of child development (Sameroff & Chandler, 1975). However, all child resources should be included in current models and it is timely for researchers to recognize that child health may be as important as temperament or IQ in determining outcomes for risk populations. The present study took one important step in this direction.

Health has both a behavioural as well as a physiological component and therefore it is best studied within a social context. A purely medical model may suffice to describe a child's symptoms and prescribe a cure, but this cause and effect (stimulus-response) approach simplifies and obscures the complex relationship between health and the child's environment. Ecological theory (Bronfenbrenner, 1979) stresses the importance of an array of environmental influences and the interaction that the different social systems

have on each other. Child health should be studied in the context of the family (e.g., parenting stress, parent-child relationship) and society (e.g., universal health care, waiting lists) as well as the freedom from or progression of disease in an individual child. The present study examined health from conception to early childhood within a social context and assessed its impact as a predictor as well as a child outcome.

Both the causes and the effects of any illness are nested within factors internal and external to the child, and these factors are themselves dynamic. Prospective, longitudinal research is one of the best methods to study the trajectories of health over time in families (Cairns & Cairns, 1994; Serbin et al, 1998; Werner & Smith, 1992). If investigators simply focus on one time point, valuable information about the impact of health on children and their families may be obscured. For example, the rate of respiratory problems in two day cares may not differ significantly. However, the extent to which these difficulties are chronic for one group of children compared to another may be informative and lead us to wonder about parental health, smoking habits, and treatment of persistent coughs and wheezing. In the British Cohort Study on health across the lifespan, examining various facets of the participants' lives at numerous time points over a quarter of a century revealed that early disadvantage predicted adult physical health (Hertzman, 2000).

There is evidence for both continuity and discontinuity of health status over time (Werner & Smith, 1982), and it is important to take a multi-faceted, multi-informant, longitudinal approach in order to best capture the impact of health on families across generations. The present study used maternal report to examine multiple health variables in a high-risk longitudinal sample. Over the next data collection phase for the present

longitudinal sample it may be possible to obtain more accurate and prospective medical information. For example, access to medical records may be secured or at a minimum mothers will not be asked to go as far back in time to report child illness.

It is important to identify which components of physical health may be transmitted across generations and feed into cycles of risk. One mechanism of transfer of risk across generations seems to be poor academic achievement leading to school dropout, which in turn places aggressive girls at risk for risky sexual practices leading to STDs and teen pregnancy (Cairns & Cairns, 1994; Serbin et al, 1991). The offspring of these young mothers appear to be at especially high risk for injuries and illness requiring emergency medical treatment (Serbin et al, 1996). Fagot and her colleagues (1998) found that teenage fatherhood was also a risk factor: a sample of boys who became parents early were more likely to have children with health problems as well as poor parenting skills. It is clear from these studies that risk may be transferred across generations and that investigators should be aware that there may be multiple negative outcomes including health. Results from the present study indicate that aggressive and withdrawn girls are at risk for health problems as well as health problems in their offspring which may be the result of heredity, negative health habits such as smoking and substance abuse, parenting that does not promote health, or a combination thereof.

Future research should provide longitudinal multi-informant information that will allow investigators to follow the trajectory of health over time across multiple domains. Following children as they enter the school environment is important, providing an opportunity to study the effects of health on cognitive development at a crucial transition point in child development. Health could also be studied within a broader context if

parents' knowledge of, timely access to, and use of local health services is studied. Government agencies seeking to prevent community health problems or provide effective interventions would benefit from looking more than just strictly the medical model. Findings from the present study suggest that family social dynamics play a role in determining child health and thus better communication among researchers, clinicians and policymakers is warranted.

Concluding comments

Taken together, these findings suggest that maternal childhood risk status and neonatal health status have an impact on physical health in high-risk families. There were different trajectories for the offspring of mothers who were highly aggressive or socially withdrawn as children. Mothers who were highly aggressive girls as well as mothers who had used drugs in the past were more likely to expose their children to cigarette smoke. Conversely, mothers who were socially withdrawn as children as well as mothers who are more educated were more likely to provide a healthier breathing environment for their children. Maternal social withdrawal was not only protective in this study, but also emerged as a risk factor. Mothers' childhood withdrawal predicted more pre- and post-natal health problems and more colic in infants. This childhood behavioural style may help predict who will have more difficulties making the transition to motherhood. Mothers who were both aggressive and withdrawn as children were more likely to start families at a younger age and to report more parenting stress, suggesting that their offspring may be at more environmental than biological risk. It is clear from these results that maternal childhood risk status may have multiple effects on the next

generation and that there are different pathways of risk for offspring of aggressive versus withdrawn girls.

There was evidence that inter-generational transfer of risk may be moderated by several demographic variables. Maternal education was particularly important as a buffer against smoking during pregnancy and as a parent, which has implications for the physical environment of offspring in this high-risk sample. Gender was a strong predictor of chronic illness, with mothers of boys reporting more frequent childhood illnesses, and there was a trend for older children to be more likely to have a severe illness by the time of testing than younger children.

There was also evidence for continuity of health of offspring over time. Newborns that may have been considered at risk due to gestational immaturity or physical problems that required immediate medical treatment were also more likely to experience health problems in early childhood. Children whose mothers reported more colic were also more likely to develop a severe illness such as epilepsy, lupus, cancer, thyroid, kidney or heart problems. Mothers whose children were ill more often also reported more parenting stress. Taken together, these results provide evidence for continuity over time and the potential impact of health on the mother-child relationship, which has implications for the role of health in future models of child development.

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Appendix A

Composition of the Original Sample:

Concordia Longitudinal Risk Project

Screening Method for the Concordia Risk Project

The children in the original Concordia Risk Project were screened for aggression and social withdrawal using the Pupil Evaluation Inventory (PEI; Pekarik, Prinz, Lievert, Weintraub & Neale, 1976) translated into French. The PEI is a peer nomination technique containing 35 items which includes aggression items such as "those who are mean and cruel to other children," withdrawal items such as "those who are too shy to make friends," and likeability items such as "those who help others."

For the Concordia Risk Project, 4,109 children (in 152 classrooms) were asked to choose four children that best matched each item in the PEI. Nominations for the aggression and withdrawal dimensions were calculated for each child and a square root transformation was then performed on the total nominated scores for the two dimensions to reduce skew. Transformed scores were then converted to z-scores for each sex and within each class so that each child was scored according to norms for both sex and age. Approximately equal samples of boys and girls were obtained.

Children were assigned to the aggressive group (n=198) or the withdrawn group (n=220) if they obtained z-scores on the salient factor equal to or exceeding the 95th percentile cut-off (Z =1.65) and z-scores on the other factor below the 75th percentile (n=0.68). Children were assigned to the aggressive-withdrawn group (n=239) if they obtained a z-score equal or above to the 75th percentile on both aggression and withdrawal dimensions. A lower criteria was used to select the aggressive-withdrawn group since the likelihood of scoring above the 75th percentile on both dimensions is very low. Children who scored between the 25th and 75th percentiles on both dimensions were assigned to the normative control group (n=1,117).

Appendix B

Demographic Information Questionnaire

Mai 1996

N° d'identification _____

L'INDIVIDU DANS SON MILIEU

Renseignements sociodémographiques additionnels

Tous ces renseignements sont traités de façon totalement confidentielle

1. **Informations sur la famille de la mère de l'enfant:**

a. Nombre de frères : _____; de soeurs : _____; rang dans la famille _____

Frères ou soeurs décédé(e)s? NON _____ OUI _____ –> préciser : _____

b. Mère : Âge _____. Si décédée, à quel âge : _____ ; cause du décès : _____

Niveau de scolarité _____ ; en quoi _____

Occupation principale de ces 20 dernières années : _____

c. Père : Âge _____. Si décédé, à quel âge : _____ ; cause du décès : _____

Niveau de scolarité _____ ; en quoi _____

Occupation principale de ces 20 dernières années : _____

d. Les parents se sont séparés/divorcés en _____:

2. Informations sur la famille du père de l'enfant:

a. Nombre de frères : _____; de soeurs : _____; rang dans la famille _____

Frères ou soeurs décédé(e)s? NON _____ OUI _____ –> préciser : _____

b. Mère : Âge _____. Si décédée, à quel âge : _____ ; cause du décès : _____

Niveau de scolarité _____ ; en quoi _____

Occupation principale de ces 20 dernières années : _____

c. Père : Âge _____. Si décédé, à quel âge : _____ ; cause du décès : _____

Niveau de scolarité _____ ; en quoi _____

Occupation principale de ces 20 dernières années : _____

d. Les parents se sont séparés/divorcés en _____:

3. **Informations sur la famille du conjoint**: si n'est pas le père

a. Nombre de frères : _____; de soeurs : _____; rang dans la famille _____

Frères ou soeurs décédé(e)s? NON _____ OUI _____ –> préciser : _____

b. Mère : Âge _____. Si décédée, à quel âge : _____ ; cause du décès : _____

Niveau de scolarité _____ ; en quoi _____

Occupation principale de ces 20 dernières années : _____

c. Père : Âge _____. Si décédé, à quel âge : _____ ; cause du décès : _____

Niveau de scolarité _____ ; en quoi _____

Occupation principale de ces 20 dernières années : _____

d. Les parents se sont séparés/divorcés en _____:

4. Historique personnel: mère de l'enfant.

A été élevée principalement par :

____ père et ma mère	____ mère
____ père	____ grands-parents
____ oncle / tante	____ foyer d'accueil

Âge : _____ premier mariage - première fois conjointe de fait
Âge : _____ premier enfant
Âge : _____ séparation - divorce

5. Historique personnel: père de l'enfant.

A été élevé principalement par :

____ père et ma mère	____ mère
____ père	____ grands-parents
____ oncle / tante	____ foyer d'accueil

Âge : _____ premier mariage - première fois conjoint de fait
Âge : _____ premier enfant
Âge : _____ séparation - divorce

6. Historique personnel: conjoint (si n'est pas le père)

A été élevé principalement par :

____ père et ma mère	____ mère
____ père	____ grands-parents
____ oncle / tante	____ foyer d'accueil

Âge : _____ premier mariage - première fois conjoint de fait
Âge : _____ premier enfant
Âge : _____ séparation - divorce

4. **Père de l'enfant.** Si la mère vit seule ou si le conjoint n'est pas le père de l'enfant ...

a) Nom : _____ Date de naissance: ____ ____ ____
AN MO JR

b) Niveau de scolarité _____ ; en quoi _____

c) Occupation : _____

Son salaire : _____ $/ heure Nombre d'heures : _____ / semaine

Travaille là depuis : date AN ____ MO ____

d) Cause de séparation/divorce : _____

e) Verse-t-il une pension alimentaire? NON _____ OUI _____ -> _____ $ / mois
Devrait mais ne le fait pas _____

f) Fréquence et durée des visites : _____

Appendix C

Maternal Consent Form

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

Je comprends que toutes les informations que nous fournissons, qu'elles soient écrites filmées, sont strictement confidentielles et qu'elles ne serviront qu'à des fins de recherche. Da toutes les circonstances, je suis assuré(e) que l'anonymat sera conservé. Cependant, selon la sur la protection de la jeunesse, toute information indiquant de l'abus physique ou sexuel de 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 mome Comme le projet "L'individu dans son milieu" est à long terme, je comprends que je pourr être appelé(e) dans l'avenir pour participer à d'autres étapes de ce projet. Je me réserve le dr de décider, à ce moment, de donner suite ou non à la demande de participation.

Signature:_____

Nom:_____ Date:_____

Assistant(e) de recherche:_____

Appendix D

Obstetric and Child Health Questionnaire

L'INDIVIDU DANS SON MILIEU: Les parents et leurs enfants
PROFIL DE VIE: Historique obstétrical

SECTION A: Résumé de la grossesse de l'enfant ciblé(e)

1- Avez-vous été suivie par un médecin pendant cette grossesse?

Non ___ Oui ___-> Combien de fois? _____

2- Les tests suivants furent-ils administrés?:

Amniocenteses Non ___ Oui ___-> Résultats _____

Echographie Non ___ Oui ___-> Résultats _____

3- A quel moment de la grossesse avez-vous découvert que vous étiez enceinte? ___ semaines.

4- Fumiez-vous pendant la grossesse?

Non ___ Oui ___->

de cigarettes par jour? (# cpj ___ 1/2 ppj ___ 1 ppj ___ 2 ppj ___ ne sait pas ___)

5- Avez-vous pris de l'alcool pendant la grossesse?

Non ___ Oui ___->

(#/mois en moy. ___ #/sem. en moy. ___ #/jour en moy. ___ Jours de 2 verres ou plus? ___ ne sait pas ___)

6- Exposition toxique?

Non ___ Oui ___-> Sorte, si connue _____ durée durant la grossesse _____ quel trimestre _____.

7- Avez-vous pris des médicaments pendant la grossesse?

Non ___ Oui ___-> Lesquels?

_____ Diurétiques
_____ Phenobarbital
_____ Anticonvulsants
_____ Antibiotiques
_____ Hallucinogènes
_____ Autres (précisez): _____.
_____ Antihypertensifs
_____ Sédatifs/tranqillisants/calmants
_____ Hormone progestationelles
_____ Stupéfiants
_____ Antihistaminiques

SECTION B: Problèmes prénataux

1- Avez-vous souffert d'une maladie quelconque durant votre grossesse?

Non ___ Oui ___-> précisez: _____

_____

2- Pertes de sang pendant la gestation?

Non ___ Oui ___-> Quel trimestre _____.

3- Diabète?

Non ___ Oui ___-> (de grossesse ___ insulino-dépendant ___ non insulino-dépendant ___).

4- Désordres chroniques précédant la gestation?

Non ___ Oui ___-> (hypertension ___ hypotension ___ autres (spécifiez):

_____).

5- Toxémie endogène (empoisonnement du sang)?

Non ___ Oui ___-> trimestre _____.

6- Fièvre pendant la gestation >100 degré?

Non ___ Oui ___-> trimestre _____.

SECTION C: Résumé du travail et de l'accouchement

1- Age de la mère ___, du père ___, lors de la naissance du bébé?

2- Nombre de semaines de gestation? ___

3- Evénements très stressants ou difficiles au moment de la naissance?

Non___ Oui ___-> Lesquels? _____

_____

4- Quand les eaux ont-elles crevées?

___ Prématurément (>8 heures avant le début du travail)

___ Spontanément avant le début du travail

___ Spontanément après le début du travail

___ Provoqué artificiellement

5- Début du travail a-t-il été

___ spontané ___ provoqué? comment? _____

6- Oxytocin, pytocin, etc. administrée (précisez)?

Non ___ Oui ___-> Pour induire le travail? ___; autre raison? ___-> _____

7- Epidurale administrée?

Non ___ Oui ___-> A quel moment? _____

8- Autre médicaments administrés lors de l'accouchement?

Non ___ Oui ___ Précisez types, temps et raisons: _____

_____

9- Complications pendant le travail?

Non ___ Oui ___->

___ Début prématuré du travail <37 semaines

___ Travail prolongé >24 heures

___ Accouchement précipité

___ Éclampsisme

___ dysfunction placentaire

___ toxémie

___ infection

___ oligohydramniose

___ polyhydramniose

___ autres _____

10- Combien d'heures dura le travail? _____

11- Type d'accouchement? ___ par la tête ___ par le siége

___ postérieure (sur le dos) ___ vaginale -spontanée

___ utilisation des forceps (bas ___ moyen ___ haut ___)

___ ventouse obstétricale ___ par césarienne - facultative ___ ou d'urgence ___

Si césarienne, première ___; autre ___; raison: _____

_____

SECTION D: Charactéristiques du nouveau-né (avec livret de naissance, si disponible)

1- Taille à la naissance _____

2- Poids à la naissance _____ code (selon l'échelle ci-dessous) _____

0 = < 1000 grammes (2.2 lbs)
1 = 1001 - 1500 grammes (2.2 - 3.3 lbs)
2 = 1501 - 2000 grammes (3.3 - 4.4 lbs)
3 = 2001 - 2500 grammes (4.4 - 5.5 lbs)
4 = 2501 - 3000 grammes (5.5 - 6.6 lbs)
5 = 3001 - 3500 grammes (6.6 - 7.7 lbs)
6 = 3501 - 4000 grammes (7.7 - 8.8 lbs)
7 = > 4000 grammes (8.8 lbs)

3- Circonférence de la tête _____

4- Facteur RH (- ou +) ____ 5- Apgar, 1 minute ____ 5 minutes ____

6- Nourri(e) au sein? Non ___ Oui ___-> (quel période? _____);

7- Nourri(e) à la bouteille? Non ___ Oui ___-> (quel période? _____).

SECTION E: Complications natales diverses

1- Combien de temps fut l'enfant à l'hôpital après sa naissance? _____

2- L'enfant est-il rentré à la maison avec sa mère?

Non ___ Oui ___

3- Anomalies congénitales mineures visibles, majeures ou chromosomiques?

Non ___ Oui ___-> Spécifier _____.

4- Est-ce que ton bébé avait des problèmes de santé à l'hôpital?

Non ___ Oui ___->

a- Problèmes de peau? Non ___ Oui ___->

Jaunice ___ cyanose ___ pétéchies ___ ecchymose ___ pâleur ___ desquamation ___ oedème ___

autre: _____. Sévérité _____ durée _____

b- Problèmes respiratoire? Non ___ Oui ___-> Spécifier le type et la durée:

_____.

c- Traitement aux stéroids? Non ___ Oui ___-> Spécifier le type et la durée:

_____.

d- Autre médicaments? Non ___ Oui ___-> Spécifiez le type et la durée:

_____

e- Problèmes cardiaques? Non ___ Oui ___-> Spécifier le type et la durée:

_____.

f- Crises d'épilepsie? Non ___ Oui ___-> Spécifiez le type et la durée:

_____.

g- Hémorr. intra-craniennes? Non ___ Oui ___-> 1er degré ___ 2e ___ 3e ___ 4e ___ inconnu ___

h- Problèmes hématologiques? Non ___ Oui ___-> spécifier _____

i- Transfusions sanguines? Non ___ Oui ___-> spécifiez _____

j- Infections? Non ___ Oui ___-> Quel organisme? _____

k- Hospitalisation à l'unité de soins intensifs pour nouveuax-nés?

Non ___ Oui ___-> Durée et raison _____

l- Hydrocéphalie? Non ___ Oui ___ spécifier _____

m- Spina bifida? Non ___ Oui ___ spécifier _____

n- Chirurgies? Non ___ Oui ___-> spécifier _____

o- Circoncision? Non ___ Oui ___-> Quand? _____ Décrire les problèmes:

p- Choliques? Non ___ Oui ___-> Début _____ Fin _____ Fréquence _____

q- Vaccinations reçues? Oui ___-> Réactions sévères? _____

Non ___-> Lesquelles n'ont pas été reçues et pourquoi?

_____

SECTION F: Combien avez-vous eu (d'enfants): Ces nombres doivent inclure l'enfant ciblé(e)

_____ menés à terme? (>38 semaines) Qui? _____
_____ prématurés? (<38 semaines) Qui? Spécifiez # de semaines _____
_____ nés avec anomalies congénitales mineures ou majeures
_____ dont le poids à la naissance < 5.5 livres (2500 grams)
_____ dont le poids à la naissance > 9 livres (4100 grammes)
_____ d'avortements (<20 semaines)
_____ de fausses couches
_____ mort-nés

SECTION G: Jalons du développment

1. A quel âge ton enfant a-t-il atteint les étapes développementales suivants:

a) Gazouillez ____
b) Sevrage ____
c) Dire ses premier mots ____
d) Associer deux mots ____
e) Faire des phrases de 3 mots ou plus ____
f) Parler clairement pour être compris par des inconnus ____
g) S'assoir sans aide ____
h) Ramper ____
i) Marche indépendante (10 à 15 pas) ____
j) Contrôle anal: Jour ___ Nuit ___
k) Contrôle de la vessie: Jour ___ Nuit ___
l) S'éloigner de sa mère sans difficulté ____
m) Garderie: Parenté (____hrs/sem.) ___ à ___
Garderie (____hrs/sem.) ___ à ___
Gardienne ou mil. familial (____hrs/sem.) ___ à ___
n) Classe pré-maternelle (____hrs/sem.) ___ à ___
o) Maternelle (____hrs/sem.) ___ à ___

2. Taille actuelle de l'enfant _____

3. Poids actuel de l'enfant _____

SECTION H: Difficultés lors du développement (Indiquer les périodes et tout commentaire pertinent)

a) Difficile à nourrir (mange peu ou trop) _____
b) Constipation _____

c) Douleurs abdominales _____
d) Difficultés à s'endormir _____
e) Difficultés à demeurer endormi _____
f) Hyperactivité _____
g) Comportement imprévisible _____
h) Se frappait la tête _____
i) Crises de colère _____
j) Se blessait souvent _____

SECTION I: Stress post-natal

Cette section traite des tensions qui auraient pu se présenter à la maison durant la vie de l'enfant. Elle doit être conduite comme une entrevue clinique: L'interviewer notera dans la section appropriée toute information suggérant une tension qui aurait pu affecter les parents, la famille et/ou le développement de la relation entre les parents et l'enfant ciblé(e). **LORSQUE L'INTENSITÉ DU STRESS EST DE 3 à 5** (voir l'échelle ci-dessous), l'interviewer approfondira ces informations avec les questions indiquées et/ou appropriées et notera les réponses pertinentes (**à l'exception de l'item 1 où toutes les questions doivent être posées à toutes les mères**). Indiquez si certains des évènements suivants eurent lieu durant le 1er, 2e ou 3e trimestre de grossesse, durant la première année de vie ou durant les années qui suivirent.

1= Pas du tout stressant
2= un peu stressant
3= assez stressant
4= très stressant
5= extrêmement stressant

1) T'es-tu sentie très déprimée et extrêmement fatiguée, sans énergie après sa naissance (ou la naissance d'un autre enfant suivant l'enfant ciblé)? Non ___ Oui ___->

- Te sentais-tu comme ça jour après jour? Non ___ Oui ___-> période:
- As-tu sentie que tu perdais l'intérêt pour des choses que tu aimais avant? Non ___ Oui ___->
- Te sentais-tu comme ça jour après jour? Non ___ Oui ___-> période:
- Quelle opinion avais-tu de toi-même? Te sentais-tu sans valeur? Non ___ Oui ___->
- Te sentais-tu comme ça jour après jour? Non ___ Oui ___-> période:
- Avais-tu de la difficulté à réfléchir et à te concentrer? Non ___ Oui ___->
- Te sentais-tu comme ça jour après jour? Non ___ Oui ___-> période:
- Avais-tu aussi des idées ou des peurs irrationnelles, comme faire du mal à ton enfant ou te faire du mal ou même t'enlever la vie? Non ___ Oui ___ -> Décrire:

QUESTIONNAIRE MÉDICAL
Général (enfant)

1. Est-ce que ton enfant a des symptômes d'infections ou de maladie quelconque aujourd'hui?
Non ___ Oui ___->
(P.ex. rhume, mal de gorge)? _____

_____ début _____, sévérité _____.

2. Est-ce que ton enfant a eu des symptômes d'infection au cours du mois précédent? Non___ Oui___->

(P.ex. rhume, mal de gorge)? _____

_____ début _____, sévérité _____.

3. Est-ce que ton enfant a eu une chirurgie récemment? Non ___ Oui ___->

raison? _____. quand?_____

4. Est-ce que ton enfant a eu ou a été en contact avec le virus de l'hépatite au cours des 6 derniers mois?
Non ___ Oui ___->
Quand? _____. sévérité _____

5. Est-ce que ton enfant prend présentement des médicaments? Non ___ Oui ___->

Lesquels, raison et depuis quand? _____

_____

6. Au cours des 2 derniers mois, ton enfant a-t-il(elle) pris des médicaments prescrit par le médecin?
Non ___ Oui ___->
Lesquels, raison et depuis quand? _____

_____

Les questions qui suivent portent sur des problèmes de santé de longue durée.

7. Ton enfant présente-t-il/elle ou a-t-il/elle déjà présenté un problème de (cochez):

a. ___ Anémie (Période? _____)

b. ___ Maladie de la peau ou autres allergies cutanées (Période? _____)

c. ___ Autres allergies (Période? _____)
Spécifier _____

d. ___ Rhume des foins (Période? _____)

e. ___ Sérieux maux de dos ou de colonne (Période? _____)
f. ___ Arthrite ou rhumatisme (Période? _____)
g. ___ Autres problèmes sérieux de dos et/ou des articulations (Période? _____)
Spécifier _____

h. ___ Cancer Lequel? _____ (Période? _____)
Traitement? _____

i. ___ Diabète Lequel? _____ (Période? _____)
Traitement? _____

j. ___ Bronchite chronique ou toux persistante (Période? _____)
Spécifier _____

k. ___ Asthme (Période? _____)
Spécifier, traitement? _____
_____

l. ___ Déficience mentale/intellectuelle et/ou retards développementaux: Spécifier, traitements? (Période? _____)
_____

m. ___ Dépression (Période? _____)
Spécifier, traitements? _____
_____

n. ___ Epilepsie (Période? _____)
o. ___ Maladie du coeur (Période? _____)
Spécifier _____

p. ___ Troubles urinaires ou maladie du rein (Période? _____)
Spécifier _____

q. ___ Ulcères d'estomac (Période? _____)
Sévérité _____

r. ___ Autres troubles digestifs (Période? _____)
Spécifiez _____

s. ___ Goître ou troubles de la thyroïde (Période? _____)
Sévérité _____

t. ___ Migraine ou maux de tête fréquents (Période? _____)
Fréquence et sévérité _____

u. ___ Lupus (Période? _____)
Fréquence et sévérité des épisodes _____

v ___ Otites (Période? _____)
Fréquence, sévérité, détailler traitements _____
_____
Chirurgie? _____
Évaluation formelle et informelle de l'ouie? _____

8. Combien de fois et pour quelle raison avez-vous, pour tous les problèmes de santé de longue durée mentionnés ci-haut, effectué de visite (s) d'ordre médical pour votre enfant **au cours des 12 derniers mois**:

1) à votre médecin de famille _____

2) à une clinique médicale ou à un C.L.S.C. _____

3) au service d'urgence d'un hôpital _____

9. Votre enfant a-t-il(elle) déja été référé(e) à un psychologue, un(une) travailleur(euse) sociale, à une clinique spécialisée ou à un hôpital pour des problèmes émotifs, psychologique, et/ou de comportements?
Non ___ Oui ___-> Pourquoi, traitements? _____
_____

combien de temps? _____ à quel endroit? _____.

Appendix E

Maternal Health Questionnaire

No d'identification _____

QUESTIONNAIRE SUR LA SANTÉ

Au cours des trois derniers mois, as-tu souffert de certains de ces problèmes de santé? Encercle le numéro correspondant:

1. Haute pression
2. Problèmes cardiaques (angine, crise cardiaque)
3. Ulcères d'estomac
4. Problèmes de digestion, maux d'estomac
5. Douleurs au dos, maux de dos
6. Tendinite
7. FEMMES: Crampes menstruelles
8. Cancer (de toutes sortes)
9. Maux de tête, migraines
10. Rhume
11. Grosse grippe ou fièvre qui t'a forcé(e) à rester à la maison
12. Crise de la vésicule biliaire (de foie)
13. Irritabilité du colon (diarrhée ou constipation prolongées)
14. Basse pression
15. Diabète
16. Crises d'asthme bronchique
17. Hypoglycémie
18. Problèmes d'estomac précis
19. Colite ou maladie de Crohn
20. Gastro-entérite
21. Laryngite, pharyngite, amygdalite
22. Maux de gorge
23. Hémorroïdes
24. Eczéma
25. Bursite de l'épaule
26. Problèmes de sinus
27. SIDA ou virus du SIDA
28. FEMMES: Endométriose
29. Mononucléose
30. FEMMES: Kyste aux ovaires
31. Bronchite
32. Pneumonie
33. Psoriasis
34. Goutte
35. Sang dans les selles
36. Arthrite
37. Urémie
38. Maladies transmises sexuellement (gonorrhée, herpès, etc...)
39. Épilepsie
40. Sclérose en plaques
41. Fibrose kystique
42. Dystrophie musculaire
43. Anémie
44. Blessure(s) / Foulure(s). Préciser: _____
45. Autres maladies. Préciser: _____
46. Hépatite A ou B

Voici quelques questions supplémentaires qui nous aideront à mieux évaluer ta condition physique.

CIGARETTES

1. Fumes-tu? ____oui ____non

2. Si oui:
   a) _____ cig./jour
   b) Marque _____
   c) Teneur en nicotine ____ mg
   d) A quel âge as-tu commencé à fumer régulièrement: ____ ans

3. Si non:
   a) Utilises-tu présentement la "patch"? ____oui ____non
   b) ou de la gomme à la nicotine? ____oui ____non

ALLERGIES

4. Souffres-tu d'allergies? ____oui ____non Si non: passe au # 9

5. Si oui:
   a) Animaux ____ préciser _____
   b) Aliments ____ préciser _____
   c) Rhume des foins ____ Période: De _____ (mois) à _____ (mois)
   d) Médicaments ____ préciser _____
   e) Autres ____ préciser _____

6. Suis-tu présentement un traitement par injections (piqûres) pour tes allergies?

   _____oui _____non

   Si oui, quand ton traitement se terminera-t-il? _____ 19____

7. Prends-tu d'autres médicaments pour contrôler ces allergies?
   (Médicaments avec ou sans prescription du médecin)

   ____oui ____non

8. Si oui: Lesquels? _____

   _____

MÉDICAMENTS ET TRAITEMENTS

9. Prends-tu des médicaments en ce moment, autres que pour les allergies?

   ____oui ____non (Avec ou sans prescription du médecin)

10. Si oui:

Lesquels?		Pour quels problèmes?	Fois/jour	Dosage
_____	-->	_____	_____	_____
_____	-->	_____	_____	_____
_____	-->	_____	_____	_____

11. Suis-tu, ou as-tu déjà suivi, des traitements de chimiothérapie ou de radiothérapie?
____oui ____non

12. Si oui: Quand? (dates du début et de la fin des traitements):

a) Début: _____ 19____ fin: _____ 19____

b) Pour quel(s) problème(s) de santé? _____

13a. Suis-tu, ou as-tu déjà suivi, d'autres types de traitements (par exemple: physio, désintoxication, ergothérapie, etc.)?

____oui ____non

13b. Si oui:

Quoi?	Quand? début et fin	Pour quels problèmes?
_____	De___ 19___ à ___ 19___	_____
_____	De___ 19___ à ___ 19___	_____

FEMMES: MATERNITÉ ET CONTRACEPTION

14a. Es-tu enceinte? ____oui ____non Si oui: Quand accoucheras-tu? _____

14b. Si non: Allaites-tu présentement? ____oui ____non

15. Si tu n'es pas enceinte:

a) Prends-tu des contraceptifs oraux? ____oui ____non

b) Si oui: Depuis quand? _____ 19___

c) Quelle est la marque de ces contraceptifs? _____

d) date de début et de fin des dernières menstruations:

Début: _____ Fin: _____

POIDS ET TAILLE

16. Quel est ton poids? _____livres ou _____kilos

17. Quelle est ta grandeur? ____pieds ____pouces ou ____mètre ____ cm

SPORTS ET EXERCICES

18. Fais-tu des sports ou de l'exercice? ____oui ____non

19. Si oui:

Quoi?	Toute l'année?	Combien d'heures/semaine?
_____	___ oui ___non	_____ heures
_____	___ oui ___non	_____ heures

No d'identification:_____

2 nov. 1993

CONSOMMATION D'ALCOOL ET DE DROGUES

ALCOOL: Rempli par: Mère Père

1. Prends-tu de l'alcool? Oui___ Non___ --> **Si non: Passe au # 3.**

2. Si oui:
   a. Combien de verres par semaine bois-tu en moyenne depuis les derniers six mois: _____ verres par semaine.

   b. Qu'est-ce que tu bois? Bière___ Vin___ Fort___

3. Y a-t-il eu une période où tu prenais plus d'alcool que tu en prends maintenant?

   Si jamais pris d'alcool, passe à la section DROGUES

   Oui___ Non___ --> **Si non: Passe au # 5.**

4. Si oui:
   a. Quel âge avais-tu dans ce temps-là? De _____ ans à _____ ans

   b. Qu'est-ce que tu buvais? Bière___ Vin___ Fort___

   c. Combien de verres par semaine buvais-tu en moyenne dans ce temps-là? _____ verres par semaine.

5. Si tu bois OU si tu as déjà bu:

   a. T'es-tu déjà rendu compte, à certaines occasions, que tu finissais par prendre plus d'alcool que tu en avais l'intention au départ?

      Fréquemment ___ À l'occasion ___ Jamais___

   b. T'est-il déjà arrivé de faire quelque chose qui aurait pu être dangereux après avoir pris de l'alcool (par exemple: conduire, travailler sur une machine, etc...)?

      Fréquemment ___ À l'occasion ___ Jamais ___

   c. Y a-t-il des gens qui se sont plaints que tu buvais trop?

      Fréquemment ___ À l'occasion ___ Jamais ___

   d. As-tu déjà pensé qu'il fallait que tu diminues ou que tu arrêtes de boire?

      Fréquemment ___ À l'occasion ___ Jamais ___

DROGUES:

6. As-tu pris de la drogue, ou utilisé des médicaments comme de la drogu (pour avoir des effets spéciaux), au cours des six derniers mois?

   Oui___ Non___ --> **Si non: Passe à la question # 8.**

7. Si oui:
   a. Qu'est-ce que tu prends? _____

   b. Combien de fois par semaine en prends-tu, en moyenne, depuis le six derniers mois?
      _____ fois par semaine

   c. Quelle quantité consommes-tu en moyenne chaque fois? _____

8. Y a-t-il eu une période où tu prenais plus de drogues que maintenant?

   Si jamais pris de drogue, passe au questionnaire suivant

   Oui___ Non___ --> **Si non: Passe au # 10.**

9. Si oui:
   a. Quel âge avais-tu dans ce temps-là? De ____ans à ____ans

   b. Qu'est-ce que tu prenais? _____

   c. En moyenne, combien de fois par semaine en prenais-tu durant l période la pire? _____ fois par semaine

   d. Quelle quantité consommais-tu chaque fois, durant la période l pire? _____

10. Si tu prends de la drogue, ou si tu utilises des médicaments comme de l drogue (pour avoir des effets spéciaux), OU si tu en as déjà pris:

    a. T'es-tu déjà rendu compte, à certaines occasions, que tu finissai par prendre plus de drogue ou de médicaments que tu en avai l'intention au départ?

       Fréquemment ___ À l'occasion ___ Jamais ___

    b. T'est-il déjà arrivé de faire quelque chose qui aurait pu êtr dangereux après avoir pris de la drogue ou des médicaments (pa exemple: conduire, travailler sur une machine, etc.)?

       Fréquemment ___ À l'occasion ___ Jamais ___

    c. Y a-t-il des gens qui se sont plaints que tu consommais de l drogue ou que tu utilisais des médicaments comme de la drogue?

       Fréquemment ___ À l'occasion ___ Jamais ___

    d. As-tu déjà pensé qu'il fallait que tu diminues ou que tu arrêtes d prendre de la drogue ou des médicaments comme de la drogue?

       Fréquemment ___ À l'occasion ___ Jamais ___

Appendix F

Parenting Stress Index (PSI)

Rempli par: Mère Père No d'identification: _____

ISP (version abrégée)
(Abidin, 1986)

Directives:

Pour ce questionnaire, nous vous demandons d'encercler la réponse qui décrit le mieux vos sentiments. Il se peut que le choix de réponse ne décrive par exactement comment vous vous sentez. À ce moment-là, encerclez la réponse qui s'y rapproche le plus. VOTRE PREMIÈRE RÉACTION À CHAQUE QUESTION DEVRAIT ÊTRE VOTRE RÉPONSE.

Veuillez écrire à quel point vous êtes en accord ou en désaccord avec chaque énoncé en encerclant le chiffre qui correspond à la meilleure réponse pour vous selon le choix suivant:

1	=	très d'accord
2	=	parfois d'accord
3	=	modérément d'accord
4	=	parfois en désaccord
5	=	très en désaccord

Exemple: 1 **2** 3 4 5 : J'aime aller au cinéma (Si vous aimer parfois aller au cinéma, vous devriez alors encercler le "2").

1.	J'ai souvent le sentiment que je ne peux pas très bien faire face aux choses.	1	2	3	4	5
2.	Je me trouve à donner une plus grande partie de ma vie à combler les besoins de mon enfant que je m'y attendais.	1	2	3	4	5
3.	Je me sens prisonnier(ère) de mes responsabilités de parent.	1	2	3	4	5
4.	Depuis que j'ai cet enfant, je n'arrive pas à faire des choses nouvelles et différentes.	1	2	3	4	5
5.	Depuis que j'ai cet enfant, je sens que je ne suis presque jamais capable de faire des choses que j'aime.	1	2	3	4	5
6.	Je ne suis pas content(e) du dernier article de vêtement que je me suis acheté.	1	2	3	4	5
7.	Il y a plusieurs choses qui me dérangent au niveau de la vie.	1	2	3	4	5
8.	Avoir un enfant m'a causé plus de problèmes que j'avais prévus au niveau de ma relation avec mon époux/épouse (ami/amie).	1	2	3	4	5
9.	Je me sens seul(e), sans ami(e)s.	1	2	3	4	5
10.	Lorsque je vais à un "party", je ne m'attends généralement pas à avoir du plaisir.	1	2	3	4	5
11.	Je ne suis pas aussi intéressé(e) aux autres personnes que je l'étais avant.	1	2	3	4	5
12.	Je n'aime pas les choses que j'aimais auparavant.	1	2	3	4	5

1	=	très d'accord				
2	=	parfois d'accord				
3	=	modérément d'accord				
4	=	parfois en désaccord				
5	=	très en désaccord				

13.	Mon enfant fait rarement des choses pour moi qui me font sentir bien.	1	2	3	4	5
14.	Parfois, je sens que mon enfant ne m'aime pas et qu'il ne veut pas être près de moi.	1	2	3	4	5
15.	Mon enfant me sourit beaucoup moins que je m'y attendais.	1	2	3	4	5
16.	Lorsque je fais des choses pour mon enfant, j'ai le sentiment que mes efforts ne sont pas beaucoup appréciés.	1	2	3	4	5
17.	Lorsqu'il joue, mon enfant ne rit pas.	1	2	3	4	5
18.	Mon enfant ne semble pas apprendre aussi vite que la plupart des enfants.	1	2	3	4	5
19.	Mon enfant ne semble pas sourire autant que la plupart des enfants.	1	2	3	4	5
20.	Mon enfant est incapable d'en faire autant que je m'y attendais.	1	2	3	4	5
21.	Il est très difficile pour mon enfant de s'habituer à de nouvelles choses et cela lui prend beaucoup de temps.	1	2	3	4	5

22. Je sens que:
1 = je ne suis pas un bon parent
2 = je suis une personne qui a de la difficulté à être parent
3 = je suis un parent qui se situe dans la moyenne
4 = je suis un meilleur parent que la moyenne
5 = je suis un très bon parent

23.	Je m'attendais à avoir plus de sentiments chaleureux envers mon enfant que j'en ai présentement et cela me dérange.	1	2	3	4	5
24.	Mon enfant fait parfois des choses qui me dérangent juste pour être méchant(e).	1	2	3	4	5
25.	Mon enfant semble pleurer davantage ou être plus facilement irritable que la majorité des enfants.	1	2	3	4	5
26.	Mon enfant se réveille généralement de mauvaise humeur.	1	2	3	4	5
27.	J'ai le sentiment que mon enfant a beaucoup de sautes d'humeur.	1	2	3	4	5
28.	Mon enfant fait certaines choses qui me dérangent beaucoup.	1	2	3	4	5
29.	Mon enfant réagit fortement lorsque quelque chose qu'il n'aime pas se produit.	1	2	3	4	5
30.	Mon enfant devient facilement perturbé(e) face à la moindre petite chose	1	2	3	4	5

1	=	très d'accord
2	=	parfois d'accord
3	=	modérément d'accord
4	=	parfois en désaccord
5	=	très en désaccord —

31. La routine de sommeil et des repas de mon enfant a été beaucoup plus difficile à établir que je m'y attendais. 1 2 3 4 5

32. Je trouve que faire en sorte que mon enfant fasse quelque chose ou arrête de faire quelque chose est:
    1 = beaucoup plus difficile que je m'y attendais
    2 = un peu plus difficile que je m'y attendais
    3 = à peu près aussi difficile que je m'y attendais
    4 = un peu plus facile que je m'y attendais
    5 = beaucoup plus facile que je m'y attendais

33. Pensez attentivement et comptez le nombre de choses que votre enfant fait qui vous dérangent. Par exemple: il(elle) perd du temps, refuse d'écouter, est hyperactif(ve), pleure, interrompt, se bat, se plaint etc.
    1 = 1-3 2 = 4-5 3 = 6-7 4 = 8-9 5 = 10 et +

34. Mon enfant fait des choses qui m'agacent beaucoup. 1 2 3 4 5

35. Mon enfant s'est avéré(e) être plus un problème que je m'y attendais. 1 2 3 4 5

36. Mon enfant fait plus de demandes que la plupart des autres enfants. 1 2 3 4 5

Appendix G

Results of Regression Analyses Using

Child Gender and Child Age as Predictors

(Tables 20-25)

Table 20

Results of Hierarchal Regression Analysis Predicting Pre- and Post-natal Health Problems

Variables	Beta	sr^2	t	R^2 change	F change
Step 1					
Aggression	-.06	-.06	-0.68		
Withdrawal	.20	.20	2.18*	.05	2.73'
Step 2					
Aggression	-.05	-.06	-0.58		
Withdrawal	.20	.20	2.16*		
Child Gender	-.11	-.11	-1.19	.01	1.43
Step 3					
Aggression	-.02	-.02	-0.18		
Withdrawal	.17	.17	1.85'		
Child Gender	-.12	- .12	-1.27		
Smoking in Pregnancy	-.14	-.13	-1.37	.02	1.88
Step 4					
Aggression	-.02	-.02	-0.19		
Withdrawal	.18	.18	1.88'		
Child Gender	-.11	-.11	-1.17		
Smoking in Pregnancy	-.14	-.13	-1.38		
Child Age	.06	.06	0.65	.00	0.42
	R = .28		R^2 Adj= .04	F = 1.84	

Note. 'p < .10 *p < .05 **p < .01

Table 21

Results of Hierarchal Regression Analysis including Child Age as a Predictor of Duration of Colic

Variables	Beta	sr^2	t	R^2 change	F change
Step 1					
Aggression	-.03	-.03	-0.30		
Withdrawal	.25	.24	2.65**	.06	3.65*
Step 2					
Aggression	-.04	-.04	-0.38		
Withdrawal	.25	.25	2.69**		
Child Gender	.14	.15	1.54	.02	2.37
Step 3					
Aggression	-.02	-.02	-0.20		
Withdrawal	.26	.27	2.89**		
Child Gender	.13	.14	1.50		
Neonatal Treatment	.20	.21	2.19*	.04	4.81*
Step 4					
Aggression	-.02	-.02	-0.23		
Withdrawal	.27	.28	3.00**		
Child Gender	.15	.15	1.68'		
Neonatal Treatment	.22	.22	2.38*		
Child Age at Testing	.14	.14	1.48	.02	2.20

R = .37 R^2 Adj= .10 F (5, 108) = 3.46**

Note. 'p < .10 *p < .05 **p < .01

Table 22

Results of Hierarchical Regression Analysis Predicting Number of Childhood Illnesses

Variables	Beta	sr^2	t	R^2 change	F change
Step 1					
Aggression	-.08	-.08	-0.80		
Withdrawal	-.06	-.06	-0.70	.01	0.50
Step 2					
Aggression	-.06	-.06	-0.70		
Withdrawal	-.07	-.07	-0.72		
Child Gender	-.21	-.21	-2.29*	.05	5 .23*
Step 3					
Aggression	-.05	-.05	-0.55		
Withdrawal	-.11	-.11	-1.25		
Child Gender	-.18	-.18	-2.04*		
Gestational Age	-.32	-.31	-3.53**	.10	12.42**
Step 4					
Aggression	-.05	-.05	-0.53		
Withdrawal	-.11	-.11	-1.27		
Child Gender	–.19	-.19	-2.10*		
Gestational Age	-.32	-.32	-3.52**		
Child Age at Testing	-.04	-.04	-0.41	.00	0.68
	R = .40		R^2 Adj= .11		F (5, 108) = 3.87**

Note. $^{t}p < .10$ $*p < .05$ $**p < .01$

Table 23

Results of Hierarchical Regression Analysis Including Child Age as a Predictor of Respiratory Illnesses

Variables	Beta	sr^2	t	R^2 change	F change
Step 1					
Aggression	-.04	-.04	-0.47		
Withdrawal	-.17	-.14	-1.50	.02	1.18
Step 2					
Aggression	-.04	-.04	-0.38		
Withdrawal	-.14	-.14	-1.55		
Child Gender	-.17	-.17	-1.81^t	.03	3.27^t
Step 3					
Aggression	-.09	-.08	-0.92		
Withdrawal	-.11	-.11	-1.14		
Child Gender	-.16	-.16	-1.73^t		
Smoking in Pregnancy	.19	.19	1.97^t	.03	3.87^t
Step 4					
Aggression	-.10	-.10	-1.02		
Withdrawal	-.12	-.13	-1.31		
Child Gender	-.13	-.14	-1.42		
Smoking in Pregnancy	.21	.21	2.21*		
Gestational Age	-.19	-.19	-2.02^t		
Neonatal Respiratory Problems	.13	.13	1.37	.07	4.21*
Step 5					
Aggression	-.10	-.09	-1.00		
Withdrawal	-.12	-.12	-1.33		
Child Gender	-.13	-.13	-1.48		
Smoking in Pregnancy	.21	.20	2.22*		
Gestational Age	-.19	-.20	-2.02^t		
Neonatal Respiratory Problems	.13	.13	1.38		
Child Age at Testing	-.04	-.05	-0.53		

$R = .39$ R^2 Adj= .10 $F(7, 106) = 2.69$**

Note. $^t p < .10$ *$p < .05$ **$p < .01$

Table 24

Results of Regression Analysis with Child Gender and Age as Predictors of Recent Maternal Health Complaints

Variables	Beta	sr^2	t	R^2 change	F change
Step 1					
Aggression	.05	.05	0.52		
Withdrawal	.15	.14	1.53	.02	1.25
Step 2					
Aggression	.02	.02	0.19		
Withdrawal	.12	.12	1.05		
Maternal Education	-.12	-.11	-1.19	.01	1.40
Step 3					
Aggression	-.03	-.02	-0.26		
Withdrawal	.14	.14	1.49		
Maternal Education	-.11	-.10	-1.10		
Previous Alcohol Abuse	.13	.13	1.31		
Previous Drug Use	.18	.17	1 .83^t	.07	3.92*
Step 4					
Aggression	-.04	-.04	-0.37		
Withdrawal	.16	.17	1.75^t		
Maternal Education	-.09	-.09	-0.91		
Previous Alcohol Abuse	.15	.14	1.46		
Previous Drug Use	.21	.20	2.07*		
Child Gender	.01	.01	0.06		
Child Age at Testing	.17	.17	1.79^t	.03	1.62
	R = .36	R^2 Adj= .07		F (7, 106) = 2.19*	

Note. $^t p < .10$ *$p < .05$ **$p < .01$

Table 25

Results of Hierarchical Regression Analysis with Child Gender and Age as Predictors of Maternal Parenting Stress

Variables	Beta	sr^2	t	R^2 change	F change
Step 1					
Aggression	.22	.22	2.42*		
Withdrawal	.17	.17	1.88^t	.07	4.32*
Step 2					
Aggression	.20	.19	2.16*		
Withdrawal	.16	.16	1.73^t		
Psych Consults	.21	.20	2.28*	.04	5.18*
Step 3					
Aggression	.21	.21	2.42*		
Withdrawal	.21	.21	2.39*		
Psych Consults	.20	.19	2.26*		
Child Illness	.30	.29	3.39**	.08	11.46**
Step 4					
Aggression	.20	.21	2.42*		
Withdrawal	.16	.16	1.73^t		
Psych Consults	.20	.20	2.13*		
Child Gender	-.13	-.13	-1.39		
Child Age	.02	.02	0.24	.02	1.07
Step 5					
Aggression	.21	.23	2.43*		
Withdrawal	.21	.22	2.34*		
Psych Consults	.19	.19	2.16*		
Child Gender	-.06	-.06	-0.67		
Child Age	.01	.01	0.09		
Child Illness	.28	.29	3.08**	.07	9.47**

Table 25, continued

Results of Hierarchical Regression Analysis with Child Gender and Age as Predictors of Maternal Parenting Stress

Variables	Beta	sr^2	t	R^2 change	F change
Step 6					
Aggression	.21	.22	2.38*		
Withdrawal	.18	.20	2.06*		
Psych Consults	.19	.20	2.11*		
Child Gender	-.06	-.06	-0.65		
Child Age	-.01	-.01	-0.09		
Child Illness	.27	.27	2.94**		
Maternal Health	.14	.15	1.58	.02	2.49
Step 7					
Aggression	-.44	-.13	-1.39		
Withdrawal	-.21	-.09	-1.02		
Psych Consults	.17	.19	2.01*		
Child Gender	-.07	-.08	-0.82		
Child Age	-.03	-.04	-0.37		
Child Illness	.26	.27	2.91*		
Maternal Health	.15	.17	1.74'		
Aggression/ Withdrawal	.75	.20	2.12*	.03	4.50*
	R = .50	R^2 Adj= .20		F (8, 105) = 4.42**	

Note. 'p < .10 *p < .05 **p < .01