

**Problem Behaviour and Health Problems: An Inter-generational  
Study of Parents with Childhood Histories of Aggression  
and Social Withdrawal with their Offspring**

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Problem Behaviour and Health Problems: An Inter-generational  
Study of Parents with Childhood Histories of Aggression  
and Social Withdrawal with their Offspring

Natacha De Genna, PhD

Concordia University 2005

There is evidence from longitudinal studies of individuals with childhood problem behaviours that this behavioural risk may translate into health-risk and health problems in adulthood, with implications for health-risk in the next generation. The purpose of this dissertation was to examine the longterm sequelae of childhood aggression and withdrawal on health-risk, health problems, and health-promoting behaviours such as preventative care and use of services. The Concordia Longitudinal Risk Project is a prospective, inter-generational study of individuals from disadvantaged neighborhoods in Montreal, including girls and boys who were selected for extreme levels of aggression and social withdrawal. These individuals were followed across childhood and into adulthood, allowing us to examine processes of continuity and change, primarily experiential factors that precede and support cessation of unhealthy behaviour. In the inter-generational phase of the project, mothers were visited at home at two time points: when offspring were 1-6 years old, and again at 9-12 years old. At both waves of testing, mothers were interviewed about their health-risk, and medical histories were taken for mothers and their target child. In addition, during Study 1 mothers were asked about their adolescent health-risk behaviours and provided obstetric histories, and were asked in Study 2 about preventative health behaviours and use of developmental and medical services. Results indicated that girls who were both highly aggressive and socially

withdrawn showed the earliest signs of health-risk behaviour, and that adolescent health risk behaviour was a marker for poor health management in adulthood. Girlhood aggression was a risk factor for health-risk behaviour in both studies, and maternal health-risk behaviours were shown to have a direct impact on health outcomes in offspring. Although the pattern was not as clear for childhood withdrawal, this characteristic appeared to be linked more closely to psychosocial risk than medical risk. Offspring of withdrawn parents were more likely to be prescribed medication during the second wave of testing. Taken together, there was evidence that early problem behaviour was linked to health-risk in adulthood and for young offspring. The results of these two studies have important implications for the longterm sequelae of childhood aggression and withdrawal, and the inter-generational transfer of health-risk.



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A dissertation in psychology is never the undertaking of just one person, nor just one person and her mentors. I am grateful to all the people in the High Risk Lab and Stack Lab who contributed to my success on this project, and first and foremost our lab coordinator Claude Senneville. Thank you, Claude, for always putting aside what you were working on yourself to tirelessly answer my questions! I will always think of you as the heart of the Concordia Risk Project because you keep things going on automatic, perform miracles on a daily basis, yet make it all look so effortless. Thanks also to Zhang Ming Wang, Guanghui Li, and Lucie Bonneville, for their assistance with statistical analyses. Finally, big thanks to Lindsey Barrieau for all her assistance at the very end, when I was already in Pittsburgh and really needed to be in two places at once.

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## Contributions of Authors

As first author on both manuscripts in this dissertation, Natacha De Genna helped conceptualize the studies on physical health in these high-risk families, secured doctoral funding to conduct research on this aspect of inter-generational continuity, and conducted all data analyses. She completed all writing, with substantial help from Dale Stack and Lisa Serbin, in terms of regular meetings and the provision of both written and oral feedback on the studies, statistical analyses and manuscripts.

Dale Stack, Lisa Serbin, and Alex Schwartzman also submitted the grant applications to obtain funding for the inter-generational phase of the Concordia Longitudinal Risk Study, and they continue to regularly secure grants in order to maintain the longitudinal aspect of this project. In addition, Dale Stack helped conceptualize both studies and their manuscripts, as well as the dissertation. Dale Stack and Lisa Serbin were also responsible for designing and implementing the greater research project, of which these two studies were only a small part.

Alex Schwartzman and Jane Ledingham first conceptualized the Concordia study, wrote the grant applications to secure the original funding, and conducted the initial waves of testing. Alex Schwartzman was the PI during the first two decades of the project, continues to obtain funding for the adult phases of the investigation, and provides invaluable guidance to the other principal investigators.

The longitudinal and systematic study of human behaviour is the hallmark of research in developmental psychology and is crucial to understanding and preventing health problems, especially in North America. Almost all of the leading causes of death in Canada and the United States can be prevented by or are somehow related to behaviour (Center for Disease Control and Prevention, 2000). Although health behaviours may be easier to study and less invasive than psychophysiological measures of health-risk such as heart rate and blood tests, surprisingly little systematic research has been conducted on the link between early behavioural styles and later health behaviours (Friedman, 2000). However, the classic disease model of health, in which disorders are discrete and arise from a single (usually biological) cause, is slowly being supplanted by more complex models in medical research that often include psychosocial factors (Rutter, 1996).

Despite recent efforts to acknowledge psychological input to physical health status, the medical model of disease continues to permeate most research on physical health problems, and provides the basis for much of developmental psychopathology as well (Sroufe, 1997). For example, the disease classifications of the Diagnostic and Statistical Manual suggest that there are discrete and enduring disorders with unique properties that imply an endogenous problem within the child (Sroufe, 1997), despite the results of global prevalence studies consistently finding high rates of comorbidity and overlap between internalizing and externalizing symptoms (Schwab-Stone & Briggs-Gowan, 1998). More longitudinal and prospective research is clearly warranted, supplementing existing investigations into genetic precursors with experiential factors that support and even precede the cessation of unhealthy behaviour and turning away from deviant pathways (Rutter & Sroufe, 2000; Sroufe, 1997). Investigations into the

continuity and discontinuity of behaviours that support good and bad health are also crucial for effective public health campaigns as well as preventative interventions with high-risk individuals and their families.

In the present dissertation, several important models and concepts from different literatures are reviewed in detail before the Concordia Longitudinal Risk Project is introduced and the dissertation studies are presented. Theories of continuity and discontinuity are addressed first, because of their implications for using lifespan developmental research to predicting behaviour over time. Next, models of developmental trajectories of risk and resilience are examined, and then pertinent research on high-risk families is systematically reviewed. This naturally leads to a discussion on the ecology of health, which extends beyond the parent-child dyad and family "nest" and places the child, parents and family in a bigger picture that includes the context of society and its pressures (i.e., stress) on the individual. Finally, the more specific and individual characteristics of gender, aggression and social withdrawal are each examined closely in turn for their known associations with various health behaviours. All of these concepts and theories make an important contribution to our current understanding of the link between human behaviour and physical health outcomes.

### *Continuity and Discontinuity*

The transactional model (Sameroff & Chandler, 1975) posits that child development (and consequently, pathology) is influenced by the child, parent, and environment factors, and that risks may accumulate over time. In other words, child development occurs in an environment that is largely created by parents, and as a

function of transactions between the child and his or her environment, including parenting. Therefore, if parenting or other environmental factors are less than optimal, this may compromise a child's mental and physical health. In fact, children's health care and health behaviour are determined almost entirely by parents, who choose to seek health care, organize use of services, administer medication, and model and enforce preventative behaviours such as good nutrition and dental care in children. Moreover, considerable continuity has been demonstrated in child behaviour, parenting, and environmental factors such as family poverty and a child's access to quality medical care. Therefore, continuity is supported both internally and externally, and the effects of risk factors such as chronic poverty and parental inattention to child health concerns have been shown to have an increasingly serious impact over childhood (Patterson, Reid, & Dishion, 1992; Rutter, 2005; Rutter & Sroufe, 2000; Sroufe & Egeland, 1991; Sroufe, Egeland, & Carlson, 1999).

Caspi (1993) discusses several genetic and environmental factors that may be responsible for behavioural continuity that contributes to poor mental and physical health over the lifespan. Genetic influences on child temperament and cognitive delay, for example, may help maintain conduct problems from toddlerhood into adolescence and even adulthood. Moffitt's (1990) work on anti-social behaviour suggests that deficits in verbal ability and executive functioning are especially good candidates for a genetic contribution to anti-social behaviour. Environmentally, parenting that does not "fit" child temperament, teacher expectations of disruptive classroom behaviour and limited academic performance, and increased association with deviant peers will also perpetuate continuity in conduct problems. Continuity is expected in adulthood as well, due to such

influences as academic failure, assortative mating, and difficulties at work and home that propagate behaviour problems that began in early childhood (Caspi, 1993). Finally, there is also random variation in development that is beyond genetic or environmental influence, what Molenaar, Boomsma and Dolan (1993) have called the “third force” of nature. Rutter and Sroufe (2000) provide the genetic example of the double X-chromosome in women: it is randomly determined which X is “turned off,” and this random variation has implications for a variety of health outcomes.

Researchers have discovered that it is often the interaction between individual differences and the environment that helps explain developmental psychopathology. Caspi and Bem (1990) have categorized three types of person-environment interactions that contribute to behavioural continuity: reactive interactions, evocative interactions, and proactive interactions. *Reactive interactions* occur when different individuals are located in the same environment but experience, interpret, and react to similar experiences differently. For example, Dodge’s (1986) research on physical aggression suggests that individual differences in information-processing of social information contributes to continuity of aggression across childhood. *Evocative interactions* happen as a function of an individual’s personality, which evoke different responses in others. In Patterson’s coercion model, for example, anti-social child behaviours can promote negative parenting practices that contribute to cycles of coercive interactions within families that in turn intensify the continuity of anti-social behaviour across childhood (Patterson, Reid, & Dishion, 1992). Mistrusting and hostile individuals help perpetuate a hostile environment around themselves by initiating conflict and sparking aggressive reactions from others (Smith, 1994). In *proactive interactions*, on the other hand,

individuals create and/or select environments of their own and there is a developmental effect: increased autonomy leads children to more selection and less parental influence. For example, as children become adolescents they choose their own friends based on common interests, and then romantic partners in adolescence and early adulthood, and individual differences that influence those choices will help maintain behavioural continuity (Caspi & Bem, 1990). In fact, there is considerable evidence for assortative mating for individuals with anti-social behaviour (Krueger, Moffitt, Caspi, & Bleske, 1998).

Theoretical models of problem behaviour also suggest an age gradient: the development of problem behaviour such as aggression and the initiation of cigarette and alcohol use at earlier ages are considered more deviant than initiation of similar behaviours at a later age, and are associated with higher risk for other deviant behaviour (Donovan & Jessor, 1985; Jessor & Jessor, 1977). Similarly, diagnostic criteria that have been developed for adults will not map directly onto problems developing in childhood and adolescence. For example, Vik and his colleagues (1997) have pointed out that adolescent alcoholics, given their relatively briefer periods of affliction and lack of career and marital responsibilities, may not show the same levels of tolerance and withdrawal to alcohol, or levels of impairment in life functioning as adult alcoholics. Therefore, it is necessary to be sensitive to developmental timing when examining vulnerability to health-risk that is linked to early behaviour problems. However, as Friedman (2000) has pointed out, disease prevention interventions are often aimed at adults at a single point in time, with little attention to the life-span trajectories along which the individuals are already traveling.

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Within a developmental perspective, therefore, pathology evolves as a function of successive adaptations to gene-environment interactions (Sroufe & Egeland, 1991). Disturbance is rarely pre-determined, even in the presence of several risk factors and illnesses with a well-known genetic component (Rutter & Sroufe, 2000). For example, research has shown that biological and environmental vulnerabilities appear to interact with hormonal changes at puberty and stress in adolescence (and early adulthood) to promote the onset of schizophrenia, a disorder with a well-known genetic component (Brennan & Walker, 1991). Moreover, recent research designed to examine genetic contributions to psychopathology suggest that environmental factors are generally of roughly equal importance, and that genetic influences are rarely deterministic (Caspi, Taylor, Moffitt, & Plomin, 2000; Plomin & Kovas, 2005; Plomin & Rutter, 1998; Rhee & Waldman, 2002). Thus, psychopathology is considered probabilistic and current research is turning more and more to examining developmental processes that contribute to both continuity and change along developmental trajectories (Rutter, 2005; Sroufe, 1997).

#### *Developmental Trajectories of Risk and Resilience*

Bowlby (1973) adapted the pathways framework introduced by Waddington in 1957 using the branches of tracks in a railway yard as an analogy, and suggested that individuals may begin on one track at conception, but have many opportunities to “derail” onto maladaptive tracks or, conversely, switch onto a better track at different points in the lifespan (Loeber, 1991; Sroufe, 1997). Pathology is never a given, even for those children born into the worst circumstances (Sroufe, 1997) and current research examines both resilience as well as vulnerability. Early risk status does not necessarily



lead to negative outcomes; many children reared in disadvantaged environments manage to climb out of poverty and dangerous neighbourhoods to become successful adults and rear their own families in a different context (Caspi & Elder, 1988; Furstenberg, Brooks-Gunn, & Morgan, 1987; Rutter, 1987; Serbin & Karp, 2003; Serbin et al., 2004; Stack et al., 2005; Werner & Smith, 1982). Variables such as parental resources (e.g., education, mental health) and the child's own constitution (e.g., health, temperament) can moderate risk factors (Peters, 2000; Peters & Russell, 1996; Wyman, Cowen, Work, Hoyt-Meyers, Magnus & Fagen, 1999). There are many life experiences that only occur during late adolescence and adulthood (e.g., romantic relationships, military service, childrearing, career transitions) and these offer opportunities for discontinuity in previous trajectories if they bring about a radical alteration in opportunities or a person's self-concept or cognitive set (Rutter & Sroufe, 2000).

Cicchetti and Rogosch (1996) have proposed that several different paths may lead to a single outcome (equifinality) and conversely, there are many different pathways that may potentially branch out from a single point (multifinality). There are many examples in the medical literature, with smoking and obesity being well-known examples of multifinality (i.e., risk factors for a variety of negative health outcomes), and no single identifiable cause for most diseases (i.e., equifinality). Another useful distinction is between *homotypic* outcomes that resemble the original risk factor closely, such as smoking and lung disease, and *heterotypic* outcomes that are not as closely related to the original risk factor, such as the link between smoking and breast cancer (Caspi & Moffitt, 1995). Longitudinal studies of aggression in childhood have demonstrated both homotypic outcomes such as violence and crime, as well as heterotypic outcomes such as

health-risk behaviours and mental health problems (Huesmann, Eron, Lefkowitz, & Walder, 1984; Moskowitz, Schwartzman & Ledingham, 1985; Olweus, 1984; Serbin et al., 2002, 2004). In fact, studies of many different types and levels of risk have demonstrated heterogeneity of outcome as the rule rather than the exception (Sameroff, 2000).

Maladaptive pathways are rarely permanent and are not considered an inherent characteristic of individuals within a developmental psychopathology perspective. Parents can influence pathways of health in offspring via their genetic contribution, as well as the environment they provide to nurture offspring growth (beginning *in utero*). Change is possible at any moment, but is constrained by prior adaptation (Sroufe, 1997). The railway analogy suggests a certain momentum, with a tendency to remain on a specific track becoming more likely the longer one remains on it. This interpretation is supported by research showing that young children who are defiant, become aggressive with other children, and turn increasingly to anti-social behaviour as they age into adolescence are more likely to persist on a criminal pathway (Loeber et al., 1993; Moffitt, 1993). However, just as it is clear that not all defiant toddlers will become sociopaths one day, there are many opportunities for individuals to deflect away from maladaptive pathways and much recent research has focused on resilience, or processes that support a switch from maladaptive pathways. Resilience itself is a process that develops in some individuals as a function of positive experiences and/or positive adaptation to previous challenges (Sroufe, 1997). Resilience is often conceptualized as the opposite end of a dimension, with vulnerability on the other end (Ingram & Price, 2001).

Vulnerability is considered to represent relatively stable and enduring endogenous factors that predispose individuals to develop a disorder, given the right set of conditions (Price & Lento, 2001). The concept of vulnerability to psychopathology was introduced by Meehl, as part of the diathesis-stress model of schizophrenia (Price & Lento, 2001). Ingram and Price (2001) argue that although vulnerability and risk are related (often empirically), they are conceptually separate, with risk factors referring to correlational or descriptive variables and vulnerability being more causal. There is still a role for environmental factors in this framework, however, as is clearly seen in research examining vulnerability processes associated with conduct disorders that are acquired during early socialization. For example, Crick and Dodge (1994) have identified social-cognitive processes that are presumed to have developed in the context of hostile home and neighbourhood environments that lead to aggressive behaviour.

Chassin and her colleagues (2001) reviewed models of vulnerability to substance abuse, and suggested that there are four areas that influence vulnerability across the lifespan: genetic and biological factors, temperament and personality factors, social environmental influences, and cognitive influences such as the expectancies about the effects of substances. Therefore, although vulnerability has been conceptualized as more of a trait than a state or episodic condition, vulnerability levels may fluctuate as a function of new learning experiences (Ingram & Price, 2001). These new learning experiences occur within the context of human relationships, beginning within the family and extending to peer and romantic relationships, and outward to people that provide services (such as physicians and teachers). In particular, the family is the human nest in

which early interactions occur, and the family can either nurture resiliency or promote vulnerability.

### *High-Risk Families*

Many developmental psychopathologists are moving beyond diathesis-stress models to multi-dimensional models that reflect the dynamic nature of the interactions between children and their environments, including the family environment (Cicchetti & Cohen, 1995; Price & Lento, 2001, Sroufe, 1997). Since the advent of longitudinal research on children in the 1920's, there has been a shift from identifying a single vulnerability factor to examining interactions between multiple risk factors and developmental change, as well as mounting evidence for continuity and clustering of risk within the same families (Price & Lento, 2001). For example, 10% of Canadian children with behaviour problems are concentrated in about 5% of families with children who have behaviour problems, and this concentration is even stronger for problems related to aggression. The odds of a second child being physically aggressive if the first child was physically aggressive are about 3-4 times higher than if the first child was non-aggressive (Baillargeon, Tremblay, & Willms, 2002). Moreover, physical health problems as varied as hypertension (Doris & Fornage, 2005; Gumieniak et al., 2005), juvenile idiopathic arthritis (Prahalad et al., 2004), as well as autoimmune diabetes and thyroiditis (Golden, Levin, Ban, Concepcion, Greenberg, & Tomer, 2005) also seem to occur with more frequency within certain families. Hence, it seems clear that risk accumulates within certain families, with implications for both mental and physical health.

Repetti, Taylor, and Seeman (2002) suggest that risky family characteristics

create a cascade of risk that predicts negative health outcomes over the lifespan. These authors have reviewed research on longterm outcomes for children from “risky families” characterized by conflict (e.g., Lundberg, 1993; Walker et al., 1999), neglect, and relationships that lack warmth and support (Felitti et al., 1998; Gottman & Katz, 1989; Lissau & Sorensen, 1994; Wickrama et al., 1997). Although these children may also be biologically vulnerable and/or may have genetic vulnerabilities, it is proposed that any constitutional liabilities are further exacerbated by disturbances in physiological and neuroendocrine system regulation due to poor emotion regulation and maladaptive social patterns developed in early childhood. Repetti, Taylor, and Seeman further state that children from risky families are more likely to turn to risky behaviours such as smoking, alcohol and substance abuse and early sexual activity in order to compensate for deficits in social-emotional competence.

Similarly, in Sher’s (1991) deviance-proneness model of substance abuse, poor parenting interacts with child characteristics such as difficult temperament and cognitive deficits, and leads to school failure and emotional distress. Thus, early parent-child interactions set the stage for adolescent affiliation with deviant peers who promote problem behaviour such as truancy, the use of controlled substances and delinquency (Serbin et al., 2004; Stack et al., in press). Support for the temperamental component of this model include numerous longitudinal studies that have found links between adolescent substance abuse and early emotional distress, impulsivity, difficulty in concentrating, and difficulty in forming close relationships (Block, Block, & Keyes, 1988; Caspi, Moffitt, Newman, & Silva, 1996; Lerner & Vicary, 1984; Shedler & Block, 1990). Although Sher did not specify how parenting moderated the effects of behavioural

undercontrol and dysregulation on school failure and adolescent substance abuse (Chassin & Ritter, 2001), several authors have suggested that parental monitoring, discipline, and social support are important factors (Dobkin, Charlebois, & Tremblay, 1997; Hawkins, Catalano, & Miller, 1992; Jacob & Leonard, 1994; Stice & Barrera, 1995; Wills, McNamara, Vaccaro, & Hirky, 1996).

Parenting can also provide resilience in the face of childhood adversity, and Repetti and her colleagues (2001) cite Cowen, Wyman, and Parker's (1990) work as an example. Cowen et al examined *stress resilient* children who survived chronic hardship and family disturbance due to continuity of care with a primary caregiver in infancy, evidence of strong parenting skills, and a higher quality parent-child relationship. Thus, parental behaviour helps determine the impact of risk on child development. As a result, it is important to examine trajectories of risk and resilience (as well as factors contributing to vulnerability) within an environmental context, and psychological studies of health outcomes within an environmental context are a critical component of this research.

### *The Ecology of Health*

Rather than examine the effects of dispositional factors in isolation, it is important to consider them in the context of one another, which is consistent with the organizational view of development espoused by developmental psychopathology (Calkins & Fox, 2002; see also Cicchetti & Rogosch, 1996). Rutter and Sroufe (2000) point out that context is crucial in determining whether vulnerability translates into the commission of a particular behavioural act signifying psychopathology (e.g., suicide attempt, burglary). Moreover, they note that there may be different predisposing influences that differ from

the individual differences in liability, such as alcohol intoxication and/or the opportunities to commit such behavioural acts. Thus, although an individual may already be considered vulnerable, environmental factors will also play an important role in the eventual development of pathology.

Bronfenbrenner's ecological model (1979) of nested systems of influence on child development may help identify different levels of influences on developmental psychopathology. Parenting effects on child temperament and the interaction between child behaviour and parenting as discussed earlier belong to the *microsystem* and *mesosystem*, respectively. Socioeconomic status and other sources of resilience or stress on parenting and the family are good examples of the *exosystem* that will indirectly affect child mental and physical health. Universal health care is part of both the *macrosystem* as well as the *chronosystem*, because policy changes over several generations influence access to timely and effective health and developmental services. Therefore, child mental and physical health are clearly determined not only by physical vulnerabilities and individual differences in behaviour, but also by the nested set of circumstances in which children grow.

Sociological thinking on environmental influences and health behaviour is guided by Weber (Cockerham, 1997), who suggested that health lifestyles have two major components: (1) life choices (self-direction) and (2) life chances (structural probabilities). In Weber's model, individual differences will guide life choices, or approach and avoidance with respect to health behaviour and illness. Life chances, on the other hand, represent those circumstances outside the individual; important environmental factors such as access to health care, exposure to secondhand smoke, and normative use of

tobacco within one's immediate family and neighbourhood (Weber, 1979). Life chances, therefore, are strongly linked to SES, which is demonstrably the most powerful and universal predictor of health outcomes (Adler et al., 1994).

Remarkably, socioeconomic distinctions in mortality and morbidity are found for practically all diseases and occur at every level of a social hierarchy, not just between the upper- and lower-classes: the SES-health gradient ensures that the upper class lives longer than the upper middle class, even though both classes are affluent (Adler et al., 1994; Illsley & Baker, 1991). From sociology, a social stress model maintains that differences in health and life expectancy are based on the different capabilities of the various social classes in buffering the effects of stress (Cockerham, 1997). Stress is a process in which people confront life challenges, attempt to adapt to them using available personal and social resources, and develop more or less enduring health problems as a result of this process (Pearlin, Lieberman, Menaghan, & Mullan, 1981). Stress interferes with homeostasis by definition, and many argue that it is a critical variable in models of psychopathology (Monroe & Simons, 1991).

Selye (1956) demonstrated that a wide variety of stressors all produce similar physical reactions in individuals: initial lowering of bodily resistance during which a variety of infectious diseases may develop (that would normally be successfully resisted), followed by an activation of bodily defence mechanisms characterized by arousal of the autonomic nervous system; adrenaline discharge; increased heart-rate, blood pressure, muscle tone; and increased digestive secretion coupled with lowered levels of resistance to inflammation in the stomach (and other tissue). If this bodily state is prolonged it results in a wide range of diseases of adaptation (e.g., cardiovascular-renal diseases,



rheumatism and arthritis, ulcers, inflammatory and allergic diseases), which are caused by the body's own attempts to adapt to stress rather than by any external agent directly.

Sterling and Eyer (1988) labelled the ability to successfully adapt to life's challenges as allostasis, and the concept of *allostatic load* was introduced as a measure of the cumulative lifetime burden of these adaptations on the body (McEwen & Stellar, 1992). Using data from the MacArthur Successful Aging Study, Seeman and her colleagues (2001) demonstrated that their measure of allostatic load was associated with increased risk for mortality and decline in physical functioning in older persons (70-79 years old). In younger individuals, the effects of stress may be seen in both parents and children. For example, a recent study has shown that caretaker stress directly and independently predicts childhood wheezing, even after controlling for stress-induced behavioural changes in behaviour (e.g., smoking, breastfeeding) and biological processes such as immune response and susceptibility to lower respiratory infections (Wright, Cohen, Carey, Weiss, & Gold, 2002). Therefore, the stress associated with low SES and/or psychopathology is not negligible, and may aggravate vulnerabilities in both parental and child mental/physical health.

Stress may also be linked to health-risk behaviours that develop in adolescence, with long-lasting implications for adult health and environmental concerns for offspring. Substance use initiation generally occurs during early adolescence, with the use of "gateway" drugs such as alcohol and cigarettes (Johnston, O'Malley, & Bachman, 1998; Kandel, 1975). Although many adolescents experiment with alcohol and illegal substances, early onset of alcohol and drug use is a risk factor for adult substance abuse and dependence (Chassin & Ritter, 2001). Furthermore, several studies have shown that

adolescents who had been exposed to physical or sexual abuse (Riggs, Alario, & McHorney, 1990) or violence (Berenson, Wiemann, McCombs, & Somma-Garcia, 2001) were much more likely to engage in a variety of health-risk behaviours such as smoking tobacco or marijuana, drinking alcohol and using drugs in general and before sex, self-induced vomiting, early initiation of sexual activity, multiple sex partners, STDs, suicidal ideation and suicide attempts. However, few of the studies on the initiation of health-risk behaviours in adolescence, especially those that have examined the link between childhood behaviour problems and health-risk, have been conducted on girls.

### *Health and gender*

Until recently, medical research was focused solely on men and results from studies that used exclusively male participants were generalized to women and children, without the benefit of testing those populations for different aetiologies and trajectories of disease (Prout & Fish, 2001). However, it has become clear that there are important gender differences in health lifestyle, health outcomes such as lung cancer (more prevalent in women), and health service utilization. For example, it is now well-known that although men suffer from coronary disease at an earlier age, women past menopause are also at-risk for heart problems. Differences in aetiology and progression of problem behaviours such as aggression and withdrawal have also been identified (Crick, 1996; Serbin et al., 2004; Zoccolillo, 1993), and these behavioural differences may also contribute to differences in health outcomes between men and women. Therefore, these gender differences need to be addressed in any model of developmental psychopathology, and potentially different pathways for girls and boys should be identified.

Gender differences in health outcomes begin before birth (e.g., more female foetuses are successfully carried to term), with important implications for longitudinal research and preventative intervention in high-risk samples. Boys generally have more health problems than girls (Gissler et al., 1999). For example, although women are more likely to suffer from asthma as adults, the disease is far more common in boys before adolescence (Bjornsen & Mitchell, 2000; Wright, 2002). However, adult women report more physical symptoms, visit physicians more frequently, and make greater use of other health care services than men (Ensom, 2000). Finally, gender differences become glaring close to the end of life, when women suffer from more chronic conditions and disability, whereas men suffer from more acute conditions that result in their earlier deaths (Nathanson, 1977; Verbrugge, 1979; Waldron, 1983). Others have demonstrated that gender differences may be less marked than previously thought (Kandrack, Grant, & Segall, 1991), especially once structural inequalities are taken into account (Verbrugge, 1989), and that women's increased reporting is only consistently found for the more psychological symptoms (Macintyre, Hunt, & Sweeting, 1996). However, as long as evidence of gender differences in health reporting or outcomes are present in some form across the lifespan, they cannot be ignored in models that examine the link between early child behaviour problems and health.

In terms of health-related behaviour, Chassin and Ritter (2001) have pointed out that gender is one area of Sher's deviance-proneness model to substance abuse that needs further consideration. Although a recent Canadian study found no gender differences for smoking in 318 adolescents (Cohen, Evers, Manske, Bercovitz, & Edward, 2003), several findings suggest that girls smoke for different reasons than boys (e.g., weight loss, stress

reduction; File, Fluck, & Leahy, 2001) and that they may be more vulnerable to the physiological effects of smoking (Holmen et al., 2002). Interestingly, although girls high on both aggression and depression were found to smoke more, boys' depression dampened elevated smoking risk associated with their externalizing behaviour (Whalen, Jamner, Henker, & Delfino, 2001). Kahn and her associates (2002) found that high impulsiveness in teenage girls was related to sexual risk-taking behaviours such as early initiation, higher number of partners, and non-use of contraception and condoms. Taken together, high-risk behaviours appear to be equal or more prevalent in adolescent girls than in boys, and seem to be associated with different behaviours and risk factors.

#### *Aggression and Social Withdrawal*

Two risk factors for health problems that have been identified in both child and adult populations are aggression and social withdrawal. These behaviours represent under-controlled or over-controlled emotional and behaviour responses to social situations, and are also commonly referred to in the child psychopathology literature as externalizing and internalizing problems (Salovey & Sluyter, 1997). Research on these two deviant behavioural patterns has reliably demonstrated that early aggression and social withdrawal are linked to a host of negative outcomes, including psychological disorders (Burgess, Marshall, Rubin, & Fox, 2003; Dumas & Lafreniere, 1993; Lyons, Serbin, & Marchessault, 1988; Peplar & Rubin, 1991; Rubin, 1993; Rubin & Mills, 1990; Rubin, Stewart, & Coplan, 1995) and physical health problems (Bardone et al., 1998; Friedman et al., 1995; Serbin et al., 2004; Tucker & Friedman, 1996). Although more is known about the continuity and correlates of aggression across the lifespan, there is evidence that social withdrawal may also contribute to negative health outcomes over

time (Huesmann, Eron, Lefkowitz, & Walder, 1984; Ladd & Burgess, 1999; 2001; Serbin & Stack, 1998; Serbin et al., 2002; 2004). Moreover, problems with early aggression and withdrawal have been known to co-occur in some children (Moskowitz & Schwartzman, 1989; Salovey & Sluyter, 1997). Findings from several longitudinal studies of children who are both aggressive and withdrawn suggest that they may be at the highest risk for poor mental and physical health (Ladd & Burgess, 1999; Schwartzman, Ledingham, & Serbin, 1985; Serbin, Peters, & Schwartzman, 1996; Serbin, Schwartzman, Moskowitz, & Ledingham, 1991; Serbin et al., 2004; Stack et al., 2005).

Overt aggression involves causing another person physical harm, or verbally threatening to cause them harm (Bjorkvist & Niemala, 1992; McCord, 1988; Moskowitz, Schwartzman, & Ledingham, 1985). Although physical aggression remains more prevalent in males and is therefore more closely associated with them, there is evidence that this gender gap is slowly closing (Cairns & Cairns, 1994; Moretti & Odgers, 2002). Over the past several years, studies have indicated that childhood aggression can be reliably identified and assessed in girls within community-based samples, and that it is fairly stable over time (Coie & Dodge, 1998; Moskowitz & Schwartzman, 1989; Serbin et al., 1991, 1998; Stack et al., in press). Moreover, girlhood aggression predicts patterns of negative adolescent and adult outcomes that are distinct from the overt delinquency and other long-term outcomes typical of aggressive boys (Schwartzman, Mohan, Serbin, & Ledingham, 1999; Schwartzman et al., 1985; Serbin et al., 1991).

Several behavioural correlates of aggression including hostility, lack of self-control, impulsivity, tension, and carelessness have been associated with health-risk (Friedman et al., 1995; Ratliff-Crain & Baum, 1990; Scherwitz, et al, 1992; Vingerhoets

et al., 1990). There are numerous longitudinal studies linking hostility and aggression to health-impairing behaviour patterns (e.g., Caspi et al., 1997; Miller, Smith, Turner, Guijarro, & Hallet, 1996; Pine, Cohen, Brook, & Coplan, 1997; Tucker & Friedman, 1996) and there is conclusive evidence that conduct problems and aggression in childhood are strong predictors of risk-taking behaviour such as substance abuse in adolescence and young adulthood (Bardone et al., 1998; Cairns & Cairns, 1994; Caspi et al., 1997; Chassin, Pitts, DeLucia, & Todd, 1999; Hawkins, Catalano, & Miller, 1992; Henry et al., 1993; Robins & Pryzbeck, 1985; Scaramella et al., 1998; Serbin et al., 1991). In their exhaustive meta-analysis on the link between hostility and physical health, Miller and his associates (1996) found both direct and indirect pathways between hostility and negative health outcomes in adults, albeit the lack of women in almost of the studies reviewed.

Even though more evidence has accumulated for aggressive children being at-risk for health problems across the lifespan, due to health-risk behaviours they adopt in adolescence, children who are socially withdrawn are also vulnerable to developing developmental and health problems. Social withdrawal has been defined as behaviours that are socially isolating, and are often associated with insecurity, avoidance, negative self-perceptions, loneliness, dependency, and fear (Moskowitz & Schwartzman, 1989; Rubin, 1993; Rubin, Chen, McDougall, & Bowker, 1995). Moreover, Rubin and his colleagues have been able to demonstrate considerable stability in withdrawn behaviour, at least across childhood. They have also demonstrated that social withdrawal may be more heterogenous than previously imagined, with evidence pointing to at least two distinct types. In the traditional form, the child is rejected by peers, whereas in the other

form the child is not rejected but frequently chooses solitary play over group activities (Bowker, Bukowski, Zargarpour, & Hoza, 1998; Coplan & Rubin, 1998; Coplan, Rubin, Fox, Calkins, & Stewart, 1994). Recent research suggests that differences in physiological thresholds for stimulation and child temperament may help determine whether social withdrawal will become pathological, with higher risk associated with lower thresholds of tolerance for social stimulation (Henderson, Marshall, Fox, & Rubin, 2004).

Several epidemiological studies have now demonstrated that depression in adults, a clinical correlate of social withdrawal in children (Achenbach & Rescorla, 2001; Kovacs, 1992), is also a risk factor for coronary disease in adults (Friedman & Booth-Kewley, 1987; Pratt, Ford, Crum, Armenian, Gallo & Eaton, 1996; Rosengren et al., 2004). This effect may be partially mediated by depression's association with unhealthy lifestyles and poor patient compliance (Zigelstein, Bush, & Fauerbach, 1998). However, depressive symptoms have also been linked to pathophysiological effects such as hypercortisolemia (Caroll, Curtis, Davies, Mendels, & Sugarman, 1976; Gold, Goodwin, & Chrousos, 1988), reduced heart rate variability (Carney, Saunders, Freedland, Stein, Rich, & Jaffe, 1995), and hypercoagulation (Doulalas et al., 2005; Panagiotakos et al., 2004). Therefore, there may be several pathways of risk for cardiovascular and other diseases for individuals experiencing depressive symptomatology, involving both physiology and behaviour.

Although a sub-type of adult alcoholics for whom alcohol is used to self-medicate anxiety and depression has been identified, several authors from the addiction literature have suggested that anger, hostility and irritability are more predictive of later adolescent

alcohol abuse than anxiety and depression (Chassin & Ritter, 2001). One reason that there have been mixed findings supporting Sher's negative affect pathway to substance abuse is that children who learn to cope with negative affect by withdrawing may be protected from peer cultures that endorse risk-taking behaviour. Chassin and her colleagues (2001) speculate that adolescents that cope with negative affect by withdrawing from social situations are probably less likely to interact with peers who are engaged in substance abuse and therefore, lack the opportunities to come into contact with and be reinforced for alcohol abuse. Therefore, although there is popular support for the notion that alcohol is used to self-medicate depression and internalizing symptoms, empirical evidence suggests that social withdrawal may actually be protective for the initiation of various health-risk behaviours such as smoking and drinking.

In sum, both early aggression and withdrawal are good candidates for behavioural problems that manifest first in childhood, continue into adulthood, and contribute to poor health either directly or by exacerbating existing vulnerabilities by increasing the probability of engaging in health-risk behaviours. Inter-generational transmission has been defined as behaviours, characteristics and circumstances that are passed on from parent to child (Kolvin, Miller, Fleeting, & Kolvin, 1988), and there is ample evidence that as aggressive and withdrawn individuals enter adulthood and begin their own families, the next generation is also placed at-risk for negative mental and physical health outcomes (Cairns & Cairns, 1994; Serbin et al, 1998; 2002; 2004; Stack et al., in press). For example, Martin and Burchinal (1992) found that offspring of mothers from the National Longitudinal Survey of Youth (NLSY) who had been involved in antisocial behaviour as youths had offspring with significantly higher scores on a number of clinical



scales, including antisocial behaviour, anxiety/depression, and peer conflict/social withdrawal. In a study examining psychophysiological correlates of non-optimal mother-infant interactions, Field and her colleagues (2001) found that depressed mothers who were “withdrawn” and “poor interaction partners” in early observations with infants had offspring with elevated cortisol levels. Only prospective and inter-generational research on families of aggressive and withdrawn individuals can help elucidate the mechanisms of transfer of mental and physical health-risk to the next generation.

*The Concordia Longitudinal Risk Project*

A developmental psychopathology perspective is compatible with an approach that focuses on extreme groups and types of individuals, and follows them over time (Calkins & Fox, 2002). Indeed, only longitudinal designs can tease apart person effects on the environment versus environmental effects on the person (Rutter & Sroufe, 2000), and only longitudinal studies that extend from childhood to adulthood allow us to identify specific developmental periods when targeted interventions may be most effective (Serbin & Stack, 1998). Methodology for prospective, longitudinal investigations is now well established in the field of developmental psychology (Wadsworth, 1988). Inter-generational research investigates the continuities and discontinuities between parents and children on various constructs, preferably at similar ages, and a variety of measures should be included in order to capture heterotypic continuity (Cairns, Cairns, Xie, & Hearne, 1998; Quinton, 1988; Serbin & Karp, 2003).

The Concordia Longitudinal Risk Project is a prospective, inter-generational study of individuals from disadvantaged neighbourhoods in Montreal, including many girls and boys who were selected for extreme levels of aggression and/or social

withdrawal. In fact, half of the individuals studied in the Concordia project were identified by their grade-school classmates as abnormally aggressive and/or withdrawn compared to age- and gender-matched peers. These aggressive/withdrawn children, together with a comparison group from the same low SES neighbourhoods and schools, were longitudinally followed across childhood and into adulthood, permitting the examination of processes of continuity and change, especially with respect to experiential factors that precede and support desistance from unhealthy behaviour and deviant pathways. Due to the nature of the design, with only a portion of participants showing patterns of atypical behaviour, it is also possible to observe factors that are predictive of positive adaptation, which has become an important focus of recent research on risk and resiliency (e.g., Luthar, 2003).

Unlike most longitudinal studies of childhood behaviour problems, this is a community-based (rather than a clinical) sample. Use of a community sample avoids the selection biases inherent in clinic-referred samples, and is also more representative of the population of Quebec (Stack et al., in press). However, unlike many longitudinal studies of disadvantaged children, specific atypical patterns of social behaviour (i.e., aggression and withdrawal) were initially identified and could be followed as predictors within a population at high-risk for psychosocial problems. Another unique feature of the original design was the inclusion of an approximately equal number of girls and boys within each of the risk profiles (Serbin et al., 2004). Consequently, the Concordia study is one of the few longitudinal studies worldwide that has followed a large sample of highly aggressive girls into adulthood.

Although there were similarities in the risk pathways of aggressive and/or withdrawn girls and boys in this sample, the trajectories followed by many aggressive and withdrawn girls were also distinctive from boys' trajectories (Stack et al., 2005; in press). At the time of identification for the Concordia study, both highly aggressive girls and boys were likely to have lower IQ scores and lower standardized academic achievement test scores than either the contrast group of children who were low on both aggression and withdrawal, or the highly socially withdrawn group of children (Ledingham, 1981; Schwartzman et al., 1985). Moreover, children who were high on both aggression and withdrawal had the lowest IQ and school achievement scores in the sample. Therefore, even at its onset, results from the Concordia study provided correlational evidence for a link between early aggression and social withdrawal and poor outcomes in school.

Girls' and boys' progress in school was tracked across childhood, in order to determine if there was continuity in the effects of early problem behaviour on scholastic success or failure. In the first follow-up study of academic outcomes that took place three years after the initial identification, children who were highly aggressive at the onset of the study were more likely to have repeated a grade, or to have been placed in a special class for children with behavioural or learning problems (Schwartzman et al., 1985). These failure rates continued into high school, with the original aggression scores predicting elevated rates of high school dropout. The group of children who were both highly aggressive and socially withdrawn showed the highest rates of failure. Finally, girls' aggression in elementary school continued to predict high school dropout, even

after statistically controlling for academic ability by using achievement scores as a covariate in multiple regression (Serbin et al., 1998).

A naturalistic observation of 174 fifth- and sixth-grade children was conducted on a separate group identified from among the same schools and using the same methods as the original Concordia sample (Lyons, Serbin, & Marchessault, 1988; Serbin, Lyons, Marchessault, Schwartzman, & Ledingham, 1987; Serbin, Marchessault, McAffer, Peters, & Schwartzman, 1993). In this study, girls and boys who were nominated by their peers as being the most aggressive in their classrooms were also observed to be more physically aggressive on the playground than non-aggressive children of either sex. Despite the well-known preference for same-sex playmates normally observed in this age group, the highly aggressive girls spent much of their time engaging in “rough-and-tumble” play with boys, and most of their observed aggressive acts were also directed at boys (rather than other girls). Associating with boys (especially those with aggressive play styles) and being avoided by girls may be a crucial feature in the continuity of aggression in girls who display physical aggression into middle childhood. Furthermore, girls who are drawn to peer groups that engage in aggression and other types of risk-taking behaviour in elementary school may expand their repertoire of maladaptive behaviour as they mature, following the norms and values of their deviant peer group (Stack et al., in press).

Childhood aggression and social withdrawal were not only negative predictors of academic success and peer group behaviour in the Concordia sample, but were also predictors of other problem behaviour, including health-risk behaviour (De Genna, Stack, Serbin, Ledingham, & Schwartzman, in press; Serbin et al., 1998, 2004; Stack et al., in

press). Highly aggressive girls were more likely to report elevated rates of smoking, alcohol, and illegal drug usage in adolescence (De Genna et al., in press; Serbin et al., 2004), suggesting that they continue to seek out behaviourally-compatible peer groups that may include boys and girls with similar aggressive or “pre-delinquent” behavioural styles, if not those peers actively engaging in delinquent behaviour. Gender appears somewhat protective for overtly anti-social behaviour: the aggressive teenage girls were less involved with criminal or violent behaviour than the aggressive teenage boys (Schwartzman et al., 1999). However, the aggressive girls did have a higher arrest rate than the other girls in this sample by their late teens and, along with their self reported health-risk behaviour (e.g., smoking and drugs), it is highly likely that this risky behaviour is indicative of a pattern that will promote continuity in their negative life trajectories (Serbin et al., 2004; Stack et al., 2005; in press).

Another aspect of the risk-taking behaviour and peer relations typical of the highly aggressive girls in the Concordia sample relates to their early sexual behaviour. Using the relative risk ratio, a statistic that is widely used in epidemiological research (RR; Rothman, 1986), examination of adolescent health care records of 853 women revealed elevated risks for a variety of gynecological problems for aggressive girls throughout the teen years (Serbin et al., 1991). Childhood aggression predicted elevated rates of gynecological problems and birth control use between 11 and 17 years of age, as well as increased likelihood of early motherhood (i.e., before age 23). Girls high in aggression were also found to have elevated incidence of STDs between the ages of 14 and 20, suggesting that they were more likely to engage in sexual risk-taking behaviour in adolescence (Serbin et al., 1991). The pattern observed in girls who were both

aggressive and withdrawn in middle childhood was found to be even more dramatic. In addition to similar risk patterns found among the aggressive group, almost half (48%) of all the girls high on both of these risk dimensions became teenage mothers.

Taken together, there is evidence of continuity of adolescent health-risk behaviours into the childbearing years for women rated as highly aggressive in childhood. Now that the original sample are adults and most targets have started their own families, it is possible to examine how their childhood difficulties might affect their health lifestyles, the transition to parenthood, and resulting health outcomes in their own offspring (Serbin et al., 2004; Stack et al., 2005). This potential transfer of risk to the next generation via health may function through heredity, SES, maternal modeling of poor health habits, or a combination of all these risk factors. Therefore, it is important to monitor multiple outcomes in these families over time, in order to tease apart the various health influences.

When medical records of 94 offspring of teenage girls from the Concordia study were examined (Serbin, Peters, & Schwartzman, 1996), maternal childhood aggression was predictive of increased annual rates of visits to the ER, more specifically for treatment of injuries, acute infections, and asthma. Rates of emergency hospitalizations and emergency surgeries followed a similar pattern. The young offspring of the aggressive and aggressive/withdrawn teenage mothers were at elevated risk for emergency room visitation compared with the offspring of teenage mothers who were not aggressive in childhood. Serbin et al concluded that these results may not simply reflect family disorganization or inappropriate use of emergency room services (i.e., in lieu of

regular medical care); they did not rule out inadequate or unbalanced diets, poor hygiene in the home, or abuse and neglect.

A number of common childhood problems emerged in a larger and more representative sample of 175 families with offspring aged 1 to 6 years from the Concordia study (Serbin et al., 2004; Serbin, Stack, & Schwartzman, 2000; Stack, Serbin, Schwartzman, & Ledingham, 2005). Almost a third of mothers reported chronic and recurrent respiratory illness in their children (asthma, bronchitis, upper respiratory infections, nasal allergies), and frequent middle ear infections (otitis media). A study examining only mother-participants revealed that 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 (De Genna, 2001). Severe illnesses (such as cancer, epilepsy, heart problems, kidney problems, thyroid problems, and lupus) were seen in 10% of the young offspring. Physical health problems in children were predicted by a variety of historical and current factors including mothers' childhood histories of aggression, as well as neonatal health status, current maternal tobacco use, and high levels of parenting stress (Serbin, Stack, & Schwartzman, 2000). Moreover, the highest levels of poverty and parenting stress (De Genna, 2001) were reported for women with childhood histories of both aggression and social withdrawal.

A third set of results related to physical health in the second generation of the Concordia project are drawn from two studies examining the influence of maternal characteristics on children's developing hypothalamic-pituitary-adrenal (HPA) systems. First, Granger and his colleagues (1998) found that maternal social withdrawal was

negatively related to baseline cortisol levels in school-age offspring. In the second study, Ben-Dat Fisher et al (under revision) examined the diurnal trajectory of preschool offspring's cortisol in relation to variables measuring the quality of maternal care and home environment. Under non-optimal circumstances, children displayed diurnal cortisol trajectories that deviated from the robust, normal pattern (characterized by an early morning peak followed by a steep decline that becomes more gradual across the day). For example, maternal smoking was related to lower-than-expected morning cortisol values in children, and poor cognitive stimulation was related to a flatter daily pattern of cortisol secretion (Ben-Dat Fisher et al., under revision). These data are similar to research findings that reported flattened rhythms among children who live under persistent, adverse circumstances (Gunnar & Vazquez, 2001). Therefore, there is evidence that maternal factors may alter the development of a stress-sensitive biological system in young children.

These lines of research illustrate that childhood aggression and social withdrawal may influence the physical health of adult women and their offspring in both direct and indirect ways. Mothers might directly affect their children through negative health behaviours such as smoking, and through indirect mechanisms such as the effects of family poverty and parenting stress on maternal health and resources available to cope with parenting and poor child health. The present dissertation was a series of two studies designed to explore physical health in families from the Concordia Longitudinal Risk Project and identify pathways of risk and resilience, consistent with the principles of developmental psychopathology and social-contextual models of health. Consequently, individual behaviour and health outcomes were studied in context, using a prospective,



longitudinal design that is sensitive to developmental trajectories. Furthermore, multiple measures and multiple outcomes were studied, in an effort to capture both homotypic and heterotypic sequelae of childhood aggression and withdrawal across two generations.

#### *Dissertation Studies*

Two studies were conducted that attempted to identify cascades of health-risk within these at-risk families. Mothers were visited in their homes at two time points: when offspring were preschool age (Study 1) and at the cusp of puberty (Study 2). In the first study, mother-participants were asked about their past and current health-risk behaviour, as well as current health problems experienced by them and their offspring. In the second study mother-participants were once again asked about their health, and both mother-participants as well as mothers who were female partners of father-participants were asked about the health of the target children. Moreover, several new elements were incorporated into this study. Mothers were asked not only about their health-risk, but also about their positive health habits (e.g., nutrition, dental care). Health habit information was collected for target offspring, and mothers were asked about their children's use of developmental and medical services.

#### *Study 1 (in press, Journal of Developmental and Behavioral Pediatrics)*

The goal of the first study was to examine the relations among Concordia project mothers' aggression and withdrawal, high-risk behaviour during adolescence, transition to motherhood, and resulting health outcomes in preschool offspring. This is one of the first studies of longterm physical health outcomes in aggressive and withdrawn girls that have been followed prospectively from childhood into adulthood and parenthood. As mothers in the Concordia project mature into middle adulthood, early risk factors for

cardiovascular disease (e.g., lifetime smoking, obesity) may become apparent. Moreover, many health problems first appear by preschool age: for example, eighty percent of all childhood asthma has its onset by age 3 (Weiss, 1998). Therefore, it is important to examine the impact of maternal childhood risk status on very early health outcomes to help determine if there are visible effects of maternal aggression or withdrawal, long before the cumulative effects of chronic family poverty and parenting stress may have taken a toll on family health. Strengths of this study include the longitudinal examination of physical health in aggressive girls, the developmental timing of the study, and its usefulness to policymakers concerned with early and effective interventions.

*Study 2 (manuscript to be submitted)*

The second study was conducted when Concordia project offspring were in middle childhood, and added several new components to the body of literature on the health of these at-risk families. Continuity of health-risk related to parental childhood aggression and withdrawal was examined in both generations, and wellness behaviours such as preventative dental care and good nutrition were also examined as factors in family health. Moreover, mothers were asked about their children's use of medical (e.g., paediatrician) and developmental (e.g., child psychologist) services, which is an important component of health behaviour. Therefore, Study 2 assessed the role of parental childhood risk status in perpetuating health-risk in these families who were vulnerable to health problems because of psychosocial risk, health-risk behaviours demonstrated in earlier studies, lack of attention to preventative care, and low SES. Consequently, this study makes an original contribution by virtue of its breadth of descriptive information on health behaviour in individuals with childhood histories of

aggression and withdrawal, and the link between positive and negative health behaviours and health outcomes in two generations.

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From risky behaviour to health risk: Continuity across two generations

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## ABSTRACT

The purpose of this study was to determine the impact of childhood aggression and social withdrawal on adolescent health-risk behaviours and adult health outcomes, and to examine the transfer of health-risk to preschool offspring. This was a prospective, longitudinal and inter-generational study of 114 mothers from disadvantaged neighborhoods who were identified in childhood as being highly aggressive and/or withdrawn, or low on these two behavioural risk dimensions, and their preschool offspring aged 1- 6 years old. Health histories of mothers (adolescent health-risk behaviour, health during pregnancy, current symptoms) and target children were taken during structured interviews conducted at home. Regression analyses tested the relationship between maternal childhood risk status and subsequent health outcomes, and these were followed by structural equation modeling of a proposed inter-generational pathway. Maternal childhood aggression predicted current health-risk behaviours (e.g., daily cigarette smoking), whereas maternal childhood social withdrawal was not associated with maternal health-risk at the time of testing. Mothers who were high on both aggression and withdrawal were more likely to engage in adolescent health-risk behaviour, which was directly related to health problems in preschoolers (even after controlling for covariates such as neonatal health status and gender). In sum, there are distinct health trajectories for women who are highly aggressive and socially withdrawn in childhood, with implications for women's longterm health. Specifically, aggression in girls is likely to lead to health-risk behaviours that may also place the next generation at risk for pediatric illness. Results are interpreted in terms of the health-hostility link, best known in adult men, as well as inter-generational models.

Although the overall link between lifestyle and illness is widely acknowledged in the field of public health, there is a dearth of studies on the relation between specific behavioural patterns and subsequent health outcomes. This becomes especially salient when compared to the extensive research based on the biomedical model focusing on infectious disease.<sup>1</sup> Results from investigations to date suggest that multiple health-risk behaviours tend to cluster into a syndrome in the same persons<sup>2-6</sup> and that individuals who engage in multiple health-risk behaviours are also more likely to have interpersonal difficulties originating in early maladaptive social interactions at home and in school.<sup>3, 7-8</sup> There is also increasing evidence that abusive or dysfunctional childhoods may themselves promote adult pathology, contributing to outcomes such as ischemic heart disease and cancer.<sup>9</sup> Consequently, various investigators<sup>10</sup> have proposed an integrated biobehavioural profile linking early psychosocial risk to cumulating risk for both mental and physical health problems across the lifespan.

Structural constraints imposed by SES and education limit individuals' choices and may lead to unhealthy lifestyles<sup>11</sup> but psychosocial risk is also important in explaining individual differences in approach and avoidance of health-risk and prevention. Socially disadvantaged people may have less autonomy to choose healthy behaviours due to unequal access to health information and resources, enjoy less control over sleeping hours and food choices, and are more likely to live in environments where unhealthy eating, smoking and drinking are normative.<sup>12-13</sup> Nevertheless, unhealthy behaviours cannot completely explain the SES-health gradient<sup>14</sup> and not all individuals living in disadvantaged environments engage in health-risk behaviours to the same extent. Only longitudinal research using participants from similar disadvantaged milieus

can determine the relationship of behaviour to health-risk lifestyle, as well as the periods of greatest risk and phases most susceptible to change across the lifespan.<sup>15</sup>

Chassin and Ritter's model of vulnerability to substance abuse<sup>16</sup> is useful to our current investigation because health-risk behaviours such as smoking are strongly associated with substance abuse. One pathway validated by research links childhood externalizing behaviour to substance abuse in adolescence and adulthood.<sup>17-20</sup> A second pathway involves negative affect, which may lead adolescents in deviant peer groups to regulate their emotions by using and abusing nicotine, alcohol and illegal drugs.<sup>9-10</sup> Finally, there is evidence that there may be a third pathway in which a subset of adolescents are predisposed to substance abuse because they are physiologically more sensitive to the reinforcing properties of drugs.<sup>16</sup> Although there is evidence that both individual differences as well as different family environments lead to health-risk behaviours, additional prospective longitudinal studies are warranted in order to elucidate the pathways from childhood behaviour to adulthood that are more salient under various conditions and in specific populations.

Behavioural characteristics associated with health-risk behaviours include hostility, lack of self-control, impulsivity, tension, and carelessness.<sup>21-24</sup> There are numerous studies linking hostility and aggression to health-impairing behaviour patterns<sup>2, 25-26</sup> and there is conclusive evidence that conduct problems and aggression in childhood are often manifested as risk-taking behaviours by early adolescence in both boys and girls.<sup>2,7,15, 27-28</sup> Finally, in their meta-analysis on the link between hostility and physical health, Miller and his associates<sup>25</sup> found both direct and indirect pathways between

hostility and negative health outcomes in adults, albeit there was a lack of women in most of the studies included in their sample.

Aggression in girls and women has only recently become a focus of research, yet there is already empirical support for a similar pattern of health risk behaviour in more aggressive females.<sup>15, 28-29</sup> Girls with conduct disorder are often characterized by negative health habits such as poor diet, lack of sleep, and risk-taking behaviours (smoking, excessive use of alcohol, and substance abuse) as well as poorer overall health and inadequate adherence to medical regimens.<sup>26-27</sup> In three major longitudinal studies on adolescent girls, there was evidence that high levels of aggression in girls predicted high-risk sexual behaviour in adolescence and continuing negative fertility patterns in adulthood.<sup>15, 27-28</sup> Taken together, these results suggest that childhood aggression in girls is linked to health-risk in adolescence and early adulthood, with implications for physical health over the lifespan.

However, at least half of the children who experience early social difficulties are not aggressive, but shy or socially reticent.<sup>30</sup> There is evidence to suggest that social withdrawal, unlike aggression, may actually be protective for certain health-risk behaviours, primarily through lack of association with deviant peers. For example, in the prospective, longitudinal Terman study of gifted children,<sup>31</sup> "Termites" who were more sociable as children were somewhat more likely to grow up to smoke and drink whereas their less outgoing peers did not partake in these health-risk behaviours that often have a social element.<sup>32</sup> Anxious and depressed girls from the Dunedin study reported more medical problems between age 15 and 21, yet neither group appeared to have a substance abuse problem or adverse reproductive health outcomes.<sup>27</sup> In contrast to highly



aggressive children, these findings suggest that social withdrawal may be more directly related to physical health or symptom reporting, rather than moderated by health-risk behaviour.

As children with behaviour problems that predispose them to health problems reach physical maturity, they become parents who may subsequently transfer their health risk to the next generation.<sup>29, 33-37</sup> Fagot and colleagues<sup>33</sup> examined boys from high-crime areas (Oregon Youth Study), and found that those boys who became teenage fathers had offspring who were significantly more likely to suffer from health problems. An early study of reproductive outcomes in the Concordia study 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 gynaecological problems, sexually-transmitted diseases (STDs) and teenage pregnancy.<sup>28</sup> Subsequent research on some of these high-risk mothers' school-age offspring suggest that their children are at risk for multiple negative outcomes including poor health and low academic achievement.<sup>29, 35-38</sup>

There are many potential processes for the inter-generational transmission of health risk, and the next step in our research is identifying the specific processes linking childhood aggression and withdrawal to risk for negative health outcomes in the next generation. Social learning theory suggests that children who are consistently exposed to health-risk behaviours such as poor eating, smoking and drinking are more likely to engage in those behaviours themselves.<sup>11</sup> Furthermore, lower education and conditions of poverty in adulthood (both predicted by childhood aggression and withdrawal in the Concordia sample) may help perpetuate negative behaviours modeled at home.<sup>29</sup> Social contextual models of adolescent health risk suggest that parents indirectly influence

adolescent risk-taking behaviours by influencing their academic success and association with deviant peers.<sup>7, 39-42</sup> Wickrama and his colleagues<sup>11</sup> found that parents' health-risk lifestyles mediated the effect of SES on adolescents' lifestyles and furthermore, that health-risk behaviours were transmitted inter-generationally at both the factor level as well as the unique component level. Therefore, there is empirical support for both social learning and structural-constraint models of health-risk behaviours.

Repetti and her colleagues<sup>10</sup> have suggested that at-risk families initiate and sustain biologically dysregulated responses to stress that accumulate and subsequently predispose children to poor health over the lifespan. Animal models of psychosocial risk have demonstrated that maternal deprivation leads to increased stress hormone production in rodents<sup>43-44</sup> and similar shifts in the basal and response-dependent levels of stress hormones as well as aggressive behaviour, increased preference for alcohol, and decreased affiliative behaviour in primates.<sup>45-48</sup> Support for a cumulative risk hypothesis and inter-generational effects in humans comes from a 30-year longitudinal study of poor Hawaiian families in which pre- and peri-natal complications were only predictive of negative developmental outcomes in combination with chronic poverty, parental psychopathology, or persistently poor parenting.<sup>49-50</sup> Preliminary evidence from our own research comes from a study of diurnal cortisol in a subsample ( $n=36$ ) of preschool offspring. Ben-Dat Fisher and her colleagues (under revision) found that mothers who were socially withdrawn as children showed dysregulated patterns of diurnal cortisol, particularly lower morning cortisol values. A similar dysregulated pattern was observed in the preschoolers of mothers who smoked daily, suggesting a separate trajectory of

health-risk for the offspring of aggressive mothers via exposure to second-hand smoke, since aggression has been linked to smoking in this sample.<sup>29</sup>

The present study was guided by the inter-generational model of risk transmission<sup>15, 51-53</sup> in which psychosocial problems in childhood are expected to affect individuals throughout the lifespan, possibly having a negative impact on their physical health and jeopardizing the well-being of their young offspring. The original investigation was designed to examine the effects of behavioural styles characterized by aggression and social withdrawal on life-course trajectories. In this phase of the study, the primary objective was to examine health-risk pathways from childhood psychosocial risk to adolescence and then motherhood. Based on Chassin and Ritter's model of pathways to substance abuse,<sup>16</sup> the well-documented hostility-health link in males,<sup>25</sup> and earlier findings from the Concordia study,<sup>28-29,35-38</sup> we expected young mothers who had been highly aggressive or both aggressive and socially withdrawn to be at the most risk for health-risk behaviour in adolescence, with continuity into adulthood and motherhood. We were also interested in examining whether maternal childhood aggression and withdrawal predicted pregnancy problems and neonatal health. Although we had no specific hypotheses about health outcomes for mothers who were highly withdrawn, we expected that they might experience more health problems over the lifespan, as suggested by the findings from the Dunedin study<sup>27</sup> as well as the dysregulated cortisol patterns described above (Ben-Dat Fisher et al., under revision).

The second part of the study examined the links among maternal childhood risk status, neonatal health status, and health outcomes for preschool offspring in disadvantaged families. In general, based on previous results from the Concordia

project,<sup>29, 35-37</sup> we expected the children of highly aggressive or socially withdrawn mothers to fare poorly compared to mothers who were neither aggressive nor withdrawn in childhood. In particular, it was hypothesized that mothers who engaged in adolescent risk-taking behaviours would have offspring with more preschool health problems. However, maternal education and family income, neonatal health status, and child gender (specifically, being born a girl) were all expected to be protective factors. Finally, in order to clarify the trajectories of risk and resilience over two generations in these at-risk families, a path analysis was conducted. It was hypothesized that the effect of maternal childhood risk status on mother and child health outcomes 25 years later would be mediated by more proximal variables such as SES, maternal health-risk behaviour such as smoking, and offspring's health at birth.

## METHOD

Identification of the original sample. In the school years 1976-1977 and 1977-1978, the Concordia longitudinal study began with the screening of 4,109 children from the French language school board in regular Grade 1, 4, and 7 classes. These children lived in lower SES, inner-city neighborhoods of Montreal, Quebec, Canada. The children were screened along dimensions of aggression and withdrawal using a peer-nomination technique translated into French (Pupil Evaluation Inventory; PEI).<sup>54</sup> The PEI is a 34-item questionnaire that loads onto 3 factors: Aggression, Withdrawal, and Likability. Children were asked to nominate up to 4 boys and (separately) 4 girls who best matched each item on the PEI. Percentile cutoffs were used to establish which children had received extreme scores on Aggression and Withdrawal, compared to age- and gender-matched peers. The present study focused exclusively on the original female participants. Girls who scored above the 95th percentile on Aggression and below the 75th percentile on Withdrawal, relative to same-sex classmates, were classified as aggressive; the reverse criteria were used to select highly withdrawn girls. As a function of the low probability of achieving extreme scores on both dimensions, more liberal criteria were used to identify a sufficient number of children who were both aggressive and socially withdrawn. Z scores greater than or equal to the 75th percentile on both Aggression and Withdrawal were criteria for this classification. Finally age-matched children for whom z scores on the Aggression and Withdrawal scales fell in the average range (i.e., between the 25th and 75th percentiles) were selected for comparison. For a more extensive description of the original methodology, see Schwartzman et al, 1985.<sup>55</sup>

Current sample. Mothers were recruited within the Concordia study if they had a biological child between the ages of 1-6 years old living with them, and they lived within one hour (by car) of the metropolitan Montreal area. The refusal rate was 17% for those mothers who met the above criteria, for a participating sample totaling 114 families. Families were contacted by telephone and, if they agreed to participate, completed a demographic questionnaire and two home visits were scheduled. Family prestige scores<sup>56</sup> in the maternal family of origin (i.e., in mothers' childhood) ranged from 175-661, with an average of 379.83 (SD= 104.07), which corresponds to the following types of jobs: receptionist, barber, nurse's aide. At the time of testing, mothers' average age was 30.33 (SD =2.58; range: 25.63-34.44) and average age of target offspring was 3.48 years old (SD= 1.58; range= 1.01- 6.04). There were 49 sons (43%) and 65 daughters (57%) in the current study.

Mothers had an average of 11.64 years (SD=2.35) of formal education, which is equivalent to a high school diploma (range: 5-17 years). A quarter of the sample ( $n=44$ ) were high-school dropouts. Current annual family income ranged from \$8,430 to \$152,885, with a mean of \$38,216 Canadian, (SD = \$24,143) which corresponds to roughly \$29,345 US. This mean family income is well below both Canadian (\$54,583) and Quebec (\$49,261) average family incomes for the same period.<sup>57</sup> A substantial minority (21%) of families in this sample were receiving government assistance (welfare) and 43% had incomes below the "poverty line," calculated using Health Canada's Low Income Cut-Off (e.g., LICO) which takes into account family size as well as the population of the community of residence.<sup>58</sup> The wide range of income provided

sufficient variability to examine behavioural risk and resilience across a broad SES spectrum.

Procedure. During a home visit, mothers gave written informed consent, completed a battery of questionnaires, and participated in mother-child observations. For the purposes of this study, mothers were interviewed about their past and present health and a complete medical history was taken for the target child. These structured interviews were developed for the purposes of this study in order to collect information on maternal and child health. Questions were straightforward and did not rely on inference (e.g., do you currently smoke? At what age did you start smoking daily? How tall are you and how much do you weigh? Did your obstetrician tell you that you suffered from gestational diabetes during your pregnancy? Does your child have epilepsy?). New mothers in the province of Quebec are released from hospital with an immunization history booklet for their newborn which includes neonatal measurements (e.g., length, weight, and head circumference) as well as APGAR scores and immunizations, so these data were recorded directly into the questionnaire. Therefore, although the child health data is based on maternal report, we can be fairly confident of the accuracy of certain objective measures of neonatal health status. We also relied on self-report for maternal health-risk behaviours. However, studies have shown that self-report for smoking, for example, is consistent with serum and urinary levels of cotinine.<sup>59-61</sup>

Health data were entered into the database using a coding scheme developed specifically for each interview: past maternal health-risk behaviour, current maternal health problems, obstetric history for the target child, and medical history for the preschooler. After data entry, each line was carefully screened for accuracy and

descriptive analyses (SPSS)<sup>62</sup> were conducted in order to examine the distribution of scores and to double-check for accuracy. A z-score for skewness was calculated manually by dividing the Skew by the SE Skew for each variable: values higher than 1.96 or lower than -1.96 were considered skewed, and values higher than 3.00 or lower than -3.00 were considered skewed enough to warrant transformation before inclusion in analyses. Next, summary variables were created to be used as predictors and criteria in a set of regression analyses designed to address our hypotheses. An adolescent health-risk index (described in detail below) was created using variables from the maternal health-risk behaviour interview. Problems experienced during pregnancy with the target child, as reported in the obstetric interview, were used to create a dichotomous outcome. Number of cigarettes smoked daily and maternal height and weight information (used to calculate BMI in non-pregnant and non-nursing mothers) derived from the current maternal health interview. Finally, a sum score for child health problems and a dichotomous outcome for respiratory problems were created using data from the child medical history interview.



## RESULTS

Intercorrelations among predictors and health outcomes in both mothers and preschool offspring are presented in Table 1. Multiple regression analysis (SPSS)<sup>62</sup> was used in order to determine whether maternal childhood risk status predicted: (1) adolescent health-risk behaviours and prenatal health, (2) current maternal health-risk (e.g., smoking and overweight), and (3) health in preschool offspring. Only two of the variables were positively skewed (family income and total number of child illnesses), and a square root transformation was used to balance the distributions of these variables before inclusion in regression analyses. Due to the sample size, the number of possible predictors included in each analysis was limited. One method used to reduce the number of predictors was the creation of risk indices and factor scores combining theoretically related variables. For example, several maternal adolescent risk behaviours were used to create a composite risk behaviour index, and data on neonatal health status were entered into a principal components analysis in order to create a factor score for those measures.

Sample size was maximized in hierarchical regression analyses by using mothers' childhood aggression and withdrawal scores as dimensions, rather than categorical predictors. Variable entry in the regressions was chronological, so that maternal childhood risk status was in the first step, followed by demographic variables such as maternal education, and then more proximal factors such as neonatal health status. An interaction term for maternal childhood Aggression x Withdrawal that is the cross product of the original aggression and withdrawal scores was always entered into the last step, and then removed if it was not a significant predictor. Logistic regressions were used for dichotomous outcomes such as presence of a problem during pregnancy or

maternal overweight, whereas hierarchical regressions were used for continuous outcome variables such as number of cigarettes smoked daily by mothers. The regression analyses are presented in chronological order of outcomes, starting with maternal adolescent health risk, followed by prenatal health, and then current maternal smoking and health of offspring. Finally, structural equation modeling<sup>63</sup> was utilized in order to assess a conceptual path model for the transfer of health risk from one generation to the next.

Maternal Adolescent Risk. Information obtained during interviews with the mothers was used to identify extreme groups for specific adolescent risk-taking behaviours that were chosen based on previous studies of early anti-social behaviour<sup>2,7, 15, 27-29</sup>. These included regular use of cigarettes by age 14 (8.8%), heavy use of alcohol before age 18 (11.4%), regular recreational drug use before age 18 (20%), and becoming a teenage mother (8.8%). Each of these adolescent risk behaviours places the individual at risk for adult pathology. The inter-correlations among maternal adolescent health-risk behaviours in the current study are presented in Table 2.

One-third of the mothers ( $n=38$ ) had at least one of these risk factors, and presence/absence of adolescent risk was used as the outcome measure for a logistic regression. Maternal childhood Aggression and maternal childhood Withdrawal were entered in a first step, occupational prestige in maternal family of origin in a second step and finally, the interaction term for maternal childhood Aggression and Withdrawal. As illustrated by section A of Table 3, the interaction of maternal childhood Aggression and social Withdrawal was the only significant predictor of maternal adolescent risk behaviour (Odds Ratio=1.80, Wald = 5.01,  $p < .05$ ). For purposes of illustration and to isolate the source of this interaction, Aggression and Withdrawal scores were used to

graph the sample into low, middle and high along these childhood risk dimensions. As depicted in Figure 1, mothers who were both highly aggressive and highly withdrawn in childhood were more likely to have engaged in adolescent risk behaviour, after controlling for SES. In contrast to 31% of mothers who were low on childhood aggression and withdrawal, 28% of mothers who were strictly aggressive (risk ratio=0.73, *ns*), and 11% of mothers who were only socially withdrawn (risk ratio=0.19,  $p < .05$ ), almost 70% of mothers who scored in the top third of both psychosocial risk dimensions (aggression and withdrawal) as children regularly used cigarettes, alcohol or drugs, or became mothers at a very early age (risk ratio= 6.01,  $p < .001$ ). In other words, being both highly aggressive and withdrawn as children placed these women at six times as much risk for adolescent health-risk behaviour than women who were low on just one or both childhood risk dimensions.

Maternal Prenatal Health. Mothers were asked about problems they experienced during pregnancy with the target child and four risk factors were identified: bleeding during pregnancy (25%), gestational diabetes (5%), fever higher than 100F (5%), and abnormal ultrasound results (5%). The relatively low frequencies for each separate pregnancy problem reported did not allow for regression analysis on each outcome. Therefore, a risk index was created in order to examine the extent to which the presence of any problems during pregnancy (one-third of mothers experienced at least one problem) was related to maternal childhood risk status using logistic regression. Maternal childhood Aggression and social Withdrawal were entered first, followed by maternal education and current family income. As depicted in section B of Table 3, mothers who were socially withdrawn as children tended to be more likely to experience a problem during their

pregnancy (Odds Ratio=1.44, Wald=2.99,  $p < .08$ ). Although pregnancy problems were not common and therefore the power to detect differences was low, maternal childhood withdrawal approached statistical significance in both the initial step with maternal childhood risk status as well as in the final equation in which demographic variables were included as controls.

Current Maternal Health-Risks. Almost a third of Canadian women (27-31%) aged 25-34 smoke cigarettes daily,<sup>64-65</sup> and 39% of the mothers in our sample reported daily smoking<sup>1</sup>. As there is a well-known dose/response relationship for the effect of tobacco on health, number of cigarettes smoked daily was used as the criterion in a hierarchical regression. Maternal childhood Aggression and Withdrawal were entered in a first step, followed by maternal education and current family income, established protective factors. As depicted in section A of Table 4, maternal childhood Aggression directly predicted the number of cigarettes smoked daily ( $\beta = .23$ ,  $t=2.56$ ,  $p < .01$ ), even after controlling for maternal education ( $\beta = -.32$ ,  $t=-3.30$ ,  $p < .001$ ) which was a significant negative predictor of maternal smoking. Mothers of preschoolers who were highly aggressive as girls were likely to smoke more cigarettes daily twenty years later, which has implications for both their own future health and the health of their young offspring.

According to the Heart and Stroke Foundation of Canada,<sup>65</sup> 18% of all Canadian women in this age range are overweight and the women in our sample were no exception:

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<sup>a</sup>Although we asked mothers about smoking during pregnancy, this was highly correlated with current daily smoking ( $r = .78$ ), and the contemporary variable was deemed more reliable because it was not retrospective and was associated with less stigma than smoking during pregnancy.

23% of mothers who were not pregnant or nursing had a body mass index (BMI) of 28 or higher. A logistic regression was performed in order to investigate psychosocial risk factors for overweight (as a dichotomous outcome). Although maternal education and family income were initially included in the analysis, these variables were removed because they did not add predictive variance to the equation. Maternal childhood risk status was entered in the first step, followed by current maternal smoking and finally, the interaction term for maternal childhood Aggression x Withdrawal. As portrayed in Section B of Table 4, only the interaction term of Aggression and Withdrawal (Wald= 3.17, Odds Ratio= 1.53,  $p < .07$ ) appeared to be associated with this well-established health risk factor. Although the final equation was not statistically significant, Figure 2 was included to illustrate the nature of the interaction between maternal childhood risk status, which closely approximates the adolescent risk curve in Figure 1. Almost half of all mothers who were high on both Aggression and Withdrawal as children were currently overweight, which is clinically significant. Taken together with the finding that these same mothers are at the highest risk for adolescent risk-taking, a picture begins to emerge of a childhood behavioural profile that places girls at high risk for health problems such as diabetes and stroke in adulthood.

Health of Preschool Offspring. Mothers were asked if target offspring had suffered from a health problem using a checklist. Only the following health problems had occurred in this sample: anemia (2%), skin problems (11%), hay fever (1%), other allergies (6%), chronic bronchitis or persistent cough (8%), asthma (12%), epilepsy (1%), kidney problems (2%), digestive problems (3%), thyroid problems (1%), headaches or migraines (1%), and otitis (26%). The total number of illnesses in offspring was investigated using

hierarchical regression, shown in section A of Table 5. Maternal childhood risk status was entered first, followed by two maternal health-risk behaviours: adolescent risk, and current smoking. In the next step, two child health-risk variables were entered: child gender and a factor score for neonatal health. This factor score was created using principal components analysis of objective measures of neonatal health status recorded in the child's immunization record, accounting for 64% of the variance in this analysis, Eigenvalue= 2.58. The following variables loaded well onto this factor: birthweight (.76), length at birth (.74), head circumference (.45), and weeks gestation (.63). Current family income was the predictor entered in the final step. Maternal adolescent risk-taking behaviour ( $\beta = .26$ ,  $t=2.83$ ,  $p < .01$ ) emerged as a risk factor for health in preschool offspring, whereas positive neonatal health status ( $\beta = -.24$ ,  $t=-2.76$ ,  $p < .01$ ) acted as a buffer against subsequent childhood illness. Consistent with the literature,<sup>66-67</sup> more illnesses were reported for sons than for daughters ( $\beta = -.18$ ,  $t=-2.02$ ,  $p < .05$ ). What is most striking about these results is that maternal adolescent risk-taking behaviour predicted health problems in offspring over a decade later, even after controlling for neonatal health and current levels of environmental exposure to maternal smoking.

The only specific category of childhood illness that occurred with enough frequency (28% of offspring) to justify a separate regression analysis was upper respiratory tract problems (e.g., allergies, asthma, frequent bronchitis, persistent cough). Childhood respiratory problems were treated as a dichotomous outcome in a logistic regression with maternal childhood risk status in a first step, maternal adolescent risk-taking behaviour and smoking in a second step, maternal education and family income in a third step, and child's gender and neonatal health status in a fourth step. As depicted in

section B of Table 5, current maternal smoking (Wald = 5.91, Odds Ratio= 1.07,  $p < .01$ ), child gender (Wald = 4.76, Odds Ratio= 0.35,  $p < .05$ ) and neonatal health status (Wald = 5.70, Odds Ratio = 0.55,  $p < .05$ ) were all significant predictors of respiratory problems in early childhood. Contrary to the results for overall early childhood illness, maternal adolescent risk-taking was not a significant predictor of respiratory illness. Prenatal effects on health were further controlled statistically by including neonatal health status in the analysis. Current maternal smoking was a risk factor for respiratory problems in offspring, even after controlling for established predictors such as neonatal health status and gender, a finding that is strongly supported in the literature on second-hand smoke.<sup>68-</sup>

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Model predicting inter-generational transfer of risk. A path model<sup>63</sup> was conducted to test the fit of a conceptual model of inter-generational risk to physical health in offspring. Due to the participant-to-path ratio demanded by structural equation modeling, we included only the most highly correlated and theoretically relevant predictors in the following model. The fit of the overall model for upper respiratory problems in target offspring was good: CFI= 1.00, RMSEA= 0.00 and  $\chi^2 = 10.00$  (13,  $n = 114$ ),  $p < .69$ . As depicted in Figure 3, maternal childhood behavioural risk status was linked to offspring's respiratory health through current cigarette smoking ( $\beta = .23$ ) as well as through educational attainment. As was the case for overall childhood illnesses, children who were more fragile at birth ( $\beta = -.25$ ), as well as boys ( $\beta = -.21$ ), were more susceptible to upper respiratory illness in early childhood. In sum, although there were no direct pathways from maternal childhood risk status to respiratory illness in preschool offspring, both childhood Aggression and Withdrawal are linked to health-risk factors

(such as cigarette smoking and school failure) that become apparent by adolescence and place the next generation at risk for negative health outcomes.



## DISCUSSION

Consistent with our hypotheses and with previous findings from the Concordia project, mothers who were both highly aggressive and socially withdrawn as children were at the highest risk for engaging in adolescent health-risk behaviour such as smoking, drinking, taking drugs or becoming a teenage mother. Involvement in adolescent health-risk behaviours was correlated with current maternal smoking, and directly predicted pediatric health of preschool offspring. In contrast, mothers who were socially withdrawn but not aggressive in childhood did not appear to place their children at risk for poor health outcomes due to negative health behaviours that commenced in adolescence. However, maternal childhood withdrawal was associated with lower educational attainment and may be related to health problems during pregnancy. Maternal childhood aggression predicted lower levels of educational attainment as well as more daily cigarette smoking. Conversely, maternal aggression was negatively related to maternal reports of child health, which may be interpreted as a reluctance on the part of these women to report that their child had suffered any health problems during the preschool years. Taken together, these findings may provide additional support for a biobehavioural model linking early behavioural difficulties to cumulating risk for physical health problems across the lifespan.

Maternal childhood psychosocial risk status may have a lasting adverse impact on the health of these women as well as their families. Based on the present findings, there is preliminary evidence for both direct and indirect transfer of risk to the next generation, and support for the theory that there may be distinct trajectories for the health and future families of girls who are aggressive compared to girls who are socially withdrawn.

Although this study used a correlational design and therefore cannot address issues of causality, it is a unique prospective and longitudinal study of women's childhood aggression and withdrawal on health-risk later in life. Whereas maternal childhood withdrawal may be related to a difficult transition to motherhood, with implications for the early mother-child relationship and parenting stress, childhood aggression appears to be associated with daily cigarette smoking, which directly places offspring at environmental risk.

These results are consistent with previous findings from the Concordia project, in which there were distinct trajectories for the offspring of women who were withdrawn and aggressive in childhood.<sup>29, 35-38</sup> Earlier studies concluded that individuals high on both childhood risk dimensions may face the greatest risk<sup>28-29, 37-38</sup>, and there was evidence of this cumulative risk in the present study of physical health outcomes. For example, almost 70% of the aggressive-withdrawn mothers engaged in at least one of the adolescent risk-taking behaviours examined, and almost half of these aggressive-withdrawn mothers were overweight at the time of testing. In this wave of the study, both maternal adolescent health-risk behaviour as well as health of offspring at birth were predictors of health in early childhood.

The mothers from this study came from disadvantaged backgrounds in inner-city Montreal and were raised with essentially similar structural constraints (SES, educational expectations) on their health lifestyles. However, important individual differences in their childhood behaviour appear to have oriented them towards different health behaviours by the time they reached adolescence and adulthood, with implications for their health-risk as adult women. Consistent with the health-risk and hostility literature (previously

focused on male outcomes), aggressive behaviour in girls was linked to tobacco use, by far the most prominent contributor to behavioural mortality in developed countries<sup>70</sup>.

Contrary to the authors' expectations based on the literature<sup>16-20, 23-26</sup>, the aggression dimension alone did not predict the combined adolescent risk index, which included additional health behaviours. However, a combination of childhood aggression and social withdrawal predicted both adolescent and current health-risk (e.g., overweight), which is consistent with previous Concordia study findings indicating that women high on both childhood risk dimensions are most likely to be at health-risk by adolescence, with increased gynecological problems, early use of birth control, and teenage pregnancy.<sup>28, 36</sup> These results partially support the first and second pathways to substance abuse in Chassin and Ritter's model<sup>16</sup>, in which childhood externalizing problems plus unregulated negative affect lead to adolescent alcohol and substance abuse. Moreover, we suggest that the long-term consequences of these early behavioural styles are not only adolescent health-risk behaviours and poorer health in adulthood, but increased risk for the health of the next generation.

Education and family income were included as control variables, since SES has been demonstrated to be crucial in determining physical health outcomes throughout modern history (documented as far back as the 15<sup>th</sup> century) and in many populations.<sup>14</sup> Consistent with the literature, maternal education was protective against maternal daily smoking, so that mothers who were more educated smoked significantly less cigarettes daily. In contrast, family income was not a predictor of adolescent health risk behaviours, perinatal health, or health in either the mother or preschool child. However, SES-health differentials are most apparent in countries with strong material inequalities such as the

USA,<sup>14</sup> and may be less apparent in countries like Canada that provide all citizens with universal health care and a relatively high standard of living. Family income may also become a more important predictor of health and development in Canadian children after they start elementary school<sup>71</sup>, when the effects of residential segregation intensify (whereby SES determines residence in neighborhoods with higher-quality schools and medical facilities). Finally, it may be that the effects of social class are stronger than the effects of family income (some professionals may earn similar wages as several working class occupations), as has been suggested by some authors<sup>72</sup>, and that maternal education is simply tapping into “working class values” and neighborhood residence better than the family income variable. This will be investigated in future studies, when it will be possible to evaluate the long-term effects of poverty and neighborhood membership on child health and access to medical care and other services within this high-risk sample.

Consistent with the health-risk and hostility, aggressive behaviour in girls literature, when combined with high levels of social withdrawal, was linked to health-risk behaviours such as smoking and use of controlled substances in adolescence. Tobacco use is the number one risk factor for the top three causes of death in Canada<sup>73</sup>, therefore it is important to identify early behaviours that may place individuals at greater risk for smoking. Moreover, over half of the mothers who were highly aggressive and withdrawn as children were overweight by the time of the present study. Health-risk indicators such as cigarette smoking and being overweight not only place these women at greater risk for early onset of lifestyle health problems such as cardiovascular disease, but also may contribute to a dangerous environment for the next generation. Wong and her colleagues<sup>74</sup> compare the family structure to a bird’s nest that holds in and allows risk to

accumulate, perpetuating continuity within families. We think that offspring of aggressive mothers are vulnerable to negative health outcomes from at least two sources: first, directly from the cumulative effects of secondhand smoke; and second, through the effects of social learning whereby these youngsters learn to emulate their parents' negative health habits and maladaptive coping styles. And since smokers are also more likely to have partners and family members who smoke,<sup>75-76</sup> this has serious implications regarding the snowballing effects of both secondhand smoke and modelling of health behaviours such as smoking and poor nutrition within the homes of mothers who were aggressive as girls.

In these results, the offspring of withdrawn mothers do not appear to be at increased risk for health problems, although the link between maternal childhood risk status and health outcomes may be indirect, or may involve a mechanism that was not tested at this wave of the Concordia study. Women who were socially withdrawn as children were less likely to engage in health-risk behaviours such as smoking, which is not surprising considering previous studies linking sociability to health-risk behaviours<sup>31,32</sup>, and demonstrating that internalizing problems in girls are not linked to substance abuse<sup>27</sup>. Of more concern is that women who had been highly withdrawn as children tended to report more health problems during pregnancy. We hypothesize that these results suggest a more difficult transition to motherhood for girls who were highly socially withdrawn in childhood.

Repetti et al<sup>10</sup> and McEwen and Seeman<sup>77</sup> speak of “cascades” of risk within certain families, in which both genetic vulnerabilities and adverse early experiences predispose individuals to biologically and behaviourally over-react to events throughout

their lives. It may be that the effects of maternal social withdrawal on parenting and health outcomes are cumulative and could become more apparent over time, or may reveal themselves only under stressful conditions or critical life transitions such as divorce, school entry or the health problems of middle-age. Although the current study was not designed to examine the mediating effects of stress or stressful life events on health outcomes, the preliminary cortisol data on a subsample of these families in the Concordia project (Ben-Dat Fisher et al., unpublished data) suggest that women who are highly withdrawn as children may be biologically vulnerable. Further studies using both physiological and psychological measures on a larger sample of Concordia women will help determine if mothers with childhood histories of social withdrawal are at greater risk for health problems associated with the wear and tear of stress over the lifespan as they enter middle-age.

One implication of these results is that pregnancy may be an appropriate target period for interventions with women who are socially withdrawn, in order to provide additional social support and prepare them for this life transition. Indeed, several researchers<sup>78</sup> have suggested that pregnancy may be the ideal time for preventative intervention programs. There is also concern that highly withdrawn women may avoid the social interaction required to seek prompt medical attention and services for themselves and their young children, and that they lack the social skills and motivation to be successful advocates for their family's health concerns. Future studies on families from the Concordia project will examine service usage in order to specifically address this issue.

Although the present study makes an important contribution to the research on inter-generational transfer of risk, with implications for physical health issues in high-risk families, several limitations need to be addressed in future research. One of the limitations of the present study was a relatively small sample size, which may have resulted in relatively low power to detect significant effects. In order to maximize power to detect real effects, a regression approach was utilized in order to treat aggression and withdrawal as dimensions. Another limitation of this study is its reliance on maternal report. However, findings from several studies<sup>79-81</sup> suggest that self-ratings of health may be even better predictors of health status and mortality than medical records or current diagnoses. Medical billing records are being obtained for a much larger sample of participants in the next phase of the Concordia study, in order to address reliability issues and to answer new questions about access and use of specific medical services. Despite the limitations of the current study, these results on high-risk women add to the body of research on health and hostility in men, and warrant further investigation into the link between childhood behaviour problems and the transfer of health-risk to preschool offspring.

Taken together, the present findings have implications for wellness and health-risk behaviours across the lifespan of at least two generations. It is clear that behaviour patterns established by middle childhood are linked to physical health outcomes in adults, so that children who are at risk of peer rejection and academic failure due to high levels of aggressive behaviour and social withdrawal should also be targeted for preventative intervention on health issues. Moreover, the subset of girls who were high on both dimensions of psychosocial risk experienced the most difficulties at each stage of life

studied thus far, including peer rejection, academic failure, adolescent health-risk behaviour, assortative mating with similarly troubled partners, and chronic poverty.<sup>28, 35, 37-38</sup> Motherhood may be a critical transition for these girls in particular, and an important opportunity for health professionals to come into contact with all disadvantaged women. Many women from high-risk populations may specifically seek medical attention at this time in their lives, indicating a great potential for intervention that may affect their future health and the health of their families. Future research should continue to investigate the health-behaviour link in disadvantaged and vulnerable populations, and focus on the inter-generational transfer of health-risk from mother to child. The scientific community has recently acknowledged the importance of aggression as a behavioural pattern in girls and begun to follow their long-term trajectories. Consequently, it has now become possible to examine the sequellae of childhood aggression, not only in terms of their own physical and mental health, but also the health of the next generation.



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Table 1

*Correlations among maternal childhood risk status, health outcomes and selected demographic variables*

| Variable                      | 1 | 2    | 3      | 4    | 5                 | 6      | 7                 | 8    | 9    | 10   | 11               | 12    | 13                |
|-------------------------------|---|------|--------|------|-------------------|--------|-------------------|------|------|------|------------------|-------|-------------------|
| 1. Childhood Aggression       | - | -.09 | .44*** | .19* | -.24**            | -.14   | .32***            | -.11 | .03  | .06  | .14              | -.14  | -.03              |
| 2. Childhood Withdrawal       | - | -    | .12    | .02  | -.17 <sup>t</sup> | -.22*  | -.13              | .19* | -.05 | -.02 | .03              | -.07  | -.14              |
| 3. Aggression/Withdrawal      | - | -    | -      | .27* | -.10              | -.23** | .11               | .08  | .00  | .06  | .24**            | -.01  | .05               |
| 4. Adolescent Risk Index      | - | -    | -      | -    | -.14              | -.09   | .27**             | -.00 | .11  | -.06 | .15              | .23*  | .14               |
| 5. Maternal Education         | - | -    | -      | -    | -                 | .43*** | -.37***           | -.01 | .05  | .13  | -.03             | -.03  | -.08              |
| 6. Family Income              | - | -    | -      | -    | -                 | -      | -.17 <sup>t</sup> | -.10 | .11  | .09  | -.15             | .02   | -.06              |
| 7. Current Cigarette Use      | - | -    | -      | -    | -                 | -      | -                 | -.03 | -.09 | .08  | -.02             | .19*  | .24**             |
| 8. Pregnancy Problems         | - | -    | -      | -    | -                 | -      | -                 | -    | -.02 | -.08 | -.04             | -.01  | .17 <sup>t</sup>  |
| 9. Neonatal Health Factor     | - | -    | -      | -    | -                 | -      | -                 | -    | -    | -.02 | .16 <sup>t</sup> | -.21* | -.24**            |
| 10. Gender of Offspring       | - | -    | -      | -    | -                 | -      | -                 | -    | -    | -    | .13              | -.19* | -.17 <sup>t</sup> |
| 11. Maternal Weight Problem   | - | -    | -      | -    | -                 | -      | -                 | -    | -    | -    | -                | -.08  | -.06              |
| 12. Total Child Illnesses     | - | -    | -      | -    | -                 | -      | -                 | -    | -    | -    | -                | -     | .64***            |
| 13. Child Respiratory Illness | - | -    | -      | -    | -                 | -      | -                 | -    | -    | -    | -                | -     | -                 |

Note. <sup>t</sup> $p < .10$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Table 2

*Correlations among maternal adolescent health risk behaviours*

| Variable                          | 1 | 2      | 3      | 4    |
|-----------------------------------|---|--------|--------|------|
| 1. Alcohol abuse                  | - | .44*** | .08    | -.11 |
| 2. Regular drug use               | - | -      | .23*** | .00  |
| 3. Daily smoker<br>< 14 years old | - | -      | -      | .12  |
| 4. Teenage mother                 | - | -      | -      | -    |

*Note.* \*\*\* $p < .001$

Table 3

Results from the Final Equation of Logistic Regression Models on Past Maternal Health

| A. Adolescent Risk Index ( $R^2 = .17$ , $\chi^2 = 6.34^{**}$ ) |                   |                            |
|---|-------------------|----------------------------|
|   | <u>Odds Ratio</u> | <u>Confidence Interval</u> |
| Maternal Childhood Aggression                                   | 1.33              | 0.84-2.09                  |
| Maternal Childhood Withdrawal                                   | 1.02              | 0.62-1.69                  |
| Family Prestige for Maternal Family of Origin                   | 1.00              | 1.00-1.01                  |
| Aggression x Withdrawal Interaction                             | 1.80*             | 1.08-3.02                  |
| B. Problems During Pregnancy ( $R^2 = .07$ , $\chi^2 = 6.04$ )  |                   |                            |
|   | <u>Odds Ratio</u> | <u>Confidence Interval</u> |
| Maternal Childhood Aggression                                   | 0.81              | 0.54-1.21                  |
| Maternal Childhood Withdrawal                                   | 1.44 <sup>†</sup> | 0.95-2.17                  |
| Maternal level of Education                                     | 1.03              | 0.85-1.25                  |
| Current Family Income   | 1.00              | 0.99-1.00                  |

Note. <sup>†</sup> $p < .10$ , \* $p < .05$ , \*\* $p < .01$

Table 4  
Results from the Final Equation of Regression Models on Current Maternal Health

| A. Current daily maternal smoking ( $R^2_{adj}=.19$ , $F=7.58^{***}$ ) |                   |                     |            |          |  |
|--|-------------------|---------------------|------------|----------|--|
|  | Beta              | t                   | $R^2_{ch}$ | $F_{ch}$ |  |
| Maternal Childhood Aggression  | .23               | 2.56**              | .11        | 7.16***  |  |
| Maternal Childhood Withdrawal  | -.17              | -1.89 <sup>t</sup>  |            |          |  |
| Maternal level of Education  | -.32              | -3.30***            | .10        | 7.21***  |  |
| Current Family Income  | -.04              | -0.46               |            |          |  |
| B. Maternal Obesity (BMI > 27) ( $R^2=.09$ , $\chi^2=6.79$ )           |                   |                     |            |          |  |
|  | Odds Ratio        | Confidence Interval |            |          |  |
| Maternal Childhood Aggression  | 1.15              | 0.69-1.91           |            |          |  |
| Maternal Childhood Withdrawal  | 0.92              | 0.54-1.58           |            |          |  |
| Current Daily Maternal Smoking   | 0.98              | 0.94-1.03           |            |          |  |
| Aggression x Withdrawal Interaction                                    | 1.53 <sup>t</sup> | 0.96-2.45           |            |          |  |

Note. <sup>t</sup> $p < .10$ , \*\* $p < .01$ , \*\*\* $p < .001$

Table 5

Results from the Final Equation of Regression Models on Health Outcomes In Preschool Offspring

| A. Number of Illnesses reported for Offspring ( $R^2$ adj = .20, $F=4.41^{***}$ ) |            |                     |          |        |  |
|---|------------|---------------------|----------|--------|--|
|   | Beta       | t                   | $R^2$ ch | $F$ ch |  |
| Maternal Childhood Aggression   | -.21       | -2.27*              | .03      | 1.46   |  |
| Maternal Childhood Withdrawal   | -.06       | -0.66               |          |        |  |
| Maternal Adolescent Risk Index  | .26        | 2.83**              | .09      | 5.83** |  |
| Current Daily Maternal Smoking  | .16        | 1.70 <sup>t</sup>   |          |        |  |
| Child's gender  | -.18       | -2.02 <sup>t</sup>  | .08      | 5.48** |  |
| Neonatal Health Status Factor   | -.24       | -2.76**             |          |        |  |
| Current Family Income   | .07        | 0.77                | .00      | .00    |  |
| B. Respiratory Illness in Preschool Offspring ( $R^2$ = .24, $\chi^2$ = 20.63**)  |            |                     |          |        |  |
|   | Odds Ratio | Confidence Interval |          |        |  |
| Maternal Childhood Aggression   | 0.75       | 0.47-1.20           |          |        |  |
| Maternal Childhood Withdrawal   | 0.68       | 0.41-1.13           |          |        |  |
| Current Daily Maternal Smoking  | 1.07**     | 1.01-1.12           |          |        |  |
| Maternal level of Education   | 1.04       | 0.82-1.32           |          |        |  |
| Current Family Income   | 1.00       | 0.99-1.01           |          |        |  |
| Child's gender  | 0.35*      | 0.14-0.91           |          |        |  |
| Neonatal Health Status Factor   | 0.55*      | 0.33-0.91           |          |        |  |

Note. <sup>t</sup> $p < .10$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Table 6  
*Summary of Results from the Final Equation of Regression Models by Health Outcome*

| Outcome                          | Significant Predictors  | Table    | Figure   |
|----------------------------------|---|----------|----------|
| Adolescent Risk Index            | Aggression x Withdrawal interaction*  | Table 3a | Figure 1 |
| Problems during Pregnancy        | Maternal Childhood Withdrawal <sup>†</sup>  | Table 3b |          |
| Current Daily Maternal Smoking   | Maternal Childhood Aggression**<br>Maternal Childhood Withdrawal <sup>†</sup><br>Maternal level of Education***   | Table 4a |          |
| Maternal Obesity                 | Aggression x Withdrawal interaction <sup>†</sup>  | Table 4b | Figure 2 |
| Number of Illnesses in Offspring | Maternal Childhood Aggression*<br>Maternal Adolescent Risk Index**<br>Current Daily Maternal Smoking <sup>†</sup><br>Child's Gender <sup>†</sup><br>Neonatal Health Status Factor** | Table 5a |          |
| Respiratory Illness in Offspring | Current Daily Maternal Smoking**<br>Child's Gender*<br>Neonatal Health Status Factor*   | Table 5b | Figure 3 |

Note. <sup>†</sup> $p < .10$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$



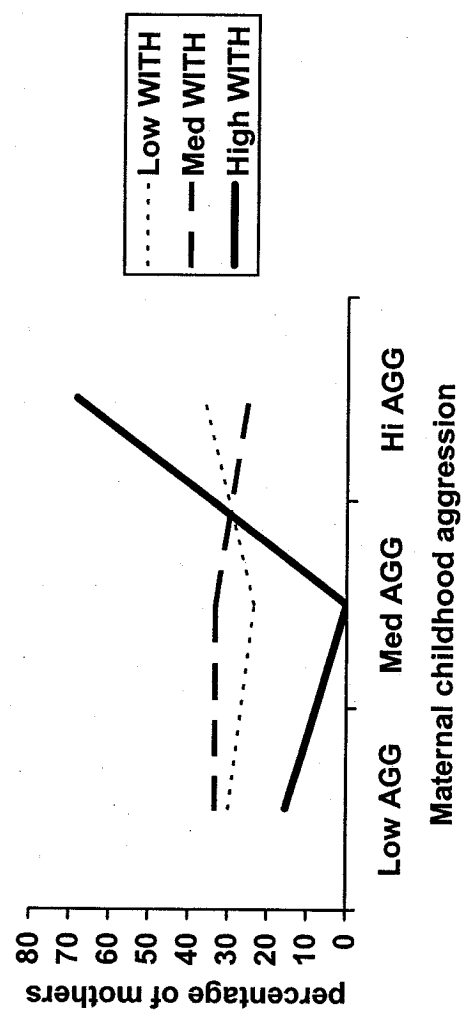


Figure 1. Percentage of mothers engaging in adolescent risk-taking as a function of maternal childhood risk status (aggression, withdrawal).

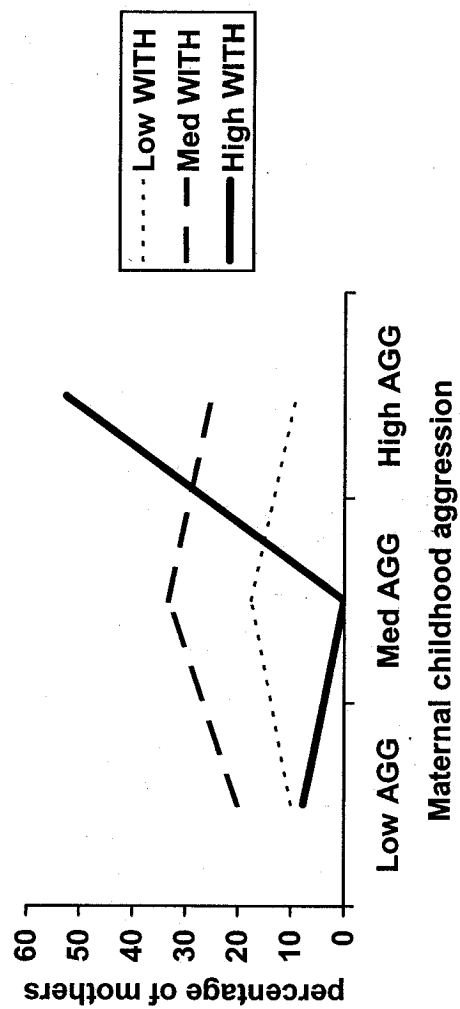


Figure 2. Percentage of mothers overweight (BMI > 27) as a function of maternal childhood risk status (aggression, withdrawal).

$R^2 = .16$

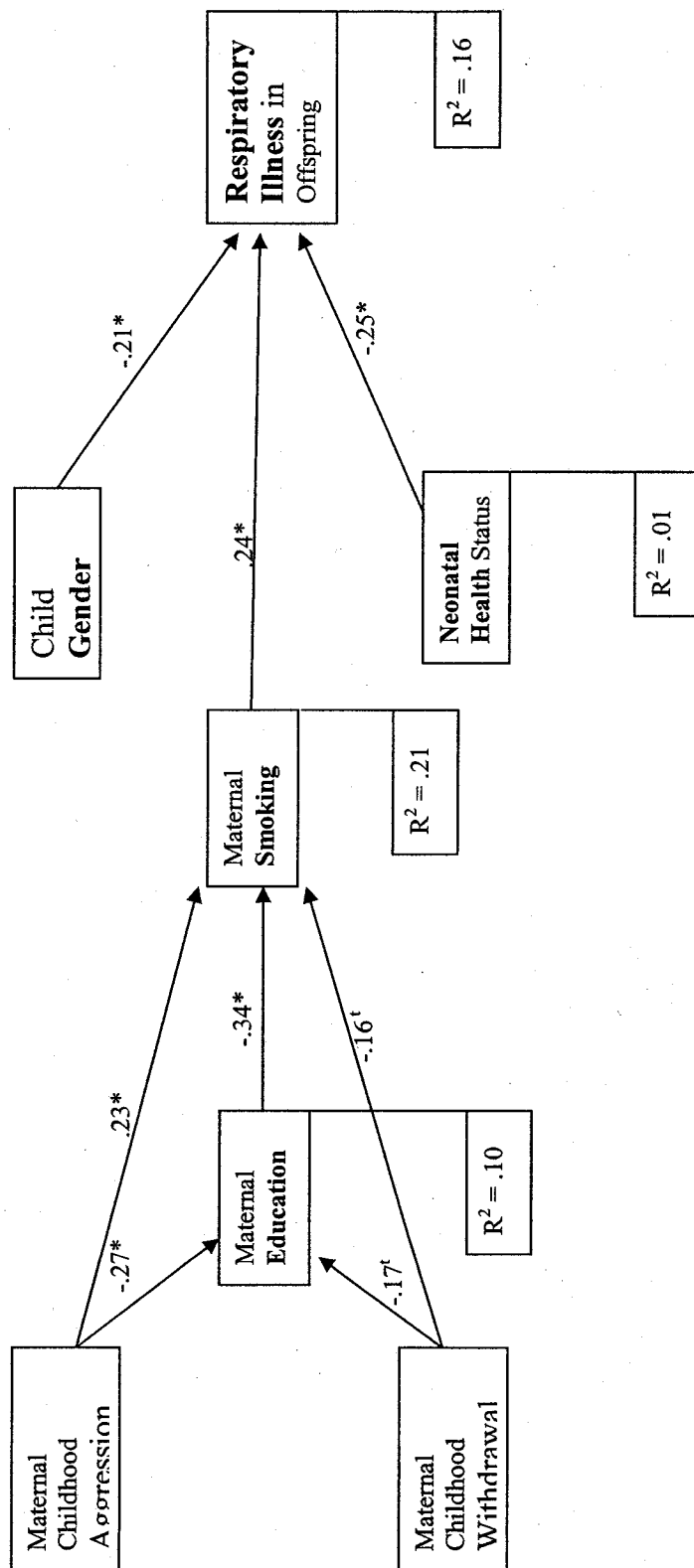


Figure 3. Structural equation model predicting respiratory problems in offspring ( $n = 114$  women).  $\chi^2=10.0$ ,  $p = 0.69$ , CFI=1.00, RMSEA=0.00. Standardized EQS parameter estimates are presented next to paths. \* $p < .05$ .

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### Connecting Study 1 to Study 2

Study 1 was a prospective, longitudinal and inter-generational study designed to determine the impact of childhood aggression and social withdrawal on adolescent health-risk behaviours and adult health outcomes, and to examine the transfer of health-risk to preschool offspring. Maternal childhood aggression predicted current health-risk behaviours (e.g., daily cigarette smoking), whereas maternal childhood social withdrawal was not associated with maternal health-risk at the time of testing. Mother-participants who were high on both aggression and withdrawal were more likely to engage in adolescent health-risk behaviour, which was directly related to health problems in preschool offspring (even after controlling for covariates such as neonatal health status and gender). In sum, there was evidence for distinct health trajectories for women who were highly aggressive and socially withdrawn in childhood, with implications for their longterm health and the health of their offspring.

Several questions about the nature of behavioural and health-risk and transfer of health-risk to the next generation remained after Study 1. These questions include: Are women who were aggressive and withdrawn more likely to have health problems as they approach middle-age, when many women struggle with weight gain and discover unforeseen health problems such as high blood pressure? Do aggressive women continue to show the same pattern of health-risk behaviours such as smoking, or is this trajectory halted over time? Are maternal health-risk indicators related to more positive health behaviours, such as dental care and nutrition? Are maternal health-risk and wellness behaviours related to similar behaviours in offspring? Might there not be a cumulative

risk effect on offspring, such that parental childhood aggression and withdrawal begin to have a more direct effect on their children's health over time?

In order to answer some of these questions, the same families from the Concordia project were contacted again several years later, when children were 9-12 years of age. Mother-participants were interviewed about their health-risk behaviour and their health problems, using a similar protocol. Mother-participants and female partners of father-participants were interviewed about children's health status. Moreover, several other new components were added to the study. For the first time, all mothers were interviewed about wellness behaviours such as daily sleeping and eating patterns, and dental care. Mothers were also asked about service usage, and their satisfaction with services sought for their children. Even though there was a smaller sample in this new wave of testing, the breadth of this study helps make a unique contribution to the literature on inter-generational transmission of health-risk.

Although only summary tables of the general results are presented in the following manuscript, separate tables for each subsection of analysis that depict all predictors entered into the regressions are presented in Appendices O-V. Furthermore, Appendices X-BB include tables comparing the effect sizes for child health outcomes in the mother-participant sample with the child health outcomes in the full sample that includes both mother-participants and female partners of father-participants.

Running head: AN APPLE A DAY KEEPS THE DOCTOR AWAY

An apple a day keeps the doctor away: Health behaviour and  
service usage across generations in high-risk families

*Manuscript to be submitted*

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An apple a day keeps the doctor away: Health behaviour  
and service usage across generations in high-risk families

ABSTRACT

The purpose of this study was to determine the impact of childhood aggression and social withdrawal on health-risk behaviours, preventative health and adult health outcomes, and to examine the transfer of health-risk to school-aged offspring. Previous studies have linked aggression to poor health habits and negative health outcomes in adults while social withdrawal has been linked to increased reporting of symptoms and service usage. Little research has attempted to examine the effects of parental childhood histories of aggression and withdrawal on health behaviour and health problems in the next generation. Seventy-four parents from inner-city, disadvantaged neighbourhoods who were identified in childhood as being highly aggressive and/or withdrawn and their offspring aged 9-11 years old participated in this prospective, longitudinal study using two generations. Health histories of mothers (adolescent health-risk behaviour, current symptoms, and health-risk factors such as smoking and obesity) and target children were taken during structured interviews conducted at home. Mothers were also asked about preventative health habits (e.g., nutrition, dental care). Regression analyses tested the relationship between childhood risk status and subsequent health outcomes in both generations. Maternal childhood aggression predicted lower self-rated physical health and some current health-risk (e.g., smoking, poorer nutrition), whereas childhood withdrawal predicted internalizing symptoms such as more headaches and migraines. Children of withdrawn mothers were more likely to be on Ritalin, and to be prescribed medication for respiratory problems. Consistent with previous studies on the Concordia sample, parents



who were high on both dimensions of aggression and withdrawal showed the earliest signs of health-risk (adolescence) and there was evidence that their offspring may also be at the highest risk for poor health habits and negative health outcomes. Finally, although use and satisfaction of medical services were associated with SES-related variables more than parental childhood risk, childhood withdrawal was related to increased use of developmental services. In summary, there are distinct health and service usage trajectories for families of individuals who are highly aggressive and socially withdrawn in childhood, with implications for early prevention and transfer of health-risk to the next generation.

It is generally assumed that human beings are consumers of available health care options. However, we all perform health-protective behaviour that mostly does not involve use of the health care system, so that we are actually also "producers" of our own health (Harris & Guten, 1979). Individual differences in daily choices significantly determine health outcomes, and specific health-risk behaviours such as smoking are responsible for morbidity and reduced life expectancy in North America (House, Strecher, Metzner, & Robbins, 1986; Wickrama, Conger, & Lorenz, 1994). Although a recent Centers for Disease Control and Prevention report (National Center for Health Statistics, 2001) suggests that we have made great strides in public health over the last decade (e.g., improvements in physical fitness and nutrition, decreases in adolescent alcohol and marijuana use), several areas saw either stagnation (e.g., continued heavy alcohol use by 30% of adolescents) or outright deterioration (e.g., increases in overweight). Furthermore, although the overall link between lifestyle and illness is widely acknowledged in the field of public health, studies on the relations between specific behavioural patterns that emerge early in the lifespan and subsequent health habits and outcomes later in life are clearly warranted in order to elucidate the processes and mechanisms of the health-behaviour link.

Health lifestyles are collective patterns of health-related behaviour based on options available to people according to their life chances (Cockerham, Rutten, & Abel, 1997). Therefore, both individual unhealthy practices as well as current social conditions are accountable for poor health (Cockerham, 1997). Although unhealthy lifestyles represent the sum of daily individual choices, individual choices may be limited by structural constraints imposed by SES and education (Wickrama, Conger, Wallace, &

Elder, 1999). In fact, problems such as substance abuse, obesity, and injuries are over-represented among certain socioeconomic and ethnic/racial minority groups (CDC, 2001), and socioeconomic distinctions in mortality and morbidity are found for practically all diseases, and occur at every level of a social hierarchy, not just between the upper and lower classes (Adler & Boyce, 1994; Carroll, Smith, & Bennett, 2002; Illsley & Baker, 1991). However, there is considerable within-group variability; not all individuals from disadvantaged environments engage in unhealthy practices to the same extent, and unhealthy behaviours cannot completely explain the SES-health gradient (Carroll, Smith, & Bennett, 2002).

Multiple health-risk behaviours tend to cluster into a syndrome in the same persons (Caspi, Dickson, Harrington, Langley, Moffitt, & Silva, 1997; Donovan & Jessor, 1985; Ensminger, 1987; Mott & Haurin, 1988; Osgood, Johnston, O'Malley & Bachman, 1988) and seem to be linked to interpersonal difficulties originating in early maladaptive social interactions at home and in school (Donovan & Jessor, 1985; Scaramella, Conger, Simons, & Whitbeck, 1998; Sher, 1991). For example, studies have linked early physical aggression (Miller-Johnson, Coie, Maumary-Gamud, Lochman, & Terry, 1999; Siegler, Peterson, Barefoot, & Williams, 1992; Valois, McKeown, Garrison, & Vincent, 1995), psychobiological reactivity (Boyce et al., 1995) externalizing behaviour, and emotion regulation problems (Chassin & Ritter, 2001; Donovan & Jessor, 1985; Sher, 1991; Zucker, Fitzgerald, & Moses, 1995) to subsequent health-risk behaviour and health problems. As a result, various investigators (e.g., Felitti, et al., 1998; Repetti, Taylor, & Seeman, 2002; Taylor, Lerner, Sage, Lehman, & Seeman, 2004) have proposed an integrated biobehavioural profile linking early psychosocial risk within

families to cumulating risk for both mental and physical health problems across the lifespan. However, more longitudinal research using participants from various disadvantaged milieus is required in order to specify which early behaviours and processes lead to health-risk lifestyles, as well as which periods of the lifespan provide the greatest risk for health-risk trajectories and turning points for better health habits.

There are numerous studies linking hostility and aggression to health-impairing behaviour patterns (Cairns & Cairns, 1994; Caspi et al., 1997; De Genna, Stack, Serbin, Ledingham, & Schwartzman, *in press*; Miller, Smith, Turner, Guijarro, & Hallet, 1996; Pine, Cohen, Brook, & Coplan, 1997; Serbin Peters, McAffer, & Schwartzman, 1991; Serbin et al., 2004) and there is conclusive evidence that conduct problems and aggression in childhood are often manifested as risk-taking behaviours by early adolescence in both boys and girls (Bardone et al., 1998; Cairns & Cairns, 1994; Caspi et al., 1997; Scaramella, et al., 1998; Pine et al., 1997; Serbin, et al., 1991). Moreover, there is substantial evidence from several recent meta-analyses linking anger, hostility and aggressiveness to adult health problems such as coronary heart disease (Miller et al., 1996; Smith, 1992) and hypertension (Rutledge & Hogan, 2002).

Unlike aggression, social withdrawal in childhood may actually be protective for certain health-risk behaviours, primarily through lack of association with deviant peers. For example, anxious and depressed girls from the Dunedin study reported more medical problems between age 15 and 21, yet neither group appeared to have a substance abuse problem or adverse reproductive health outcomes (Bardone et al., 1998). De Genna et al (*in press*) found that women who were socially withdrawn in elementary school were less likely to smoke as adults, but more likely to report problems during pregnancy and longer

bouts of infantile colic. The social support literature suggests that women who are socially isolated or report poor social relations are at higher morbidity and mortality risk compared to women with adequate social support networks (House, Landis, & Umberson, 1988). Taken together, these findings suggest that there are separate health trajectories for individuals who are aggressive or socially withdrawn as children, but that both types of early problem behaviour have implications for adult health.

Biological maturation also influences social and developmental processes that have an impact on physical health. In a pioneering study, Magnusson and colleagues (Magnusson, 1988; Stattin & Magnusson, 1990) found that very early-maturing Swedish girls differed in both their social affiliations and health-risk behaviour. By age 13, they had joined peer groups who were older, and their social and sexual behaviour patterns were more characteristic of these older peers than other, physically-immature members of their own cohort. Although differences in health-risk behaviour between early- and later-maturing girls disappeared by age 16, the very early-maturing sample married earlier, had more children, and did not attend university. Caspi and Moffitt (1991) found a similar early maturation-deviance pattern in the Dunedin sample, but the effect was only obtained for girls enrolled in co-educational schools. Finally, Cairns and Cairns (1994) found that early-maturing girls in the Carolina Longitudinal Study (CLS) tended to affiliate with other early-maturing girls, but there were no differences in terms of aggression, lower levels of school performance, or teen pregnancy. Even though they have not been consistently replicated in other countries, Magnusson's findings suggest that we should not neglect the effects of physical maturation on girls' health-risk behaviour.

Similar work on the effects of pubertal development on aggression and social dominance in boys demonstrated the importance of social context. Rowe and his colleagues (2004) found that levels of circulating testosterone only related to conduct disorder in boys with deviant peers, and to leadership in boys who did not have deviant peers. Therefore, biological maturation occurs within a social context, and children's development and personality characteristics interact with the psychosocial environments created by their families, peers, and the broader culture (Tinsley, 1992). Social learning theory emphasizes the importance of parental modeling and reinforcement of behaviours (Akers, 1977; Bandura, 1977), and there is evidence that children who are consistently exposed to health-risk behaviours such as poor eating, smoking and drinking are more likely to engage in those behaviours themselves (Patterson, Reid, & Dishion, 1992; Wickrama et al., 1999). Moreover, lower education and conditions of poverty in adulthood may help perpetuate negative behaviours modelled at home (Serbin et al., 2004). Therefore, children learn about health habits from parental modeling and reinforcement, and they also inherit the social constraints placed on their behaviours and choice of friends by family SES.

Parental health-risk behaviours such as smoking and poor nutrition may also be associated with other poor health behaviours in offspring that are likely to influence children's longterm risk of having lifestyle diseases. For example, Burke et al (1998) found that parental smoking was related to children's smoking, lower physical activity, more television watching, BMI, hip-to-waist ratio, and fat intake. Moreover, Wickrama and colleagues (1999) found that parents' health-risk lifestyles mediated the effect of SES on adolescents' lifestyles, after controlling for SES. The results of these studies suggest

that there may be a single underlying health-risk factor, but that parental behaviour is also important in predicting specific health-risk behaviours in offspring.

Similar to health habits, parents greatly influence children's use of medical and mental health services, because most services must be identified and selected by parents on behalf of their children, including providing consent for examinations and interventions. Parents bear the burden of setting appointments, completing paperwork, providing transportation to and from appointments, and paying for services (Farmer, Burns, Angold, & Costello, 1997). In addition, although some school services may be accessible to children without parental mediation, most medical and mental health services that children take advantage of require parental planning and effort.

There is evidence that the more impact children's emotional, behavioural, and medical problems have on parental well-being and feelings of competence, the more likely the parent is to access services for these problems (Angold et al., 1998; Farmer et al., 1997; Messer et al., 1996). In other words, use of services may be related to parent characteristics as much as child characteristics. Moreover, service usage in and of itself may contribute to negative impact on families, as parents experience frustration with barriers to access and use of services (Farmer et al., 1997; Friksen & Huff, 1996). Therefore, service usage and parental satisfaction with services are important components of children's health care that may be affected by social constraints as well as parental behavioural styles.

Identifying the specific processes associated with the inter-generational transfer of health-risk and wellness behaviours, including use of medical and developmental services, has important implications for public health. As ecological theory

(Bronfenbrenner, 1979) would suggest, families of procreation are nested in broader social contexts, contexts that include their families of origin. Continuity in health-risk behaviours may emerge because of continued contact and reinforcement from one's family of origin, as well as contact with peers that intensifies in adolescence and increases across the lifespan. Developmentally-sensitive models are required in order to best plan prevention and interventions with high-risk individuals and their families. For example, adolescence is a critical transition for at-risk populations, and may represent a crucial period for the transfer of risk, and an important turning point for individuals struggling with problems of aggression and social withdrawal. Clarifying general behavioural processes associated with the transfer of health risk over the lifespan and across generations has important implications for designing focused and timely interventions.

The Concordia Longitudinal Risk Project is a prospective, inter-generational study of individuals who were identified in childhood as being aggressive and/or socially withdrawn compared to peers. An early study of reproductive outcomes in the Concordia study 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 gynaecological problems, sexually-transmitted diseases (STDs) and teenage pregnancy (Serbin et al., 1991). Subsequent research on some of these high-risk teenage mothers' school-age offspring suggest that their children are at risk for multiple negative outcomes including poor health and low academic achievement (Serbin, Peters, & Schwartzman, 1996; Serbin et al., 1998; 2004; Stack et al., 2005; in press).



A more recent set of inter-generational studies on the Concordia sample examined a subsample of mothers who had given birth at a more normative range of ages (i.e., not just teenage mothers), along with their preschool offspring. Ben-Dat Fisher and colleagues (under revision) found that mothers who were socially withdrawn as children showed dysregulated patterns of diurnal cortisol, particularly lower morning cortisol values. A similar dysregulated pattern was observed in the preschoolers of mothers who smoked daily, suggesting a separate trajectory of health-risk for the offspring of aggressive mothers via exposure to second-hand smoke. An examination of physical health-risk in these families revealed that mothers who were high on both aggression and withdrawal were the most likely to engage in adolescent health-risk behaviour and be currently overweight. However, mothers high on aggression alone smoked more cigarettes daily, which was directly related to respiratory problems in preschool offspring (De Genna et al., in press).

The original Concordia investigation was designed to examine the effects of behavioural styles characterized by aggression and social withdrawal on life-course trajectories. In the present phase of the study, the primary objective was to examine health-risk pathways from these childhood risk factors to health and health-risk in female participants who have reached middle adulthood, and to investigate inter-generational effects of male or female aggression and withdrawal on children's health habits and service usage. More specifically, we examined: (1) health and health habits in *mothers* who were aggressive and/or withdrawn as children, (2) health and health habits in *offspring* whose mothers or fathers were aggressive and/or withdrawn, as well as (3) use and maternal satisfaction with services in these high-risk families. Hypotheses and results

are presented for mother-participants, who had been the targets of the original Concordia study as children themselves (maternal health problems, maternal health-risk, maternal wellness), and then for the offspring of both mother- and father-participants (child health problems, child health-risk, child wellness, use and satisfaction with services).

#### *Hypotheses for Mother-Participants*

Based on earlier findings from the Concordia Longitudinal Risk Study (e.g., De Genna et al., in press; Serbin et al., 1991; 1996; 1998; Stack et al., 2005; in press) as well as the literature reviewed above, we expected mothers who had been highly aggressive or both aggressive and withdrawn as children to be at the most risk for health-risk behaviour in adolescence, with continuity into adulthood and parenthood. Maternal childhood aggression was expected to work primarily through health-risk behaviours to influence maternal health. Although we had no specific hypotheses about health outcomes for mothers who were highly withdrawn, we expected that they might report more health problems over the lifespan, as suggested by the findings from the Dunedin study (Bardone et al., 1998) as well as the dysregulated cortisol patterns described above (Ben-Dat Fisher, Serbin, Stack, Ledingham, & Schwartzman, under review).

We also expected mothers who were aggressive or aggressive and withdrawn as children to be less concerned with daily behaviours that promote good health such as getting enough sleep, eating well, brushing their teeth regularly, and maintaining physical fitness. Furthermore, it was hypothesized that wellness behaviours would be inter-related, so that mothers who engaged in recommended levels of one activity (e.g., brushing their teeth at least twice a day) would also engage in recommended levels of another (e.g., eating at least 5 servings of fruits and vegetables), and that health-risk and wellness

would be inversely related, based on previous findings that these are two separate but related constructs (Donovan, Jessor, & Costa, 1993; Neumark-Sztainer et al., 1997).

### *Hypotheses for Offspring*

In line with previous findings on offspring from the Concordia project (De Genna et al., in press; Serbin et al., 1996; 1998; 2004; Stack et al., 2005; in press), children of high-risk mothers and fathers were expected to fare poorly compared to children of parents who were neither aggressive nor withdrawn in childhood. Based specifically on results when the same offspring were tested at preschool age with mother-participants only (De Genna et al., in press), effects of parental childhood risk status on the next generation were expected to be indirect. In particular, health problems in children were hypothesized to be related to maternal health-risk, as associated with parental childhood aggression. In other words, mothers with histories of childhood aggression and women who were spouses of men with childhood histories of aggression were expected to place their children at-risk for health problems via their own health-risk behaviours. However, neonatal health status and demographic characteristics such as maternal education, family income, and child gender (specifically, being born a girl) were all expected to be protective factors for health lifestyle and health outcomes in middle childhood, consistent with a social-contextual model.

Children of parents who were highly aggressive and withdrawn were expected to currently be at the highest risk for obesity, because mother-participants who were highly aggressive and withdrawn as children were the most likely to be overweight in the preschool study (De Genna et al., in press). Maternal education and family income were expected to indirectly provide a buffer to overweight in children, by their association with

positive health habits such as good nutrition. Furthermore, it was hypothesized that wellness behaviours in the offspring would be strongly related to maternal habits in general, and that highly aggressive parents in particular would be less likely to model the appropriate daily health habits.

#### *Hypotheses for Services*

Children of parents who were highly aggressive and withdrawn in childhood were expected to use more medical and developmental services, based on previous findings with Concordia offspring suggesting that they were at higher risk for both mental and physical health problems. Moreover, we hypothesized that parents who were highly aggressive or withdrawn in childhood would be less satisfied with services, reflecting a lifelong pattern of difficulties with social interaction, as well as higher perceived burden from problems in their offspring.

## METHOD

Identification of the original sample. In the school years 1976-1977 and 1977-1978, the Concordia project began with the screening of 4,109 children from the French language school board in regular Grade 1, 4, and 7 classes. These school children lived in lower SES, inner-city neighborhoods of Montreal, Quebec, Canada. The children were screened along dimensions of aggression and withdrawal using a peer-nomination technique translated into French (Pupil Evaluation Inventory; PEI; Pekarik, Prinz, Leibert, Weintraub, & Neale, 1976). The PEI is a 34-item questionnaire that loads onto 3 factors: Aggression, Withdrawal, and Likability. Children were asked to nominate up to 4 boys and (separately) 4 girls who best matched each item on the PEI. Percentile cutoffs were used to establish children who received extreme scores on Aggression and Withdrawal, compared to age- and gender-matched peers. Children who scored above the 95th percentile on Aggression and below the 75th percentile on Withdrawal, relative to same-sex classmates, were selected for the aggressive group; the reverse criteria were used to select the withdrawn group. As a function of the low probability of achieving extreme scores on both dimensions, more liberal criteria were used to identify a sufficient number of children to form the aggressive-withdrawn group. Z-scores greater than or equal to the 75th percentile on both Aggression and Withdrawal were criteria for membership in this group. Finally age-matched children for whom z scores on the Aggression and Withdrawal scales fell in the average range (i.e., between the 25th and 75th percentiles) were selected for the comparison group. For a more extensive description of the original methodology, see Schwartzman et al (1985).

Current sample. Parents and offspring were recruited within the Concordia study if the child was between the ages of 9-12 years old, still living with the parent, and had participated in a previous study of 175 families visited at home when the target child was a preschooler (1-6 years old). The refusal rate for families contacted was roughly 26%, for a total of 74 previously tested Concordia families with offspring in this age range. The current sample included 44 mother-participants and 30 female partners of father-participants, together with their offspring. Mothers were contacted by telephone and, if they agreed to participate in this wave of the study, completed a demographic questionnaire and scheduled a home visit. Analyses on families were conducted in two parts: first, on mother-participants who had been the target child in the original sample; second, on mothers who were spouses of father-participants (e.g., target fathers).

The 44 mother-participants included 8 mothers who were highly aggressive as children, 7 mothers who were highly socially withdrawn, 7 mothers who were high on both childhood risk dimensions, and 22 mothers who were low on both dimensions and who served as a comparison group because they were from the same disadvantaged neighborhoods. As seen in Table 1, mothers' average age was 36.9 years old at the time of testing (range = 33.32-41.26) and average age of their target offspring was 11.24 years old (range = 9.50-13.25). There were slightly more daughters ( $n = 25$ ; 57%) than sons ( $n = 19$ ; 43%) in the mother-participant group. Only 7 mother-participants (16%) were currently raising their children alone, and 37 women (84%) were either married or cohabiting during this wave of testing in the Concordia project. Family prestige scores (Nock & Rossi, 1979) in the maternal family of origin (i.e., in mothers' childhood) ranged from 175-661, with an average of 393.25, which roughly corresponds to the

following types of jobs: carpenter, building superintendent, metalworker, construction inspector, farmer, sales representative (wholesale), crane operator, electric company cable operator, telephone company technician, printing press operator. Mothers completed an average of 12 years of formal education, equivalent to a high school diploma (range: 6-17 years). Less than 16% of the sample ( $n = 16$ ) did not complete secondary education. Thus, although all of the mothers were raised in the same disadvantaged neighborhoods and most came from blue-collar families, 84% of them successfully completed high school. Current annual family income ranged from \$7,925.84 to \$128,180, with a mean of \$58,707 Canadian, which corresponds to roughly US\$ 48,626. This mean family income is below both Canadian (C \$64,900) and provincial (C\$ 57,100) average family incomes (Statistics Canada, 2005). Only 7% of the families in this sample were receiving government assistance (welfare), which is the same rate recently reported for Quebec (Roy, 2004), and one-third of mothers reported receiving government assistance when offspring were preschool age.

The overall sample of 74 mother- and father-participants included 13 fathers or mothers who were highly aggressive as children, 11 fathers or mothers who were highly socially withdrawn, 9 fathers or mothers who were high on both childhood risk dimensions, and 41 fathers or mothers who were low on both dimensions and comprised the comparison group. As shown in Table 1, target parents' average age was 36.81 years old at time of testing (range = 29.47-47.26) and offspring were 11.09 years old on average (range = 9.33-13.25). There were roughly the same proportion of daughters ( $n = 38$ ; 51%) and sons ( $n = 36$ ; 49%). Of parents who provided information on marital status, only 10 parents (14%) were currently raising their children alone, and 61 participants

(82%) were either married or cohabiting during this wave of testing in the Concordia project. Family prestige scores (Nock & Rossi, 1979) in the target-parent's family of origin (i.e., grandparents) ranged from 175-661, with an average of 396, comparable to the family prestige scores in the mother-participant sample. Mothers completed an average of 12.25 years of formal education, equivalent to a high school diploma (range: 7-17 years). Less than 13% of the target parents ( $n = 9$ ) were high-school dropouts. Thus, although all of the target-parents were raised in the same disadvantaged neighborhoods and most came from blue-collar families, almost all of them successfully completed high school (87%). Current annual family income ranged from \$5,628 to \$156,800, with a mean of \$63,802 Canadian, which corresponds to roughly US \$ 52,846. This mean family income is commensurate with Canadian (C\$ 64,900) and actually higher than provincial (C\$ 57,100) average family incomes (Statistics Canada, 2005). The wide range of income in this sample provided sufficient variability to examine health-risk across a broad SES spectrum.

Procedure. Figure 1 illustrates the parent and child ages, types of measures administered, and locales for various waves of testing in the Concordia Project that are pertinent to this study. During the latest phase of the project, families were visited at home where mothers (mother-participants and female partners of father-participants) gave written informed consent, completed a battery of questionnaires and interviews, and participated in mother-child observations. For the purposes of this study, mothers were interviewed about their past and present health and a complete medical history was taken for the target child. Mothers then completed a questionnaire on their use of medical and developmental services, and their satisfaction with those services. During that time, target



offspring were administered the Weschler Intelligence Scales for Children (WISC-III; The Psychological Corporation, 2000). A questionnaire package was also sent to the children's teachers, in order to assess classroom behaviour.

### Measures

*Health measures.* During a single interview, mother-participants were asked about their current health (e.g., diabetes, asthma), their health-risk (e.g., height and weight, daily cigarette smoking) and health habits (e.g., dental care, nutrition). Both mother-participants and mothers who were female partners of father-participants were asked about the target offspring's current health and their child's health habits. These structured interviews were based on a health interview administered to mother-participants when children were preschool age (De Genna et al., in press) and further developed for the purposes of this study in order to collect data on maternal and child health habits. Questions were straightforward and did not rely on inference (e.g., Do you currently smoke? How tall are you? How often do you brush your teeth? Does your child suffer from asthma? Is your child on prescription medication? How often does your child brush his/her teeth?). Although the health data is self- and maternal-report, studies have shown that self-report for smoking is consistent with serum and urinary levels of cotinine (Klebanoff et al., 2001; Kodl & Wakschlag, 2004; Peacock et al., 1998), and that self-report for health may be even better predictors of health status and mortality than medical records or current diagnoses (Idler & Benyamini, 1997; McCullough & Laurenceau, 2004; Mossey & Shapiro, 1982; Pless & Pless, 1995). In fact, although the poorest children may experience greater levels of morbidity, maternal ratings of children's health have been shown to be related specifically to the child's morbidity, independent of her

own health, poverty, and environmental stress (Kohen, Brooks-Gunn, McCormick, & Graber, 1997; McCormick, Brooks-Gunn, Shorter, Holmes & Heagerty, 1989).

*Service usage.* The questionnaire on service usage and satisfaction was also developed for the purposes of the current wave of testing. On this measure, mothers were asked if they had used nine different types of services, their frequency of use over the last year, and their degree of satisfaction with the services used (on a scale of 0-100). Most of the services used by mothers could be categorized as developmental (e.g., parenting training on child development, family therapy, child psychologist) or medical (e.g., paediatrician, dentist, dermatologist).

The data from the structured health interviews and services questionnaire were entered into the database manually. After data entry, each line was carefully screened for accuracy and descriptive analyses were conducted in order to examine the distribution of scores and to double-check for accuracy. Summary variables were then created to be used as predictors and criteria in a set of regression analyses designed to address our hypotheses. For example, variables were created for maternal and child respiratory problems, and parent training services.

*Other measures.* Information gathered concurrently from non-health measures were integrated into the analyses of the health and services data. Maternal parenting stress was measured with the short form of the Parenting Stress Index (PSI; Abidin, 1995). This 36-item inventory is 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 that was used in analyses for this study (Internal consistency: Cronbach

alpha = .95). Mothers and teachers completed the Child Behaviour Checklist for Children (CBCL; Achenbach, 1991), which has high test-retest values (0.95-1.00), inter-rater reliability (0.93-0.96) and internal consistency (0.78-0.97). The CBCL is designed to obtain information from parents and teachers on children's competencies and behavioural/emotional problems. The CBCL/6-18 has 118 items that describe specific behavioural and emotional problems, plus two open-ended items for reporting additional problems.

Longitudinal data collected on child health and behaviour when target offspring were preschoolers (1-6 years old) were also used in the following analyses in order to determine continuity of health-risk over several waves of data collection. Information on maternal and preschooler health was collected during interview procedures similar to those used in the present study. For a more extensive description of this methodology, see De Genna et al (in press).

## RESULTS

Multiple regression analysis (SPSS) was used in order to determine whether childhood risk status and other risk factors predicted: (1) current health of mother-participants, (2) health-risk in mother-participants, (3) wellness behaviours in mother-participants, (4) health problems in offspring from the full sample, (5) health-risk in all offspring, (6) wellness behaviours in all offspring, and (7) use and maternal satisfaction with medical and developmental services. Descriptive information (e.g., means, range, prevalence) is provided for each measure in each subsection, followed by the results of regression analyses relating to parental childhood risk status, and then results pertaining to indirect effects of parental childhood risk on health outcomes.

A multiple regression approach permits us to use maternal childhood aggression and social withdrawal as continuous variables (and hence, maximizes power). Specifically, each participant has an aggression and a withdrawal z-score, and these are the scores that were entered as predictors in Step 1 of each regression. This technique has been successfully used in previous phases of this prospective, longitudinal study (i.e., De Genna et al., in press; Saltaris et al., 2004; Serbin et al., 1991; 1996; 1998). Variable entry in the regression analyses was chronological, so that childhood risk status was entered in the first step, followed by demographic variables such as maternal education and family income, and then more proximal risk factors such as neonatal health status and parenting stress. The interaction between childhood aggression and withdrawal was entered in the final step in order to first consider the influence of the main effects (i.e., aggression and withdrawal; Cohen & Cohen, 1983), and it was removed if it did not significantly contribute to the final model.

Where possible, hierarchical regression analysis of continuous variables were used to investigate the effects of parental childhood risk status on health across both generations. Various authors point out that dichotomization of a continuous variable often results in a loss of information, statistical power, and accuracy (Aiken & West, 1991; Mason, Tu, & Cauce, 1996; McClelland & Judd, 1993). However, many policy research questions and issues are dichotomous in nature (Scott, Mason, & Chapman, 1999). Therefore, logistic regressions were used for dichotomous outcomes such as use of psychological or psychiatric services or maternal obesity (as defined by a BMI cut-off recommended by the Center for Disease Control; 2000), whereas hierarchical regressions were used for continuous outcome variables such as maternal self-rated health and number of cigarettes smoked daily. Due to the sample size, particularly in the analyses using only mother-participants, the number of possible predictors included in each analysis was limited. In some cases, risk indices were created using theoretically related variables in order to reduce the number of predictors.

Maternal health. Information obtained during interviews with mother-participants was used to identify their overall self-rated health, as well as prevalence of specific health problems. On a scale of 1-10, with 1 being “poor,” 4 being “fair,” 7 being “good,” and 10 being “excellent,” most mothers rated their health as better than good ( $M = 8.05$ ,  $SD = 1.63$ ). Only 13.5% of mothers rated their health as less than good. However, this percentage is high compared to only 5.6% of Canadian women aged 25-34 years of age or 8.6% of Canadian women aged 35-44 years of age who rated their health as less than good (Canadian Institutes for Health Information, 2002). Twenty-seven percent of mother-participants rated their own health as excellent, which is fairly comparable to the

norms for Canadian women (32.6% of all Canadian women aged 25-34, 28.8% of all Canadian women aged 35-44). Almost half the sample (46%) reported a health problem in the last 12 months, including frequent headaches (39%), problems with blood pressure (9%), arthritis (16%), gynecological complaints (16%), or a general respiratory problem (48%). Table 2 presents the inter-correlations among predictors and outcomes for maternal health outcomes.

Results obtained from regression analyses conducted on maternal health outcomes are presented in section A of Table 3. Maternal childhood aggression was a significant negative predictor of current health status; mothers who were highly aggressive as girls rated their health lower ( $Beta = -.42$ ). However, a logistic regression on headaches and migraines revealed that mothers who were highly withdrawn as girls were almost three times more likely than other mothers to report problems with frequent headaches and migraines (Odds Ratio = 2.90). Therefore, although mothers with childhood histories of aggression were more likely to report that their health was poorer, they did not report more specific health problems. In contrast, mothers who were socially withdrawn as children were more likely to suffer from frequent headaches and migraines, symptoms that are consistent with internalizing problems.

In terms of other specific health problems reported by mother-participants, daily number of cigarettes smoked while the target child was a preschooler was a significant predictor of current blood pressure problems. Thus, mothers who smoked more cigarettes at the initial wave of inter-generational testing were more likely to currently have a problem with their blood pressure (Odds Ratio = 1.14). There were no significant regressions predicting maternal arthritis or gynecological problems, and no significant

predictors of maternal respiratory problems. Taken together, these results provide only partial support for our hypothesis that maternal childhood risk status would have an indirect influence on current maternal health outcomes.

Maternal Health-Risk. An adolescent risk-taking index created for a previous study (De Genna et al., in press) as well as current health-risk indicators were explored in this step of the regression analyses. The adolescent risk-taking index used retrospective information collected from mothers when offspring were preschoolers, and examined risk-taking behaviours chosen based on previous studies of girls' anti-social behaviour (Bardone et al., 1998; Cairns & Cairns, 1994; Caspi et al., 1997; Scaramella et al., 1998). These included daily use of cigarettes by age 14, heavy use of alcohol, regular recreational drug use, and becoming a teenage mother. One-third of the mother-participants in this sample had engaged in adolescent health-risk behaviour, which is comparable to the percentage found for the mother-participants tested during the preschool wave of testing (De Genna et al., in press).

Current maternal height and weight were used to calculate a body mass-index (BMI) for all but one mother, who was breastfeeding at the time of testing. The average BMI was 26.80 ( $SD = 7.67$ ), which can be considered as "some excess weight" (Canadian Institutes for Health Information, 2002). Only one of the mothers (2%) would be considered clinically underweight using the relatively strict Quebec standard of BMI less than 19 (compared to 18% of all Quebec women aged 20-44; Ledoux & Rivard, 1998). Over a third of mothers (35%) would be considered overweight using American standards ( $BMI > 27$ ) and 44% of them would be considered overweight using the Quebec standard of  $BMI \geq 25$  (compared to only 19% of all Quebec women aged 20-44).

Over half (54%) of the mother-participants in the present study (54%) were at their optimal weight using this standard ( $BMI = 19-24.9$ ), which is also less than other women of childbearing age in Quebec (63%). Therefore, mothers in the present study seem to have more problems with overweight, compared to Quebec and Canadian norms.

There is also evidence that these women are putting their health (and their children's health) at risk from the effects of tobacco. Twenty-seven percent of the mothers (27%) were daily smokers at the time of testing (23% of women in Quebec smoke daily: Canadian Institutes for Health Information, 2002), and only 21% reported that they have never smoked cigarettes on a daily basis (compared to 36.7% of women in Quebec). Descriptively, most of the daily smokers began smoking as teenagers ( $M = 16.33$ ,  $SD = 8.60$ ), 11% of the mothers currently smoke half a pack of cigarettes daily, and the other 16% who smoke daily consume a pack or more of cigarettes per day. Almost a quarter of the target mothers (23%) reported that there was at least one other adult smoker in the house. Thus, most of the smokers had a partner who smoked, which has implications for modelling health-risk behaviour as well as daily exposure of offspring to more environmental smoke. Table 4 presents the inter-correlations among predictors and outcomes for maternal health-risk.

The results of significant regressions on maternal health-risk indicators are presented in section B of Table 3. Mothers who were both highly aggressive and withdrawn as children were more likely to engage in health-risk behaviour in adolescence. Maternal childhood aggression was a significant risk factor for the number of cigarettes smoked while pregnant with the target child as well as current levels of smoking. These findings on maternal risky behaviour are consistent with previous results



(De Genna et al., in press), despite the fact that mothers are now smoking less (preschool  $M = 7.02$  cigarettes daily; current  $M = 4.89$  cigarettes daily) and 5 of the mothers in this sample have managed to quit since the preschool wave of testing. Therefore, being highly aggressive as a girl is a strong predictor of cigarette smoking across the childbearing years. Together with the statistics on other smokers in the household, these results have serious implications for the levels of environmental smoke in the family home, with consequences for health in these families.

Consistent with the literature on early-maturing girls (Caspi & Moffitt, 1991; Magnusson, 1988; Stattin & Magnusson, 1990) mothers who reached menarche later were less likely to engage in teenage risky behaviour (Odds Ratio = 0.92). Furthermore, engaging in a risky behaviour during adolescence (Beta = .32) and close spacing of children (Beta = .31) were both significantly linked to current maternal BMI. That is, mothers with histories of adolescent health-risk and mothers with more children were heavier than other mothers in the sample. Having more children and a higher BMI places these women at risk for health problems such as Type 2 diabetes (Sullivan, Morrato, Ghushchyan, Wyatt, & Hill, 2005) and cardiovascular disease (Dekker & Schouten, 1993; Green, Beral, & Moser, 1988; Lawlor et al., 2003; Ness et al., 1993), even after controlling for other lifestyle risk factors and SES. Based on these results and the early-maturers literature, it appears that puberty may be an important transition point for the onset of health-risk behaviours that have an influence on women's health-risk well into middle adulthood.

Maternal Wellness. Mothers engaged in several activities to maintain and preserve their "better than good" health. They slept an average of 7.86 hours nightly ( $SD = 1.09$ ), and

ate at least 3 meals or snacks per day ( $M = 3.77$ ,  $SD = 1.10$ ). The majority of the mothers reported eating no more than 1-2 servings of meat daily (86%) or sweets/fats (75%), and most participants ate at least 3 or more servings of fruits and vegetables daily (75%).

Almost all of the mothers had been to the doctor (91%) and dentist (84%) at least once in the past year. Only 27% of mothers brushed their teeth less than twice a day, and 25% of them flossed on a daily basis. Roughly half of the mothers reported some form of regular physical activity (52%) and current satisfaction with their present levels of physical activity (47%). Table 5 presents the inter-correlations among predictors and outcomes for maternal wellness.

The results of regression analyses on maternal wellness behaviours are presented in section C of Table 3. Mothers who were highly aggressive as girls ate significantly less daily servings of fruits and vegetables ( $Beta = .29$ ). Although the final chi-square for the logistic regression that predicts weekly maternal brushing was only a trend, the interaction term for maternal childhood aggression and withdrawal was significantly and negatively related to amount of brushing ( $Beta = -.46$ ).

There was partial support for our hypothesis that wellness behaviours would be positively related to each other, and to well-known buffers such as family income and maternal education. More educated mothers reported eating more fruits and vegetables ( $Beta = .29$ ), but this was only a trend. In terms of dental health, current amount of daily maternal smoking was a risk factor for annual visits to the dentist; mothers who smoked more were less likely to visit a dentist annually (Odds Ratio = 0.87). Finally, mothers who never smoked cigarettes (Odds Ratio = 9.94) and mothers with lower BMI (Odds

Ratio = 0.90) were much more likely to report that they were satisfied with their current level of physical activity.

Child health. Mothers (including mother-participants and female partners of father-participants) were asked about the physical health of the target child. This larger group of mothers generally rated their children's health as being better than the health of the smaller group of mother-participants previously examined, with an average health rating of 8.78 ( $SD = 0.16$ ). In fact, only 4 mothers (5 %) rated their child's health as less than good. Mothers of 26 children (35%) reported that their child had had a health problem in the last 12 months, including respiratory problems (22%), frequent headaches or migraines (24%), and otitis (11%). Only 6 children had been involved in an accident or injury in the past year, thus no further statistical analysis of these data was possible. In terms of medication prescribed by a physician, 23% of offspring had been prescribed antibiotics and 12% had been prescribed medication specifically for respiratory problems. Table 6 presents the inter-correlations among predictors and outcomes for child health outcomes.

The findings from the regression analyses on child health are presented in section A of Table 7. Parental childhood risk status ( $Beta = -.35$ ) significantly predicted the total number of different health problems reported for offspring. As shown in Figure 2, children of mother- or father-participants low on the two childhood risk dimensions experienced the least amount of health problems, whereas children whose participant-parent had a childhood history of social withdrawal had the most health problems. Moreover, children of a highly withdrawn mother or father (Odds Ratio = 3.25) were much more likely to be prescribed medication for respiratory problems whereas children

of aggressive parents were less likely to be on this medication (Odds Ratio = 0.18), despite being more likely to be exposed to second-hand smoke. Finally, frequent child headaches and migraines were significantly predicted by parental childhood risk status (Odds Ratio = 2.00). As seen in Figure 3, children whose mothers or fathers had been either highly aggressive or socially withdrawn were much more likely to suffer from more headaches/migraines. Thus, there was evidence of a direct path between participant-parents' childhood risk and current health problems in offspring.

Maternal rating of her own health was the best predictor of the rating of her child's health (Beta = .37), rather than parental levels of childhood risk. Being a single parent (Beta = .26) and maternal ratings of her health (Beta = -.26) also significantly predicted the total number of different health problems reported for offspring. Close spacing of children (Odds Ratio = 9.02) was a risk factor and family income was protective (although only a trend) for prescriptions for respiratory medication. Lastly, maternal smoking emerged as a risk factor for headaches in offspring (Odds Ratio = 1.07). Therefore, child health ratings varied as a function of maternal health ratings, but there was also some support for the health-SES gradient in this sample, because family income and single motherhood were independent predictors of child health problems.

Thus, parental childhood risk status appears to be both directly and indirectly related to current health in offspring. Specifically, maternal and paternal childhood histories of social withdrawal directly predicted total number of current health problems, frequent headaches and migraines, and prescription medication for respiratory problems. In terms of indirect effects, several maternal health behaviours that were predicted by parental childhood risk status also predicted health outcomes in offspring. Specifically,

children's health problems were predicted by maternal ratings of her own health, amount of maternal smoking, close spacing of children, and family income, all of which are related to parental childhood aggression. Therefore, there appear to be two distinct trajectories for the physical health of children born to parents who were highly aggressive or highly withdrawn as children.

Child Health-Risk. Mother-participants and mothers who were spouses of father-participants were asked about their children's current height and weight, which was used (together with their age and sex) to calculate their body mass index-for-age percentile, according to growth charts developed by the National Center for Health Statistics (Center for Disease Control, 2000). Children's average BMI-for-age percentile was 59.56% ( $SD = 29.74$ ). Children's BMI percentile scores indicated that only 6% of offspring could be considered underweight ( $BMI < 5^{th}$  percentile) whereas 14% of children would be considered "at risk for overweight" ( $BMI$  at  $85^{th}$ - $94^{th}$  percentile) and 11% of them would be classified as clinically overweight ( $BMI > 95^{th}$  percentile). The levels of child overweight in this sample are currently below national (26%) and provincial (23%) averages for children 2-17 years of age (Shields, 2005). Table 8 presents the inter-correlations among predictors and outcomes for health-risk in offspring.

Section B of Table 7 demonstrates the results of two regressions conducted on children's BMI. The first analysis was a hierarchical regression on child's BMI percentile. Children who were larger at birth (neonatal health status factor score:  $Beta = .37$ ) were also currently larger for their age and sex. Moreover, larger children were more likely to have had mothers who smoked more cigarettes during pregnancy ( $Beta = .38$ ). The second analysis was a logistic regression predicting overweight in offspring ( $BMI > 95^{th}$

percentile). The only statistically significant predictor in the final equation was the family prestige score for the target parent's family of origin (Odds Ratio = 0.99). Children whose grandparents had higher occupational prestige were significantly less likely to be currently overweight. There was also a trend for children whose mothers had a higher BMI (Odds Ratio = 1.13) to be more overweight. Interestingly, all significant predictors of BMI in offspring were established by the time of the child's birth, which has implications for early prevention of childhood obesity.

Child Wellness. Mother-participants and female partners of father-participants also answered questions about their children's daily health habits, such as sleep, nutrition, dental care and physical activity. Children slept an average of 9.53 hours ( $SD = 0.99$ ) per night, with only 10% of the sample getting less than 9 hours of sleep nightly. Most of the offspring (77%) brushed their teeth at least once a day, and nearly all of them (93%) saw a dentist at least once a year. Most children ate at least 3-4 servings of fruits and vegetables (74%) daily, which still puts them at greater risk for overweight compared to Canadian children who ate at least 5 servings of fruits and vegetables daily (Shields, 2005). Although most children in this sample consumed at least 3-4 servings of dairy products (72%), a surprisingly high percentage of children (34%) also consumed at least 5 daily servings of sweets or fats. Finally, although all but three of the children engaged in daily physical activity that was not mandated by the school, 16% of mothers reported that they were not satisfied with their children's current level of physical activity. Table 9 presents the inter-correlations among predictors and outcomes for wellness in offspring.

The results of regression analyses using parental risk status to predict health habits in offspring are presented in section C of Table 7. First of all, children with either a

mother or a father who had been highly aggressive and withdrawn as children slept fewer hours per night. In terms of nutrition, children with an aggressive mother or father ate less meals and snacks per day ( $Beta = -.37$ ), even after controlling for mothers' reports of her own number of meals and snacks ( $Beta = .24$ ), as well as child BMI percentile ( $Beta = -.14$ ). Finally, maternal satisfaction with her child's activity level also varied as a function of parental childhood risk status. Mothers and female partners of fathers with childhood histories of social withdrawal were much more likely to be satisfied with children's current levels of physical activity (Odds Ratio = 3.52), but there was also a trend for aggressive mothers and female partners of aggressive fathers to be less satisfied (Odds Ratio = 0.09).

Although parental childhood aggression did not predict daily servings of fruits and vegetables consumed by their children (as it had in mother-participants), mothers' own consumption of fruits and vegetables was a significant predictor of daily servings in offspring ( $Beta = .45$ ). Mothers' daily consumption was also the best predictor of children's consumption of dairy products ( $Beta = .29$ ) and sweets and fats ( $Beta = .47$ ). Children of single parents ( $Beta = -.26$ ) consumed significantly less dairy products, and there was also a trend for children whose mothers engaged in adolescent risk-taking to consume less dairy. Similarly, although maternal toothbrushing significantly predicted toothbrushing frequency in offspring ( $Beta = .34$ ), another variable emerged as a risk factor for dental hygiene. Offspring from the Concordia project whose mothers had a higher BMI ( $Beta = -.40$ ) brushed their teeth significantly less than other offspring. Taken together, these results on child wellness suggest that preventative behaviours are strongly related to parental habits, and that parents who were highly aggressive as children may be

less likely to model appropriate daily health habits such as getting enough rest and the proper nutrition.

Services. Mother-participants and spouses of father-participants were asked to complete a services questionnaire, in which they indicated which services they were currently using, as well as their satisfaction with those services. On average, mothers reported using more than one type of medical service ( $M = 1.89$ ;  $SD = 0.97$ ; range = 0-4), including a family doctor (42%), paediatrician (57%), community clinics (15%), dentist (66%), dermatologist (7%), or some form of alternative medicine (18%). Despite current political discourse in Canada surrounding health-care reforms that involve cuts to health services that may result in decreased access, most mothers reported being very satisfied with their current medical services ( $M = 93.84$ ,  $SD = 9.24$ ), with only 4 mothers (7%) reporting that they were less than 80% satisfied.

Parents reported much less satisfaction with school services ( $M = 81.31$ ,  $SD = 0.30$ ) compared to medical services, with almost three times more mothers ( $n = 11$ ; 28%) reporting less than 80% satisfaction with available school services. Children's IQ scores were well within norms ( $M = 97.01$ ,  $SD = 14.07$ ), with scores ranging from 65-129. Only twelve children (17%) qualified as developmentally delayed ( $IQ < 85$ ) at this wave of testing, compared to almost 30% when the children were preschool age. However, over a third of the mothers ( $n = 27$ ; 37%) reported that their child had some sort of behavioural problem, including hyperactivity or attention deficits. Moreover, eleven of these children (15%) were currently taking Ritalin for their behavioural problems, but only seven of them (10%) had been to see a psychiatrist or psychologist. Finally, nearly one in five mothers (16%) reported that they had used "parent training" services such as classes on



child behaviour management, basic childcare and safety skills, and/or family therapy.

Table 10 presents the inter-correlations among predictors and outcomes for medical services, and Table 11 presents inter-correlations for developmental services.

The results of regression analyses on use of medical services and maternal satisfaction with medical services are presented in section A of Table 12. There were no significant regressions predicting overall number of medical services used, use of a family doctor, dental services or alternative medicine. Parental childhood risk status did not significantly predict use or satisfaction with medical services. However, maternal education was a significant predictor of use of the services of a paediatrician (Odds Ratio = 1.45), even after controlling for number of child health problems reported (Odds Ratio = 1.90). Mothers who were more educated were more likely to take their child to a paediatrician. In contrast, annual visits to a community walk-in clinic (provincial organizations known as *Centres locaux de services communautaires*: CLSC) were predicted by single parenthood. Single parents were more likely to take their child to one of these neighbourhood clinics (Beta = .36), which provide medical services without an appointment and therefore might be considered more convenient than a paediatrician or family doctor. Both child health problems (Beta = -.26) and maternal parenting stress (Beta = -.31) emerged as significant predictors of maternal satisfaction with medical services. As expected, mothers whose children had more health problems and mothers who were experiencing more parenting stress reported that they were less satisfied with the medical services available to them. Therefore, parental childhood risk status was only indirectly related to use and satisfaction with medical services.

The results of regression analyses on use of developmental services and maternal satisfaction with those services are presented in section B of Table 12. Although children of socially withdrawn mothers and fathers were not significantly more likely to have a behaviour problem, they were much more likely to be currently prescribed Ritalin (Odds Ratio = 11.13). There was a trend for maternal reports of externalizing problems to predict use of Ritalin, whereas the teacher report was not significant. Moreover, highly withdrawn mothers and fathers were more than twice as likely to take advantage of parent training services (Odds Ratio = 2.44). Thus, consistent with our hypotheses, use of services related to developmental problems appear to be related to parental childhood risk status.

Parental histories of childhood aggression and withdrawal did not increase the likelihood that the child had seen a mental health specialist. However, use of a child psychologist or psychiatrist was predicted by maternal ratings of problem behaviour at the school entry wave of testing, when offspring were 6-8 years of age (Odds Ratio = 2.90). There was also a trend for teacher reports of problem behaviour from the same testing period to predict use of mental health services. Taken together, current behaviour problems and use of mental health specialists were predicted by problems previously identified in offspring, when they were preschoolers or at school entry.

## Discussion

Taken together, these findings suggest that there is a link between early problem behaviours such as aggression and withdrawal and health-risk, and that this link may help perpetuate the accumulation of health-risk within high-risk families noted by previous investigators (e.g., Felitti, et al., 1998; Repetti, Taylor, & Seeman, 2002; Taylor et al., 2004). There was evidence for different trajectories of health behaviour for individuals who were highly aggressive, socially withdrawn or high on both behavioural risk dimensions in childhood, with different implications for the next generation. For example, although offspring of parents who were highly aggressive may be exposed to more second-hand smoke, offspring of parents who were highly withdrawn were more likely to have been prescribed medication for respiratory problems. Similarly, although there was evidence that children of parents with histories of childhood aggression were more likely to model poor health habits, parents who were high on withdrawal but low on aggression reported the most health problems in their children. Maternal health-risk and wellness behaviours were related to each other and also to health behaviours in children, supporting inter-generational continuity and suggesting an indirect pathway of risk or resilience from parental childhood risk status to health in the next generation.

The results of this study add to the body of evidence that health-risks tend to cluster in certain individuals (Caspi et al., 1997; Donovan & Jessor, 1985; Ensminger, 1987; Mott & Haurin, 1988; Osgood et al., 1988), and are linked to early behaviour problems (Donovan & Jessor, 1985; Scaramella et al., 1998; Sher, 1991). In the current wave of testing, maternal childhood aggression predicted lower self-rated physical health and some current health-risk in Concordia mothers (e.g., smoking, poorer nutrition), and

health behaviours in mothers were related to health behaviours in offspring. In contrast, maternal childhood withdrawal predicted current internalizing symptoms such as more headaches and migraines, and increased use of developmental services. These findings support continuity of behavioural risk across the lifespan for girls who are highly aggressive or withdrawn as children, with implications for health-risk and future health problems, as well as health in the next generation.

Consistent with our previous study of these families when offspring were preschoolers, maternal childhood aggression was a predictor of current smoking. According to the *Canadian Council on Smoking and Health*, more teenage girls than boys are taking up smoking and less women than men are quitting smoking in Canada, so smoking presents a serious problem for Canadian women and their families (Connor & McIntyre, 2002). Smoking also emerged as an important predictor of preventative behaviour in these women, such as annual visits to the dentist and regular physical activity. Therefore, aggression in girls appears to be a risk factor for smoking while pregnant, continuing to smoke more cigarettes daily into middle adulthood, having a romantic partner who also smokes, and engaging in less health preventative behaviours. All of these findings suggest that identifying young girls who are aggressive may be an important first step to targeting children who are vulnerable to health-risk, and that smoking in women is associated with additive health-risks above and beyond the daily exposure to nicotine.

Maternal behaviours have a direct impact on their children's health, via the environment they provide in terms of home and services, as well as an indirect impact by modelling health lifestyles. However, parental risk status did not significantly predict

respiratory problems in offspring in this study, nor did daily amount of maternal smoking. These results are inconsistent with previous findings from the Concordia project, when children were preschool age (De Genna et al., in press). During that earlier wave of testing, boys were more susceptible to respiratory problems, as were children whose mothers smoked more, which was predicted by maternal childhood aggression. However, gender differences in asthma and other respiratory problems are known to decline across childhood, and preschoolers may be exposed to more secondhand smoke at home than schoolchildren. Preschoolers may also be more vulnerable to the effects of secondhand smoke than older children. Nevertheless, it is important to note that mothers with histories of childhood aggression smoke significantly more than other mothers, from conception across the preschool years to middle childhood.

Although previous studies of the Concordia families have suggested that the combination of aggression and withdrawal may put these individuals and their families at higher risk than either childhood behaviour problem in isolation (Serbin et al., 1996; 1998), there was less evidence of this cumulative risk in the current sample. However, use of the interaction term in regression analyses generally revealed that high withdrawal, in the absence of high levels of aggression, was related to more negative health outcomes. Moreover, although high levels of aggression and withdrawal were not directly related to current BMI in mothers, as seen during the preschool wave of testing, this constellation did predict maternal adolescent health-risk, which was consistent with the preschool testing. Adolescent health-risk was also positively related to current maternal BMI, and BMI in offspring was positively related to maternal smoking while pregnant (which was directly predicted by parental histories of childhood aggression).

Family income was not a good predictor of health or health-risk in either mothers or offspring in the current study. However, some authors have suggested that SES is not as effective as social class for predicting value-laden health behaviours such as smoking during pregnancy (Pickett, Wakschlag, Rathouz, Leventhal, & Abrams, 2002). The contribution of social class, above and beyond family income and maternal education, would be an interesting point to consider in future studies. Other authors have suggested that the SES-health differential is most pronounced in countries with high income disparities, and material inequalities are not as pronounced in Canada as in the USA (Carroll, Smith, & Bennett, 2002). In fact, an ecological study of 21 developed countries by Pickett and her colleagues (2005) demonstrated that obesity, diabetes mortality and calorie consumption were associated with income inequality, such that obesity is less of a problem in Scandinavian countries and much higher in countries with high income disparities like the United States of America. Another possibility is that health problems related to income disparities may only become evident over long periods of time, or even across generations. Evidence for this hypothesis in the current study was the finding that grandparents' occupational prestige was the single best predictor of overweight in children.

Single parenthood and close spacing of births did emerge as risk factors for both health problems and preventative practices in offspring, whereas family income did not. The added stress of raising children alone and raising children who were born less than two years apart may undermine parents' abilities to monitor their children's health habits, manage their health care, and be successful advocates for them in the health care system. However, as seen in Table 6, neither single parenthood nor close spacing of births was

significantly positively correlated to our measure of parenting stress. Nevertheless, it is interesting that these parenting risk factors had more impact on child health outcomes than family income in this community sample.

Childhood histories of withdrawal in mothers and fathers were related to current developmental problems in offspring, and increased use of developmental services. Parents with childhood histories of social withdrawal sought more help for children's behavioural problems, both for themselves (in terms of parent training) and for their children (e.g., Ritalin), despite the fact that their children were not significantly more likely to have behavioural problems. Other studies have demonstrated that parents whose children's problems affect their sense of wellbeing and parenting competence are more likely to seek services for these problems (Angold et al., 1998; Farmer et al., 1997; Messer et al., 1996). It is possible that parents who experienced difficulties relating to others in childhood and who were extremely socially withdrawn from their peers may also find relating to their children (i.e., parenting) more challenging than other individuals.

There was also evidence that use of and satisfaction with medical services was associated with SES-related variables (e.g., maternal education, single parenthood) and parenting stress more than parental childhood risk status. These family and parent characteristics were independent predictors of use of medical services, after taking into account the number of child health problems. Therefore, even in a country with a universal health care program in place, SES remains an important predictor of use of medical services. These findings are especially interesting in light of the fact that SES did not predict more health problems per se in offspring. In terms of satisfaction with medical

services used, it is not clear from this study whether parenting stress is a predictor of dissatisfaction with medical services, or whether dissatisfaction with medical services for children contributes to parenting stress.

In sum, there was evidence to support both aspects of health lifestyles theory: the effects of social conditions and the effects of individual differences in psychosocial risk. The effects of social conditions were more evident in correlates of family poverty such as single parenthood and maternal education, rather than family income. The effects of individual differences became evident in the different trajectories of health-risk across the lifespan for aggressive and withdrawn girls. The results of this study contribute to the mounting evidence for aggression as a risk factor for girls' physical health, consistent with our previous examination of these families when the offspring were preschool age (De Genna et al., in press), as well as Miller et al's (1996) comprehensive meta-analysis on the health-hostility link. That is, even within a relatively disadvantaged group of girls from inner-city schools, it is possible to distinguish which girls and which families might be at greater risk due to the adoption of unhealthy lifestyles.

Taking a developmental perspective and longitudinally examining these individuals into middle adulthood makes it possible to identify specific times in the lifespan when intervention with the more vulnerable populations would be most appropriate. Because aggression and withdrawal in childhood remain predictors of health-related behaviour well into middle adulthood, it is clear that early identification of girls who may be at health-risk is possible. Adolescence may also be an important turning point for highly aggressive and withdrawn girls: girls reaching physical maturity earlier and girls engaging in early health-risk behaviour were the most likely to engage in



negative patterns of behaviour that endured well into adulthood. Finally, parenthood represents a crucial period in life trajectories, and an important opportunity for health care professionals to intercede in order to prevent health problems in new families, especially for parents with childhood histories of social withdrawal.

The present study makes an important contribution to the research on inter-generational transfer of risk, with implications for health lifestyles in high-risk families. However, several limitations need to be addressed in future research. One of the limitations of the present study was a relatively small sample size, which resulted in less power to detect significant differences among the parental childhood risk groups. However, a regression approach was utilized in order to treat aggression and withdrawal as dimensions rather than breaking the sample up into groups, thereby maximizing power to detect real effects. Another limitation of this study is its reliance on maternal report for both health status and health behaviours, although previous studies have demonstrated that self- and maternal-report of health-related variables are reliable (Idler & Benyamini, 1997; Klebanoff et al., 2001; Kodl & Wakschlag, 2004; Kohen et al., 1997; McCollough & Laurenceau, 2004; McCormick et al., 1989; Mossey & Shapiro, 1982; Peacock et al., 1998; Pless & Pless, 1995). Nevertheless, medical records are being obtained for a much larger sample of participants in the latest phase of the Concordia study, and a questionnaire on health habits that can be completed anonymously has been developed for administration to parents and offspring (now adolescents and young adults) in order to address both of these issues.

Despite the limitations of the current study, the authors believe that these results augment the body of literature linking early problem behaviour to health lifestyles within

high-risk families, and help illuminate pathways for the transfer of health-risk across generations. Although prospective, longitudinal and inter-generational studies of girlhood aggression are rare, more research is clearly warranted on health lifestyles and outcomes in these individuals, as evidence that aggressive women are as much at health-risk as aggressive men continues to accumulate. Moreover, future investigations need to remain sensitive to developmental timing, because important life transitions such as adolescence and parenthood may present important opportunities for women to align onto a healthier pathway, or adopt new negative health lifestyle behaviours.

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Table 1.

*Means and standard deviations for demographic characteristics of the mother-participant sample and full sample (including 30 female partners of father-participants)*

|   | Mother-participants ( <i>n</i> =44) | Full sample ( <i>n</i> =74) |
|---|-------------------------------------|-----------------------------|
| Family prestige score in target parent's family of origin | 393 (113)                           | 369 (105)                   |
| Maternal education (years)                                | 12.27 (2.60)                        | 12.14 (2.45)                |
| Annual family income (in Canadian dollars)                | \$58,707 (32, 222)                  | \$63,802 (37,717)           |
| Maternal age at testing (years)                           | 36.90 (2.41)                        | 36.81 (2.96)                |
| Child age at testing (years)                              | 11.24 (1.03)                        | 11.09 (0.96)                |

*Note.* Standard deviations are presented in parentheses.

Table 2.

*Inter-correlations among variables predicting Maternal Health Problems (n = 44)*

| Variable                                       | 1 | 2   | 3      | 4     | 5     | 6      | 7     | 8                 |
|--|---|-----|--------|-------|-------|--------|-------|-------------------|
| 1. Childhood Aggression                        | - | .05 | -.33*  | -.17  | .47** | -.40** | -.20  | .21               |
| 2. Childhood Withdrawal                        | - | -   | -.41** | -.07  | -.05  | -.12   | .39** | -.04              |
| 3. Maternal Education                          | - | -   | -      | .45** | -.26  | .09    | -.00  | -.01              |
| 4. Family Income                               | - | -   | -      | -     | -.35* | .03    | .15   | -.24              |
| 5. Smoking during<br>Preschool Wave of testing | - | -   | -      | -     | -     | -.15   | -.15  | .44**             |
| 6. Self-rating of Health                       | - | -   | -      | -     | -     | -      | -.17  | -.26 <sup>t</sup> |
| 7. Frequent Headaches/Migraines                | - | -   | -      | -     | -     | -      | -     | .07               |
| 8. Problems with Blood Pressure                | - | -   | -      | -     | -     | -      | -     | -                 |

Note. <sup>t</sup>  $p < .10$ , \* $p < .05$ , \*\* $p < .01$

Table 3.

*Summary of Significant Results from the Regression Models predicting Maternal Health Outcomes*

| Outcome Measures                   | Significant Predictors in the Final Model | Step statistic         | Final Equation   |
|------------------------------------|---|------------------------|--|
| <b>A. Maternal Health Problems</b> |   |                        |  |
| Self-Rated Health Status           | Maternal childhood aggression*            | Fch= 4.07*             | R <sup>2</sup> adj= .11, F= 2.80*                              |
| Headaches/Migraines                | Maternal childhood withdrawal*            | $\chi^2$ = 9.49**      | Cox & Snell R <sup>2</sup> = .21, $\chi^2$ = 10.57*            |
| High/Low Blood Pressure            | Maternal smoking during preschool years*  | $\chi^2$ = 5.31*       | Cox & Snell R <sup>2</sup> = .15, $\chi^2$ = 7.34 <sup>†</sup> |
| <b>B. Maternal Health-Risk</b>     |   |                        |  |
| Adolescent Health-Risk Index       | Aggression x Withdrawal interaction*      | $\chi^2$ = 10.07*      | Cox & Snell R <sup>2</sup> = .35, $\chi^2$ = 18.85**           |
| Smoking during Pregnancy           | Maternal age at menarche*                 | $\chi^2$ = 4.09*       |  |
| Current smoking (# of cigarettes)  | Maternal childhood aggression*            | Fch= 5.48**            | R <sup>2</sup> adj= .22, F= 2.80*                              |
| Body mass index (BMI)              | Maternal childhood aggression*            | Fch= 2.40 <sup>†</sup> | R <sup>2</sup> adj= .12, F= 2.93*                              |
|                                    | Adolescent health-risk index*             | Fch= 6.08*             | R <sup>2</sup> adj= .19, F= 3.17*                              |
|                                    | Close spacing of children*                | Fch= 3.99*             |  |
| <b>C. Maternal Wellness</b>        |   |                        |  |
| Daily servings of fruits/veggies   | Maternal childhood aggression*            | Fch= 5.03**            | R <sup>2</sup> adj= .24, F= 4.42**                             |
| Weekly toothbrushing               | Maternal education (years) <sup>†</sup>   | Fch= 3.26*             |  |
| Annual visit to a dentist          | Aggression x Withdrawal interaction*      | Fch= 6.35*             | R <sup>2</sup> adj= .10, F= 2.24 <sup>†</sup>                  |
| Satisfaction Physical Activity     | Current smoking*                          | $\chi^2$ = 6.82**      | Cox & Snell R <sup>2</sup> = .23, $\chi^2$ = 11.69*            |
|                                    | Never smoker*                             | $\chi^2$ = 10.58**     | Cox & Snell R <sup>2</sup> = .22, $\chi^2$ = 10.64*            |
|                                    | Body mass index (BMI)*                    | $\chi^2$ = 10.58**     |  |

Note. <sup>†</sup>p < .10, \*p < .05, \*\*p < .01

Table 4.

*Inter-correlations among variables predicting Maternal Health-Risk (n = 44)*

| Variable                          | 1 | 2   | 3     | 4    | 5                 | 6                | 7     | 8                 | 9                 | 10   | 11     | 12    | 13                |
|-----------------------------------|---|-----|-------|------|-------------------|------------------|-------|-------------------|-------------------|------|--------|-------|-------------------|
| 1. Childhood Aggression           | - | .05 | .51** | -.15 | -.05              | .27 <sup>t</sup> | .44** | -.33*             | -.17              | .10  | .06    | .31*  | .21               |
| 2. Childhood Withdrawal           | - | -   | .37*  | -.22 | .11               | .06              | -.11  | -.41**            | -.07              | -.20 | .09    | .10   | .09               |
| 3. Aggression x Withdrawal        | - | -   | -     | -.21 | .21               | .39**            | .23   | -.25 <sup>t</sup> | -.41**            | -.06 | .13    | .32*  | .28 <sup>t</sup>  |
| 4. Parents' Occupational Prestige | - | -   | -     | -    | -.27 <sup>t</sup> | .11              | -.11  | .22               | .20               | .06  | -.17   | .03   | .13               |
| 5. Age at Menarche                | - | -   | -     | -    | -                 | -.32*            | -.02  | .00               | .02               | -.22 | -.11   | .08   | -.27 <sup>t</sup> |
| 6. Adolescent Health-Risk         | - | -   | -     | -    | -                 | -                | .17   | -.14              | -.27 <sup>t</sup> | .22  | .21    | .13   | .39**             |
| 7. Smoking while Pregnant         | - | -   | -     | -    | -                 | -                | -     | -.17              | -.20              | -.08 | .09    | .52** | .14               |
| 8. Maternal Education             | - | -   | -     | -    | -                 | -                | -     | -                 | .45**             | .02  | -.21   | -.17  | -.20              |
| 9. Family Income                  | - | -   | -     | -    | -                 | -                | -     | -                 | -                 | .04  | -.51** | -.15  | -.17              |
| 10. Closely Spaced Offspring      | - | -   | -     | -    | -                 | -                | -     | -                 | -                 | -    | .06    | -.13  | .36*              |
| 11. Single Parent                 | - | -   | -     | -    | -                 | -                | -     | -                 | -                 | -    | -      | .30*  | -.18              |
| 12. Current Smoking               | - | -   | -     | -    | -                 | -                | -     | -                 | -                 | -    | -      | -     | .07               |
| 13. Body Mass Index (BMI)         | - | -   | -     | -    | -                 | -                | -     | -                 | -                 | -    | -      | -     | -                 |

*Note.* <sup>t</sup> $p < .10$ , \* $p < .05$ , \*\* $p < .01$

Table 5.

*Inter-correlations among variables predicting Maternal Wellness (n = 44)*

| Variable   | 1 | 2   | 3     | 4      | 5      | 6                | 7    | 8                 | 9                | 10     | 11                | 12               | 13    |
|--|---|-----|-------|--------|--------|------------------|------|-------------------|------------------|--------|-------------------|------------------|-------|
| 1. Childhood Aggression                                  | - | .05 | .51** | -.33*  | -.17   | .49**            | .36* | .31*              | .21              | -.42** | -.18              | -.06             | -.00  |
| 2. Childhood Withdrawal                                  | - | -   | .37*  | -.41** | -.07   | .26 <sup>t</sup> | -.23 | .10               | .09              | -.17   | -.06              | .02              | -.04  |
| 3. Aggression x Withdrawal                               | - | -   | -     | -.25   | -.41** | .62**            | -.01 | .32*              | .28 <sup>t</sup> | .03    | -.38**            | -.14             | -.10  |
| 4. Maternal Education                                    | - | -   | -     | -      | .45**  | -.36*            | -.24 | -.17              | -.20             | .42**  | .20               | .19              | -.20  |
| 5. Family Income   | - | -   | -     | -      | -      | -.36*            | -.17 | -.15              | -.17             | .10    | .11               | .31*             | .10   |
| 6. On Welfare  | - | -   | -     | -      | -      | -                | .09  | .32*              | .05              | -.20   | -.08              | -.13             | -.07  |
| 7. Never Smoker  | - | -   | -     | -      | -      | -                | -    | -.29 <sup>t</sup> | -.01             | -.16   | -.07              | .07              | .32*  |
| 8. Current Smoking                                       | - | -   | -     | -      | -      | -                | -    | -                 | .07              | -.29*  | -.19              | -.47**           | -.03  |
| 9. Body Mass Index (BMI)                                 | - | -   | -     | -      | -      | -                | -    | -                 | -                | -.02   | -.27 <sup>t</sup> | .02              | -.33* |
| 10. Servings of Fruits/Vegetables                        | - | -   | -     | -      | -      | -                | -    | -                 | -                | -      | .13               | .27 <sup>t</sup> | -.16  |
| 11. Toothbrushing Frequency                              | - | -   | -     | -      | -      | -                | -    | -                 | -                | -      | -                 | .39**            | -.23  |
| 12. Annual dentist visit                                 | - | -   | -     | -      | -      | -                | -    | -                 | -                | -      | -                 | -                | .03   |
| 13. Satisfaction with Current Level of Physical Activity | - | -   | -     | -      | -      | -                | -    | -                 | -                | -      | -                 | -                | -     |

*Note.* <sup>t</sup> $p < .10$ , \* $p < .05$ , \*\* $p < .01$

Table 6.  
Inter-correlations among variables predicting Health Problems in Offspring ( $n = 74$ )

| Variable                              | 1 | 2    | 3     | 4      | 5     | 6    | 7      | 8                | 9     | 10                | 11                | 12                | 13    | 14               | 15                |
|---------------------------------------|---|------|-------|--------|-------|------|--------|------------------|-------|-------------------|-------------------|-------------------|-------|------------------|-------------------|
| 1. Parental Aggression                | - | -.02 | .38** | -.32** | -.11  | .00  | .15    | .22 <sup>t</sup> | .27*  | -.00              | -.23 <sup>t</sup> | -.10              | -.15  | -.05             | -.13              |
| 2. Parental Withdrawal                | - | -    | .30** | -.24*  | .18   | -.06 | .04    | .14              | -.07  | .14               | -.12              | .18               | .19   | .17              | -.17              |
| 3. Aggression x Withdrawal            | - | -    | -     | -.19   | -.26* | -.04 | .07    | .21 <sup>t</sup> | .17   | -.10              | -.23 <sup>t</sup> | -.21 <sup>t</sup> | -.13  | -.23*-.23*       |                   |
| 4. Maternal Education                 | - | -    | -     | -      | .25*  | .10  | -.15   | .01              | -.16  | -.10              | .07               | -.03              | -.04  | -.06             | .09               |
| 5. Family Income                      | - | -    | -     | -      | -     | .03  | -.33** | .12              | -.27* | .17               | -.10              | .11               | -.06  | .17              | -.19              |
| 6. Close spacing of children          | - | -    | -     | -      | -     | -    | .01    | .18              | -.10  | .12               | -.03              | .15               | .32** | -.06             | -.04              |
| 7. Single parent                      | - | -    | -     | -      | -     | -    | -      | .00              | .15   | -.01              | -.01              | .21 <sup>t</sup>  | -.02  | .06              | -.08              |
| 8. Maternal parenting stress          | - | -    | -     | -      | -     | -    | -      | -                | .13   | -.03              | -.37**            | .17               | .04   | .13              | -.43**            |
| 9. Current Smoking                    | - | -    | -     | -      | -     | -    | -      | -                | -     | -.22 <sup>t</sup> | -.15              | .11               | -.00  | .20 <sup>t</sup> | -.19              |
| 10. Neonatal Health Factor            | - | -    | -     | -      | -     | -    | -      | -                | -     | -                 | .15               | -.19 <sup>t</sup> | -.08  | -.01             | .07               |
| 11. Maternal Self-rated Health-       | - | -    | -     | -      | -     | -    | -      | -                | -     | -                 | -                 | -.25*             | -.02  | -.24*-.53**      |                   |
| 12. Child Health Problems             | - | -    | -     | -      | -     | -    | -      | -                | -     | -                 | -                 | -                 | .34** | .59**            | -.21 <sup>t</sup> |
| 13. Respiratory Medication            | - | -    | -     | -      | -     | -    | -      | -                | -     | -                 | -                 | -                 | -     | .08              | -.00              |
| 14. Frequent Headaches/Migraines      | - | -    | -     | -      | -     | -    | -      | -                | -     | -                 | -                 | -                 | -     | -                | -.19              |
| 15. Maternal rating of Child's Health | - | -    | -     | -      | -     | -    | -      | -                | -     | -                 | -                 | -                 | -     | -                | -                 |

Note.  $p < .10$ , \* $p < .05$ , \*\* $p < .01$



Table 7.  
Summary of Significant Results from the Regression Models Predicting Child Health Outcomes

| Outcome Measures                             | Significant Predictors in the Final Model   | Step statistic                                      | Final Equation                                       |
|--|---|---|--|
| <b>A. Child Health Problems</b>              |   |   |  |
| Number of health problems                    | Aggression x Withdrawal interaction*<br>Maternal ratings of her own health*<br>Single parenthood* | Fch= 6.84**<br>Fch= 3.16 <sup>†</sup><br>Fch= 3.29* | R <sup>2</sup> adj= .19, F= 3.39**                   |
| Respiratory medication                       | Parental childhood withdrawal*<br>Close spacing of children*                                      | $\chi^2$ = 3.52<br>$\chi^2$ = 11.45**               | Cox & Snell R <sup>2</sup> = .22, $\chi^2$ = 10.64*  |
| Headaches/migraines                          | Aggression x Withdrawal interaction*<br>Maternal smoking (# cigarettes)                           | $\chi^2$ = 8.15**<br>$\chi^2$ = 3.89*               | Cox & Snell R <sup>2</sup> = .18, $\chi^2$ = 14.32** |
| Maternal-rated health status                 | Maternal rating of her own health*<br>Maternal parenting stress*                                  | Fch= 9.25**<br>Fch= 6.80**                          | R <sup>2</sup> adj= .19, F= 3.62**                   |
| <b>B. Child Health-Risk</b>                  |   |   |  |
| Body mass index (BMI-for-age)                | Neonatal health status factor*<br>Maternal smoking during pregnancy*                              | Fch= 12.45***<br>Fch= 12.45***                      | R <sup>2</sup> adj= .24, F= 4.59***                  |
| Overweight (BMI > 95 <sup>th</sup> %ile)     | Grandparents' occupational prestige*<br>Maternal BMI <sup>†</sup>                                 | $\chi^2$ = 12.31**<br>$\chi^2$ = 3.05 <sup>†</sup>  | Cox & Snell R <sup>2</sup> = .20, $\chi^2$ = 16.14** |
| <b>C. Child Wellness</b>                     |   |   |  |
| Sleep (hours per night)                      | Aggression x Withdrawal interaction*  | Fch= 6.72**   | R <sup>2</sup> adj= .13, F= 3.58**                   |
| Meals/snacks per day                         | Parental childhood aggression*<br>Maternal meals/snacks*  | Fch= 5.31**<br>Fch= 5.15*                           | R <sup>2</sup> adj= .17, F= 3.33**                   |
| Maternal Satisfaction with Physical Activity | Parental social withdrawal*   | $\chi^2$ = 8.09*                                    | Cox & Snell R <sup>2</sup> = .17, $\chi^2$ = 13.03*  |
| Daily servings of fruits/veggies             | Maternal servings of fruits/vegetables*   | Fch= 15.47***                                       | R <sup>2</sup> adj= .21, F= 5.65***                  |
| Daily servings of dairy                      | Maternal servings of dairy products *   | Fch= 7.25**   | R <sup>2</sup> adj= .24, F= 4.76***                  |
| Weekly toothbrushing                         | Single parenthood*<br>Maternal weekly toothbrushing*<br>Maternal BMI*                             | Fch= 5.70*<br>Fch= 9.24**<br>Fch= 11.11***          | R <sup>2</sup> adj= .33, F= 5.74***                  |

Note. <sup>†</sup>p < .10, \*p < .05, \*\*p < .01, \*\*\*p < .001

Table 8.

*Inter-correlations among variables predicting Health-Risk in Offspring (n = 74)*

| Variable                               | 1 | 2    | 3     | 4                 | 5                | 6     | 7    | 8     | 9                | 10               | 11     |
|--|---|------|-------|-------------------|------------------|-------|------|-------|------------------|------------------|--------|
| 1. Parental Aggression                 | - | -.02 | .38** | -.20 <sup>t</sup> | .22 <sup>t</sup> | .33** | -.00 | -.11  | .12              | -.05             | -.03   |
| 2. Parental Withdrawal                 | - | -    | .30** | -.16              | .03              | -.04  | .14  | .18   | .04              | .08              | .08    |
| 3. Aggression x Withdrawal             | - | -    | -     | -.21 <sup>t</sup> | .31**            | .17   | -.10 | -.26* | .23*             | -.01             | -.06   |
| 4. Grandparents' Occupational Prestige | - | -    | -     | -                 | .00              | -.13  | .10  | .13   | .13              | .03              | -.30** |
| 5. Maternal Adolescent Health-Risk     | - | -    | -     | -                 | -                | .32** | -.08 | -.27* | .23 <sup>t</sup> | .12              | -.25*  |
| 6. Smoking while Pregnant              | - | -    | -     | -                 | -                | -     | -.07 | -.25* | .06              | .26*             | -.11   |
| 7. Neonatal Health Factor              | - | -    | -     | -                 | -                | -     | -    | .17   | .27*             | .41**            | .09    |
| 8. Family Income                       | - | -    | -     | -                 | -                | -     | -    | -     | -.12             | .06              | .03    |
| 9. Maternal BMI                        | - | -    | -     | -                 | -                | -     | -    | -     | -                | .22 <sup>t</sup> | .05    |
| 10. Child's BMI-for-age                | - | -    | -     | -                 | -                | -     | -    | -     | -                | -                | .10    |
| 11. Child Overweight                   | - | -    | -     | -                 | -                | -     | -    | -     | -                | -                | -      |

*Note.* <sup>t</sup> $p < .10$ , \* $p < .05$ , \*\* $p < .01$

Table 9. *Inter-correlations among variables predicting Wellness in Offspring (n = 74)*

| Variable   | 1 | 2    | 3     | 4      | 5     | 6     | 7    | 8     | 9    | 10               | 11                | 12                | 13                | 14   | 15    |
|--|---|------|-------|--------|-------|-------|------|-------|------|------------------|-------------------|-------------------|-------------------|------|-------|
| 1. Parental Aggression                                 | - | -.02 | .38** | -.32** | -.11  | .33** | .00  | -.15  | .16  | -.05             | -.27*             | -.14              | -.33**            | -.16 | -.13  |
| 2. Parental Withdrawal                                 | - | -    | .30** | -.24*  | .18   | .20   | -.08 | .08   | -.15 | .14              | -.12              | -.26*             | -.06              | .26* | .09   |
| 3. Aggression x Withdrawal                             | - | -    | -     | -.19   | -.26* | .51** | -.05 | -.18  | -.06 | -.04             | -.04              | -.39**            | -.24*             | .01  | .01   |
| 4. Maternal Education                                  | - | -    | -     | -      | .25*  | -.24* | .07  | -.01  | -.15 | -.12             | .31**             | .14               | .03               | -.15 | -.01  |
| 5. Family Income                                       | - | -    | -     | -      | -     | -.28* | -.07 | .18   | -.06 | .09              | .12               | .02               | -.10              | .10  | -.02  |
| 6. On Welfare  | - | -    | -     | -      | -     | -     | -.08 | -.27* | .02  | -.08             | -.22 <sup>t</sup> | -.20 <sup>t</sup> | -.22 <sup>t</sup> | -.05 | -.05  |
| 7. Maternal Sleeping                                   | - | -    | -     | -      | -     | -     | -    | .04   | .11  | .21 <sup>t</sup> | -.21 <sup>t</sup> | .08               | .12               | -.11 | -.24* |
| 8. Maternal Meals/Snacks                               | - | -    | -     | -      | -     | -     | -    | -     | .08  | .22 <sup>t</sup> | .16               | .28*              | .22 <sup>t</sup>  | .12  | -.03  |
| 9. Mother Never Smoked                                 | - | -    | -     | -      | -     | -     | -    | -     | -    | .18              | -.10              | -.10              | -.04              | .13  | -.15  |
| 10. Maternal Satisfaction<br>Own Physical Activity     | - | -    | -     | -      | -     | -     | -    | -     | -    | -                | -.11              | .09               | .06               | .23* | -.09  |
| 11. Maternal Fruits/Veggies                            | - | -    | -     | -      | -     | -     | -    | -     | -    | -                | -                 | .16               | .15               | .02  | .47** |
| 12. Child Sleeping                                     | - | -    | -     | -      | -     | -     | -    | -     | -    | -                | -                 | -                 | .17               | -.06 | .12   |
| 13. Child Meals/Snacks                                 | - | -    | -     | -      | -     | -     | -    | -     | -    | -                | -                 | -                 | -                 | .05  | .13   |
| 14. Maternal Satisfaction<br>Child's Physical Activity | - | -    | -     | -      | -     | -     | -    | -     | -    | -                | -                 | -                 | -                 | -    | .13   |
| 15. Child's Fruits/Veggies                             | - | -    | -     | -      | -     | -     | -    | -     | -    | -                | -                 | -                 | -                 | -    | -     |

Note. <sup>t</sup> $p < .10$ , \* $p < .05$ , \*\* $p < .01$

Table 10.

*Inter-correlations among variables predicting Use and Satisfaction with Medical Services (n = 74)*

| Variable                               | 1 | 2    | 3      | 4    | 5      | 6                | 7                | 8                | 9    | 10    |
|--|---|------|--------|------|--------|------------------|------------------|------------------|------|-------|
| 1. Parental Aggression                 | - | -.02 | -.32** | -.11 | .15    | .22 <sup>t</sup> | -.10             | -.14             | -.16 | .03   |
| 2. Parental Withdrawal                 | - | -    | -.24*  | .18  | .04    | .14              | .18              | -.08             | .08  | .09   |
| 3. Maternal Education                  | - | -    | -      | .25* | -.15   | .01              | -.03             | .36**            | .05  | -.13  |
| 4. Family Income                       | - | -    | -      | -    | -.33** | .12              | .11              | .19              | -.07 | -.06  |
| 5. Single Parent                       | - | -    | -      | -    | -      | .00              | .21 <sup>t</sup> | -.04             | .16  | .02   |
| 6. Maternal Parenting Stress           | - | -    | -      | -    | -      | -                | .17              | .06              | .09  | -.29* |
| 7. Child Health Problems               | - | -    | -      | -    | -      | -                | -                | .22 <sup>t</sup> | .02  | -.30* |
| 8. Annual visit to Paediatrician       | - | -    | -      | -    | -      | -                | -                | -                | -.02 | -.15  |
| 9. Visits to Neighbourhood Clinic      | - | -    | -      | -    | -      | -                | -                | -                | -    | -.04  |
| 10. Satisfaction with Medical Services | - | -    | -      | -    | -      | -                | -                | -                | -    | -     |

Note. <sup>t</sup> $p < .10$ , \* $p < .05$ , \*\* $p < .01$

Table 11. *Inter-correlations among variables predicting Use and Satisfaction with Developmental Services (n = 74)*

| Variable                                       | 1 | 2    | 3                 | 4                | 5      | 6     | 7                | 8    | 9    | 10     | 11               | 12                | 13    | 14     | 15               | 16   | 17    |
|--|---|------|-------------------|------------------|--------|-------|------------------|------|------|--------|------------------|-------------------|-------|--------|------------------|------|-------|
| 1. Parental Aggression                         | - | -.02 | -.20 <sup>t</sup> | .22 <sup>t</sup> | -.32** | -.11  | .22 <sup>t</sup> | -.04 | -.00 | .33**  | .21 <sup>t</sup> | .10               | .16   | .00    | .26*             | -.05 | .16   |
| 2. Parental Withdrawal                         | - | -    | -.16              | .03              | -.24*  | .18   | .14              | -.13 | .14  | .02    | .08              | -.02              | .16   | .31**  | .26*             | -.05 | -.07  |
| 3. Grandparents' Occupational Prestige         | - | -    | -                 | .00              | .23*   | .13   | .12              | -.08 | .10  | .06    | .04              | -.23 <sup>t</sup> | .02   | .04    | -.07             | -.27 | .19   |
| 4. Maternal Adolescent Health-risk             | - | -    | -                 | -                | -.14   | -.27* | .09              | -.13 | -.08 | .08    | .16              | .17               | .15   | .09    | .21 <sup>t</sup> | -.29 | .15   |
| 5. Maternal Education                          | - | -    | -                 | -                | -      | .25*  | .01              | .06  | -.10 | -.16   | .07              | -.14              | -.04  | -.06   | -.06             | -.32 | -.01  |
| 6. Family Income                               | - | -    | -                 | -                | -      | -     | .12              | .01  | .17  | .10    | .08              | -.08              | -.08  | -.08   | .02              | -.07 | -.05  |
| 7. Maternal Parenting Stress                   | - | -    | -                 | -                | -      | -     | -                | -.13 | -.03 | .31*   | .48**            | .29*              | .56** | .17    | .18              | -.08 | .28*  |
| 8. Child Gender                                | - | -    | -                 | -                | -      | -     | -                | -    | -.04 | -.45** | -.34**           | -.31*             | -.28* | -.35** | -.16             | .31  | -.15  |
| 9. Neonatal Health Factor                      | - | -    | -                 | -                | -      | -     | -                | -    | -    | -.00   | .07              | -.12              | .05   | -.03   | .16              | -.12 | .06   |
| 10. Behaviour problems at school entry-Teacher | - | -    | -                 | -                | -      | -     | -                | -    | -    | -      | -.44**           | .43**             | .28*  | .20    | .23              | -.12 | -.03  |
| 11. Behaviour problems at school entry-Mother  | - | -    | -                 | -                | -      | -     | -                | -    | -    | -      | -                | .38**             | .63** | .37**  | .30*             | .20  | .32** |
| 12. Child's externalizing problems-Teacher     | - | -    | -                 | -                | -      | -     | -                | -    | -    | -      | -                | -                 | .33** | .30*   | .10              | -.07 | .05   |
| 13. Child's externalizing problems-Mother      | - | -    | -                 | -                | -      | -     | -                | -    | -    | -      | -                | -                 | -     | .35**  | .21 <sup>t</sup> | -.09 | .29*  |
| 14. Child on Ritalin                           | - | -    | -                 | -                | -      | -     | -                | -    | -    | -      | -                | -                 | -     | -      | .23*             | -.08 | .43** |
| 15. Parental use of Parent Training services   | - | -    | -                 | -                | -      | -     | -                | -    | -    | -      | -                | -                 | -     | -      | -                | .16  | .11   |
| 16. Satisfaction with Developmental services   | - | -    | -                 | -                | -      | -     | -                | -    | -    | -      | -                | -                 | -     | -      | -                | -    | .01   |
| 17. Child Psychologist/Psychiatrist            | - | -    | -                 | -                | -      | -     | -                | -    | -    | -      | -                | -                 | -     | -      | -                | -    | -     |

Note. <sup>t</sup> $p < .10$ , \* $p < .05$ , \*\* $p < .01$

Table 12.

*Summary of Significant Results from the Regression Models predicting Service Usage and Satisfaction*

| Outcome Measures                 | Significant Predictors in the Final Model   | Step statistic        | Final Equation                                   |
|----------------------------------|---|-----------------------|--|
| <b>A. Medical Services</b>       |   |                       |  |
| Paediatrician                    | Maternal education*                         | $\chi^2 = 9.24^{**}$  | Cox & Snell $R^2 = .20$ , $\chi^2 = 15.41^{**}$  |
|                                  | Child health problems*                      | $\chi^2 = 4.39^*$     |  |
| Neighbourhood clinic (CLSC)      | Single parenthood*                          | Fch = 3.09*           | $R^2$ adj = .10, F = 2.47*                       |
| Satisfaction with                | Maternal parenting stress*                  | Fch = 6.25*           | $R^2$ adj = .11, F = 2.84*                       |
| medical services                 | Child Health Problems*                      | Fch = 4.22*           |  |
| <b>B. Developmental Services</b> |   |                       |  |
| Ritalin prescription             | Parental childhood withdrawal*              | $\chi^2 = 8.88^{**}$  | Cox & Snell $R^2 = .34$ , $\chi^2 = 23.22^{***}$ |
| Parent training                  | Parental childhood withdrawal*              | $\chi^2 = 7.58^*$     | Cox & Snell $R^2 = .18$ , $\chi^2 = 11.91^*$     |
| Child psychologist/psychiatrist  | Problem behaviour at school entry (mother)* | $\chi^2 = 10.24^{**}$ | Cox & Snell $R^2 = .19$ , $\chi^2 = 12.87^*$     |

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

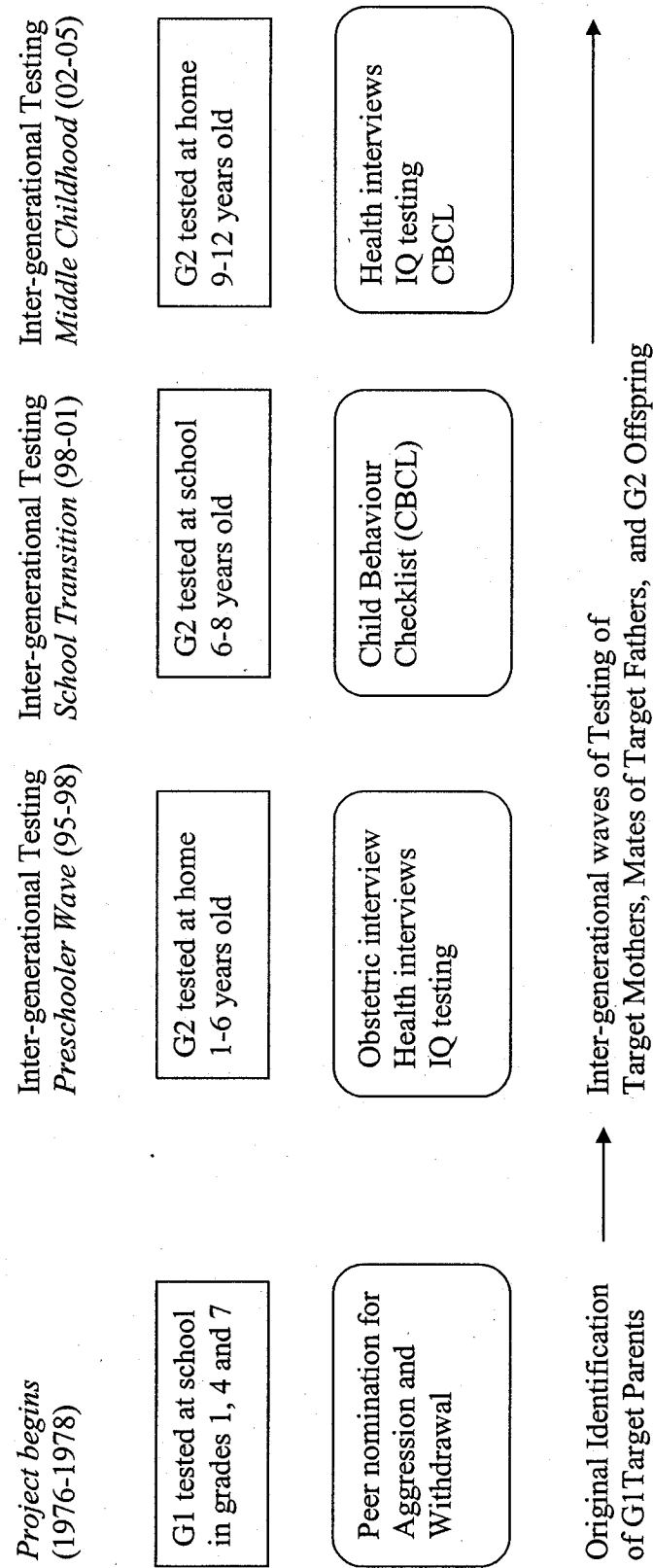


Figure 1. Design: Testing waves of the Concordia Longitudinal Project included in the present study

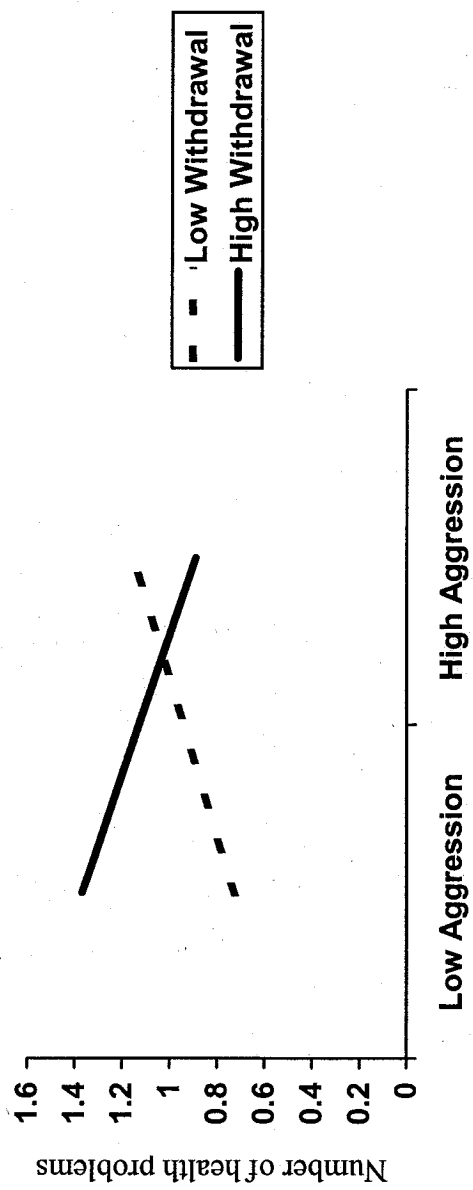


Figure 2. Number of health problems in offspring as a function of parental childhood risk status (aggression, withdrawal).



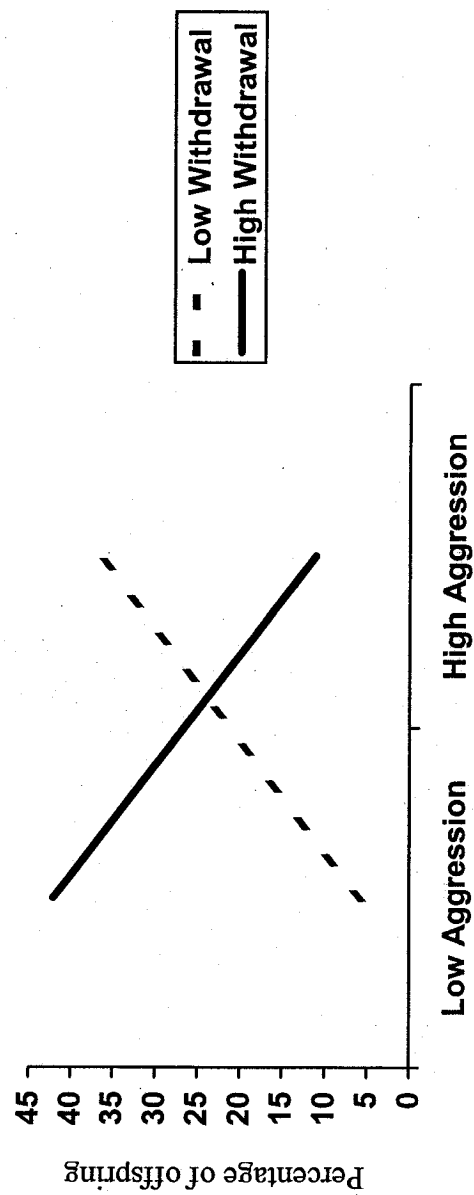


Figure 3. Percentage of offspring suffering from frequent headaches or migraines as a function of parental childhood risk status (aggression, withdrawal).

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## General Discussion

Several unique findings described in this dissertation contribute to our knowledge of the link between problem behaviour and physical health. First, because longitudinal studies of aggression in girls were so rare until very recently, Study 1 was the first study to demonstrate that girlhood aggression was linked to increased daily cigarette smoking more than a quarter of a century later. Moreover, more daily maternal smoking in the Concordia women was linked to negative health outcomes in offspring, even after statistically controlling for the target child's gender and health at birth. Therefore, this is the first longitudinal, prospective study to show an association between girlhood aggression, health-risk in adolescence and adulthood, and inter-generational transfer of that risk. This study also adds to the body of literature suggesting that the constellation of aggression and social withdrawal may place girls at the earliest health-risk, with higher risk of early initiation of smoking, drug use, binge drinking, and unprotected sex.

Study 2 also made an original contribution to the literature on aggressive and withdrawn individuals, by examining a wide range of their health behaviour as parents, and the transfer of health behaviours across generations. Maternal childhood aggression remained a significant predictor of health-risk in this wave of the study, and maternal health behaviours were related to health behaviours in school-age offspring. Furthermore, children of socially withdrawn parents were the most likely to be prescribed Ritalin as well as medication for respiratory problems, although they were not significantly more likely to suffer from either behavioural or respiratory problems. Results from Study 2 also demonstrated that parents' service usage and satisfaction with medical and developmental services was linked to childhood aggression and withdrawal. Therefore, it

is now clear that early problem behaviours such as aggression and withdrawal that can be observed by peers at school are indicative of a more general pattern of problem behaviour, including behaviours that may compromise physical health. These are significant findings because behaviour determines mortality rates in North America (CDC, 2000) and, perhaps more importantly, parenting and parents' behaviour related to health set the stage for the health of future generations.

*Health and Behaviour: Continuity and Discontinuity*

It is clear from the results of Studies 1 and 2 that psychosocial factors are important for both health behaviour (both positive and negative) and health outcomes. Behavioural correlates of health that can be observed such as aggression and social withdrawal may be as important as genetic and biological factors for health prevention, particularly in community samples with pervasive health-risk factors as smoking and obesity, and common health problems such as migraines and respiratory illness. Although a disease model leads both physicians and patients to seek out chemical solutions to health problems and assume a purely genetic or biological aetiology, multiple factors are usually important, many of them psychosocial in nature. Therefore, early recognition and identification of individuals with social problems such as high levels of aggression and withdrawal as also being at health-risk may help target such individuals for appropriate prevention programs, and place these individuals on a healthier trajectory before they become parents and transfer their health-risk to the next generation.

There was evidence for continuity of health-risk across the lifespan in the two studies, and for continuity of different trajectories of health seen in the families of aggressive versus withdrawn individuals. Mothers with childhood histories of aggression

were more likely to smoke at both time points, as well as when pregnant with the target child. Conversely, mothers who were highly withdrawn were either less likely to smoke (preschool wave), or no more likely to smoke than other mothers in our sample who had normal histories of social interaction during childhood (second time point). However, these withdrawn mothers remember the transition to parenting as a difficult one, reporting more problems during gestation and longer periods of infantile colic after the target baby was born. During the most recent wave of testing, children of withdrawn mothers and fathers were more likely to be prescribed Ritalin, and their parents were more likely to seek out parent training, although neither parents nor teachers reported that these children were more problematic than the other offspring.

The constellation of extremely high levels of aggression and withdrawal seen in some participants when they were children was a red flag for health-risk and health problems in both generations of the Concordia project. Consistent with previous studies of these individuals (Serbin et al., 1991; 1998; 2004), parents with childhood histories of aggression and withdrawal and their target offspring were consistently at-risk for a variety of negative health outcomes. For example, aggressive and withdrawn mothers were more likely to engage in early health-risk behaviour during adolescence, be overweight at the preschool wave of testing, and neglect their dental care at the second wave of testing. Their offspring had the most health problems by middle childhood, had less sleep on school nights, and suffered from more headaches and migraines. These findings add to the body of literature on longterm outcomes for children who were both aggressive and socially withdrawn, particularly the link between these problem behaviours and continuity of risk for poor health later in life.

Continuity of health-risk across the two studies was perhaps most striking in the highly aggressive girls, and the current results underscore the link between girlhood aggression and health-risk. These studies provide crucial evidence for the health-hostility link in women, which has been ignored in the heart-risk/Type A literature until fairly recently. Highly aggressive girls are more vulnerable to adopting health-risk behaviours such as smoking in adolescence, and this risk appears to be amplified when aggression is combined with high levels of social withdrawal. Currently, girlhood aggression (Cairns & Cairns, 1994; Moretti & Odgers, 2002) female smoking (Connor & McIntyre, 2002; Ries et al., 2005) and female smoking-related deaths (King, Grizeau, Bendel, Dressen, & Delaronde, 1998) are all on the rise in North America. Thus, these problem behaviours should remain a high priority for parents, teachers, physicians, and public health officials.

In contrast, social withdrawal appears to have been protective for adolescent health-risk behaviour, but parents who were socially withdrawn appear to demonstrate more problems with the transition to parenting. Although the highly withdrawn girls became parents at a more normative age than girls high on both aggression and withdrawal, mothers with childhood histories of social withdrawal reported more problems during pregnancy (De Genna et al., in press) and longer periods of infantile colic (De Genna, 2001). Parents high on social withdrawal also sought parent training services more frequently, and were more likely to have Ritalin prescribed for their offspring. Their children were significantly more likely to need medication for respiratory problems, despite the fact that they were not exposed to more environmental cigarette smoke than other children in this sample. This pattern of findings is intriguing, considering that previous studies have found that children of depressed and withdrawn

mothers show abnormal values of the stress hormone cortisol (Field et al., 2001; Fisher et al., under revision; Granger et al., 1998). Although it is impossible to determine from these studies if offspring are inheriting a biological hyper-reactivity that is contributing to health problems such as allergies and wheeze, or if parents with histories of withdrawal are simply more likely to report respiratory symptoms to their children's doctors, it raises an interesting set of questions for future studies.

As previously mentioned, girls who were high on both aggression and withdrawal appear to be at the highest risk for several different types of negative outcomes in the Concordia study. They had the lowest IQ and school achievement scores, were the most likely to engage in adolescent health-risk behaviours, and became mothers at an earlier age (De Genna et al, in press; Serbin et al., 2004; Stack et al., 2005; in press).

Furthermore, during the inter-generational phases of testing, the joint constellation of parental aggression and withdrawal predicted more health problems and less preventative care (e.g., less sleep and less dental care) in offspring. Therefore, not only is there continuity of health-risk for these individuals, but evidence for a transfer of risk to the next generation. These developmental differences between mothers who are high on one risk dimension or another or both have implications for public policy, suggesting that interventions aimed at reducing health-risk (e.g., preventing smoking or encouraging quitting smoking) should target girls who are aggressive or both aggressive and withdrawn, whereas prenatal visits and wellbaby care may be the best time to intervene to help mothers who appear socially withdrawn.

*Developmental Trajectories of Risk and Resilience*

These distinct trajectories of health-risk provide support for the pathways framework of human development adapted by John Bowlby (1973). Not all of the children who were identified as aggressive or withdrawn necessarily had the same health outcomes, and there were different pathways for children who were aggressive, children who were withdrawn, and children high on both dimensions. Adolescence was an important transition for many of these individuals, with early initiation of health-risk behaviours, teenage pregnancy, and educational attainment predicting persistence or desistance from health-risk pathways in adulthood. In terms of vulnerability, children who were both aggressive and withdrawn were the most likely to falter in adolescence, and adolescent risk-taking was in turn linked to current health-risk (obesity) as well as health problems in offspring at both waves of testing.

Thus, developmental timing was very important in the health-risk trajectories of these families. Individuals who were highly aggressive and withdrawn were at-risk for multiple negative outcomes, but those who engaged in adolescent health-risk behaviour or who dropped out of school were at the highest risk for continuing health-risk into adulthood, also placing their children at risk for more health problems. Engaging in behaviours that are considered normative during adulthood (e.g., smoking, sex) at an earlier age was clearly a marker for health-risk in these girls. Furthermore, age at menarche emerged as a risk factor for engaging in adolescent risk-taking behaviour, consistent with previous studies that have demonstrated that timing of puberty is key for young girls' association with older, more deviant peers (Caspi & Moffitt, 1991; Magnusson, 1988; Stattin & Magnusson, 1990). Given these findings and others, a



developmental perspective is crucial for understanding why some individuals who display problem behaviour in childhood experience continued difficulties across the lifespan, whereas others diverge onto more normative trajectories with time.

These differences also provide evidence for the developmental psychopathology principles of equifinality and multifinality in the lives of these women, and in their pathways of health over time and across generations. For example, both childhood aggression and lower levels of education emerged as risk factors for more smoking during the preschool wave of testing (equifinality). Maternal smoking, in turn, provides an excellent example of multifinality in this sample. Maternal smoking was predictive of *homotypic* outcomes such as respiratory illness in offspring, as well as *heterotypic* outcomes such as problems with blood pressure, less maternal visits to the dentist, less satisfaction with physical activity, more headaches and higher BMI in offspring. Therefore, although there was evidence of continuity of risk within these women and inter-generational transmission of risk to offspring, the use of a wide variety of measures allowed for the identification of outcomes that were multifinal and heterogenous.

The dissertation studies followed highly aggressive and withdrawn individuals from childhood into adulthood and parenthood, consistent with a developmental psychopathology perspective (Calkins & Fox). Only similar prospective, longitudinal and inter-generational research using multiple methods of measurement can truly capture the full range of risk that may be transferred to the next generation (Cairns et al., 1998; Quinton, 1988; Serbin & Karp; 2003; Serbin & Stack, 1998). In most cases and across both studies, health-risks were shown to be indirect and working through more proximal causes such as maternal health behaviour. For example, although parental aggression was

not directly related to daily consumption of fruits and vegetables in offspring in Study 2, it was directly related to maternal daily consumption of fruits and vegetables, and maternal consumption significantly predicted children's intake. Similarly, preschool illness in Study 1 was predicted by maternal smoking and maternal adolescent health-risk, rather than directly by maternal childhood aggression and withdrawal.

Consequently, there was considerable evidence of inter-generational transfer of health-risk from aggressive and withdrawn parents to children at both preschool and school-age.

There was evidence for continuity and clustering of risk, not only among individuals from the Concordia project, but also within families. Consistent with Repetti, Taylor and Seeman's (2002) findings in their review on the literature on longitudinal studies of at-risk children, parents with childhood histories of psychosocial risk were more likely to report problems for their own children. Although mothers who were highly aggressive reported less health problems in their children during the preschool wave of testing, they smoked more cigarettes daily, which predicted more health problems overall as well as more respiratory problems in offspring. Moreover, during the second wave of testing, maternal aggression was linked to lower ratings of maternal health, and maternal ratings of their own health in turn predicted lower ratings of child health and more health problems in children. Parents with histories of childhood withdrawal appeared to have more problems with parenting, and were more likely than other parents to seek behavioural (parent training) and medical recourse (Ritalin). Therefore, parents' childhood behaviour problems predicted a cascade of risk into the next generation, with distinct trajectories for offspring whose parents had problems with aggression and/or social withdrawal.

Despite the negative implications of these findings, there was also evidence of resilience. Mothers who were more educated were less likely to smoke around their preschoolers, and they were more likely to report that their child had a regular paediatrician during the second wave of testing. There was evidence that mothers from this high-risk sample who refrain from smoking are generally providing a healthier environment for their children, not just in terms of secondhand smoke and presence of healthy role models, but also in terms of better maternal preventative behaviours associated with not smoking (e.g., more physical activity, regular dental care, etc.). In terms of child characteristics, being born larger and healthier provided Concordia offspring with resilience in the preschool years, although the effect of neonatal health status on health outcomes seemed to have diminished by middle childhood.

### *The Ecology of Health*

The present findings provide only limited support for the contextual models of health that are consistent with current thinking in medical sociology and developmental psychology. Occupational prestige in maternal family of origin (our only measure of SES for this early time point) was not a significant predictor of maternal adolescent risk-taking behaviour, although it did predict overweight in target grandchildren. Current family income in maternal family of procreation was not a significant predictor of health-risk or health problems in either mothers or target offspring, at either time point, despite our predictions at the end of Study 1 that SES effects may become more salient in middle childhood. However, maternal education and family income may not be the only nor the best indicators of social context for high-risk children.

Some authors have suggested that social class may be a better predictor of health-risk behaviour than income, because some lower-class individuals may have higher incomes than middle- and upper-class individuals, yet maintain residence in working-class neighbourhoods and retain working-class values about health-risk behaviours such as smoking (Pickett et al., 2002). In the present two studies, maternal education may be considered the best proxy for social class. However, although maternal education was a strong predictor of smoking during the preschool wave of testing, it did not predict continued maternal smoking when children were 9-12 years of age, nor did it confer protection against health problems in either mother or child at either time point. In fact, the only finding that comes close to our predictions for maternal education was a trend in the second study, predicting increased daily consumption of fruits and vegetables (which was in turn related to consumption in offspring).

Still other authors have suggested that the SES-health gradient is weaker in countries with less income inequality such as Canada (Carroll, Smith, & Bennett, 2002; Pickett et al., 2005). Moreover, unlike our neighbours to the South, Canadians have access to universal health care, and in the province of Quebec there are neighbourhood clinics (*Centres locaux de services communautaires: CLSC*) that provide free walk-in health service to families with health problems that are not serious enough for the emergency room, but are too serious to wait for an appointment with a paediatrician or general practitioner. Serbin and her colleagues (1996) have suggested that higher risk families may use the emergency room more often, as a symptom of disorganization, and there is evidence from the finding in the second study that more educated mothers are more likely to send their children to a paediatrician, and single mothers more likely to use

the neighbourhood clinics. Therefore, although family income did not predict more health problems, other maternal variables related to SES were predictive of variance in service usage.

A social stress model helps explain some of the effects found in the second study predicting more risk for single parents and close spacing of children. This sociological explanation for socioeconomic distinctions in health suggests that distinctions between social classes may be due to differential abilities to buffer the effects of stress. Therefore, although family income did not predict health problems and health-risk, parents under additional social stress due to close spacing of children and single parenthood have less resources available to confront challenges in their environment, and manage health care in their families. In Study 2, single parents reported more health problems in their children and took them to neighbourhood clinics more often, whereas children who were born within two years of a sibling were more likely to have needed a prescription for respiratory medication during the second wave of testing. Thus, offspring of women who may be experiencing more social stress may be at-risk for more health problems, or their parents may be more likely to seek help for children's health problems more frequently. Indeed, parenting stress in Study 2 was negatively related to maternal satisfaction with medical services, although it is impossible to say using correlational data if women who were less satisfied with medical services experienced more parenting stress, or if frustration with service delivery and contact with health care providers contributed to maternal parenting stress.

*Health and Gender*

The present studies focused on women, specifically mothers, for several reasons, including the fact that much less is known about the effects of female aggression on health behaviour and health outcomes, and even less is known about inter-generational effects of girlhood aggression (Serbin et al., 2004; Stack et al., 2005; in press). The results of these studies suggest that there is evidence of health-risk among aggressive girls, although it may take a different developmental progression than the health-hostility link in men, which has been primarily shown in terms of risk for early cardiovascular disease. Although women may be protected before menopause by their relatively higher levels of estrogen, the fact that aggressive women smoke much more than non-aggressive women clearly places them at higher risk for cardiovascular disease once their levels of estrogen drop. In fact, an early sign of this health-risk may be found in Study 2: women who smoked more during the first wave of inter-generational testing were more likely to report a problem with blood pressure at the second wave of testing.

Moreover, aggressive women's increased cigarette use and assortative mating with other heavy smokers also places their offspring at health-risk, although it was difficult to demonstrate direct effects of cigarette smoking on fetal development and pediatric illness using these methods, and with a relatively small community sample. However, prenatal smoking was related to higher BMI in middle childhood, which provides some support for the Barker hypothesis that there are fetal origins to adult pathology (Barker, 1990). In this case, fetal insult that may have been sustained as a result of maternal smoking might place offspring of aggressive mothers at higher risk of obesity later in life. Moreover, maternal smoking was linked to both overall illness as

well as respiratory illness when children were preschool age, and to frequent headaches and migraines when children were 9-12 years old. Therefore, not only is there support for the health-hostility link in aggressive women in this sample, but also support for an inter-generational transfer of health-risk from aggressive women to their young offspring.

Depression is also highly gendered, being much more prevalent in women than in men, and girls who are socially withdrawn are known to be at higher risk for depression (Achenbach & Rescorla, 2001; Kovacs, 1992). Depression, in turn, has been associated with cardiovascular risk in adults (Friedman & Booth-Kewley; Pratt et al., 1996; Rosengren et al., 2004), and this may be mediated through poor health habits (Zigelstein, Bush, & Fauerbach, 1998) as well as pathophysiology associated with depressive disorders (Carroll et al., 1976, Gold, Goodwin, & Chrousos, 1988; Doulalas et al., 2005; Panagiotakos et al., 2004). Although depressive symptomatology *per se* was not examined in the dissertation studies, mothers with histories of childhood withdrawal reported more headaches and migraines in Study 2. Future research on these women should examine psychopathology (e.g., depression) in relation to symptom reporting, particularly as the sample enters menopause, with its consequent increased risk of heart disease. Furthermore, it may also be useful to include physiological measures of these women's functioning, in order to examine the contribution of early childhood withdrawal in girls to pathophysiology and depressive symptoms later in life.

### *Implications*

These findings on health-risk and health problems in the inter-generational studies of the Concordia project have important implications for clinicians, educators, and public policy. The first implication is that there are early markers of health-risk behaviours, and

preventative interventions that are designed to improve adult and parent health should begin in childhood. Paediatricians, general practitioners and nurses in neighbourhood clinics, teachers and school nurses may be important first lines of contact for high-risk children, and may help recognize and target children who are at risk for both negative mental and physical health outcomes. Observable behaviour such as aggression and withdrawal may provide clues about vulnerabilities for health-risk behaviour and health problems that would otherwise lay dormant until later in the life trajectories of these children.

Although regulating problem behaviour in the classroom may be the first priority for both parents and teachers, health professionals need to be aware that disruptive behaviour may mean that these children are also at higher risk for negative health patterns. Therefore, the physical health of girls who are singled out for intervention due to problem behaviour should not be ignored, and these girls should be considered for targets of interventions aimed at preventing early initiation of health-risk behaviour. Moreover, the problems of socially withdrawn children are more likely to go un-noticed, but they may also be at health-risk. However, care should be taken to identify children who are rejected, rather than those who simply enjoy solitary play, and interventions provided for those children with genuine problems with social interaction.

Another implication of the current research is that adolescence may be a special time for the identification of children who are at the highest risk for adoption of health-risk behaviour. In fact, girls who engage in health-impairing behaviours such as cigarette smoking or unprotected sexual activity at earlier ages are at the highest risk for a number of health problems such as high blood pressure and obesity. More research is warranted



in order to develop effective and timely preventative programs for teenage girls, who are actually increasing rates of negative health behaviours, despite the recent success of prevention programs with other cohorts. Indeed, as increasing rates of health-risk behaviour in adolescent girls appears to be related to health problems later in life as well as transfer of health risk to the next generation, preventing the initiation and maintenance of health-risk behaviour in this group could prove very cost-effective in the long run.

#### *Future Directions*

Many questions about health-risk and health trajectories in these families remain, and should be addressed in future studies of the Concordia families. As offspring enter adolescence, it will be important to determine if maternal adolescent risk-taking behaviours predict similar health-risk in their children: early initiation of sexual activity, cigarette smoking, alcohol and substance use and abuse. Moreover, it will be interesting to see if there are interactions with physical maturity in these young individuals and specifically, if early-maturing offspring associate with older, more deviant friends than their less physically mature peers. Moreover, use of occupational status measures may permit analyses of health behaviour by social class, rather than simply by family income or maternal education. Finally, it would be intriguing to examine stress and physiological measures of adaptation in these individuals and their offspring, in order to disentangle the effects of stress on health problems from the effects of stress on symptom reporting, and to see if pathophysiology mediates the effects of aggression and withdrawal on physical and mental health in offspring.

## General References

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Appendix A  
*Additional Information on the Composition of the Original Sample*

The children in the Concordia Risk Project were screened for aggression and social withdrawal using the Pupil Evaluation Inventory (PEI; Pekarik, Prinz, Liewy, Weintraub, & Neale, 1976) translated into French. The PEI is a peer nomination instrument containing 35 items, including aggression items such as “those who are mean and cruel to other children,” and 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 from 152 classrooms in Montreal were asked to choose four boys and four girls that best matched each item on 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 highly aggressive group ( $n = 198$ ) or the highly socially withdrawn group ( $n = 220$ ) if they obtained z-scores on the salient factor equal to or exceeding the 95<sup>th</sup> percentile cutoff ( $z = 1.65$ ). Children were assigned to the aggressive-withdrawn group ( $n = 239$ ) if they obtained a z-score equal or above the 75<sup>th</sup> percentile on both aggression and withdrawal. A lower criteria was used to select the highly aggressive-withdrawn group because the likelihood of scoring above the 75<sup>th</sup> percentile on both dimensions is very low. Children who scored between the 25<sup>th</sup> and 75<sup>th</sup> percentiles on both dimensions were assigned to the normative control group ( $n = 1,117$ ).

Appendix B  
*Maternal Consent form for Study 1*

**"L'INDIVIDU DANS SON MILIEU: Les parents et leurs enfants"**

Directeurs du projet: - Lisa A. Serbin, Ph.D.  
- Dale M. Stack, Ph.D.  
- Alex E. Schwartzman, Ph.D.

**FORMULAIRE DE CONSENTEMENT**

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

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

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

Signature: \_\_\_\_\_

Nom: \_\_\_\_\_

Date: \_\_\_\_\_

Assistant(e) de recherche: \_\_\_\_\_

Appendix C  
*Demographic Information Questionnaire for Study 1*

Mai 1996

No d'identification \_\_\_\_\_

Date: \_\_\_\_\_

**L'INDIVIDU DANS SON MILIEU****Renseignements sociodémographiques***Tous ces renseignements sont traités de façon totalement confidentielle*1. Sexe ☐ M ☐ F

AN MO JR

2. Âge \_\_\_\_\_ ans Date de naissance

\_\_\_\_\_

3. État civil

\*Note\*: "Conjoints de fait": désigne deux personnes qui vivent ensemble comme si elles étaient mariées. Il s'agit de ton état actuel; même si tu es légalement divorcé(e) ou autre, mais que tu vis avec un(e) conjoint(e) présentement, inscric conjoint de fait.

☐ Célibataire Conjoint de fait ||  
|| Depuis quelle date?

|| Marié(e) Séparé(e) ||

AN MO JR

|| Divorcé(e) Veuf/veuve || \_\_\_\_\_

4. Nombre d'enfants \_\_\_\_\_

Si enceinte (ou conjointe enceinte), bébé attendu pour:

AN MO

Pour chaque enfant:

1 - Inscrire le nom, le sexe, la date de naissance

2 - Encercler

"TE" si c'est ton enfant (tu es le parent biologique)

"EC" si l'enfant du conjoint (le conjoint actuel est le parent biologique)

"EA" si c'est un enfant adopté / "FA" en foyer d'accueil et qui vit chez toi

Si "TE" et "EC" sont vrais, encercler les deux.

3 - Indiquer si l'enfant vit avec toi, OUI ou NON ou GP (garde partagée)

- 4 - Inscrire l'année scolaire (si applicable) ainsi que si l'enfant fréquente une classe ou une école spéciale.

(Si tu as plus de quatre enfants, pourrais-tu inscrire leurs informations sur une feuille séparée.)

1 NOM \_\_\_\_\_ SEXE \_\_\_\_\_ AN MO JR  
☐ M ☐ F

L'enfant est: TE EC EA / FA Vit avec toi: OUI ☐ NON ☐ GP ☐

Année scolaire: \_\_\_\_\_ Classe spéciale: \_\_\_\_\_

2. NOM \_\_\_\_\_ SEXE \_\_\_\_\_ AN MO JR  
☐ M ☐ F

L'enfant est: TE EC EA / FA Vit avec toi: OUI ☐ NON ☐ GP ☐

Année scolaire: \_\_\_\_\_ Classe spéciale: \_\_\_\_\_

3. NOM \_\_\_\_\_ SEXE \_\_\_\_\_ AN MO JR  
☐ M ☐ F

L'enfant est: TE EC EA / FA Vit avec toi: OUI ☐ NON ☐ GP ☐

Année scolaire: \_\_\_\_\_ Classe spéciale: \_\_\_\_\_

4. NOM \_\_\_\_\_ SEXE \_\_\_\_\_ AN MO JR  
☐ M ☐ F

L'enfant est: TE EC EA / FA Vit avec toi: OUI ☐ NON ☐ GP ☐

Année scolaire: \_\_\_\_\_ Classe spéciale: \_\_\_\_\_

**5. Ta scolarité complétée (dernière année terminée):**

En quoi? (spécialisation/général): \_\_\_\_\_

Étudies-tu présentement? OUI : Temps plein ☐ partiel ☐ NON ☐

Si oui, quel diplôme postules-tu \_\_\_\_\_ pour quand?  
 \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_/

**6. As-tu un emploi (rappel: renseignements gardés confidentiels)?**

OUI ☐

NON ☐

Occupation: \_\_\_\_\_

As-tu déjà eu un emploi?

|| Oui ☐ Non ☐

Tes tâches: \_\_\_\_\_

En quoi?

Combien d'heures/sem.? \_\_\_\_\_

Pendant combien de temps?

\_\_\_\_\_ an(s) \_\_\_\_\_ mois

Salaire de l'heure \_\_\_\_\_ \$

Quand as-tu arrêté de travailler:

Depuis quand es-tu à cet emploi? inscrire la date

date: \_\_\_\_/\_\_\_\_/

AN MO

AN MO

\_\_\_\_/\_\_\_\_/

Au cours des 12 derniers mois, as-tu bénéficié de:

Oui ☐ Non ☐

l'Assurance chômage?

Oui ☐ Non ☐

Prestations d'aide sociale?

Oui ☐ Non ☐

la CSST? (préciser: \_\_\_\_\_)

**7. Informations sur le conjoint (renseignements gardés confidentiels):**

a) Son nom: \_\_\_\_\_

Date de naissance

AN MO JR

Son occupation: \_\_\_\_\_

Ses tâches: \_\_\_\_\_

Son salaire: \_\_\_\_\_ \$/ heure

Nombre d'heures \_\_\_\_\_ / semaine

AN MO

Il/Elle travaille là depuis: date \_\_\_\_ \_\_\_\_

b) Au cours des 12 derniers mois, a-t-il/elle bénéficié de:

Oui ☐ Non ☐ l'Assurance chômage?

Oui ☐ Non ☐ Prestations d'aide sociale?

Oui ☐ Non ☐ la CSST? (préciser: \_\_\_\_\_)

c) Sa scolarité complétée (dernière année terminée):

En quoi? (spécialisation/général): \_\_\_\_\_

Étudie-t-il (elle) présentement? OUI : Temps plein ☐ partiel ☐ NON ☐

Si oui, diplôme postulé? \_\_\_\_\_ pour quand?  
(date) \_\_\_\_/\_\_\_\_/

**8. Informations sur le père (si n'habite pas avec la mère):**

b) Son nom: \_\_\_\_\_

Date de naissance \_\_\_\_/\_\_\_\_/\_\_\_\_  
AN MO JR

Son occupation: \_\_\_\_\_

Ses tâches: \_\_\_\_\_

Son salaire: \_\_\_\_\_ \$/ heure Nombre d'heures \_\_\_\_\_ / semaine

AN MO

Il/Elle travaille là depuis: date \_\_\_\_/\_\_\_\_/\_\_\_\_

b) Au cours des 12 derniers mois, a-t-il/elle bénéficié de:

Oui ☐ Non ☐ l'Assurance chômage?

Oui ☐ Non ☐ Prestations d'aide sociale?

Oui ☐ Non ☐ la CSST? (préciser: \_\_\_\_\_)

c) Sa scolarité complétée (dernière année terminée):

En quoi? (spécialisation/général): \_\_\_\_\_

Étudie-t-il (elle) présentement? OUI : Temps plein ☐ partiel ☐ NON ☐



Si oui, diplôme postulé? \_\_\_\_\_ pour quand?  
(date) \_\_\_\_/\_\_\_\_/\_\_\_\_

**9. Disponibilité pour le test parent-enfant**

- ☐ Le matin ☐ L'après-midi  
☐ La semaine ☐ La fin de semaine

**10. Vision des couleurs:** Il y a une section de la recherche qui porte sur les couleurs.

Est-ce que tu as de la difficulté à percevoir certaines couleurs?

- ☐ Oui (préciser: \_\_\_\_\_) ☐ Non

S.V.P. Vérifier l'adresse et les numéros de téléphone.

\_\_\_\_\_  
No. rue/app. \_\_\_\_\_ rue

\_\_\_\_\_  
Ville \_\_\_\_\_ Code postal \_\_\_\_\_

Téléphones: Personnel: (\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_

Travail: (\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_

Parents: (\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_

Autre \_\_\_\_\_: (\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_

Ton numéro de téléphone personnel est à quel nom dans l'annuaire téléphonique:

Nom complet et lien avec toi:

\_\_\_\_\_

Adresse des parents: \_\_\_\_\_

\_\_\_\_\_

Rempli par: Mère Père

No d'identification: \_\_\_\_\_

Appendix D  
*Obstetric and Child Medical Questionnaire for Study 1*

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## L'INDIVIDU DANS SON MILIEU: Les parents et leurs enfants

**PROFIL DE VIE: Historique obstétrical**

Nom de l'enfant: \_\_\_\_\_

ID#: \_\_\_\_\_

Nom de la mère: \_\_\_\_\_

Date: \_\_\_\_\_

Nom du père: \_\_\_\_\_

**Résumé de la grossesse de l'enfant ciblé(e)**

- Avez-vous été suivie par un médecin pendant cette grossesse? Non \_\_\_ Oui \_\_\_ -&gt;

Combien de fois? \_\_\_\_\_

- Le nom de votre obstétricien \_\_\_\_\_.

- L'hôpital où votre bébé est né \_\_\_\_\_.

- Les tests suivants furent-ils administrés?:

Amniocenteses Non \_\_\_ Oui \_\_\_ -> nombre \_\_\_ et dates \_\_\_\_\_  
\_\_\_\_\_. Le résultat du dernier test \_\_\_\_\_Echographie Non \_\_\_ Oui \_\_\_ -> nombre \_\_\_ et dates \_\_\_\_\_  
\_\_\_\_\_. Le résultat du dernier test \_\_\_\_\_

- A quel moment de la grossesse avez vous découvert que vous étiez enceinte? \_\_\_ sem.

- Fumiez-vous pendant la grossesse? Non \_\_\_ Oui \_\_\_ -&gt; Combien de cigarettes par jour?

(# cpj \_\_\_; 1/2 ppj \_\_\_; 1 ppj \_\_\_; 2 ppj \_\_\_; ne sait pas \_\_\_).

- Avez-vous pris de l'alcool pendant la grossesse? Non \_\_\_ Oui \_\_\_ -&gt; Précisez:

#/mois en moy. \_\_\_; #/semaine en moy. \_\_\_; #/jour en moy. \_\_\_;  
Jours de 2 verres ou plus? \_\_\_; ne sait pas \_\_\_).- Exposition toxique connue? Non \_\_\_ Oui \_\_\_ ->. Sorte, si connue \_\_\_\_\_;  
durée durant la grossesse \_\_\_\_\_; quel trimestre \_\_\_\_\_.

- Avez-vous pris des médicaments pendant la grossesse? Non \_\_\_ Oui \_\_\_ -> Lesquels?

|                        |                                       |
|------------------------|---------------------------------------|
| ___ Diurétiques        | ___ Antihypertensifs                  |
| ___ Phenobarbital      | ___ Sédatifs/tranquillisants/calmants |
| ___ Anticonvulsants    | ___ Hormone progestationnelles        |
| ___ Antibiotiques      | ___ Stupéfiants                       |
| ___ Hallucinogènes     | ___ Antihistaminiques                 |
| ___ Autres (précisez): |                                       |

### Problèmes prénataux

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

Non \_\_\_ Oui \_\_\_ -> précisez:

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- Pertes de sang pendant la gestation? Non \_\_\_ Oui \_\_\_ -> Quel trimestre \_\_\_\_\_.

- Diabète? Non \_\_\_ Oui \_\_\_ -> (de grossesse \_\_\_; insulino-dépendant = sucré \_\_\_).

- Désordres chroniques précédant la gestation? Non \_\_\_ Oui \_\_\_ -> (hypertension \_\_\_; hypotension \_\_\_; polyhydramnios \_\_\_; autres (spécifiez) \_\_\_\_\_).

- Toxémie endogène (empoisonnement du sang)? Non \_\_\_ Oui \_\_\_ -> trimestre \_\_\_\_\_.

- Fièvre pendant la gestation - >100 degré? Non \_\_\_ Oui \_\_\_ -> trimestre \_\_\_\_\_.

### Résumé du travail et de l'accouchement

- Age de la mère \_\_\_, du père \_\_\_, lors de la naissance du bébé?

- Le père était-il présent lors de l'accouchement? Oui \_\_\_ Non \_\_\_ Qui d'autres?

- Nombre de semaines de gestation? \_\_\_\_\_

- Événements très stressants ou difficiles au moment de la naissance?

Non \_\_\_ Oui \_\_\_ -> Lesquels?

---

- 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 \_\_\_.

- Début du travail a-t-il été spontané \_\_\_ ou provoqué? \_\_\_; comment? \_\_\_\_\_

- Complications pendant le travail?

Non \_\_\_ Oui \_\_\_ -> (Début prématuré du travail - <37 semaines \_\_\_; travail prolongé - >24 heures \_\_\_; accouchement précipité \_\_\_; éclampsie \_\_\_; dysfonction placentaire \_\_\_; toxémie \_\_\_; infection \_\_\_; oligohydramnios \_\_\_; polyhydramnios \_\_\_; autres \_\_\_\_\_).

- Oxytocin administrée? Non \_\_\_ Oui \_\_\_ -> (pour induire le travail? \_\_\_; autre raison? \_\_\_\_\_)

- Epidurale administrée? Non \_\_\_ Oui \_\_\_ -> A quel moment? \_\_\_\_\_

- Autres médicaments administrés lors de l'accouchement? Précisez types, temps et raisons \_\_\_\_\_

- Combien d'heures dura le travail? \_\_\_\_\_

- Type d'accouchement? par la tête \_\_\_; par le siège \_\_\_; 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 \_\_\_\_\_

- Délivrance spontanée du placenta \_\_\_ par massage utérin \_\_\_ extraction manuelle? \_\_\_\_\_

- Combien de temps fut l'enfant à l'hôpital après sa naissance? \_\_\_\_\_

- Pendant combien de temps ton bébé est-il resté avec toi après l'accouchement? \_\_\_\_\_

- Avez-vous été séparés? Non \_\_\_ Oui \_\_\_ -> Période et raison \_\_\_\_\_

- L'enfant est-il rentré à la maison avec sa mère? Oui \_\_\_ Non \_\_\_

### Caractéristiques du nouveau-né (avec livret de naissance, si disponible)

- Taille à la naissance \_\_\_\_\_; taille actuelle \_\_\_\_\_.

- 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)

Facteur RH (- ou +) \_\_\_\_\_.

Apgar, 1 minute \_\_\_\_\_ . Apgar, 5 minutes \_\_\_\_\_.

Circonférence de la tête \_\_\_\_\_.

- Nourri(e) au sein? Non \_\_\_\_ Oui \_\_\_\_ -> (quel période? \_\_\_\_\_);  
à la bouteille? Non \_\_\_\_ Oui \_\_\_\_ -> (quel période? \_\_\_\_\_).

### Complications natales diverses

- Anomalies congénitales mineures visibles? Non \_\_\_\_ Oui \_\_\_\_ ->

Spécifier \_\_\_\_\_.

- Anomalies congénitales majeures? Non \_\_\_\_ Oui \_\_\_\_ ->

Spécifier \_\_\_\_\_.

- Anomalies chromosomiques? Non \_\_\_\_ Oui \_\_\_\_ ->

Trisomie 21 (syndrome de Down) \_\_\_\_; trisomie 13 \_\_\_\_; trisomie 18 \_\_\_\_; autre, spécifier \_\_\_\_\_.

- Problèmes de peau? Non \_\_\_\_ Oui \_\_\_\_ -> (jaunice \_\_\_\_; cyanose \_\_\_\_; pétéchies \_\_\_\_;  
ecchymose \_\_\_\_; pâleur \_\_\_\_; desquamation \_\_\_\_; oedème \_\_\_\_; autre - \_\_\_\_\_.  
Durée \_\_\_\_\_)

- Problèmes respiratoire? Non \_\_\_\_ Oui \_\_\_\_ -> Spécifier le type et la  
durée: \_\_\_\_\_.

- Traitement aux stéroïdes? Non \_\_\_\_ Oui \_\_\_\_ -> Spécifier le type et la durée: \_\_\_\_\_.

- Autre médicaments? Non \_\_\_\_ Oui \_\_\_\_ -> Spécifiez le type et la durée: \_\_\_\_\_.

- Problèmes cardiaques? Non \_\_\_\_ Oui \_\_\_\_ -> Spécifier le type et la durée: \_\_\_\_\_.

- Crises? Non \_\_\_\_ Oui \_\_\_\_ -> Spécifiez le type et la durée \_\_\_\_\_.

- Hémorragies intra-crâniennes? Non \_\_\_\_ Oui \_\_\_\_ -> 1er degré \_\_\_\_; 2e degré \_\_\_\_; 3e  
degré \_\_\_\_; 4e degré \_\_\_\_; degré inconnu \_\_\_\_.

- Problèmes hématologiques? Non \_\_\_\_ Oui \_\_\_\_ ->, spécifier \_\_\_\_\_;

- Transfusions sanguines? Non \_\_\_ Oui \_\_\_ ->, spécifiez \_\_\_\_\_.
- Infections? Non \_\_\_ Oui \_\_\_ -> Quel organisme? \_\_\_\_\_
- Hospitalisation à l'unité de soins intensifs pour nouveau-nés? Non \_\_\_ Oui \_\_\_ ->, durée et raison(s) \_\_\_\_\_.
- Hydrocéphalie? Non \_\_\_ Oui \_\_\_; spina bifida? Non \_\_\_ Oui \_\_\_
- Chirurgies subies par l'enfant? Non \_\_\_ Oui \_\_\_ ->; spécifier \_\_\_\_\_.
- Circoncision? Non \_\_\_ Oui \_\_\_ -> Quand? \_\_\_\_\_ Décrire les problèmes \_\_\_\_\_
- Vaccinations? Non \_\_\_ Oui \_\_\_ -> Quand? \_\_\_\_\_ Lesquels \_\_\_\_\_ Réactions? \_\_\_\_\_
- Cholériques? Non \_\_\_ Oui \_\_\_ -> Début \_\_\_\_\_ Fin \_\_\_\_\_ Fréquence \_\_\_\_\_

### Questionnaire Médical

1. Est-ce que ton enfant est en bonne santé aujourd'hui? Oui \_\_\_ Non \_\_\_ -> Est-ce qu'il/elle présente des signes/symptômes d'infections (P.ex. rhume, mal de gorge)? Oui \_\_\_ Non \_\_\_ -> Précisez \_\_\_\_\_  
début \_\_\_\_\_, sévérité \_\_\_\_\_.
3. Est-ce que ton enfant a eu des signes/symptômes d'infection au cours du mois précédent? Non \_\_\_ Oui \_\_\_ -> à quelle date à ces signes/symptômes sont-ils apparus?  
\_\_\_\_\_  
(jour/mois/année)
4. Est-ce que ton enfant a eu une chirurgie récemment? Non \_\_\_ Oui \_\_\_ -> raison? \_\_\_\_\_, à quelle date? \_\_\_\_\_  
(jour/mois/année)
5. 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 \_\_\_\_\_

6. Est-ce que ton enfant a reçu des vaccins au cours des 6 derniers mois?

Non \_\_\_ Oui \_\_\_ -> Quand et lesquels?

---

7. Est-ce que ton enfant prend présentement des médicaments?

Non \_\_\_ Oui \_\_\_ -> Lesquels?

raison et depuis quand?

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

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10. Nous sommes intéressés à savoir si ton enfant a été victime au cours de sa vie d'accidents ayant pu entraîner des blessures et possiblement provoquer un évanouissement ou une commotion cérébrale.

Non \_\_\_ Oui \_\_\_ -> donne des détails (type de blessure, date, décrit les circonstances et s'il y avait évanouissement ou commotion cérébrale).

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### **Accidents et Blessures**

Nous sommes intéressés à obtenir des informations concernant les accidents dont ton enfant a possiblement été victime, son état de santé, ainsi que les visites médicales de routine et d'urgence que vous avez effectué avec lui/elle, et ce, au cours des 12 derniers mois. Des blessures assez graves pour l'obliger à limiter ses activités normales, à consulter un médecin de famille, une clinique médicale, un C.L.S.C. ou le service d'urgence d'un hôpital (P. ex. fracture, coupure ou brûlure grave, entorse au pied, etc.)

1. Au cours des 12 derniers mois, ton enfant a-t-il eu des accidents ayant causé des blessures (incluant les empoisonnements) et ayant entraîné des restrictions au niveau de ses activités?

Non \_\_\_ Oui \_\_\_ -> Lesquels?

---



2. Au cours des 12 derniers mois, ton enfant a-t-il eu des accidents ayant causé des blessures (incluant les empoisonnements) pour lesquelles il/elle a consulté un médecin?

Non \_\_\_ Oui \_\_\_ ->Raison? \_\_\_\_\_;

Combien de fois avez-vous consulté un médecin de famille \_\_\_\_\_; une clinique médicale ou un C.L.S.C. \_\_\_\_\_; le service d'urgence d'un hôpital \_\_\_\_\_.

3. Où sont arrivés les accidents dont ton enfant a été victime au cours des 12 derniers mois? (Indiquer le nombre)

- a. \_\_\_\_\_ sur la route
- b. \_\_\_\_\_ à l'école
- c. \_\_\_\_\_ à la maison (intérieur)
- d. \_\_\_\_\_ à la maison (extérieur)
- e. \_\_\_\_\_ dans un lieu de loisir et/ou de sport
- f. \_\_\_\_\_ dans un lieu public (trottoir, édifice public, centre commercial, banque ou autre et ce, excluant le lieu de loisir et/ou de sport)
- g. \_\_\_\_\_ autre endroit; spécifiez \_\_\_\_\_

4. Comparativement à d'autres enfants de son âge en bonne santé, ton enfant est-il/elle restreint(e) dans le genre ou la quantité de jeux qu'il/elle peut faire à cause d'une maladie chronique, physique ou mentale ou à cause d'un problème de santé?

Non \_\_\_ Oui \_\_\_ -> Lesquels, depuis quand?

\_\_\_\_\_

5. Ton enfant est-il (elle) restreint (e) dans sa capacité de jouer en dehors du foyer ou de poursuivre ses études à cause de son état de santé ?

Non \_\_\_ Oui \_\_\_ -> Raison, depuis quand?

\_\_\_\_\_

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

6. Ton enfant présente-t-il/elle un problème de (cochez):

- a. ☐ Anémie (Depuis quand? \_\_\_\_\_)
- b. ☐ Maladie de la peau ou autres allergies cutanées  
(Depuis quand? \_\_\_\_\_)
- c. ☐ Autres allergies  
(spécifier \_\_\_\_\_)  
(Depuis quand? \_\_\_\_\_)
- d. ☐ Rhume des foins (Depuis quand? \_\_\_\_\_)
- e. ☐ Sérieux maux de dos ou de colonne (Depuis quand? \_\_\_\_\_)
- f. ☐ Arthrite ou rhumatisme (Depuis quand? \_\_\_\_\_)
- g. ☐ Autres problèmes sérieux de dos et/ou des articulations  
(Précisez \_\_\_\_\_)  
(Depuis quand? \_\_\_\_\_)
- h. ☐ Cancer (Lequel \_\_\_\_\_) (Depuis quand? \_\_\_\_\_)
- i. ☐ Diabète (Lequel \_\_\_\_\_) (Depuis quand? \_\_\_\_\_)
- j. ☐ Emphysème, bronchite chronique ou toux persistante (précisez et depuis  
quand? \_\_\_\_\_)
- k. ☐ Asthme (Décrire et depuis quand? \_\_\_\_\_  
\_\_\_\_\_)
- l. ☐ Déficience mentale ou intellectuelle (Depuis quand \_\_\_\_\_)  
(Décrire \_\_\_\_\_)
- m. ☐ Dépression (Depuis quand \_\_\_\_\_; décrire \_\_\_\_\_  
\_\_\_\_\_)
- n. ☐ Epilepsie (Depuis quand? \_\_\_\_\_)
- o. ☐ Maladie du coeur (Depuis quand? \_\_\_\_\_)  
(Décrire \_\_\_\_\_)

- p. \_\_\_\_ Troubles urinaires ou maladie du rein (Depuis quand? \_\_\_\_\_)  
(Décrire \_\_\_\_\_)
- q. \_\_\_\_ Ulcères d'estomac (Depuis quand? \_\_\_\_\_)  
(Sévérité \_\_\_\_\_)
- r. \_\_\_\_ Autres troubles digestifs (Depuis quand? \_\_\_\_\_)  
(Spécifiez \_\_\_\_\_)
- s. \_\_\_\_ Goître ou troubles de la thyroïde (Depuis quand? \_\_\_\_\_)  
(Sévérité \_\_\_\_\_)
- t. \_\_\_\_ Migraine ou maux de tête fréquents (Depuis quand? \_\_\_\_\_)  
(Fréquence et sévérité \_\_\_\_\_)
- u. \_\_\_\_ Lupus (Depuis quand? \_\_\_\_\_; fréquence et sévérité des épisodes \_\_\_\_\_)

7. 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

\_\_\_\_\_

8. Votre enfant a-t-il(elle) déjà été référé(e) à un psychologue, un(une) travailleur(euse) sociale, à une clinique spécialisée ou à un hôpital pour un problème psychologique?

Non \_\_\_\_ Oui \_\_\_\_ -> Pourquoi?

\_\_\_\_\_;

combien de temps?

\_\_\_\_\_;

à quel endroit?

\_\_\_\_\_;

Appendix E  
*Maternal Health Questionnaire for Study 1*

## QUESTIONNAIRE SUR LA SANTÉ

Au cours des trois derniers mois, as-tu souffert de certains de ces problèmes de santé?  
Encerle 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) À 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 \_\_\_\_ à \_\_\_\_  
(mois) (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  
                   \_\_\_\_\_                      \_\_\_\_\_ oui \_\_\_\_\_ non                      \_\_\_\_\_ heures



## Appendix F

*Demographic comparison of Risk Group (childhood histories of high aggression and/or withdrawal) with Comparison Group Mothers (low on these two risk dimensions)*

|   | Risk Mothers ( <i>n</i> =56) | Comparison Mothers ( <i>n</i> =58) |
|---|------------------------------|------------------------------------|
| Family prestige score in mother's family of origin  | 367.96 (112.62)              | 387.33 (98.11)                     |
| Maternal education (years)                          | 10.98 (2.08)                 | 12.28 (2.44)                       |
| Annual family income (in Canadian dollars)          | \$ 34, 495 (24, 913)         | \$ 41, 807 (23, 021)               |
| Maternal age at the birth of first child (in years) | 23.83 (3.79)                 | 24.84 (3.13)                       |
| Maternal age at testing (in years)                  | 30.24 (2.57)                 | 30.42 (2.61)                       |
| Child age at testing (years)                        | 3.40 (1.65)                  | 3.55 (1.52)                        |

*Note.* Standard deviations are presented in parentheses.

## Appendix G

*Comparison of Mother-Participants in the Current Study with  
all identified Mothers in the Concordia Longitudinal Risk Project*

|   | Current Sample ( <i>n</i> =114) | All CLRP Mothers ( <i>n</i> =373) |
|---|---------------------------------|-----------------------------------|
| Childhood Aggression<br>Z-score                       | 0.38 (1.07)                     | .33                               |
| Childhood Withdrawal<br>Z-score                       | 0.45 (0.98)                     | .40                               |
| Family prestige score in<br>mother's family of origin | 377.82 (105.47)                 | ???                               |
| Maternal educational<br>Attainment (years)            | 11.64 (2.35)                    | 11.85                             |
| Maternal age at birth of<br>her first child           | 24.35 (3.48)                    | 24.39                             |
| Family's occupational<br>prestige score in            | 328.43 (110.67)                 | 341.37                            |

*Note.* Standard deviations are presented in parentheses.

Appendix H  
*Maternal Consent Form for Study 2*

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«L'INDIVIDU DANS SON MILIEU: Les parents et leurs enfants»

Directeurs du projet:

-Lisa A. Serbin, Ph.D.

-Dale M. Stack, Ph.D.

Numéro d'identification:

**Formulaire de consentement**

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

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

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

Nom: \_\_\_\_\_

Date: \_\_\_\_\_

EN LETTRES MOULÉES

Signature: \_\_\_\_\_

\*\*\*\*\*

Nom de l'enseignant/e: \_\_\_\_\_

Année: \_\_\_\_\_

Nom du directeur/de la directrice: \_\_\_\_\_

Nom de l'école: \_\_\_\_\_

Numéro de téléphone: (       ) \_\_\_\_\_  
code régional

Appendix I  
*Demographic Information Questionnaire for Study 2*

No d'identification \_\_\_\_\_ Date: \_\_\_\_\_

## L'INDIVIDU DANS SON MILIEU

### Renseignements sociodémographiques

*Tous ces renseignements sont traités de façon totalement confidentielle*

1. Sexe ☐ M ☐ F AN MO JR
2. Âge \_\_\_\_\_ ans Date de naissance \_\_\_\_\_
3. État civil

\*Note\*: "Conjoints de fait": désigne deux personnes qui vivent ensemble comme si elles étaient mariées. Il s'agit de ton état actuel; même si tu es légalement divorcé(e) ou autre, mais que tu vis avec un(e) conjoint(e) présentement, inscriis conjoint de fait.

- ☐ Célibataire Conjoint de fait ||  
 || Depuis quelle date?
- || Marié(e) Séparé(e) ||  
 AN MO JR
- || Divorcé(e) Veuf/veuve || \_\_\_\_\_

4. Nombre d'enfants \_\_\_\_\_

Si enceinte (ou conjointe enceinte), bébé attendu pour: AN MO

#### Pour chaque enfant:

- 1 - Inscrire le nom, le sexe, la date de naissance
- 2 - Encercler  
 "TE" si c'est ton enfant (tu es le parent biologique)  
 "EC" si l'enfant du conjoint (le conjoint actuel est le parent biologique)  
 "EA" si c'est un enfant adopté / "FA" en foyer d'accueil et qui vit chez toi  
 Si "TE" et "EC" sont vrais, encercler les deux.
- 3 - Indiquer si l'enfant vit avec toi, OUI ou NON ou GP (garde partagée)

- 4 - Inscrire l'année scolaire (si applicable) ainsi que si l'enfant fréquente une classe ou une école spéciale.

(Si tu as plus de quatre enfants, pourrais-tu inscrire leurs informations sur une feuille séparée.)

1 NOM \_\_\_\_\_ SEXE \_\_\_\_\_ AN MO JR  
☐ M ☐ F

L'enfant est: TE EC EA / FA Vit avec toi: OUI ☐ NON ☐ GP ☐

Année scolaire: \_\_\_\_\_ Classe spéciale: \_\_\_\_\_

2. NOM \_\_\_\_\_ SEXE \_\_\_\_\_ AN MO JR  
☐ M ☐ F

L'enfant est: TE EC EA / FA Vit avec toi: OUI ☐ NON ☐ GP ☐

Année scolaire: \_\_\_\_\_ Classe spéciale: \_\_\_\_\_

3. NOM \_\_\_\_\_ SEXE \_\_\_\_\_ AN MO JR  
☐ M ☐ F

L'enfant est: TE EC EA / FA Vit avec toi: OUI ☐ NON ☐ GP ☐

Année scolaire: \_\_\_\_\_ Classe spéciale: \_\_\_\_\_

4. NOM \_\_\_\_\_ SEXE \_\_\_\_\_ AN MO JR  
☐ M ☐ F

L'enfant est: TE EC EA / FA Vit avec toi: OUI ☐ NON ☐ GP ☐

Année scolaire: \_\_\_\_\_ Classe spéciale: \_\_\_\_\_

**5. Ta scolarité complétée (dernière année terminée):**

En quoi? (spécialisation/général): \_\_\_\_\_

Éudies-tu présentement? OUI : Temps plein ☐ partiel ☐ NON ☐

Si oui, quel diplôme postules-tu \_\_\_\_\_ pour quand? \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_

**6. As-tu un emploi (rappel: renseignements gardés confidentiels)?**

OUI ☐

NON ☐

Occupation: \_\_\_\_\_

As-tu déjà eu un emploi?

|| Oui ☐ Non ☐

Tes tâches: \_\_\_\_\_

En quoi?

Combien d'heures/sem.? \_\_\_\_\_

Pendant combien de temps?

\_\_\_\_\_ an(s) \_\_\_\_\_ mois

Salaire de l'heure \_\_\_\_\_ \$

Quand as-tu arrêté de travailler:

Depuis quand es-tu à cet emploi? inscrire la date

date: \_\_\_\_/\_\_\_\_/\_\_\_\_

AN MO

AN MO

\_\_\_\_/\_\_\_\_/\_\_\_\_

Au cours des 12 derniers mois, as-tu bénéficié de:

Oui ☐ Non ☐

l'Assurance chômage?

Oui ☐ Non ☐

Prestations d'aide sociale?

Oui ☐ Non ☐

la CSST? (préciser: \_\_\_\_\_)

**7. Informations sur le conjoint (renseignements gardés confidentiels):**

c) Son nom: \_\_\_\_\_

Date de naissance \_\_\_\_\_

AN MO JR

Son occupation: \_\_\_\_\_

Ses tâches: \_\_\_\_\_

Son salaire: \_\_\_\_\_ \$/ heure

Nombre d'heures \_\_\_\_\_ / semaine

AN MO

Il/Elle travaille là depuis: date \_\_\_\_\_

b) Au cours des 12 derniers mois, a-t-il/elle bénéficié de:



- Oui ☐ Non ☐ l'Assurance chômage?
- Oui ☐ Non ☐ Prestations d'aide sociale?
- Oui ☐ Non ☐ la CSST? (préciser: \_\_\_\_\_)

- c) Sa scolarité complétée (dernière année terminée):  
En quoi? (spécialisation/général): \_\_\_\_\_
- Étudie-t-il (elle) présentement? OUI : Temps plein ☐ partiel ☐ NON ☐
- Si oui, diplôme postulé? \_\_\_\_\_ pour quand?  
(date) \_\_\_\_/\_\_\_\_/\_\_\_\_

**8. Informations sur le père (si n'habite pas avec la mère):**

- d) Son nom: \_\_\_\_\_  
Date de naissance \_\_\_\_/\_\_\_\_/\_\_\_\_  
AN MO JR
- Son occupation: \_\_\_\_\_
- Ses tâches: \_\_\_\_\_
- Son salaire: \_\_\_\_\_ \$/ heure      Nombre d'heures \_\_\_\_\_ / semaine
- AN MO
- Il/Elle travaille là depuis: date \_\_\_\_/\_\_\_\_/\_\_\_\_

- b) Au cours des 12 derniers mois, a-t-il/elle bénéficié de:
- Oui ☐ Non ☐ l'Assurance chômage?
- Oui ☐ Non ☐ Prestations d'aide sociale?
- Oui ☐ Non ☐ la CSST? (préciser: \_\_\_\_\_)
- c) Sa scolarité complétée (dernière année terminée):  
En quoi? (spécialisation/général): \_\_\_\_\_
- Étudie-t-il (elle) présentement? OUI : Temps plein ☐ partiel ☐ NON ☐

Si oui, diplôme postulé? \_\_\_\_\_ pour quand?  
(date) \_\_\_\_/\_\_\_\_/\_\_\_\_

**9. Disponibilité pour le test parent-enfant**

- ☐ Le matin ☐ L'après-midi  
☐ La semaine ☐ La fin de semaine

**10. Vision des couleurs:** Il y a une section de la recherche qui porte sur les couleurs.

Est-ce que tu as de la difficulté à percevoir certaines couleurs?

☐ Oui (préciser: \_\_\_\_\_) ☐ Non

S.V.P. Vérifier l'adresse et les numéros de téléphone.

\_\_\_\_\_  
No. rue/app. \_\_\_\_\_ rue

\_\_\_\_\_  
Ville \_\_\_\_\_ Code postal \_\_\_\_\_

Téléphones: Personnel: (\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_

Travail: (\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_

Parents: (\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_

Autre \_\_\_\_\_: (\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_

Ton numéro de téléphone personnel est à quel nom dans l'annuaire téléphonique:  
Nom complet et lien avec toi:

\_\_\_\_\_

Adresse des parents: \_\_\_\_\_  
\_\_\_\_\_

Rempli par: Mère Père

No d'identification: \_\_\_\_\_

Appendix J  
*Maternal and Child Health Questionnaire for Study 2*

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## QUESTIONNAIRE SUR LA SANTÉ

Date : \_\_\_\_\_  
 Date de naissance de l'enfant (a/m/j) : \_\_\_\_\_  
 Date de naissance de la mère (a/m/j) : \_\_\_\_\_

\*\*\*\*\*

### Information sur la mère

Poids \_\_\_\_\_  
 Grandeur \_\_\_\_\_

### SANTÉ GÉNÉRALE :

Êtes-vous enceinte? Oui \_\_\_\_ Non \_\_\_\_  
 Allaitiez-vous? Oui \_\_\_\_ Non \_\_\_\_  
 Utilisez-vous un moyen de contraception? Non \_\_\_\_ Oui \_\_\_\_ → Si oui, lequel? \_\_\_\_\_

Quand avez-vous été menstruée pour la dernière fois? \_\_\_\_\_ (1<sup>er</sup> jour)

Vos périodes sont-elles régulières? Oui \_\_\_\_ Non \_\_\_\_  
 À quelle âge avez-vous eu vos premières menstruations? \_\_\_\_\_  
 (age et mois, ex. 9 ans 4 mois)

Comment évaluez-vous votre santé générale?

1      2      3      4      5      6      7      8      9      10

Faible                  Passable                  Bonne                  Excellente

Au cours des 12 derniers mois, combien de fois avez-vous consulté...

un médecin de famille? \_\_\_\_\_  
 une clinique médicale? \_\_\_\_\_  
 un CLSC? \_\_\_\_\_  
 ou le service d'urgence d'un hôpital? \_\_\_\_\_

Au cours des 12 derniers mois, depuis \_\_\_\_\_ 200\_\_\_\_\_, avez-vous eu des problèmes avec votre santé? Non \_\_\_\_ Oui → Précisez? \_\_\_\_\_

Au cours des 12 derniers mois, avez-vous pris des médicaments prescrits par le médecin?

Non \_\_\_\_\_ Oui \_\_\_\_\_

Si oui, lesquels et pourquoi?

---



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Je vais vous nommer des problèmes de santé. Simplement me dire oui ou non (si oui, demander des précisions):

- |                                    |                                    |
|------------------------------------|------------------------------------|
| 1. Diabète _____                   | 9. Arthrite / bursite _____        |
| 2 Crise d'asthme / bronchite _____ | 10. Problèmes digestifs _____      |
| 3. Crise de foie _____             | 11. Anémie / hypoglycémie _____    |
| 4. Haute / basse pression _____    | 12. Problèmes gynécologiques _____ |
| 5. Cholestérol élevé _____         | 13. MTS _____                      |
| 6. Problèmes cardiaques _____      | 14. Cancer _____                   |
| 7. Migraines / maux de tête _____  | 15. Problèmes de vision _____      |
| 8. Maladie de peau _____           | 16. Rhumes fréquents _____         |
| 17. Allergies _____ Lesquelles?    |                                    |

Précisions (intensité et durée des symptômes): \_\_\_\_\_

---



---

Avez-vous consulté un psychologue ou du personnel en santé mentale au cours des 12 derniers mois pour des problèmes d'anxiété, de dépression, ou autres?

Oui \_\_\_\_\_ Non \_\_\_\_\_ -> Lesquels?

---

Fumez-vous? Non \_\_\_\_\_ Oui \_\_\_\_\_

Si oui, a) nombre de cigarettes par jour \_\_\_\_\_

b) à quel âge avez-vous commencé à fumer régulièrement? \_\_\_\_\_

Si non, a) avez-vous déjà fumé régulièrement? Oui \_\_\_\_\_ Non \_\_\_\_\_

b) si oui, âge du début \_\_\_\_\_ âge d'arrêt \_\_\_\_\_

Quelqu'un d'autre dans la famille ou à la maison fume-t-il? Non \_\_\_\_\_ Oui \_\_\_\_\_

Si oui, précisez : Qui? \_\_\_\_\_

Combien de cigarettes par jour? \_\_\_\_\_

### PRÉVENTION

Combien d'heures dormez-vous par jour en moyenne? \_\_\_\_\_

À quelle heure vous couchez-vous? \_\_\_\_\_ vous réveillez-vous? \_\_\_\_\_

À quelle fréquence vous brossez-vous les dents? \_\_\_\_\_/semaine.

À quelle fréquence passez-vous la soie dentaire? \_\_\_\_\_/semaine.

Avez-vous passé un examen dentaire durant la dernière année? Non \_\_\_\_\_ Oui \_\_\_\_\_

Si oui, combien? \_\_\_\_\_

À quelle fréquence allez-vous chez le dentiste? \_\_\_\_\_

Avez-vous eu des problèmes importants avec votre dentition? Non \_\_\_\_\_ Oui \_\_\_\_\_

Si oui, lesquels? \_\_\_\_\_

Faites-vous des sports ou de l'exercice physique? Non \_\_\_\_\_ Oui \_\_\_\_\_

Si oui, lesquels? \_\_\_\_\_ fréquence? \_\_\_\_\_

\_\_\_\_\_

Êtes-vous satisfait(e) de votre niveau d'activité? Non \_\_\_\_\_ Oui \_\_\_\_\_

Pourquoi?

\_\_\_\_\_

\_\_\_\_\_

Combien de fois par jour mangez-vous? \_\_\_\_\_

Combien de temps se passe-t-il entre votre réveil et l'heure où vous mangez? \_\_\_\_\_

*Combien de portions de chacun des aliments suivants mangez-vous par jour?*

Viande (une portion de viande est équivalente à 3 oz., 1/2 cannette de thon ou 2 oeufs).

1-2 ☐ 3-4 ☐ 5-6 ☐ 7+ ☐

Fruits / Légumes (une portion de fruit/légume est équivalente à une banane, une pomme, une patate, une tasse de salade ou 1/2 tasse de jus).

1-2 ☐ 3-4 ☐ 5-6 ☐ 7+ ☐

Produits Laitiers (une portion de produit laitier est équivalente à un verre de lait, 2 morceaux de fromage Kraft ou une portion individuelle de yogourt).

1-2 ☐ 3-4 ☐ 5-6 ☐ 7+ ☐

Pain / Céréales (une portion de pain/céréales est équivalente à une tranche de pain, 1/2 bagel ou un muffin).

1-2 ☐ 3-4 ☐ 5-6 ☐ 7+ ☐

Sucre / Gras (une portion de sucre/gras est équivalente à une cuillerée à thé de sucre ou une tablette de chocolat).

1-2 ☐ 3-4 ☐ 5-6 ☐ 7+ ☐

En auto, à quelle fréquence portez-vous une ceinture de sécurité...

...lorsque vous vous assoyez en avant?

Jamais \_\_\_\_ Parfois \_\_\_\_ Habituellement \_\_\_\_ Toujours \_\_\_\_

...lorsque vous vous assoyez en arrière?

Jamais \_\_\_\_ Parfois \_\_\_\_ Habituellement \_\_\_\_ Toujours \_\_\_\_

Combien de fois dans le dernier mois avez-vous été en voiture avec quelqu'un qui avait bu un verre (bière, vin, alcool) dans les deux heures précédentes?

---

Combien de fois dans le dernier mois avez-vous conduit une voiture après avoir bu un verre (bière, vin, alcool) dans les deux heures précédentes?

---

### Information sur l'enfant

Poids \_\_\_\_\_  
 Grandeur \_\_\_\_\_

Votre fille a-t-elle eu ses premières menstruation? Non \_\_\_\_\_ Oui \_\_\_\_\_  
 -> Première \_\_\_\_\_ (aa/mm) dernière \_\_\_\_\_ (mm/jj)

OU

Votre fils a-t-il eu ses premiers signes de la puberté? Non \_\_\_\_\_ Oui \_\_\_\_\_  
 (Poils au pubice, esselles, poussée de croissance, etc.) -> Quand \_\_\_\_\_ (date)

Comment évaluez-vous la santé de votre enfant comparativement aux autres enfants de son âge?

|        |   |          |   |       |   |            |   |   |    |
|--------|---|----------|---|-------|---|------------|---|---|----|
| 1      | 2 | 3        | 4 | 5     | 6 | 7          | 8 | 9 | 10 |
| Faible |   | Passable |   | Bonne |   | Excellente |   |   |    |

Au cours des 12 derniers mois, depuis \_\_\_\_\_ 200\_\_\_\_\_, votre enfant a-t-il eu des problèmes de santé? Non \_\_\_\_\_ Oui \_\_\_\_\_

Si oui, lesquels? \_\_\_\_\_

Je vais vous nommer des problèmes de santé. Simplement me dire oui ou non (si oui, demander des précisions):

- |  |                                   |
|--|-----------------------------------|
| 1. Maladie de la peau _____                      | 7. Ulcères d'estomac _____        |
| 2 Allergie _____                                 | 8. Problèmes digestifs _____      |
| 3. Diabète _____                                 | 9. Maladie du rein _____          |
| 4. Bronchite chronique _____<br>toux persistante | 10. Migraine / maux de tête _____ |
| 5. Asthme _____                                  | 11. Otites _____                  |
| 6. Épilepsie _____                               | 12. Rhume et grippe _____         |



Autres problèmes de santé

\_\_\_\_\_

Précisions (intensité et durée des symptômes): \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Je vais vous nommer d'autres types de problèmes. Simplement me dire oui ou non (si oui, demander des précisions):

1. Problème auditif \_\_\_\_\_ 5. Problème de développement \_\_\_\_\_

2. Trouble d'alimentation \_\_\_\_\_ 6. Problème de comportement \_\_\_\_\_

3. Dépression / Anxiété \_\_\_\_\_ 7. Hyperactivité \_\_\_\_\_

4. Problème visuel \_\_\_\_\_ 8. Trouble d'attention \_\_\_\_\_

Autres problèmes: \_\_\_\_\_

\_\_\_\_\_

Précisions (intensité et durée des symptômes des autres problèmes):

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Au cours des 12 derniers mois, combien de fois votre enfant a-t-il consulté...

un médecin de famille \_\_\_\_\_

une clinique médicale \_\_\_\_\_

un CLSC \_\_\_\_\_

ou le service d'urgence d'un hôpital \_\_\_\_\_

Au cours des 12 derniers mois, votre enfant a-t-il /elle pris des médicaments prescrits par le médecin? Non \_\_\_\_ Oui \_\_\_\_

→ Si oui, lesquels et pourquoi? \_\_\_\_\_

### ACCIDENTS & BLESSURES

Au cours des 12 derniers mois, votre enfant a-t-il eu des accidents ayant causé des blessures (incluant les empoisonnements)

a) ayant restreint ses activités? Non \_\_\_\_ Oui \_\_\_\_

→ Si oui, lesquels? \_\_\_\_\_

b) pour lesquelles il/elle a consulté un médecin? Non \_\_\_\_ Oui \_\_\_\_

→ Si oui, précisez: \_\_\_\_\_

Où sont arrivés les accidents dont votre enfant a été victime au cours des 12 derniers mois? (Indiquer le nombre)

a) \_\_\_\_ sur la route

e) \_\_\_\_ dans un lieu de loisir et/ou de sport

b) \_\_\_\_ à l'école

f) \_\_\_\_ dans un lieu public (trottoir, édifice public, banque)

c) \_\_\_\_ à la maison (intérieur) g) \_\_\_\_ Autre endroit, spécifiez \_\_\_\_\_

d) \_\_\_\_ à la maison (extérieur)

Comparé aux enfants de son âge, pensez-vous que votre enfant a des accidents plus souvent que les autres enfants? Non \_\_\_\_ Oui \_\_\_\_

→ Si oui, spécifiez \_\_\_\_\_

## PRÉVENTION

Combien d'heures votre enfant dort-il/elle en moyenne par jour? \_\_\_\_\_

À quelle heure...

se couche-t-il/elle les jours d'école? \_\_\_\_\_

se lève-t-il/elle les jours d'école? \_\_\_\_\_

À quelle fréquence votre enfant se brosse-t-il/elle les dents? \_\_\_\_\_/semaine.

À quelle fréquence passe-t-il/elle la soie dentaire? \_\_\_\_\_/semaine.

A-t-il/elle passé un examen dentaire durant la dernière année? Oui \_\_\_\_\_ Non \_\_\_\_\_

À quelle fréquence va-t-il/elle chez le dentiste? \_\_\_\_\_

A-t-il/elle eu des problèmes importants avec sa dentition? Non \_\_\_\_\_ Oui \_\_\_\_\_

→ Si oui, lesquels?

\_\_\_\_\_

Fait-il/elle des sports ou de l'exercice physique? Non \_\_\_\_\_ Oui \_\_\_\_\_

Si oui, lesquels? \_\_\_\_\_ → fréquence? \_\_\_\_\_

\_\_\_\_\_ → \_\_\_\_\_

\_\_\_\_\_ → \_\_\_\_\_

Êtes-vous satisfait(e) du niveau d'activité que votre enfant fait? Non \_\_\_\_\_ Oui \_\_\_\_\_

Pourquoi? \_\_\_\_\_

\_\_\_\_\_

En voiture, à quelle fréquence votre enfant porte-t-il/elle une ceinture de sécurité....

...lorsqu'il/elle s'assoie en avant?

Jamais \_\_\_\_\_ Parfois \_\_\_\_\_ Habituellement \_\_\_\_\_ Toujours \_\_\_\_\_...lorsqu'il/elle s'assoie en arrière?

Jamais \_\_\_\_\_ Parfois \_\_\_\_\_ Habituellement \_\_\_\_\_ Toujours \_\_\_\_\_

Combien de fois par jour votre enfant mange-t-il? \_\_\_\_\_

Combien de temps se passe-t-il entre le réveil de votre enfant et l'heure où il mange? \_\_\_\_\_

*Combien de portions de chacun des aliments suivants votre enfant mange-t-il par jour?*

Viande (une portion de viande est équivalente à 3 oz., 1/2 cannette de thon ou 2 oeufs).

1-2 ☐ 3-4 ☐ 5-6 ☐ 7+ ☐

Fruits / Légumes (une portion de fruit/légume est équivalente à une banane, une pomme, une patate, une tasse de salade ou 1/2 tasse de jus).

1-2 ☐ 3-4 ☐ 5-6 ☐ 7+ ☐

Produits Laitiers (une portion de produit laitier est équivalente à un verre de lait, 2 morceaux de fromage Kraft ou une portion individuelle de yogourt).

1-2 ☐ 3-4 ☐ 5-6 ☐ 7+ ☐

Pain / Céréales (une portion de pain/céréales est équivalente à une tranche de pain, 1/2 bagel ou un muffin).

1-2 ☐ 3-4 ☐ 5-6 ☐ 7+ ☐

Sucre / Gras (une portion de sucre/gras est équivalente à une cuillerée à thé de sucre ou une tablette de chocolat).

1-2 ☐ 3-4 ☐ 5-6 ☐ 7+ ☐

Appendix K.  
*Service Usage Questionnaire for Study 2*

---

IDNO \_\_\_\_\_

## QUESTIONNAIRE D'UTILISATION DES SERVICES

1. Votre enfant a-t-il déjà utilisé des services développementaux?

1. Non

2. Oui, cochez chaque case qui convient

- ☐ développement du nourrisson/stimulation du nourrisson
  - ☐ développement langagier
  - ☐ orthophonie
  - ☐ thérapie d'intégration sensorielle
  - ☐ thérapie par le jeu
  - ☐ autres services développementaux (décrire) \_\_\_\_\_
- \_\_\_\_\_

A quelle fréquence?

\_\_\_\_\_  
\_\_\_\_\_

Quel est votre degré de satisfaction?

\_\_\_\_\_

0%

100%

Très Insatisfaite

Très Satisfaite

**2. Votre enfant a-t-il déjà participé à des activités organisées?**

1. Non

2. Oui, cochez chaque case qui convient

- ☐ activités récréatives organisées pour les enfants
- ☐ activités organisées parents-enfants
- ☐ autres activités organisées (décrire) \_\_\_\_\_  
\_\_\_\_\_

A quelle fréquence?

---

---

Quel est votre degré de satisfaction?

0%

100%

Très Insatisfaite

Très Satisfaite

**3. Avez-vous déjà utilisé des services de soutien?**

1. Non

2. Oui, cochez chaque case qui convient

- ☐ préposé(e) pour des soins spéciaux
- ☐ préposé(e) en soutien familial
- ☐ coordonnateur/trice de cas
- ☐ entretien ménager

- ☐ organization de parents
- ☐ soutien financier
- ☐ transport adapté
- ☐ autres services de soutien (décrire) \_\_\_\_\_

A quelle fréquence?

---



---

Quel est votre degré de satisfaction?

0%

100%

Très Insatisfaite

Très Satisfaite

#### 4. Avez-vous déjà utilisé des services de répit?

1. Non

2. Oui, cochez chaque case qui convient

- ☐ service à domicile
- ☐ en dehors du domicile
- ☐ service de gardiennage
- ☐ autres services de répit (décrire) \_\_\_\_\_



A quelle fréquence?

---



---

Quel est votre degré de satisfaction?

---

0%

100%

Très Insatisfaite

Très Satisfaite

5. Avez-vous déjà utilisé des services de garderie/école?

1. Non

2. Oui, cochez chaque case qui convient

- ☐ garderie régulière
- ☐ garderie régulière avec personnel spécialisé
- ☐ garderie/école spécialisée
- ☐ classe régulière
- ☐ classe régulière avec assistant pédagogique ou curriculum adapté
- ☐ classe spécialisée
- ☐ autres services pédagogiques spécialisés (décrire)\_\_\_\_\_

---

A quelle fréquence?

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---

Quel est votre degré de satisfaction?

0%

100%

Très Insatisfaite

Très Satisfaite

6. Avez-vous déjà suivi une formation parentale ou une thérapie familiale?

1. Non

2. Oui, cochez chaque case qui convient

- ☐ formation parentale en gestion du comportement de l'enfant
- ☐ formation parentale en développement des habiletés de l'enfant
- ☐ formation parentale en soins de base aux enfants, santé et sécurité
- ☐ thérapie familiale
- ☐ autres formations parentales et thérapies familiales (décrire)

A quelle fréquence?

---



---

Quel est votre degré de satisfaction?

0%

100%

Très Insatisfaite

Très Satisfaite

7. Avez-vous déjà utilisé des services spécialisés pour les parents?

1. Non

2. Oui, cochez chaque case qui convient

- ☐ thérapie individuelle
- ☐ thérapie de couple, conseil matrimonial
- ☐ conseiller en orientation professionnelle
- ☐ éducation aux adultes
- ☐ soins de la santé pour les parents (décrire)

☐ autres services pour les parents (décrire) \_\_\_\_\_

A quelle fréquence?

---



---

Quel est votre degré de satisfaction?

0%

100%

Très Insatisfaite

Très Satisfaite

8. Votre enfant, a-t-il déjà reçu des soins médicaux?

1. Non

2. Oui, cochez chaque case qui convient

- ☐ médecin de famille
- ☐ pédiatre
- ☐ neurologue
- ☐ psychiatre
- ☐ allergologue
- ☐ physiothérapeute
- ☐ soins infirmiers à domicile
- ☐ dentiste
- ☐ autres soins médicaux pour enfant (décrire) \_\_\_\_\_

A quelle fréquence?

---

---

Quel est votre degré de satisfaction?

---

0%

100%

Très Insatisfaite

Très Satisfaite

9. Votre enfant, a-t-il déjà utilisé des médecines alternatives?

1. Non

2. Oui, cochez chaque case qui convient

- ☐ homéopathie, naturopathie
- ☐ diète spécialisée, vitamines, etc.
- ☐ autres médecines alternatives (décrire) \_\_\_\_\_
- \_\_\_\_\_

A quelle fréquence?

\_\_\_\_\_

\_\_\_\_\_

Quel est votre degré de satisfaction?

0%

100%

Très Insatisfaite

Très Satisfaite

10. Autres services pour l'enfant et la famille (décrire)

\_\_\_\_\_

\_\_\_\_\_

Appendix L  
*Parenting Stress Index (PSI) for Study 2*

Rempli par: Mère Père

No d'identification: \_\_\_\_\_

**ISP (version abrégée)**

(Abidin, 1986)

**Directives:**

Pour ce questionnaire, nous vous demandons d'encrer 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, encrer la réponse qui s'y rapproche le plus. VOTRE PREMIÈRE RÉACTION À CHAQUE QUESTION DEVRAIT ÊTRE VOTRE RÉPONSE.

Veillez écrire à quel point vous êtes en accord ou en désaccord avec chaque énoncé en encrant 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 aimez parfois aller au cinéma, vous devriez alors encrer 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

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

- |   |           |
|---|-----------|
| 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<br>et différentes.                                  | 1 2 3 4 5 |
| 5. Depuis que j'ai cet enfant, je sens que je ne suis presque jamais capable<br>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<br>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 |
| 7. Avoir un enfant m'a causé plus de problèmes que j'avais prévus au niveau<br>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<br>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 |
| 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<br>près de moi.                                     | 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 ||
- 

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

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

- 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
- 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 +

---

| 1 = très d'accord ||

| 2 = parfois d'accord ||

| 3 = modérément d'accord ||

| 4 = parfois en désaccord ||

| 5 = très en désaccord ||

---

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 M  
*Child Behavior Checklist (CBCL) for Study 2: Maternal Report Form*

---

## CBCL-4/18

Date (A/M/J) : \_\_\_\_\_

No d'identification : \_\_\_\_\_

Rempli par : Mère Père

I. Veuillez énumérer les sports que votre enfant aime le plus faire. (Par ex. natation, baseball, bicyclette, etc.)

☐ Aucun

A. \_\_\_\_\_

B. \_\_\_\_\_

C. \_\_\_\_\_

Comparé aux enfants de son âge, combien de temps passe-t-il à faire ces sports ?

Moins

Plus

Ne sait que la Moyenne que la

pas moyenne

moyenne

Comparé aux enfants de son âge, comment est-il/elle bon/ne dans ces sports ?

Moins

Plus

Ne sait que la Moyenne que la

pas moyenne

moyenne

II Quels passe-temps, activités ou jeux autres que les sports votre enfant aime-t-il faire. (Par ex. lecture, piano, bricolage [ne pas inclure TV])

☐ Aucun

A. \_\_\_\_\_

B. \_\_\_\_\_

C. \_\_\_\_\_

Comparé aux enfants de son âge, combien de temps passe-t-il/elle à faire ces activités ?

Moins

Plus

Ne sait que la Moyenne que la

pas moyenne

moyenne

Comparé aux enfants de son âge, comment est-il/elle bon/ne dans ces activités ?

Moins

Plus

Ne sait que la Moyenne que la

pas moyenne

moyenne

III Veuillez énumérer les organisations, les clubs, les équipes ou les groupes dont votre enfant fait partie.

☐ Aucun

A. \_\_\_\_\_

B. \_\_\_\_\_

C. \_\_\_\_\_

Comparé aux enfants de son âge, à quel point votre enfant est-il/elle actif/ve dans chacun d'eux ?

Moins

Plus

Ne sait que la Moyenne que la

pas moyenne

moyenne

IV Veuillez énumérer les tâches et les corvées que votre enfant fait (par ex., livrer les journaux, faire son lit, etc.)

☐ Aucun

A. \_\_\_\_\_

B. \_\_\_\_\_

C. \_\_\_\_\_

Comparé aux enfants de son âge, comment votre enfant s'acquitte-t-il/elle de ses tâches ?

Moins bien

Mieux

Ne sait que la Moyenne que la

pas moyenne

moyenne

V À peu près combien de bon(ne)s ami(e)s votre enfant a-t-il ?

☐ Aucun

☐ 1

☐ 2 ou 3

☐ 4 ou plus

À peu près combien de fois par semaine fait-il/elle des activités avec ses ami(e)s?

☐ moins d'une

☐ 1 ou 2

☐ 3 ou

fois

plus

VI Comparé à d'autres enfants de son âge, comment est-ce que votre enfant . . .

|   | Pire                     | À peu près<br>pareil     | Mieux                    |
|---|--------------------------|--------------------------|--------------------------|
| e. s'entend avec ses frères et soeurs   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| f. s'entend avec les autres enfants     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| g. s'entend avec ses parents            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| h. joue et travaille par lui-/elle-même | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

## VII 1. Rendement scolaire (pour les enfants de six ans et plus)

Ne va pas à l'école ☐

|                        |                            | Échec                    | En bas de<br>la moyenne  | Dans la<br>moyenne       | En haut de<br>la moyenne |
|------------------------|----------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| a.                     | Lecture ou Français        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b.                     | Écriture                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c.                     | Arithmétique/Mathématiques | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d.                     | Épellation                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Autres matières</i> |                            |                          |                          |                          |                          |
| e.                     | _____                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| f.                     | _____                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| g.                     | _____                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. Votre enfant est-il/elle dans une classe spéciale ?

Non \_\_\_\_\_ Oui \_\_\_\_\_ (précisez) \_\_\_\_\_

3. Votre enfant a-t-il/elle déjà doublé une année ?

Non \_\_\_\_\_ Oui \_\_\_\_\_ (précisez) \_\_\_\_\_

4. Votre enfant a-t-il des problèmes académiques ou autres à l'école ?

Non \_\_\_\_\_ Oui \_\_\_\_\_ (précisez) \_\_\_\_\_

Quand ces problèmes ont-ils commencé ?

\_\_\_\_\_

\_\_\_\_\_

Sont-ils terminés ?

Non \_\_\_\_\_ Oui \_\_\_\_\_ (depuis quand ?) \_\_\_\_\_



Voici une liste d'énoncés décrivant les enfants. En vous basant sur le comportement de votre enfant au cours des 6 derniers mois, veuillez encercler :

2 --> si c'est très vrai ou souvent vrai pour votre enfant

1 --> si c'est quelquefois vrai pour votre enfant

0 --> si ce n'est pas vrai pour votre enfant

Assurez-vous de répondre à tous les énoncés au meilleur de votre connaissance, même si certains ne semblent pas s'appliquer à votre enfant.

1. Agit trop jeune pour son âge. .... 0 1 2

2. Allergie ..... 0 1 2

(décrire) \_\_\_\_\_

\_\_\_\_\_

3. Argumente beaucoup ..... 0 1 2

4. Asthme ..... 0 1 2

5. Se comporte comme l'autre sexe ..... 0 1 2

6. Fait caca dans ses culottes ..... 0 1 2

7. Se vante ..... 0 1 2

8. Ne peut se concentrer ou porter attention

longtemps ..... 0 1 2

9. Ne peut s'arrêter de penser à certaines

choses, obsessions ..... 0 1 2

(décrire) \_\_\_\_\_

\_\_\_\_\_

10. Ne peut s'asseoir tranquille, est agité/e  
ou hyperactif(ve) ..... 0 1 2
11. S'accroche aux adultes, ou est trop  
dépendant(e) ..... 0 1 2
12. Se plaint de solitude ..... 0 1 2
13. Est confus(e) ou semble être dans la brume 0 1 2
14. Pleure beaucoup ..... 0 1 2
15. Est cruel(le) envers les animaux ..... 0 1 2
16. Est cruel(le), brutal(e) ou mesquin(e) envers  
les autres ..... 0 1 2
17. Rêvasse ou se perd dans ses pensées ..... 0 1 2
18. Se fait volontairement mal ou tentative de  
suicide ..... 0 1 2
19. Demande beaucoup d'attention ..... 0 1 2
20. Détruit ses propres objets ..... 0 1 2
21. Détruit les objets appartenant à sa famille ou  
aux autres enfants ..... 0 1 2
22. Est désobéissant(e) à la maison ..... 0 1 2
23. Est désobéissant(e) à l'école ..... 0 1 2
24. Ne mange pas bien ..... 0 1 2
25. Ne s'entend pas avec les autres enfants..... 0 1 2
26. Ne semble pas se sentir coupable après une  
mauvaise action ..... 0 1 2

27. Facilement jaloux(se) ..... 0 1 2
28. Mange ou boit des choses non comestibles 0 1 2  
(décrire)\_\_\_\_\_
29. Craint certains animaux, situations ou lieux  
autres que l'école ..... 0 1 2  
(décrire)\_\_\_\_\_  
\_\_\_\_\_
30. Craint d'aller à l'école ..... 0 1 2
31. Craint de penser ou faire quelque chose de  
mal ..... 0 1 2
32. Sent qu'il/elle doit être parfait(e) ..... 0 1 2
33. Sent ou se plaint que personne ne l'aime ..... 0 1 2
34. Pense que les autres lui en veulent ..... 0 1 2
35. Se sent inférieur(e) ou bon(ne) à rien ..... 0 1 2
36. Se blesse souvent, a souvent des accidents .... 0 1 2
37. Se bataille souvent ..... 0 1 2
38. Est fréquemment taquiné(e) ..... 0 1 2
39. Fréquente les enfants qui attirent les ennuis  
.....0 1 2
40. Entend des choses imaginaires ..... 0 1 2  
(décrire)\_\_\_\_\_  
\_\_\_\_\_

41. Est impulsif(ve) ou agit sans réfléchir ..... 0 1 2

(décrire) \_\_\_\_\_

\_\_\_\_\_

42. Aime être seul(e) ..... 0 1 2

43. Ment ou triche ..... 0 1 2

44. Se ronge les ongles ..... 0 1 2

45. Nerveux(se), tendu(e) ..... 0 1 2

46. Mouvements nerveux ou tics ..... 0 1 2

(décrire) \_\_\_\_\_

\_\_\_\_\_

47. Fait des cauchemars ..... 0 1 2

48. N'est pas aimé(e) des autres enfants ..... 0 1 2

49. Constipé(e) ..... 0 1 2

50. Très craintif(ve) ou anxieux(se) ..... 0 1 2

51. A des étourdissements ..... 0 1 2

52. Se sent trop coupable ..... 0 1 2

53. Mange trop ..... 0 1 2

54. Est toujours fatigué(e) ..... 0 1 2

55. Est trop gros(se) ..... 0 1 2

## 56. Problèmes physiques sans cause médicale apparente

a. fièvre ou douleurs ..... 0 1 2

b. maux de tête ..... 0 1 2

c. nausées, se sent malade ..... 0 1 2

d. problèmes aux yeux ..... 0 1 2

(décrire) \_\_\_\_\_

\_\_\_\_\_

e. éruption, rougeurs ou autres

problèmes de peau ..... 0 1 2

f. troubles d'estomac, crampes ..... 0 1 2

g. vomissements ..... 0 1 2

h. autres ..... 0 1 2

(décrire) \_\_\_\_\_

\_\_\_\_\_

57. Attaque physiquement les gens ..... 0 1 2

58. Se gratte le nez, la peau ou d'autres parties

du corps ..... 0 1 2

59. Joue avec ses organes sexuels en public ..... 0 1 2

60. Joue trop avec ses organes sexuels ..... 0 1 2

61. Fait mal ses travaux scolaires ..... 0 1 2

62. Est maladroit(e), manque de coordination..... 0 1 2

63. Préfère jouer avec des enfants plus vieux ..... 0 1 2

64. Préfère jouer avec des enfants plus jeunes .... 0 1 2
65. Refuse de parler ..... 0 1 2
66. Répète souvent certains gestes, compulsions 0 1 2  
(décrire) \_\_\_\_\_  
\_\_\_\_\_
67. Se sauve de la maison ..... 0 1 2
68. Hurle ou crie beaucoup ..... 0 1 2
69. Renfermé(e), garde les choses pour lui/elle... 0 1 2
70. Voit des choses imaginaires ..... 0 1 2  
(décrire) \_\_\_\_\_  
\_\_\_\_\_
71. Centré(e) sur lui/elle même ou facilement  
embarrassé(e) ..... 0 1 2
72. Déclenche des feux ..... 0 1 2
73. A des problèmes sexuels ..... 0 1 2  
(décrire) \_\_\_\_\_  
\_\_\_\_\_
74. Fait le "clown" ou se pavane ..... 0 1 2
75. Timide ..... 0 1 2
76. Dort moins que les autres enfants ..... 0 1 2
77. Dort moins que les autres enfants durant le  
jour et la nuit ..... 0 1 2  
(décrire) \_\_\_\_\_

78. Joue avec ses excréments..... 0 1 2
79. Problème de langage ..... 0 1 2  
(décrire) \_\_\_\_\_  
\_\_\_\_\_
80. Regard vague, dans le vide ..... 0 1 2
81. Vole à la maison ..... 0 1 2
82. Vole à l'extérieur de la maison ..... 0 1 2
83. Entrepose des choses dont il/elle n'a pas  
besoin ..... 0 1 2  
(décrire) \_\_\_\_\_  
\_\_\_\_\_
84. Comportements bizarres ..... 0 1 2  
(décrire) \_\_\_\_\_  
\_\_\_\_\_
85. Idées étranges ..... 0 1 2  
(décrire) \_\_\_\_\_  
\_\_\_\_\_
86. Irritable, entêté(e), maussade ..... 0 1 2
87. Change soudainement d'humeur ..... 0 1 2
88. Boude beaucoup ..... 0 1 2
89. Soupçonneux(se), méfiant(e) ..... 0 1 2
90. Grossier(e) ..... 0 1 2
91. Parle de se tuer ..... 0 1 2

92. Parle ou marche durant son sommeil ..... 0 1 2

(décrire) \_\_\_\_\_

\_\_\_\_\_

93. Parle trop ..... 0 1 2

94. Agace beaucoup ..... 0 1 2

95. Accès de colère, crises, ou s'emporte

facilement ..... 0 1 2

96. Pense trop au sexe ..... 0 1 2

97. Menace les gens ..... 0 1 2

98. Suce son pouce ..... 0 1 2

99. Trop préoccupé(e) par l'ordre et la propreté 0 1 2

100. Trouble lié au sommeil ..... 0 1 2

(décrire) \_\_\_\_\_

\_\_\_\_\_

101. Fait l'école buissonnière, vagabonde ..... 0 1 2

102. N'est pas actif(ve), a des mouvements lents,

manque d'énergie ..... 0 1 2

103. Triste, malheureux(se) ou dépressif(ve) ..... 0 1 2

104. Extrêmement bruyant(e) ..... 0 1 2

105. Boit de l'alcool ou prend de la drogue ..... 0 1 2

(décrire) \_\_\_\_\_

\_\_\_\_\_



106. Vandalisme (tendance à détruire) ..... 0 1 2
107. Se mouille durant le jour ..... 0 1 2
108. Mouille son lit ..... 0 1 2
109. Pleurniche, gémit ..... 0 1 2
110. Souhaite être de l'autre sexe ..... 0 1 2
111. Se retire, n'aime pas s'impliquer avec les  
autres ..... 0 1 2
112. S'inquiète ..... 0 1 2
113. S'il vous plaît, décrire tous problèmes que votre  
enfant a et qui ne sont pas énumérés dans ce questionnaire.

\_\_\_\_\_ 0 1 2

\_\_\_\_\_ 0 1 2

\_\_\_\_\_ 0 1 2

114. Avez-vous des inquiétudes au sujet du développement de votre enfant, que ce soit sur le plan de l'école, de son comportement, de ses relations avec sa famille et ses amis, etc.?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Assurez-vous d'avoir répondu à tout. Merci de votre collaboration.

Appendix N  
*Child Behavior Checklist (CBCL) for Study 2: Teacher Report Form*

---

## CBCL-ENSEIGNANT/E

Voici une liste d'énoncés pouvant décrire les élèves. Veuillez évaluer chaque énoncé en fonction du comportement de l'élève au cours des deux derniers mois et encrer la cote appropriée. Veuillez encrer la cote 2 si l'énoncé est très vrai ou souvent vrai, la cote 1 si l'énoncé est ou parfois vrai et la cote 0 si l'énoncé ne correspond pas du tout à l'élève ou que vous n'avez pas suffisamment d'informations pour répondre à cette question.

2 = très vrai ou souvent vrai;

1 = parfois vrai;

0 = ne correspond pas du tout ou informations insuffisantes.

- |   |   |   |     |   |
|---|---|---|-----|---|
| 0 | 1 | 2 | 1.  | Se comporte d'une façon trop jeune pour son âge.                              |
| 0 | 1 | 2 | 2.  | Fredonne ou fait d'autres bruits étranges en classe.                          |
| 0 | 1 | 2 | 3.  | Se dispute beaucoup.  |
| 0 | 1 | 2 | 4.  | Ne termine pas les choses qu'il (elle) commence.                              |
| 0 | 1 | 2 | 6.  | Défie quelqu'un de, ou répond de façon impolit au<br>personnel enseignant.    |
| 0 | 1 | 2 | 7.  | Se vante.   |
| 0 | 1 | 2 | 8.  | Est incapable de se concentrer pour une longue période de temps.              |
| 0 | 1 | 2 | 9.  | Ne peut cesser de penser à certaines choses, a des obsessions<br>(Expliquez). |
| 0 | 1 | 2 | 10. | Ne peut pas rester assis(e), est agité(e) ou hyperactif(ve).                  |
| 0 | 1 | 2 | 11. | S'accroche aux adultes ou est trop dépendant(e).                              |
| 0 | 1 | 2 | 12. | Se plaint de se sentir seul(e).   |
| 0 | 1 | 2 | 13. | Confus(se) ou semble être dans le brouillard.                                 |
| 0 | 1 | 2 | 14. | Pleure beaucoup.  |
| 0 | 1 | 2 | 15. | A la bougeotte.   |

- |   |   |   |     |  |
|---|---|---|-----|--|
| 0 | 1 | 2 | 16. | Est cruel(le), brutal(e) ou méchant(e) envers les autres.                                |
| 0 | 1 | 2 | 17. | Est perdu(e) dans ses rêveries ou dans ses pensées.                                      |
| 0 | 1 | 2 | 18. | Se fait mal intentionnellement ou essaie de se suicider.                                 |
| 0 | 1 | 2 | 19. | Exige beaucoup d'attention.  |
| 0 | 1 | 2 | 20. | Détruit ses propres choses.  |
| 0 | 1 | 2 | 21. | Détruit des objets qui appartiennent à d'autres personnes.                               |
| 0 | 1 | 2 | 22. | A de la difficulté à suivre les directives qu'on lui donne.                              |
| 0 | 1 | 2 | 23. | Est désobéissant(e) à l'école.   |
| 0 | 1 | 2 | 24. | Dérange les autres élèves.   |
| 0 | 1 | 2 | 25. | Ne s'entend pas avec les autres enfants.   |
| 0 | 1 | 2 | 26. | Ne semble pas se sentir coupable après s'être mal comporté(e).                           |
| 0 | 1 | 2 | 27. | Est facilement jaloux(se).   |
| 0 | 1 | 2 | 29. | A peur de certains animaux, de certaines situations ou d'endroits<br>autres que l'école. |
| 0 | 1 | 2 | 31. | A peur d'avoir des mauvaises pensées ou de faire quelque chose<br>de mal.                |
| 0 | 1 | 2 | 32. | Pense qu'il(elle) doit être parfait(e).  |
| 0 | 1 | 2 | 33. | Pense ou se plaint que personne ne l'aime.   |
| 0 | 1 | 2 | 34. | Pense qu'on le(la) persécute.  |
| 0 | 1 | 2 | 35. | Se croit bon(ne) à rien ou inférieur(e).   |
| 0 | 1 | 2 | 36. | Se fait souvent mal, est prédisposé(e) aux accidents.                                    |
| 0 | 1 | 2 | 37. | Se bagarre souvent.  |
| 0 | 1 | 2 | 38. | Se fait taquiner beaucoup.   |
| 0 | 1 | 2 | 39. | Fréquente des enfants qui attirent des ennuis.   |

- |   |   |   |     |  |
|---|---|---|-----|--|
| 0 | 1 | 2 | 40. | Croit entendre des sons qui n'existent pas (Expliquez).          |
| 0 | 1 | 2 | 41. | Est impulsif(ve) ou agit sans réfléchir.                         |
| 0 | 1 | 2 | 42. | Aime la solitude.  |
| 0 | 1 | 2 | 43. | Ment ou triche.  |
| 0 | 1 | 2 | 44. | Ronge ses ongles.  |
| 0 | 1 | 2 | 45. | Nerveux(se), stressé(e), tendu(e).                               |
| 0 | 1 | 2 | 47. | A une attitude trop conformiste face aux règlements.             |
| 0 | 1 | 2 | 48. | N'est pas aimé(e) par les autres élèves.                         |
| 0 | 1 | 2 | 49. | A des difficultés d'apprentissage.                               |
| 0 | 1 | 2 | 50. | Est trop peureux(se) ou anxieux(se).                             |
| 0 | 1 | 2 | 52. | Se sent trop coupable.   |
| 0 | 1 | 2 | 53. | N'attend pas son tour pour parler.                               |
| 0 | 1 | 2 | 57. | Attaque les gens physiquement.                                   |
| 0 | 1 | 2 | 60. | Est apathique et manque de motivation.                           |
| 0 | 1 | 2 | 61. | Travaille mal à l'école.   |
| 0 | 1 | 2 | 62. | Est mal coordonné(e) ou maladroit(e).                            |
| 0 | 1 | 2 | 63. | Préfère jouer avec des enfants plus âgés.                        |
| 0 | 1 | 2 | 64. | Préfère jouer avec des enfants plus jeunes.                      |
| 0 | 1 | 2 | 65. | Refuse de parler.  |
| 0 | 1 | 2 | 66. | Répète sans cesse certains actes; est compulsif(ve) (expliquez). |
| 0 | 1 | 2 | 67. | Dérange la classe.   |
| 0 | 1 | 2 | 68. | Hurle beaucoup.  |
| 0 | 1 | 2 | 69. | Est renfermé(e), garde les choses pour lui(elle) même.           |

- |   |   |   |     |   |
|---|---|---|-----|---|
| 0 | 1 | 2 | 70. | Voit des choses qui ne sont pas là (expliquez).   |
| 0 | 1 | 2 | 71. | Est timide ou facilement embarrassé(e).   |
| 0 | 1 | 2 | 72. | Son travail n'est pas ordonné.  |
| 0 | 1 | 2 | 74. | Fait le (la) fin(e) ou le bouffon.  |
| 0 | 1 | 2 | 75. | Est gêné(e) ou timide.  |
| 0 | 1 | 2 | 76. | Son comportement est explosif et imprévisible.  |
| 0 | 1 | 2 | 77. | Ses demandes doivent être comblées immédiatement et il (elle)<br>est facilement frustré(e). |
| 0 | 1 | 2 | 78. | N'est pas attentif(ve) et est facilement distrait(e).                                       |
| 0 | 1 | 2 | 80. | A le regard vague.  |
| 0 | 1 | 2 | 81. | Se sent blessé(e) lorsqu'il (elle) est critiqué(e).   |
| 0 | 1 | 2 | 82. | Vole.   |
| 0 | 1 | 2 | 84. | A des comportements étranges (expliquez).   |
| 0 | 1 | 2 | 85. | A des idées étranges (expliquez).   |
| 0 | 1 | 2 | 86. | Est entêté(e), maussade ou irritable.   |
| 0 | 1 | 2 | 87. | A des sautes d'humeur ou de sentiments soudains.  |
| 0 | 1 | 2 | 88. | Boude beaucoup.   |
| 0 | 1 | 2 | 89. | Est méfiant(e).   |
| 0 | 1 | 2 | 90. | Sacre ou se sert de mots obscènes.  |
| 0 | 1 | 2 | 92. | Ne fournit pas son rendement maximum.   |
| 0 | 1 | 2 | 93. | Parle trop.   |
| 0 | 1 | 2 | 94. | Taquine beaucoup.   |
| 0 | 1 | 2 | 95. | A des accès de colère, des crises ou s'emporte facilement<br>(expliquez).                   |

- |   |   |   |      |  |
|---|---|---|------|--|
| 0 | 1 | 2 | 97.  | Menace les gens.   |
| 0 | 1 | 2 | 98.  | Est en retard à l'école ou en classe.  |
| 0 | 1 | 2 | 100. | Ne fait pas ses travaux.   |
| 0 | 1 | 2 | 101. | Fait l'école buissonnière, manque l'école.   |
| 0 | 1 | 2 | 102. | Est trop peu actif(ve), fait des mouvements lents ou<br>manque d'énergie.                            |
| 0 | 1 | 2 | 103. | Est malheureux(se), triste ou déprimé(e).  |
| 0 | 1 | 2 | 104. | Est exceptionnellement bruyant(e).   |
| 0 | 1 | 2 | 105. | Prends de l'alcool ou de la drogue (expliquez).  |
| 0 | 1 | 2 | 106. | Est très anxieux(se) de plaire.  |
| 0 | 1 | 2 | 108. | A peur de commettre des erreurs.   |
| 0 | 1 | 2 | 111. | Est renfermé(e), ne se mêle pas aux autres.  |
| 0 | 1 | 2 | 112. | Se fait des soucis.  |
| 0 | 1 | 2 | 113. | Veuillez indiquer tout problème que l'élève présente et que<br>nous n'avons pas mentionné ci-dessus. |

# Appendix O.

## Results from the Final Equation of Regression Models predicting Maternal Health Problems in Study 2

| Outcome Measures                            | Predictors (in order of entry)          | Effect Size       | Significance Test |
|---|---|-------------------|-------------------|
| Self-Rated Health Status<br>$\chi^2=2.80^*$ | Maternal childhood aggression           | Beta = -.42       | t = -2.75**       |
|   | Maternal childhood withdrawal           | Beta = -.14       | t = -0.87         |
|   | Maternal education (years)              | Beta = -.10       | t = -0.61         |
| Headaches/Migraines<br>$\chi^2=10.57^*$     | Maternal childhood aggression           | Odds Ratio = 0.65 | Wald = 1.45       |
|   | Maternal childhood withdrawal           | Odds Ratio = 2.90 | Wald = 6.30**     |
|   | Family income                           | Odds Ratio = 1.00 | Wald = 0.55       |
|   | Maternal education (years)              | Odds Ratio = 1.06 | Wald = 0.11       |
| High/Low Blood Pressure<br>$\chi^2=7.34^t$  | Maternal childhood aggression           | Odds Ratio = 1.05 | Wald = 0.01       |
|   | Maternal childhood withdrawal           | Odds Ratio = 0.86 | Wald = 0.06       |
|   | Maternal smoking during preschool years | Odds Ratio = 1.14 | Wald = 4.00*      |

Note. <sup>t</sup> $p < .10$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$



# Appendix P.

## Results from the Final Equation of Regression Models predicting Maternal Health-Risk in Study 2

| Outcome Measures                                    | Predictors (in order of entry)      | Effect Size       | Significance Test     |
|---|-------------------------------------|-------------------|-----------------------|
| Adolescent Health-Risk Index<br>$\chi^2=18.85^{**}$ | Maternal childhood aggression       | Odds Ratio = 0.92 | Wald = 0.04           |
|   | Maternal childhood withdrawal       | Odds Ratio = 0.58 | Wald = 0.83           |
|   | Parents' occupational prestige      | Odds Ratio = 1.01 | Wald = 1.27           |
|   | Maternal age at menarche            | Odds Ratio = 0.92 | Wald = 5.42*          |
|   | Aggression x Withdrawal interaction | Odds Ratio = 4.34 | Wald = 4.12*          |
| Smoking during Pregnancy<br>F = 2.80*               | Maternal childhood aggression       | Beta = .41        | t = 2.72**            |
|   | Maternal childhood withdrawal       | Beta = -.17       | t = -1.12             |
|   | Maternal education (years)          | Beta = -.11       | t = -0.63             |
| Current smoking (# of cigarettes)<br>F = 2.93*      | Maternal childhood aggression       | Beta = .29        | t = 2.04*             |
|   | Maternal childhood withdrawal       | Beta = .06        | t = 0.40              |
|   | Single parenthood                   | Beta = .28        | t = 1.92 <sup>t</sup> |
| Body mass index (BMI)<br>F = 3.17*                  | Maternal childhood aggression       | Beta = .06        | t = 0.39              |
|   | Maternal childhood withdrawal       | Beta = .13        | t = 0.84              |
|   | Adolescent health-risk index        | Beta = .32        | t = 2.03*             |
|   | Close spacing of children           | Beta = .31        | t = 2.00*             |

Note. <sup>t</sup>p < .10, \*p < .05, \*\*p < .01, \*\*\*p < .001

# Appendix Q.

## Results from the Final Equation of Regression Models predicting Maternal Wellness Behaviours in Study 2

| Outcome Measures  | Predictors (in order of entry)      | Effect Size       | Significance Test     |
|---|-------------------------------------|-------------------|-----------------------|
| Daily servings of fruits/vegetables<br>F = 4.42**       | Maternal childhood aggression       | Beta = -.29       | t = -2.00*            |
|   | Maternal childhood withdrawal       | Beta = .01        | t = 0.07              |
|   | Maternal education (years)          | Beta = .29        | t = 1.90 <sup>t</sup> |
|   | Mother on welfare                   | Beta = -.23       | t = -1.68             |
| Weekly toothbrushing<br>F = 2.24 <sup>t</sup>           | Maternal childhood aggression       | Beta = .11        | t = 0.63              |
|   | Maternal childhood withdrawal       | Beta = .19        | t = 1.10              |
|   | Maternal education (years)          | Beta = .20        | t = 1.19              |
|   | Aggression x Withdrawal interaction | Beta = -.46       | t = -2.52*            |
| Dentist visits<br>$\chi^2=11.69^*$                      | Maternal childhood aggression       | Odds Ratio = 1.36 | Wald = 0.35           |
|   | Maternal childhood withdrawal       | Odds Ratio = 1.44 | Wald = 0.41           |
|   | Family income                       | Odds Ratio = 1.00 | Wald = 2.39           |
|   | Current maternal smoking            | Odds Ratio = 0.87 | Wald = 5.27*          |
| Satisfaction with Physical Activity<br>$\chi^2=10.64^*$ | Maternal childhood aggression       | Odds Ratio = 0.77 | Wald = 0.47           |
|   | Maternal childhood withdrawal       | Odds Ratio = 1.30 | Wald = 0.47           |
|   | Never smoker                        | Odds Ratio = 9.94 | Wald = 4.48*          |
|   | Body mass index (BMI)               | Odds Ratio = 0.90 | Wald = 3.75*          |

Note. <sup>t</sup>p < .10, \*p < .05, \*\*p < .01, \*\*\*p < .001

# Appendix R.

## Summary of Results from the Final Equation of Regression Models predicting Child Health Problems in Study 2

| Outcome Measures                              | Predictors (in order of entry)      | Effect Size       | Significance Test        |
|---|-------------------------------------|-------------------|--------------------------|
| Number of health problems<br>F = 3.39**       | Parental childhood aggression       | Beta = -.09       | t = -0.70                |
|   | Parental childhood withdrawal       | Beta = .21        | t = 1.72 <sup>t</sup>    |
|   | Neonatal health status              | Beta = -.22       | t = -1.96 <sup>t</sup>   |
|   | Single parenthood                   | Beta = .26        | t = 2.20*                |
|   | Family income                       | Beta = .07        | t = 0.55                 |
|   | Maternal rating of her own health   | Beta = -.26       | t = -2.23*               |
| Respiratory medication<br>$\chi^2=14.97^{**}$ | Aggression x Withdrawal interaction | Beta = -.35       | t = -2.62**              |
|   | Parental childhood aggression       | Odds Ratio = 0.18 | Wald = 3.79*             |
|   | Parental childhood withdrawal       | Odds Ratio = 3.25 | Wald = 3.99*             |
|   | Family income                       | Odds Ratio = 1.00 | Wald = 3.13 <sup>t</sup> |
|   | Close spacing of children           | Odds Ratio = 9.02 | Wald = 6.95**            |
|   |                                     |                   |                          |
| Headaches/migraines<br>$\chi^2=14.32^{**}$    | Parental childhood aggression       | Odds Ratio = 1.09 | Wald = 0.06              |
|   | Parental childhood withdrawal       | Odds Ratio = 2.01 | Wald = 4.34*             |
|   | Current maternal smoking            | Odds Ratio = 1.07 | Wald = 5.12*             |
|   | Aggression x Withdrawal interaction | Odds Ratio = 0.43 | Wald = 5.83*             |
| Maternal-rated health status<br>F = 3.62**    | Parental childhood aggression       | Beta = .08        | t = 0.66                 |
|   | Parental childhood withdrawal       | Beta = .05        | t = 0.41                 |
|   | Family income                       | Beta = -.11       | t = -1.00                |
|   | Maternal education (years)          | Beta = .20        | t = 1.57                 |
|   | Maternal parenting stress           | Beta = -.20       | t = -1.67                |
|   | Maternal rating of her own health   | Beta = .37        | t = 3.04**               |

Note. <sup>t</sup>p < .10, \*p < .05, \*\*p < .01, \*\*\*p < .001

# Appendix S.

## Summary of Results from the Final Equation of Regression Models predicting Child Health-Risk in Study 2

| Outcome Measures  | Predictors (in order of entry)      | Effect Size       | Significance Test        |
|---|-------------------------------------|-------------------|--------------------------|
| Body mass index (BMI-for-age)<br>F = 4.60***                          | Parental childhood aggression       | Beta = -.20       | t = -1.75 <sup>t</sup>   |
|   | Parental childhood withdrawal       | Beta = .07        | t = 0.60                 |
|   | Neonatal health status factor       | Beta = .37        | t = 3.24**               |
|   | Maternal smoking during pregnancy   | Beta = .38        | t = 3.26**               |
|   | Family income                       | Beta = .10        | t = 0.89                 |
|   | Maternal BMI                        | Beta = .14        | t = 1.21                 |
| Overweight (BMI > 95 <sup>th</sup> percentile)<br>$\chi^2=16.14^{**}$ | Parental childhood aggression       | Odds Ratio = 1.00 | Wald = 0.00              |
|   | Parental childhood withdrawal       | Odds Ratio = 1.23 | Wald = 0.41              |
|   | Grandparents' occupational prestige | Odds Ratio = 0.99 | Wald = 5.73*             |
|   | Maternal adolescent health-risk     | Odds Ratio = 0.07 | Wald = 3.21 <sup>t</sup> |
|   | Maternal smoking during pregnancy   | Odds Ratio = 0.97 | Wald = 0.21              |
|   | Maternal BMI                        | Odds Ratio = 1.13 | Wald = 2.91 <sup>t</sup> |

Note. <sup>t</sup>p < .10, \*p < .05, \*\*p < .01, \*\*\*p < .001

Appendix T. (continued on next page)

Summary of Results from the Final Equation of Regression Models predicting Child Wellness Behaviour in Study 2

| Outcome Measures  | Predictors (in order of entry)          | Effect Size       | Significance Test        |
|---|---|-------------------|--------------------------|
| Sleep (hours per night)<br>F = 3.58**                                       | Maternal childhood aggression           | Beta = -.02       | t = -0.15                |
|   | Maternal childhood withdrawal           | Beta = -.16       | t = -1.37                |
|   | Maternal nightly hours of sleep         | Beta = .05        | t = 0.42                 |
|   | Aggression x Withdrawal interaction     | Beta = -.33       | t = -2.59**              |
| Meals/snacks per day<br>F = 3.33**  | Parental childhood aggression           | Beta = -.37       | t = -3.08**              |
|   | Maternal childhood withdrawal           | Beta = -.13       | t = -1.14                |
|   | Family income                           | Beta = -.14       | t = -1.20                |
|   | Maternal education (years)              | Beta = -.10       | t = -0.79                |
|   | Maternal meals/snacks                   | Beta = .24        | t = 2.03*                |
|   | Child's BMI                             | Beta = -.14       | t = -1.26                |
| Maternal Satisfaction with<br>Child's Physical Activity<br>$\chi^2=13.13^*$ | Parental childhood aggression           | Odds Ratio = 0.55 | Wald = 2.82 <sup>t</sup> |
|   | Parental social withdrawal              | Odds Ratio = 3.52 | Wald = 3.93*             |
|   | Maternal never smoker                   | Odds Ratio = 6.44 | Wald = 2.23              |
|   | Maternal satisfaction with own activity | Odds Ratio = 3.30 | Wald = 1.84              |
|   | Child's BMI                             | Odds Ratio = 1.00 | Wald = 0.06              |
| Daily servings of fruits/vegetables<br>F = 5.65***                          | Parental childhood aggression           | Beta = .01        | t = 0.05                 |
|   | Parental social withdrawal              | Beta = .17        | t = 1.60                 |
|   | Mother on welfare                       | Beta = -.11       | t = -1.00                |
|   | Maternal servings of fruits/vegetables  | Beta = .45        | t = 3.93***              |

Note. <sup>t</sup>p < .10, \*p < .05, \*\*p < .01, \*\*\*p < .001

Appendix T. (continued from previous page)

*Summary of Results from the Final Equation of Regression Models predicting Child Wellness Behaviours in Study 2*

| Outcome Measures                                | Predictors (in order of entry)      | Effect Size | Significance Test      |
|---|-------------------------------------|-------------|------------------------|
| Daily servings of dairy products<br>F = 4.78*** | Parental childhood aggression       | Beta = -.06 | t = -0.55              |
|   | Parental social withdrawal          | Beta = .02  | t = 0.22               |
|   | Adolescent health-risk index        | Beta = -.19 | t = -1.73 <sup>t</sup> |
|   | Single parenthood                   | Beta = -.26 | t = -2.38*             |
|   | Child age at testing                | Beta = -.16 | t = -1.45              |
|   | Maternal servings of dairy products | Beta = .29  | t = 2.69**             |
| Daily servings of sweets/fats<br>F = 4.87***    | Parental childhood aggression       | Beta = -.16 | t = -1.39              |
|   | Parental social withdrawal          | Beta = -.21 | t = -1.81 <sup>t</sup> |
|   | Family income                       | Beta = .02  | t = 0.14               |
|   | Maternal education (years)          | Beta = -.07 | t = -0.55              |
|   | Maternal servings of sweets/fats    | Beta = .47  | t = 4.39***            |
|   |                                     |             |                        |
| Weekly toothbrushing<br>F = 5.74***             | Parental childhood aggression       | Beta = .05  | t = 0.48               |
|   | Parental social withdrawal          | Beta = .05  | t = 0.47               |
|   | Maternal education (years)          | Beta = .10  | t = 0.86               |
|   | Family income                       | Beta = .02  | t = 0.20               |
|   | Current maternal smoking            | Beta = -.15 | t = -1.40              |
|   | Maternal BMI                        | Beta = -.40 | t = -3.84***           |
|   | Maternal weekly toothbrushing       | Beta = .32  | t = 3.04**             |

Note. <sup>t</sup>  $p < .10$ , \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

# Appendix U.

## Summary of Results from the Regression Models predicting Medical Service Usage and Satisfaction in Study 2

| Outcome Measures                                | Significant Predictors        | Effect Size       | Significance Test |
|---|-------------------------------|-------------------|-------------------|
| Paediatrician<br>$\chi^2=15.41^{**}$            | Parental childhood aggression | Odds Ratio = 1.06 | Wald = 0.05       |
|   | Parental childhood withdrawal | Odds Ratio = 0.85 | Wald = 0.27       |
|   | Family income                 | Odds Ratio = 1.00 | Wald = 0.68       |
|   | Maternal education (years)    | Odds Ratio = 1.45 | Wald = 5.92*      |
|   | Child health problems         | Odds Ratio = 1.90 | Wald = 4.09*      |
| Neighbourhood clinic (CLSC)<br>F = 2.47*        | Parental childhood aggression | Beta = .10        | t = 0.88          |
|   | Parental childhood withdrawal | Beta = -.13       | t = -1.10         |
|   | Family income                 | Beta = .09        | t = 0.70          |
|   | Single parenthood             | Beta = .36        | t = 2.81**        |
|   | Child health problems         | Beta = -.19       | t = -1.58         |
| Satisfaction with medical services<br>F = 2.84* | Parental childhood aggression | Beta = .11        | t = 0.87          |
|   | Parental childhood withdrawal | Beta = .14        | t = 1.12          |
|   | Maternal parenting stress     | Beta = -.31       | t = -2.39*        |
|   | Child health problems         | Beta = -.26       | t = -2.05*        |

Note. <sup>†</sup> $p < .10$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Appendix V.  
*Summary of Results from the Regression Models predicting Developmental Service Usage and Satisfaction in Study 2*

| Outcome Measures                                      | Significant Predictors                               | Effect Size        | Significance Test        |
|---|--|--------------------|--------------------------|
| Ritalin prescription<br>$\chi^2 = 23.22^{***}$        | Parental childhood aggression                        | Odds Ratio = 1.15  | Wald = 0.02              |
|   | Parental childhood withdrawal                        | Odds Ratio = 11.13 | Wald = 4.33*             |
|   | Child gender   | Odds Ratio = 0.70  | Wald = 0.15              |
|   | Teacher rating of externalizing problems             | Odds Ratio = 1.16  | Wald = 1.40              |
|   | Maternal rating of externalizing problems            | Odds Ratio = 1.27  | Wald = 3.60 <sup>t</sup> |
| Parent training services<br>$\chi^2 = 11.85^*$        | Parental childhood aggression                        | Odds Ratio = 1.46  | Wald = 1.03              |
|   | Parental childhood withdrawal                        | Odds Ratio = 2.44  | Wald = 4.60*             |
|   | Teacher report of problem behaviour at school entry  | Odds Ratio = 1.06  | Wald = 0.40              |
|   | Maternal report of problem behaviour at school entry | Odds Ratio = 1.48  | Wald = 2.73 <sup>t</sup> |
|   | Maternal parenting stress                            | Odds Ratio = 0.98  | Wald = 0.47              |
| Child psychologist/psychiatrist<br>$\chi^2 = 12.87^*$ | Parental childhood aggression                        | Odds Ratio = 1.02  | Wald = 0.00              |
|   | Parental childhood withdrawal                        | Odds Ratio = 0.65  | Wald = 0.37              |
|   | Teacher report of problem behaviour at school entry  | Odds Ratio = 0.49  | Wald = 3.29 <sup>t</sup> |
|   | Maternal report of problem behaviour at school entry | Odds Ratio = 2.90  | Wald = 4.88*             |
|   | Maternal parenting stress                            | Odds Ratio = 1.05  | Wald = 2.21              |

Note. <sup>t</sup> $p < .10$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$



Appendix W.

*Demographic comparison of Mother-Participants and Mothers who are Female Partners of Father-Participants*

|   | Mother-participants (n =44) | Female Partners (n =30) |
|---|-----------------------------|-------------------------|
| Family prestige score in target parent's family of origin | 393 (113)                   | 400 (95)                |
| Maternal education (years)                                | 12.27 (2.60)                | 11.65 (1.41)            |
| Annual family income (in Canadian dollars)                | \$58,707 (32, 222)          | \$65, 589 (43, 480)     |
| Maternal age at testing (years)                           | 36.90 (2.41)                | 36.69 (3.65)            |
| Child age at testing (years)                              | 11.24 (1.03)                | 10.91 (0.82)            |

*Note.* Standard deviations are presented in parentheses.

Appendix X.

*Comparing Effect Sizes from the Regression Models predicting Child Health Problems in Study 2*

| Outcome Measures                              | Predictors (in order of entry)      | Mother-Participants Only<br>(n = 44) | Full Sample<br>(n = 74)        |
|---|-------------------------------------|--------------------------------------|--------------------------------|
| <b>Number of health problems</b>              | Parental childhood aggression       | Beta = -.28                          | Beta = -.09                    |
| F = 3.12* mother-participants                 | Parental childhood withdrawal       | Beta = .24                           | Beta = .21 <sup>t</sup>        |
| F = 3.39** for full sample                    | Neonatal health status              |                                      | Beta = -.22 <sup>t</sup>       |
|   | Single parenthood                   | Beta = .23                           | Beta = .26*                    |
|   | Family income                       |                                      | Beta = .07                     |
|   | Maternal rating of her own health   | Beta = -.33*                         | Beta = -.26*                   |
|   | Aggression x Withdrawal interaction | Beta = -.31 <sup>t</sup>             | Beta = -.35**                  |
| <b>Respiratory medication</b>                 | Parental childhood aggression       | Odds Ratio = 0.01                    | Odds Ratio = 0.18*             |
| $\chi^2=13.52^{**}$ for mother-participants   | Parental childhood withdrawal       | Odds Ratio = 9.99 <sup>t</sup>       | Odds Ratio = 3.25*             |
| $\chi^2=14.97^{**}$ for full sample           | Family income                       | Odds Ratio = 1.00                    | Odds Ratio = 1.00 <sup>t</sup> |
|   | Close spacing of children           | Odds Ratio = 157.64 <sup>t</sup>     | Odds Ratio = 9.02**            |
| <b>Headaches/migraines</b>                    | Parental childhood aggression       | Odds Ratio = 0.79                    | Odds Ratio = 1.09              |
| $\chi^2=16.81^{**}$ for mother-participants   | Parental childhood withdrawal       | Odds Ratio = 2.63 <sup>t</sup>       | Odds Ratio = 2.01*             |
| $\chi^2=14.32^{**}$ for full sample           | Current maternal smoking            | Odds Ratio = 1.08                    | Odds Ratio = 1.07*             |
|   | Aggression x Withdrawal interaction | Odds Ratio = 0.20*                   | Odds Ratio = 0.43*             |
| <b>Maternal-rated health status</b>           | Parental childhood aggression       | Beta = -.02                          | Beta = .08                     |
| F = 2.25 <sup>t</sup> for mother-participants | Parental childhood withdrawal       | Beta = -.07                          | Beta = .05                     |
| F = 3.62** for full sample                    | Family income                       |                                      | Beta = -.11                    |
|   | Maternal education (years)          | Beta = .05                           | Beta = .20                     |
|   | Maternal parenting stress           |                                      | Beta = -.20                    |
|   | Maternal rating of her own health   | Beta = .40*                          | Beta = .37**                   |

Note. <sup>t</sup> $p < .10$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

Appendix Y.  
Comparing Effect Sizes from the Regression Models predicting Child Health-Risk in Study 2

| Outcome Measures  | Predictors (in order of entry)  | Mother-Participants Only<br>( <i>n</i> = 44)   | Full Sample<br>( <i>n</i> = 74)   |
|---|---|--|---|
| <b>Body mass index (BMI-for-age)</b><br>F = 4.51** for mother-participants<br>F = 4.60*** for full sample                           | Parental childhood aggression<br>Parental childhood withdrawal<br>Neonatal health status factor<br>Maternal smoking during pregnancy<br>Family income<br>Maternal BMI                         | Beta = -.27 <sup>t</sup><br>Beta = .13<br>Beta = .42**<br>Beta = .41**<br><br>Beta = .18               | Beta = -.20 <sup>t</sup><br>Beta = .07<br>Beta = .37**<br>Beta = .38**<br>Beta = .10<br>Beta = .14  |
| <b>Overweight (BMI &gt; 95<sup>th</sup>ile)</b><br>$\chi^2$ = 14.41** for mother-participants<br>$\chi^2$ = 16.14** for full sample | Parental childhood aggression<br>Parental childhood withdrawal<br>Grandparents' occupational prestige<br>Maternal adolescent health-risk<br>Maternal smoking during pregnancy<br>Maternal BMI | Odds Ratio = 0.51<br>Odds Ratio = 1.58<br>Odds Ratio = 0.98*<br>Odds Ratio = 0.21<br>Odds Ratio = 1.14 | Odds Ratio = 1.00<br>Odds Ratio = 1.23<br>Odds Ratio = 0.99*<br>Odds Ratio = 0.07 <sup>t</sup><br>Odds Ratio = 0.97<br>Odds Ratio = 1.13 <sup>t</sup> |

Note. <sup>t</sup>*p* < .10, \**p* < .05, \*\**p* < .01, \*\*\**p* < .001

Appendix Y. (continued on next page)  
*Comparing Effect Sizes from the Regression Models predicting Child Wellness Behaviour in Study 2*

| Outcome Measures   | Predictors (in order of entry)  | Mother-Participants Only<br>( <i>n</i> = 44)   | Full Sample<br>( <i>n</i> = 74)   |
|--|---|--|---|
| <b>Sleep (hours per night)</b><br>F = 4.10** for mother-participants<br>F = 3.58** for full sample   | Maternal childhood aggression<br>Maternal childhood withdrawal<br>Maternal nightly hours of sleep<br>Aggression x Withdrawal interaction              | Beta = -.04<br>Beta = -.14<br>Beta = -.14<br>Beta = -.47**   | Beta = -.02<br>Beta = -.16<br>Beta = .05<br>Beta = -.33**   |
| <b>Meals/snacks per day</b><br>F = 2.78* for mother-participants<br>F = 3.58** for full sample   | Parental childhood aggression<br>Maternal childhood withdrawal<br>Family income<br>Maternal education (years)<br>Maternal meals/snacks<br>Child's BMI | Beta = -.28 <sup>t</sup><br>Beta = -.18<br>Beta = -.25<br><br>Beta = .36*<br>Beta = -.07                             | Beta = -.37**<br>Beta = -.13<br>Beta = -.14<br>Beta = -.10<br>Beta = .24*<br>Beta = -.14                            |
| <b>Maternal Satisfaction with Child's Physical Activity</b><br>$\chi^2$ = 14.46** for mother-participants<br>$\chi^2$ = 13.13* for full sample | Parental childhood aggression<br>Parental social withdrawal<br>Maternal never smoker<br>Maternal satisfaction with own activity<br>Child's BMI        | Odds Ratio = 0.37 <sup>t</sup><br>Odds Ratio = 6.73*<br>Odds Ratio = 13.72<br>Odds Ratio = 6.87<br>Odds Ratio = 1.01 | Odds Ratio = 0.55 <sup>t</sup><br>Odds Ratio = 3.52*<br>Odds Ratio = 6.44<br>Odds Ratio = 3.30<br>Odds Ratio = 1.00 |
| <b>Daily servings of fruits/vegetables</b><br>F = 2.46 <sup>t</sup> for mother-participants<br>F = 3.58** for full sample                      | Parental childhood aggression<br>Parental social withdrawal<br>Mother on welfare<br>Maternal servings of fruits/vegetables                            | Beta = -.23<br>Beta = .18<br>Beta = .18<br>Beta = .31 <sup>t</sup>   | Beta = .01<br>Beta = .17<br>Beta = -.11<br>Beta = .45***  |

Note. <sup>t</sup>*p* < .10, \**p* < .05, \*\**p* < .01, \*\*\**p* < .001

Appendix Z. (continued from previous page)

*Comparing Effect Sizes from the Regression Models Predicting Child Wellness Behaviours in Study 2*

| Outcome Measures                        | Predictors (in order of entry)      | Mother-Participants Only<br>( <i>n</i> = 44) | Full Sample<br>( <i>n</i> = 74) |
|---|-------------------------------------|--|---------------------------------|
| <b>Daily servings of dairy products</b> |                                     |  |                                 |
| F = 4.89*** for mother-participants     | Parental childhood aggression       | Beta = -.18                                  | Beta = -.06                     |
| F = 4.78*** for full sample             | Parental social withdrawal          | Beta = .05                                   | Beta = .02                      |
|   | Adolescent health-risk index        | Beta = -.12                                  | Beta = -.19 <sup>t</sup>        |
|   | Single parenthood                   | Beta = -.30*                                 | Beta = -.26*                    |
|   | Child age at testing                |  | Beta = -.16                     |
|   | Maternal servings of dairy products | Beta = .42**                                 | Beta = .29**                    |
| <b>Daily servings of sweets/fats</b>    |                                     |  |                                 |
| F = 4.90*** for mother-participants     | Parental childhood aggression       | Beta = -.27 <sup>t</sup>                     | Beta = -.16                     |
| F = 4.87*** for full sample             | Parental social withdrawal          | Beta = -.25 <sup>t</sup>                     | Beta = -.21 <sup>t</sup>        |
|   | Family income                       | Beta = .13                                   | Beta = .02                      |
|   | Maternal education (years)          | Beta = -.21                                  | Beta = -.07                     |
|   | Maternal servings of sweets/fats    | Beta = .50***                                | Beta = .47***                   |
| <b>Weekly toothbrushing</b>             |                                     |  |                                 |
| F = 4.00** for mother-participants      | Parental childhood aggression       | Beta = .14                                   | Beta = .05                      |
| F = 4.87*** for full sample             | Parental social withdrawal          | Beta = -.05                                  | Beta = .05                      |
|   | Maternal education (years)          | Beta = .10                                   | Beta = .10                      |
|   | Family income                       |  | Beta = .02                      |
|   | Current maternal smoking            |  | Beta = -.15                     |
|   | Maternal BMI                        | Beta = -.45**                                | Beta = -.40***                  |
|   | Maternal weekly toothbrushing       | Beta = .25 <sup>t</sup>                      | Beta = .32**                    |

Note. <sup>t</sup>*p* < .10, \**p* < .05, \*\**p* < .01, \*\*\**p* < .001

# Appendix AA.

## Comparing Effect Sizes from the Regression Models predicting Medical Service Usage and Satisfaction in Study 2

| Outcome Measures  | Predictors (in order of entry) | Mother-Participants Only<br>(n = 44) | Full Sample<br>(n = 74) |
|---|--------------------------------|--------------------------------------|-------------------------|
| <b>Paediatrician</b><br>$\chi^2=13.52^*$ for mother-participants<br>$\chi^2=15.41^{**}$ for full sample     | Parental childhood aggression  | Odds Ratio = 1.44                    | Odds Ratio = 1.06       |
|   | Parental childhood withdrawal  | Odds Ratio = 0.66                    | Odds Ratio = 0.85       |
|   | Family income                  | Odds Ratio = 1.00                    | Odds Ratio = 1.00       |
|   | Maternal education (years)     | Odds Ratio = 1.29                    | Odds Ratio = 1.45*      |
|   | Child health problems          | Odds Ratio = 2.29 <sup>t</sup>       | Odds Ratio = 1.90*      |
|   |                                |                                      |                         |
| <b>Neighbourhood clinic (CLSC)</b><br>F = 0.98 for mother-participants<br>F = 2.47* for full sample         | Parental childhood aggression  | Beta = -.24                          | Beta = .10              |
|   | Parental childhood withdrawal  | Beta = .10                           | Beta = -.13             |
|   | Family income                  | Beta = .10                           | Beta = .09              |
|   | Single parenthood              | Beta = .20                           | Beta = .36**            |
|   | Child health problems          | Beta = .05                           | Beta = -.19             |
|   |                                |                                      |                         |
| <b>Satisfaction with medical services</b><br>F = 2.68* for mother-participants<br>F = 2.84* for full sample | Parental childhood aggression  | Beta = -.03                          | Beta = .11              |
|   | Parental childhood withdrawal  | Beta = .25                           | Beta = .14              |
|   | Maternal parenting stress      | Beta = -.15                          | Beta = -.31*            |
|   | Child health problems          | Beta = -.42*                         | Beta = -.26*            |

Note. <sup>t</sup>p < .10, \*p < .05, \*\*p < .01, \*\*\*p < .001

Appendix BB.

*Comparing Effect Sizes from the Regression Models predicting Developmental Service Usage and Satisfaction in Study 2*

| Outcome Measures   | Predictors (in order of entry)                       | Mother-Participants Only<br>( <i>n</i> = 44) | Full Sample<br>( <i>n</i> = 74) |
|--|--|--|---------------------------------|
| <b>Ritalin prescription</b><br>$\chi^2 = 10.47^t$ for mother-participants<br>$\chi^2 = 23.22^{***}$ for full sample            | Parental childhood aggression                        | Odds Ratio = 1.00                            | Odds Ratio = 1.15               |
|  | Parental childhood withdrawal                        | Odds Ratio = 8.73 <sup>t</sup>               | Odds Ratio = 11.13*             |
|  | Child gender   | Odds Ratio = 0.63                            | Odds Ratio = 0.70               |
|  | Teacher rating of externalizing problems             | Odds Ratio = 1.14                            | Odds Ratio = 1.16               |
|  | Maternal rating of externalizing problems            | Odds Ratio = 1.25 <sup>t</sup>               | Odds Ratio = 1.27 <sup>t</sup>  |
| <b>Parent training services</b><br>$\chi^2 = 13.27^*$ for mother-participants<br>$\chi^2 = 11.85^*$ for full sample            | Parental childhood aggression                        | Odds Ratio = 1.42                            | Odds Ratio = 1.46               |
|  | Parental childhood withdrawal                        | Odds Ratio = 1.99                            | Odds Ratio = 2.44*              |
|  | Teacher report of problem behaviour at school entry  | Odds Ratio = 1.27                            | Odds Ratio = 1.06               |
|  | Maternal report of problem behaviour at school entry | Odds Ratio = 1.79 <sup>t</sup>               | Odds Ratio = 1.48 <sup>t</sup>  |
|  | Maternal parenting stress                            | Odds Ratio = 0.96                            | Odds Ratio = 0.98               |
| <b>Child psychologist/psychiatrist</b><br>$\chi^2 = 10.45^t$ for mother-participants<br>$\chi^2 = 23.22^{***}$ for full sample | Parental childhood aggression                        | Odds Ratio = 1.33                            | Odds Ratio = 1.02               |
|  | Parental childhood withdrawal                        | Odds Ratio = 0.10                            | Odds Ratio = 0.65               |
|  | Teacher report of problem behaviour at school entry  | Odds Ratio = 0.37                            | Odds Ratio = 0.49 <sup>t</sup>  |
|  | Maternal report of problem behaviour at school entry | Odds Ratio = 3.68                            | Odds Ratio = 2.90*              |
|  | Maternal parenting stress                            | Odds Ratio = 1.09                            | Odds Ratio = 1.05               |

Note. <sup>t</sup>*p* < .10, \**p* < .05, \*\**p* < .01, \*\*\**p* < .001