

Precursors of Language Ability and Academic Performance in Childhood: A
Longitudinal Study of At-Risk French-speaking Children

Lisa Campisi

A Thesis
in
The Department
of
Psychology

Presented in Partial Fulfillment of the Requirements
for the Degree of Masters of Arts at
Concordia University
Montreal, Quebec, Canada

September 2005



Library and
Archives Canada

Bibliothèque et
Archives Canada

Published Heritage
Branch

Direction du
Patrimoine de l'édition

395 Wellington Street
Ottawa ON K1A 0N4
Canada

395, rue Wellington
Ottawa ON K1A 0N4
Canada

Your file *Votre référence*

ISBN: 0-494-10179-2

Our file *Notre référence*

ISBN: 0-494-10179-2

NOTICE:

The author has granted a non-exclusive license allowing Library and Archives Canada to reproduce, publish, archive, preserve, conserve, communicate to the public by telecommunication or on the Internet, loan, distribute and sell theses worldwide, for commercial or non-commercial purposes, in microform, paper, electronic and/or any other formats.

The author retains copyright ownership and moral rights in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author's permission.

AVIS:

L'auteur a accordé une licence non exclusive permettant à la Bibliothèque et Archives Canada de reproduire, publier, archiver, sauvegarder, conserver, transmettre au public par télécommunication ou par l'Internet, prêter, distribuer et vendre des thèses partout dans le monde, à des fins commerciales ou autres, sur support microforme, papier, électronique et/ou autres formats.

L'auteur conserve la propriété du droit d'auteur et des droits moraux qui protègent cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

In compliance with the Canadian Privacy Act some supporting forms may have been removed from this thesis.

Conformément à la loi canadienne sur la protection de la vie privée, quelques formulaires secondaires ont été enlevés de cette thèse.

While these forms may be included in the document page count, their removal does not represent any loss of content from the thesis.

Bien que ces formulaires aient inclus dans la pagination, il n'y aura aucun contenu manquant.


Canada

Abstract

The current investigation examined whether intergenerational transfer of risk could be revealed through mothers' and preschool-aged children's language complexity, and whether continuity of risk persisted in these children's academic abilities, three years later. Participating families were drawn from the Concordia Longitudinal Risk Project, a prospective, longitudinal investigation of French-speaking families from low SES Montreal neighborhoods. At Time 1 (N=159), mothers' history of childhood social withdrawal was shown to predict language complexity when engaging in conversational speech with their preschool-aged children. Mothers' language complexity was also shown to be predictive of preschoolers' language complexity. At Time 2 (N=131), children's report card grades in Language Arts and Mathematics were both predicted by their language complexity at preschool-age. The findings support an intergenerational continuity of risk operating through language complexity and extending beyond language-related school abilities.

Acknowledgments

I would like to acknowledge everyone that has offered support and encouragement during the journey that has led to the completion of my thesis. Firstly, I am deeply grateful to my supervisor, Dr. Lisa Serbin, for her help in bringing this project to fruition and for giving me the strength to persevere. I would also like to thank Claude Senneville, for his help in data analysis. Thank you to Veronica Asgary, Julie Aouad and Valerie Sami, for the many hours they spent in helping with data transcription and coding. I would also like to acknowledge my labmates Dahlia Ben-Dat Fisher, Caroline Temcheff and Alexa Martin-Storey, for their help, support and enthusiasm during these two years.

I also wish to express my gratitude to my committee members, Dr. Mark Ellenbogen and Dr. Diane Poulin-Dubois, for providing helpful and constructive comments on this thesis.

Finally, thank you to my parents and sister, for making it possible for me to follow my dreams.

Table of Contents

	Page
List of Tables	vi
List of Appendices	vii
Introduction	1
Method.....	8
Participants	8
Procedure	12
Results.....	19
Preliminary Analyses	19
Design	19
Prediction of Mothers' and Children's Language Complexity at Time 1	21
Prediction of School-Related Abilities at Time 2	28
Discussion	34
Limitations and Future Directions	39
Concluding Comments	41
References.....	42
Appendix A.....	49
Appendix B.....	50
Appendix C.....	56
Appendix D.....	57
Appendix E.....	59

List of Tables

	Page
Table 1 Characteristics of the Sample at Time 1 (N=159).....	11
Table 2 Characteristics of the Sample at Time 2 (N=131)	13
Table 3 Descriptive Statistics for Mothers' and Children's MLU scores.....	18
Table 4 Correlations (and degrees of freedom) among Dependant Variables...	20
Table 5 Correlations between Predictor Variables and Maternal MLU (Original female participants; N=101)	22
Table 6 Results of the Regression Equations Predicting Maternal Language (MLU)	23
Table 7..... Correlations between Predictor Variables and Child MLU (Full Sample; N=159)	25
Table 8 Results of the Regression Equations Predicting Child Language	27
Table 9 Correlations between predictor variables and Language Arts Report Card Grades (Time 2 Sample; N=131)	29
Table 10Results of the Regression Equations Predicting Language Arts Report Card Grades	30
Table 11 Correlations between predictor variables and Math Report Card Grades (Time 2 Sample; N=131)	32
Table 12 Table 12 – Results of the Regression Equations Predicting Math Report Card Grades	33

List of Appendices

	Page
Appendix A Consent Form (Time 1).....	49
Appendix B Home Visit Protocol	50
Appendix CConsent Form (Time 2).....	56
Appendix D Pupil Evaluation Inventory	57
Appendix E Demographic Information Questionnaire (DIQ)	59

Precursors of Language Ability and Academic Performance in Childhood:

A Longitudinal Study of At-Risk French-speaking Children

Children who grow up in disadvantaged households are often likely to bear children who face the similar obstacles and, like their parents, are at an elevated risk for serious psychosocial problems (Caspi & Elder, 1988). Such children are at-risk for a variety of problems including cognitive, academic, emotional, and behavioural difficulties, as well as various health-related problems (Lipman, Offord, Racine & Boyle, 1994). One study, for instance, established that school-aged children who grow up poor are three times more likely to have one or more psychiatric disorders, attentional disorders, conduct disorders, and emotional disorders than are non-poor children (Lipman et al., 1994). Others have reported that children growing up in impoverished households often exhibit impaired language skills when compared to children growing up in middle class households (Whitehurst, 1997). Another study showed that low SES is one of the strongest predictors of performance differences in children at the beginning of grade one (Alexander & Entwisle, 1988).

In effect, low SES is strongly associated with a number of negative outcomes in children. Nonetheless, many children who grow up in these “high risk” situations often go on to lead successful adult lives, despite the initial hardships they may have endured (Elder & Caspi, 1988; Rutter, 1987; Werner & Smith, 1992). In this respect, parenting that supports and stimulates children’s growth is widely accepted as an important protective factor in children’s early development. There is now a wealth of data supporting the notion that parents’ cognitive stimulation can play an important role in fostering optimal cognitive development in children. (Berk & Spuhl, 1995; Pianta, 1997;

Pianta & Walsh, 1996). Within the area of language development, several studies have found that vocabulary size and variety in children are associated with the amount of linguistic output provided by their parents (Hart & Risley, 1995; Weizman & Snow, 2001). There is further evidence that maternal language may serve to buffer the negative effects that low SES has on children's language development. A study conducted by Hoff (2003), revealed that child-directed maternal language was the most important predictor of children's lexical development and mediated the effect of SES on children's vocabulary production. There is a significant difference between the rates of vocabulary growth in children of lower SES versus those of higher SES households (Dollaghan et al., 1999, Hart & Risley, 1995). The study by Hoff (2003), revealed that differences in growth of productive vocabulary between groups of children from the higher SES families and those from lower SES families were fully explained by differences in their mothers' speech. In particular, children who heard longer utterances (as determined by maternal mean length of utterance, or MLU) built more complex vocabularies, and did so at faster rates, than children who heard shorter utterances from their mother. Hoff (2003) therefore concluded that children's language experience is associated with children's vocabulary development, regardless of SES. Despite the risks associated with low SES, these findings suggest that mothers' language has the potential for enriching children's language experience.

In another investigation regarding language development in low-SES children, Weizman and Snow (2001) examined kindergarten children and their mothers during conversational interactions together. Differences in the sophistication of maternal vocabulary accounted for a significant portion of the variance in children's vocabulary

test scores at both the kindergarten level and 2 years later, when these children were in the second grade. When maternal education and child nonverbal IQ, were included as predictors in the statistical model, they were found to be non-significant. This supports the argument that the nature and quality of mother's speech is a major predictor of children's language development, even after controlling for known predictors of children's language ability, such as maternal education and general cognitive functioning.

There is also evidence that children's early language development can subsequently influence their later performance in language-related school abilities. For instance, studies on language impairments have found links between early language impairments and later problems in spelling and reading abilities (Moseley, 1997; Stackhouse, 2000). In a 10-year longitudinal study that aimed to predict school outcomes in disadvantaged children (Walker, Greenwood, Hart & Carta, 1994), children's early language ability predicted future scholastic achievement. Specifically, 5- to 10- year-old children's academic achievements in language-related topics (reading and spelling) were found to be related to children's SES, IQ scores and early language ability, measured when these children were between 7 and 36 months of age. Significant and unique variance was accounted for by children's early language production above and beyond the variance accounted for by a composite SES Index (maternal education, income and occupational status). Taken together, these findings suggest continuity and stability in the trajectory of children's language abilities, well into the elementary grades.

Mothers' overall level of cognitive functioning has long been established as a predictor of children's communicative competence (Bouchard, Lykken, McGue, Segal & Tellegen, 1990, Hardy-Brown & Plomin, 1985). In contrast, the socio-emotional aspects

of mothers' personality characteristics and behaviour have not been widely investigated as predictors of children's language development and communicative abilities (Bornstein, 1997). However, a few studies have investigated the link between maternal depression and child-directed speech, and results suggest that socio-emotional functioning does play a role in how a mother talks to her child. One study (Herrera, Reissland & Shepherd, 2004) showed that depressed mothers communicated less effectively with their 6- to 10-month-old infants and used less affective and informative features in their speech. Another study, (Breznitz & Sherman, 1987) found that depressed mothers vocalized less when communicating with their preschool children, who, in turn, spoke less than children of non-depressed mothers. These findings suggest a pathway in which mother's speech mediates the influence of maternal depression on children's subsequent language development. It is not known, however, whether internalizing characteristics of mothers' behaviour, more generally, may predict communicative patterns with their offspring. If behavioural patterns associated, in extreme forms, with depression, are linked to reduced communication with their children then such patterns of behaviour may be a general risk factor, beyond the clinically depressed population. In addition, such behaviour patterns may precede clinical depression in young mothers. Lifetime trajectories of social withdrawal and aggression start in childhood and both of which have been found to be associated with an elevated risk for depression in adolescence and early adulthood (Serbin et al., 1998; Serbin et al., 2002; Stack, Serbin, Schwartzman & Ledingham, 2005). As such, a history of aggressive and/or socially withdrawn behaviour in mothers may be a risk factor for the next generation, due to continuity of a pattern of limited social communication within the mother-child interaction context.

Few studies to date have focused on the long-term trajectories of language development within at-risk samples (Hart & Risley, 1992; Walker et al., 1994). As documented in these studies, there are strong correlations between parents' communication patterns in child-directed speech and family SES, children's vocabulary development, children's IQ, and subsequent academic achievement. The current investigation involved families from the *Concordia Longitudinal Risk Project*, a prospective, longitudinal study of the psychosocial functioning of two generations of high-risk families. This type of prospective, longitudinal design allowed us to study the early precursors of individuals' parenting abilities, and the subsequent impact of parents' behaviour on the functioning of their offspring. The initial participants in the Concordia project were selected and recruited based on peer nomination ratings of aggression and/or withdrawal in 1976-78, when these participants were enrolled in inner-city, public elementary schools (Serbin et al., 1998). Recent studies have followed these original participants as they became parents, and have shown that early childhood histories of behavioural difficulties predict their subsequent functioning as adults, as well as their own children's development.

In a study examining the continuity of risk in the original female participants with both a history of childhood social withdrawal and/or aggressive behaviour, Serbin et al. (1998) found that childhood behavioural difficulties during middle childhood were associated with lower academic achievement through high-school and beyond. Childhood histories of withdrawal or aggression were also found to be risk factors for decreased academic ability and subsequent failure to complete high-school. The findings suggest that both of these behaviour patterns are associated with low levels of school

performance, which is a well-established risk factor for life-course problems for the individual involved, and for their offspring (Milling Kinard & Reinherz, 1987, Velez et al., 1989). In another phase of the study involving observations of interactions between 89 young mothers from the original sample and their then school-aged children (Serbin et al., 1998), transfer of risk from childhood behaviour to parenting behaviour and inter-generational transfer of risk were examined. Concerning the women's parenting behaviours, a history of childhood withdrawal in mothers was shown to be related to unresponsive parenting and lowered emotional supportiveness when interacting with their school-aged child. When examining the child's behaviour, both aggression and social withdrawal in the mother were found to be predictive of subsequent emotional and behavioural difficulties in these school-aged children.

In a second study focusing on mothers with preschool-aged offsprings from the Concordia sample (N=80), Saltaris et al. (2004) explored potential mechanisms contributing to the continuing pattern of risk in the offsprings, by examining the ability of the parents to support and stimulate cognitive problem-solving in their preschool children. Mothers' childhood behaviour patterns, negatively predicted the degree of cognitive stimulation given to their children during a structured teaching situation asking the mothers to work with their children on a series of age-appropriate puzzles.

The results of these studies support the notion that there is continuity of risk in women with childhood behaviour difficulties that extend to their parenting behaviours towards their children. These children, in turn, appear to be at-risk for behaviour problems and less rapid cognitive development. Serbin et al. (2000) hypothesized that one direct process through which this inter-generational risk transmission occurs is as

follows: a pattern of problematic social behaviour originates during the individual's childhood. This maladaptive behaviour pattern persists as the individual progresses into adulthood and engenders a subsequent generation, taking the form of problematic parenting behaviours, including unresponsiveness and inadequate cognitive stimulation. The problematic behaviour of the parent negatively affects the development and behaviour of their offspring, causing various difficulties over the course of development. This "direct" path involving maladaptive parenting involves a lack of stimulation and emotional support to the offspring. This pathway may operate in conjunction with other mechanisms potentially involved in the transfer of risk, such as genetic or biological processes, or the more general environmental disadvantage associated with lower education and family income level.

The present study was designed to extend the findings on inter-generational risk transfer to the area of linguistic stimulation. We examined one specific aspect of cognitive stimulation, specifically mothers' ability to provide a rich linguistic environment for their children. The study had two parts. First, we examined the precursors of maternal language complexity and the relation between maternal language and children's preschool language complexity. In the second part of the study, we explored the relation between the children's language complexity and subsequent academic achievement in elementary school, three years later.

Specifically, the first part of our study examined linguistic richness in mothers and children's interactions together at preschool-age. Here we sought to answer the following questions. First, does an intra-generational continuity of childhood aggression and social withdrawal within one generation of mothers, reveal itself in the linguistic

interactions these mothers have with their children at preschool-age? Based on the findings from Saltaris et al. (2004) it was predicted that mothers' history of childhood behaviour problems would be related to their communication style with their child. Furthermore, based on the findings that mothers with a history of childhood withdrawal continue to display unresponsive and withdrawn behaviours when interacting with their child (Serbin et al., 1998), it was predicted that these mothers would display similar communicative behaviours of depressed mothers (Breznitz & Sherman, 1987; Herrera, Reissland & Shepherd, 2004). Similarly, based on the finding that childhood aggression has also been shown to be related with elevated risks of depression in adolescence and adulthood (Stack et al., 2001), we expected that mothers with a history of childhood aggression would exhibit reduced language complexity when interacting with their children. Second, is there evidence for inter-generational risk transmission in the linguistic complexity of preschool children? With respect to children's language, given the findings from Hoff (2003) and Weizman & Snow (2001) we expected mother's language complexity to predict children's language complexity, controlling for SES and children's general level of cognitive functioning.

In the second part of the study we examined the academic sequelae of preschool language complexity and aimed to answer the following question: Is there evidence for continuity of language-related difficulties once these children enter grade-school? Based on the findings obtained by Walker et al. 2004, it was hypothesized that children who produced less complex language at preschool-age would continue to exhibit decreased language capacities in school. As such, we hypothesized that preschool language complexity would predict school performance; particularly in subjects that are language-

related. Specifically, we expected that children's language complexity at preschool-age would predict grades in Language Arts but would not significantly predict grades in subjects that are less related to language communication abilities, such as math, when other contributing factors (e.g. general intellectual ability) are controlled statistically.

Method

Participants:

Identification of the original sample. The participants for the current study were recruited from the *Concordia Longitudinal Risk Project*, a prospective, longitudinal study which began in 1976 with the screening of over 4000 school children in grades 1, 4 and 7, attending French-language public schools in lower socio-economic, inner-city neighborhoods of Montreal, Quebec. A total of 1,776 children were retained and identified on the basis of behavioural profiles including aggression and/or social withdrawal, as evaluated by their peers, with half of these showing elevated risk profiles due to extreme atypical behaviour, while the other half was normative based on their behaviour profiles. A more detailed account of the original sample is explained in Serbin et al., 1998.

Current Sample. After these original participants reached adulthood, many became parents, providing opportunities for the longitudinal study of offspring and inter-generational transfer of risk. Time 1 of the present study was conducted between 1996 and 1998. At that time all participants of the Concordia Longitudinal Risk Project with children between 1 and 6 years of age, were contacted and invited to participate in the study. A total of 175 families agreed to participate. Both female and male original participants and their families were included in this study. Because the purpose of this

project was to study maternal influences on children's language development, female original participants (n=114) and spouses of the original male participants (n=61) were observed with their children. Accordingly, a final sample consisting of 159 mother-child dyads were included for Time 1 of this study. The 16 dyads that were excluded from this final sample were those who spoke a language other than French (n=4), those children who failed to produce a minimum number of utterances needed for reliable language analysis (n=5) and those whose taped interactions were missing (n=7).

The final sample of offspring included 74 boys (46.5% of the sample) and 85 girls (53.5%) who, at the time of testing, ranged in age between 1 and 5 years ($M=3.59$, $SD=1.56$). Families within the sample showed a wide variability with respect to income and years of education. Table 1 provides details of this information.

Insert Table 1 about here

Mothers' years of education ranged between five and 18 ($M=11.81$, $SD=2.41$), with a quarter of these women (n=41) failing to complete their high school diploma. Families in the current sample had a mean annual income of \$40,416 Canadian dollars ($SD=\$24,665$; range=\$8,430-\$152,885). This is well below both the Canadian (\$54,583) and Quebec provincial (\$49,261) average family income for the same period (Statistics Canada, 2004). A significant minority (16.4%) of the current sample was dependant on social assistance (i.e. welfare recipients), while an additional 25% were considered "working poor" given that their annual family income fell substantially below the national average (Center for International Statistics, 1998). According to the demographic information for the families included in the current sample, these data confirm the

Table 1 - Characteristics of the Sample at Time 1 (N=159)

Descriptive variables	Range	Frequency (%)	M	SD
Child Gender				
Girls		53.5		
Boys		46.5		
Child Age at Time 1	1.13-5.95		3.59	1.56
Mother's Yrs. Education	5-18 years		11.81	2.41
5-10 yrs		25.8		
11 yrs		24.5		
12-14 yrs		39.1		
15-18 yrs		10.6		
Family Yearly Income	\$8,430- \$152,885		40,712	24,752
Below Statistics Canada Low Income Cut-off		41.7		
On welfare		16.4		

continuing risk status of the Concordia sample.

Time 2 data collection was conducted between 1999 and 2003, when these children were in the early elementary (grades 1 to 3) and aged between 6 and 9 years old ($M=7.66$, $SD=1.03$). The time difference between these two time cohorts ranged between 1 and 6 years ($M=3.90$, $SD=1.12$). Of the 175 original families who participated at Time 1, 131 agreed to participate in the second phase of the study. Given that complete data was not available for all children, the total number of participants varied depending on the specific predictor and outcome variables in each analysis. Table 2 provides descriptive information for this sample during the second phase of the study.

Insert Table 2 about here

Procedure

At Time 1 of the present study, participants were contacted by phone, to invite them to participate (see consent form, Appendix A). Two home visits were arranged, each of which lasted approximately 3 hours. During the first visit, a psychometrician performed intellectual and behavioural assessments of the children while a research assistant interviewed the mothers and administered questionnaires on psychological and family functioning. During the second visit, mothers and their children were videotaped engaging in a 15 minute free-play interaction. For this, the experimenter set up a camcorder on a tripod that filmed an area encompassing a carpet on which the interactions were to take place. The participants were given a standard set of toys consisting of a tea set, Lego blocks, a telephone and age-appropriate books and were instructed to engage in free play for 15 minutes, during which the experimenter left the

Table 2 - Characteristics of the Sample at Time 2 (N=131)

Descriptive variables	Range	Frequency (%)	M	SD
Time 1 and 2 Time Gaps (in years)	1.36-6.58		3.91	1.12
Child Gender				
Girls		55		
Boys		45		
Child Age at Time 2	6.15-9.79		7.66	1.03
Mother's Yrs. Education	5-18 years		11.92	2.42
5-10 yrs		24.4		
11 yrs		22.9		
12-14 yrs		42.1		
15-18 yrs		10.6		
Family Yearly Income	\$8,430- \$152,885		41,667	24,436
Below Statistics Canada Low Income Cut-off		38.9		
On welfare		12.2		

room. For the full protocol of the home visits, see Appendix B.

At Time 2 of the study, a trained research assistant went to visit the children at their schools. Parents had previously signed consent forms for the release of school records and testing at the child's school (Appendix C). Individualized administration of tests and interview schedules with the children, were also conducted lasting approximately 45 minutes.

Measures

Parent's level of childhood aggression and withdrawal - To examine childhood levels of aggression and withdrawal of the parents in this study, we drew from information that was collected as part of the original longitudinal study. Between 1976 and 1978, when these parents were children, they were screened using a peer evaluation measure, the Pupil Evaluation Inventory (PEI; Pekarik et al., 1976; see Appendix D). Studies have shown that peer nominations represent a reliable method of rating children's behavior (Lyons, Serbin, & Marchessault, 1988). Peer evaluations have been found to be good predictors of problems of adjustment in children (Landau, Milich, & Whitten, 1984). This instrument contains 35 items that load on three separate factors, aggression, withdrawal and likeability. Aggression and withdrawal levels were used as predictors in the present study.

Family Demographics - Socio-demographic information on the families was obtained with the Demographic Information Questionnaire (DIQ; see appendix E) which was administered by phone prior to the home visits.

Parental distress - To assess the level of psychological stress and adjustment of the participating mothers, a single factor measure was derived from three parental stress

indices using factor analyses. This measure included the Social Support Satisfaction questionnaire, derived from the Parenting Social Support Index (PSSI; Telleen, 1985), the Global Symptoms Index, derived from the Symptoms Checklist-90-Revised (SCL-90-R; Derogatis, 1983) and the Parenting Stress Inventory (PSI-II; Abidin, 1986). Factorial analyses showed that this composite measure had appropriate psychometric properties for use as a combined indicator of mothers' distress.

Quality of Home Environment - The Home Observation for Measurement of the Environment (HOME; Caldwell & Bradley, 1984) was administered to each family in the study to assess the level of support and stimulation offered to the child in the home. The Infant HOME was administered to those children less than 36 months of age, while the Preschool version was administered to those above 36 months.

Child Cognitive Functioning - Depending on children's ages, cognitive functioning was measured using one of two measures of IQ. Those children ranging below 42 months of age were administered the Bayley Scales of Infant Development-Second Edition (Bayley, 1993), while those aged 43-72 months were administered a French translation of the Stanford-Binet Intelligence Scale (SB-IV; Thorndike, Hagen, & Sattler, 1986).

Maternal and child language - Mothers' and children's language samples were obtained during the free-play interactions at Time 1. These samples were then transcribed by trained transcribers with the Child Language Data Exchange System (CHILDES; MacWhinney, 1996), a widely used language analysis software that accepts and analyses language in up to 25 different languages including French. The transcription was therefore done using the normal conventions of French orthography and grammar.

Specific instructions for French transcripts and coding decisions, including how to segment utterances, were based on the criteria described in the CHILDES manual (MacWhinney, 2000). In order for the transcripts to reflect the richness of the mother and child's linguistic environment and not the amount of their verbal output, as well as making our transcripts comparable across dyads, each mother and child transcripts were truncated to the size of the shortest transcript, which consisted of 50 utterances. This procedure has been shown to provide reliable language samples (McWhinney, 2000, Kemp & Klee, 1997).

Inter-judge transcription reliability between four trained scorers was computed for 20% of the samples. Reliability was calculated using an exact agreement procedure in which the total number of agreements was divided by the total number of agreements plus disagreements and multiplied by 100. Word-for-word percentage agreement between the original investigator and an independent judge ranged from 75% to 98% (Mean=88 SD=6.1). Utterance-for-utterance percentage agreement between the raters ranged from 75% to 97% (Mean=88.9, SD=6.26).

Each mother and child transcript was analyzed for mean length of utterance (MLU), using the CHILDES, analysis program CLAN (Child Language Analysis; MacWhinney, 2000). MLU provides a measure of the mean number of morphemes (grammatical units of meaning) over utterances (Brown, 1973). This measure has proven to be a reliable indicator of both verbal and grammatical development in both child and adult speech (Bornstein, 1997; Hoff & Naigles, 2002; Rollins, Snow & Willett, 1996). One study established that mothers' MLU accounted for the greatest portion of the variance in children's preschool vocabulary (Hoff & Naigles, 2002) beyond other known

language indices (e.g. number of utterances, word type, word token). These authors (Hoff & Naigles 2002) also suggest that mothers' MLU can be considered as adequate indicator of richness of the linguistic environment. Among its many suggested uses in the assessment of preschool-aged children, MLU has been shown to be a useful means of identifying language impairments in children (Bernstein & Tigerman-Faber, 1997; Owens, 1999), and as a determinant of overall language development (Bernstein & Tigerman-Faber, 1997; Miller, 1981; Owens, 1999) and syntactic complexity, (Hoff & Naigles, 2002). For the present study we will refer to MLU as an indicator of mothers and children's general language complexity. Because of the strong loading of age on MLU, z-scores were computed for both mothers and children, within child age groups. Table 3 provides descriptive statistics on this measure of mothers' and children's language.

Insert Table 3 about here

Time 2 Measures of Academic Performance - Children's overall Language Arts grades from school report cards were obtained providing information on children's abilities in oral, written, comprehension and reading. Math grade scores were also obtained through school report cards providing information on children's skills in arithmetic, geometry, and logic. These grades were then converted into a 5 point scale (with 5 being the best) and were put into a factor analysis to derive the present scores.

Table 3 – Descriptive Statistics for Mothers' and Children's MLU scores

Descriptive variables	M	SD
Mothers		
MLU	4.35	.80
MLU z-score	.01	.99
Children		
MLU	2.73	1.11
MLU z-score	.00	.91

Results

Preliminary Analyses

Prior to analysis, all records were checked for accuracy and the presence of missing values. Any missing values in the predictor variables were replaced with the group mean for that value. Correlations among dependant variables are shown in Table 4. As can be seen, most of the correlations between dependant variables are in the small to moderate range, with the exception of Language Arts and Math report card grades ($r = .69$).

Insert Table 4 about here

Design

The plan for analysis was designed following the inter-generational model of risk transmission, which suggests that problems originating in childhood will affect individuals' parenting abilities, and the linguistic environment they provide for their children. The quality of the linguistic environment is, in turn, thought to have repercussion on their offsprings' subsequent academic achievement.

Statistical analyses were conducted using hierarchical multiple regressions, which allow for the examination of the specific contribution of a given predictor, while partialing out the effects of the other independent variables. To explore the sequence through which the predictor variables function to influence maternal and child language complexity at preschool and subsequent school-related abilities, the independent variables were entered in steps following a chronological order.

Table 4 - Correlations (and degrees of freedom) among Dependant Variables

	1	2	3	4
1. Mother's MLU	--	.33** (158)	.08 (130)	.08 (130)
2. Child MLU		-- (158)	.29** (130)	.21* (130)
3. Language Arts			--	.69** (130)
4. Math				--

^t p < .10; * p < .05; ** p < .01

Note : Due to missing values N's are unequal across cells, as reflected in the degrees of freedom

Prediction of Mothers' and Children's Language Complexity at Time 1

Prediction of Mothers' Language Complexity. To examine our first hypothesis concerning the predictors of mother's language complexity, we conducted analyses using the original female participants (N=101) recruited by the Concordia Longitudinal Risk Project between 1976 and 1978. The female spouses of the original male participants (N=58) were not included in the analyses because data was not available for childhood aggression and withdrawal levels for these women. The correlations between the predictors and the outcome variables for the original mothers' sample are presented in Table 5.

Insert Table 5 about here

A regression analysis was then conducted to examine our first hypothesis concerning the predictors of maternal language complexity (mother's MLU). In the first step, mothers' childhood aggression and withdrawal level were included, followed by the children's age and gender in the second step. Mother's educational attainment, weekly family income, and mothers' parenting distress were then entered in the third and final step. The results of the regression analysis are presented in Table 6.

Insert Table 6 about here

The overall regression equation was not found to be significant for this analysis. However, the results reveal a significant effect of the level 1 model (Step 1; $F=3.06$, $p<.05$). At level 1, a main effect of childhood withdrawal was obtained (Beta = $-.23$,

Table 5 - Correlations between Predictor Variables and Maternal Language Complexity (Original female participants; N=101)

	1	2	3	4	5	6	7	8
1. Aggression	--	-.09	.03	.06	-.24**	-.09	.19*	-.08
2. Withdrawal		--	.03	.06	-.17 ^t	-.24*	.16 ^t	-.23*
3. Age of Child			--	-.13	-.09	-.09	.10	.03
4. Sex of Child ^a				--	.13	-.10	-.16 ^t	-.07
5. Mother's Education					--	.46**	-.18 ^t	.06
6. Income						--	-.34**	.19 ^t
7. Parent Distress							--	-.13
8. Mother's MLU								--

^a 1 = male, 2 = female

^t p < .10; * p < .05; ** p < .01

Table 6 - Results of the Regression Equations Predicting Maternal Language Complexity

Variables	Original Mothers N=101		
	Beta	ΔR^2	ΔF
<u>Step 1</u>			
Aggression	-.08		
Withdrawal	-.23*		
		.06	3.06*
<u>Step 2</u>			
Aggression	-.07		
Withdrawal	-.23*		
Age of Child	.01		
Sex of Child ^a	-.06		
		.00	.17
<u>Step 3</u>			
Aggression	-.07		
Withdrawal	-.19 ^t		
Age of Child	.03		
Sex of Child	-.07		
Mother's Education	-.06		
Family Income	.15		
Mother's Distress	-.05		
		.02	.71
R = .29			
R ² = .08			
F = 1.20			

^a 1 = male, 2 = female

^t p < .10, * p < .05, ** p < .01

$p < .05$) which accounted for 6% of the total variance in mother's language complexity. The negative direction of this coefficient suggests that mothers with a history of childhood withdrawal produce less complex language when talking to their children. Moreover, this effect remained marginally significant throughout the regression, but was slightly weakened by the addition of income to the equation. On the other hand, childhood aggression levels did not prove to be significant predictors of maternal language complexity. Overall, the findings provide support for our initial hypothesis that mothers with a history of childhood social withdrawal, tend to use less complex speech when speaking to their child.

Prediction of Child Language Complexity. To examine our second hypothesis relating to predictors of children's preschool language complexity (child MLU), analyses were conducted with the entire sample of 159 children. This included the children of mothers from the original sample ($N=101$) and children of the female spouses of the original male participants ($N=58$). Both groups of children were included in these analyses because childhood aggression and withdrawal levels were available for one parent (mothers or fathers) of each child in the sample. The correlations between the predictors and child MLU are presented in Table 7.

Insert Table 7 about here

A hierarchical multiple regression analysis was then conducted, which included sex of the parent (i.e. fathers or mothers from the original sample), parents' childhood aggression and withdrawal in the first step. On the second step, child age and gender were entered, followed in the third set by mother's years of education, weekly family

Table 7 - Correlations between Predictor Variables and Child Language Complexity (Full Sample; N=159)

	1	2	3	4	5	6	7	8	9	10	11	12
1. Sex of parent ^a	--	-.00	.22*	.01	.08	-.08	-.12	.09	-.14 ^t	-.07	-.04	.00
2. Aggression		--	-.11	.02	.02	-.26**	-.10	.12	-.16*	-.08	-.12	-.09
3. Withdrawal			--	.06	.00	-.20**	-.21**	.12	-.19*	-.15 ^t	-.19*	-.10
4. Age of Child				--	-.10	-.03	.02	.04	.05	.02	-.05	.03
5. Sex of child ^a					--	.03	.00	.05	.07	.03	.19*	.17*
6. Mother's Education						--	.47**	-.15 ^t	.44**	.13	.26**	.09
7. Income							--	-.21**	.39**	.19*	.21**	.06
8. Parent Distress								--	-.39**	-.08	-.33**	.03
9. HOME									--	.23**	.46**	.14 ^t
10. Mother's MLU										--	.14	.32**
11. Child IQ											--	.28**
12. Child MLU												--

^a 1 = male, 2 = female

^t p < .10; * p < .05; ** p < .01

income and mother's current distress level. The quality of the home environment and mother's language complexity (i.e. Mother's MLU) were entered in the fourth step of the equation. Children's standardized IQ at preschool-age was then entered on the fifth and final step. The results of the regression analyses are shown in Table 8.

Insert Table 8 about here

The overall equation yielded a multiple R that was statistically significant ($F=3.37$, $p<.01$) and all predictors together accounted for 20% of the variance in child language complexity. A significant effect of child gender (Beta=.19, $p<.05$, accounting for 4% of the variance) was obtained. The positive direction of the coefficient indicates that girls produced more complex language at preschool-age than boys. Significant effects of mother's MLU (Beta=.29, $p<.01$, accounting for 9% of the variance) and child IQ (Beta=.26, $p<.01$, accounting for 5% of the variance) were also obtained, indicating that children's IQ and mother's speech complexity are both related to children's speech complexity. These findings support our hypothesis that mothers who produce language that is more complex have children who also use relatively complex language at preschool-age. This also indicates that the relation between mothers' and children's language complexity was not simply due to the variance between children's language complexity and their general cognitive ability (i.e. IQ), as is demonstrated in the final step of the analysis. In contrast, the quality of the home environment, maternal distress, maternal education and family income were not found to be predictive of child MLU. In other words, our prediction that mothers' MLU would be predictive of child MLU controlled for the aforementioned variables was confirmed.

Table 8 - Results of the Regression Equations Predicting Child Language Complexity

Variables	Full Sample N=159		
	Beta	ΔR^2	ΔF
<u>Step 1</u>			
Sex of Parent ^a	.02		
Aggression	-.10		
Withdrawal	-.11		
		.02	1.03
<u>Step 2</u>			
Sex of Parent	.01		
Aggression	-.11		
Withdrawal	-.13		
Age of Child	.05		
Sex of Child ^a	.19*		
		.04	2.95 ^t
<u>Step 3</u>			
Sex of Parent	.01		
Aggression	-.10		
Withdrawal	-.12		
Age of Child	.04		
Sex of Child	.19*		
Mother's Education	.04		
Family Income	.01		
Mother's Distress	.07		
		.01	.31
<u>Step 4</u>			
Sex of Parent	.03		
Aggression	-.07		
Withdrawal	-.09		
Age of Child	.03		
Sex of Child	.17*		
Mother's Education	.01		
Family Income	-.04		
Mother's Distress	.10		
HOME	.09		
Mom MLU	.29**		
		.09	8.19**
<u>Step 5</u>			
Sex of Parent	.02		
Aggression	-.07		
Withdrawal	-.05		
Age of Child	.05		
Sex of Child	.13 ^t		
Mother's Education	.04		
Family Income	.00		
Mother's Distress	.07		
HOME	-.01		
Mom MLU	.29**		
Child IQ	.26**		
		.05	8.47**
	R = .45		
	R ² = .20		
	F = 3.37**		

^a 1 = male, 2 = female

^t p < .10, * p < .05, ** p < .01

Prediction of School-Related Abilities at Time 2

To examine our third hypothesis, that early linguistic complexity predicts later language-related abilities in elementary school, analyses were conducted with the entire sample of children, (N=131). For the set of regression analyses of relating to school achievement, the first step included sex of the parent who participated in the original sample, parent childhood aggression, and withdrawal levels. The second step included child age and gender, followed on the third step, by mother's educational attainment, weekly family income and mother's current distress level. The quality of the home environment (HOME) and mothers' MLU were entered in the fourth step of the equation. Finally, children's IQ and children's preschool language complexity (Child MLU) were then entered on the fifth and final step.

Prediction of Language Arts Report Card Grades. Table 9 presents the correlations between the predictors and the measure of Language Arts Report Card Grades. The results of the regression equation predicting Language Arts report card grades are presented in Table 10.

Insert Tables 9 and 10 about here

The multiple R for the overall regression was found to be statistically significant ($F=4.88$, $p<.01$) and all predictors together accounted for 35% of the variance in Language Arts report card grades. Main effects of parents' childhood withdrawal ($Beta=-.28$, $p<.01$) and aggression ($Beta=-.20$, $p<.05$) levels were found and accounted together for 10% of the variance in Language Arts grades, suggesting that parents with a history of childhood withdrawal and aggression have children who perform poorly on language-

Table 9 - Correlations between predictor variables and Language Arts Report Card Grades (Time 2 Sample; N=131)

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Sex of parent ^a	--	-.00	.22*	.01	.08	-.08	-.12	.09	-.14 ^t	-.07	-.04	.00	-.07
2. Aggression		--	-.11	.02	.02	-.26**	-.10	.12	-.16*	-.08	-.12	-.09	-.13
3. Withdrawal)			--	.06	.00	-.20**	-.21**	.12	-.19*	-.15 ^t	-.19*	-.10	-.23**
4. Age of Child				--	-.10	-.03	.02	.04	.05	.02	-.05	.03	-.28**
5. Sex of child ^a					--	.03	-.00	-.05	.07	.03	.19*	.17*	.07
6. Mother's Education						--	.47**	-.15 ^t	.44**	.13	.26**	.09	.23**
7. Income							--	-.21**	.39**	.19*	.21**	.06	.11
8. Parent Distress								--	-.39**	-.08	-.33**	.03	-.22*
9. HOME									--	.23**	.46**	.14	.26**
10. Mother's MLU										--	.14	.32**	.08
11. Child IQ											--	.28**	.36**
12. Child MLU												--	.29**
13. Language Arts													--

^a 1 = male, 2 = female

^t p < .10; * p < .05; ** p < .01

Table 10 – Results of the Regression Equations Predicting Language Arts Report Card Grades

Variables	Full Sample N=131		
	Beta	ΔR^2	ΔF
<u>Step 1</u>			
Sex of Parent ^a	-.03		
Aggression	-.20*		
Withdrawal	-.28**		
		.10	4.35**
<u>Step 2</u>			
Sex of Parent	-.04		
Aggression	-.17*		
Withdrawal	-.28**		
Age of Child	-.26**		
Sex of Child ^a	.08		
		.08	5.74**
<u>Step 3</u>			
Sex of Parent	-.04		
Aggression	-.11		
Withdrawal	-.23*		
Age of Child	-.26**		
Sex of Child	.07		
Mother's Education	.14		
Family Income	-.07		
Mother's Distress	-.17 ^t		
		.04	2.07
<u>Step 4</u>			
Sex of Parent	-.03		
Aggression	-.09		
Withdrawal	-.23*		
Age of Child	-.28**		
Sex of Child	.04		
Mother's Education	.10		
Family Income	-.10		
Mother's Distress	-.12		
HOME	.16		
Mom MLU	.02		
		.01	1.11
<u>Step 5</u>			
Sex of Parent	.01		
Aggression	-.09		
Withdrawal	-.18*		
Age of Child	-.29**		
Sex of Child	-.03		
Mother's Education	.07		
Family Income	-.08		
Mother's Distress	-.13		
HOME	.00		
Mom MLU	-.07		
Child IQ	.25*		
Child MLU	.26**		
		.11	9.28**
	R = .59		
	R ² = .35		
	F = 4.88**		

^a 1 = male, 2 = female

^t p < .10, * p < .05, ** p < .01

related school abilities. An interaction of childhood withdrawal and aggression levels was examined in a secondary follow-up analysis, but yielded no significant effect. Secondary analyses were also conducted to examine the interaction of sex of parent by withdrawal and aggression, but the effects were once again not found to be significant. A main effect of child age (Beta=-.26, $p < .01$, accounting for 8% of the variance) was also obtained, suggesting that the older the child the worse the performance in Language Arts subjects. Finally, main effects of Child IQ (Beta=.25, $p < .05$) and Child MLU (Beta=.26, $p < .01$) were found, together accounting for 11% of the variance in Language Arts grades. This suggests that children who have higher IQ scores at preschool and those who produce more complex language will perform better in language-related abilities in elementary school. This finding supports our third hypothesis that child language complexity at preschool-age would predict later performance in language-related abilities in middle childhood controlling for the children's level of general intellectual ability.

Predicting Math Report Card Grades. The correlations and regression analysis to examine the prediction of Math report card grades are shown in Tables 11 and 12 respectively.

Insert Tables 11 and 12 about here

The overall regression yielded a multiple R that was statistically significant ($F=3.03$, $p < .01$) and together all predictors accounted for 25% of the variance in Math report card grades. A main effect of childhood withdrawal (Beta=-.20, $p < .01$, accounting for 10% of the variance) was obtained, suggesting that parents with a history of

Table 11 - Correlations between predictor variables and Math Report Card Grades (Time 2 Sample; N=131)

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Sex of parent ^a	--	-.00	.22*	.01	.08	-.08	-.12	.09	-.14 ^t	-.07	-.04	.00	-.05
2. Aggression		--	-.11	.02	.02	-.26**	-.10	.12	-.16*	-.08	-.12	-.09	-.08
3. Withdrawal			--	.06	.00	-.20**	-.21**	.12	-.19*	-.15 ^t	-.19*	-.10	-.15
4. Age of Child				--	-.10	-.03	.02	.04	.05	.02	-.05	.03	-.24*
5. Sex of child ^a					--	.03	-.00	-.05	.07	.03	.19*	.17*	-.01
6. Mother's Education						--	.47**	-.15	.44**	.13	.26**	.09	.16
7. Income							--	-.21**	.39**	.19*	.21**	.06	.08
8. Parent Distress								--	-.39**	-.08	-.33**	.03	-.19*
9. HOME									--	.23**	.46**	.14	.25**
10. Mother's MLU										--	.14	.32**	.08
11. Child IQ											--	.28**	.34**
12. Child MLU												--	.21*
13. Math													--

^a 1 = male, 2 = female

^t p < .10; * p < .05; ** p < .01

Table 12 – Results of the Regression Equations Predicting Math Report Card Grades

Variables	Full Sample N=131		
	Beta	ΔR^2	ΔF
<u>Step 1</u>			
Sex of Parent ^a	-.02		
Aggression	-.12		
Withdrawal	-.20*		
		.05	2.04
<u>Step 2</u>			
Sex of Parent	-.03		
Aggression	-.09		
Withdrawal	-.19*		
Age of Child	-.26**		
Sex of Child ^a	-.02		
		.06	3.85*
<u>Step 3</u>			
Sex of Parent	-.02		
Aggression	-.04		
Withdrawal	-.17 ^t		
Age of Child	-.25**		
Sex of Child	-.03		
Mother's Education	.10		
Family Income	-.09		
Mother's Distress	-.14		
		.03	1.15
<u>Step 4</u>			
Sex of Parent	-.01		
Aggression	-.01		
Withdrawal	-.15		
Age of Child	-.27**		
Sex of Child	-.06		
Mother's Education	.04		
Family Income	-.14		
Mother's Distress	-.06		
HOME	.23*		
Mom MLU	.06		
		.04	2.43 ^t
<u>Step 5</u>			
Sex of Parent	.02		
Aggression	-.01		
Withdrawal	-.12		
Age of Child	-.28**		
Sex of Child	-.12		
Mother's Education	.02		
Family Income	-.12		
Mother's Distress	-.07		
HOME	.09		
Mom MLU	-.02		
Child IQ	.26*		
Child MLU	.18*		
		.08	5.77**
R = .50			
R ² = .25			
F = 3.03**			

^a 1 = male, 2 = female

^t p < .10, * p < .05, ** p < .01

childhood withdrawal will have children who perform relatively poorly in math. A secondary analysis was subsequently carried out to examine the interaction of the sex of the parent by withdrawal, but did not prove to be significant. A main effect of child age (Beta=-.26, $p<.01$, accounting for 6% of the variance) was found, indicating once more that older children had lower grades than younger children in math subjects. The quality of the home environment was also found to be significant (Beta=.23, $p<.01$, accounting for 4% of the variance), suggesting that the higher the amount of cognitive stimulation in the home at preschool-age, the higher the children's grades in math will be once they reach elementary-school. Finally, Child IQ (Beta=.26, $p<.05$) and Child MLU (Beta=.18, $p<.01$) also yielded significant results and together accounted for 8% of the variance.

This suggests that preschool IQ and language complexity also serve to predict abilities in apparently non-language related subjects, in terms of report card grades. This was not expected given our initial hypothesis that preschool language complexity would selectively predict grades in language-related subjects but would not be predictive of performance in non-language related subjects, such as math.

Discussion

The current investigation provides support for continuity of risk in mothers with a history of psycho-social problems, as evidenced by these mothers' communication skills when interacting with their preschool-aged children. A relationship between the quality of mothers' child-directed speech and children's subsequent language complexity was also established providing support for the inter-generational transfer of risk. Finally, analyses of these children's subsequent academic achievement suggest that they are at risk for various school-related problems, at least until the early elementary grades.

With respect to our first hypothesis, which stated that a history of childhood behavioural difficulties would predict the quality of mother's language to her child, the findings supported our prediction with respect to childhood history of social withdrawal. Specifically, mothers who were socially withdrawn during childhood were found to produce less complex speech when interacting with their preschool children. With respect to childhood aggression, findings did not suggest a significant association with mother's language. This suggests that the pathway in which social withdrawal is influencing mothers' speech patterns is not due to adult depressive symptomatology, a known risk factor for both aggressive and socially withdrawn girls (Serbin et al., 1998; Serbin et al., 2000; Stack et al., 2001), but is rather due to reduced maternal engagement when interacting with their children. This corroborates results obtained from the previous studies conducted with this sample (Serbin et al., 1998), which showed that childhood social withdrawal in childhood significantly predicted maternal unresponsiveness. This also supports the basic premise of a continuity of problematic interaction style in mothers with a history of childhood withdrawal, which reveals itself in these mothers' relative linguistic limitations when interacting with their preschool-aged children.

Regarding the second hypothesis, that mothers' child-directed linguistic interactions would predict children's language complexity at preschool-age, the present results appear to support our hypothesis. Mothers who produced shorter utterances with their children, as evidenced by their lower MLU, also had children who produced less complex speech samples. This is consistent with previous studies showing a relationship between mothers' speech and children's language abilities (Bornstein, Haynes, & Painter, 2001; Hart & Risley, 1995; Hoff & Naigles, 2002; Hoff, 2003; Huttenlocher, Haight,

Bryk, Seltzer & Lyons, 1991). This is also consistent with the results of parental cognitive stimulation studies (Saltaris et al., 2004) suggesting that children benefit from complex cognitive input from their parents during parent-directed child learning tasks. Thus parents who provide their children with an enriching linguistic environment appear to have children with more developed linguistic abilities.

In addition, children's cognitive functioning, as measured by their standardized IQ scores, was also found to predict preschoolers' language complexity. Because language is a large component of most IQ tests (Hoff, 2003), this finding also provides added support that MLU is an appropriate index of language development. The study also revealed that gender was found to be predictive of language complexity. Results indicated that girls produced more complex speech samples than boys in the sample. The finding that girls show advanced rates of language development is widely supported in the literature (Bornstein, Haynes & Painter, 2001; Hyde & Linn, 1998). However, gender differences became only marginally significant once mothers' MLU and IQ were entered in the equation. Although IQ was closely related to language complexity, the unique variance accounted for by mother's MLU indicates that children's language abilities are not simply due to their general cognitive ability, but are also attributable to specific linguistic influences as measured by mothers' MLU. These findings also provide support for our hypothesis that there is an inter-generational transfer of risk in children of mothers with reduced linguistic complexity.

The second part of the study examined whether there was continuity of language-related difficulties for these children, after they entered elementary school. Overall the findings supported our hypothesis in that children with decreased language complexity at

preschool-age showed lower academic performance in elementary school. With respect to their performance in Language Arts, we anticipated that these children's preschool MLU would predict their academic performance three years later. Results confirmed our hypothesis, in that children who produced less complex speech at preschool-age exhibited increased difficulties in language-related abilities, as expressed by their lower performance in Language Arts. These results are consistent with other longitudinal studies examining the impact of early language on later academic abilities (Hart & Risley, 1992; Walker et al., 1994).

In contrast to grades in Language Arts subjects, our initial predictions regarding children's performance in Math was that preschool MLU would not be a significant predictor of children's future math abilities. Surprisingly, however, our findings showed that preschool MLU significantly predicted children's performance in Math approximately three years later. Specifically, children with lower MLU at preschool-age performed worse in Math as shown by the report card grades. However, with $Beta=.18$, $p<.05$ and $R^2=.25$, this predictive relationship was found to be smaller than the one obtained from their grades in Language Arts ($Beta=.26$, $p<.01$; $R^2=.59$). Although these findings were unexpected and were not observed by Walker and colleagues (1994) during their longitudinal investigation of children's academic skills, mathematician Keith Devlin has postulated a link between mathematical abilities and language on theoretical grounds. Specifically, Devlin (2000) differentiates between arithmetic abilities which encompass numerical abilities (e.g. counting) and algorithmic abilities (e.g. numerical operations) from mathematical abilities, which includes such skills as abstract reasoning abilities, cause and effect reasoning, and spatial reasoning. He further proposes that the skills

allowing humans to reason about abstract concepts are similar to those used in reasoning about interpersonal relationships. As such, Devlin posits ‘the features of the brain that enable us to do mathematics are the very same features that enable us to use language...’ (p.2). Because our design used children’s report card grade scores in mathematics, which included not only arithmetic abilities, but also geometry and logic, it is possible that the variance accounted for by preschool MLU reflected the linguistic content associated with the skills proposed by Devlin (2000). These findings have profound implications for the development of children’s overall academic performance and imply that preschool language complexity has far-reaching effects. It not only affects performance in subjects that are directly-related to language, but may also influence performance in a subject matter that is indirectly affected by language ability.

In addition to children’s language complexity, general cognitive ability (IQ) was found to predict performance in both Language Arts and Math grades once again, however, these findings suggest that academic ability cannot be solely accounted for by IQ, as shown by the unique variance provided by children’s preschool MLU in the equation.

The study also produced several other noteworthy findings. Parents’ childhood withdrawal levels were found to predict children’s grades in Language Arts, even when child MLU and IQ were entered in the equation. This finding suggests the possibility of an additional pathway through which parental history of maladaptive behaviour patterns predict children’s academic performance. The investigation of such a pathway extends beyond the scope of this study and remains to be explored. Finally, children’s age at Time 2 was found to correlate with their academic performance, in both Language Arts

and Math. One explanation for this finding is that, as children in this risk sample reached higher grade levels, where the subject matter progressively becomes more challenging, overall performance declined.

Overall these findings appear to confirm the hypothesis that there is a continuity of risk in preschool-age children with poor language skills, after these children enter elementary school. Although the finding that preschool MLU predicts grades in Math abilities was unanticipated, this relationship suggests that the continuity of risk has far-reaching implications and extends beyond difficulties in language-related domains, and it does so after general cognitive abilities have been accounted for.

Limitations and Future Directions

Because our study relied on analyses of pre-collected data, our choice of language assessment measures was limited. Although MLU has repeatedly been shown to be an adequate measure of language development, the use of additional language analysis measures, including both qualitative and quantitative measures and targeting both productive and receptive language ability, might have showed more powerful results.

Similarly, the choice of play materials chosen for the free play task may have influenced mothers and children's verbal output. For instance, Pike (1998) found that mothers spoke more frequently, used longer utterances, asked more questions and used a greater proportion of process questions and fewer choice questions during book-reading than during block play. In addition, Nelson (1998) also found that use of construction materials such as Legos blocks, tended to elicit fewer utterances from children. In contrast Owens (1999) found that such play materials elicited more talk about non-present events. Taken together these findings suggest that the choice of play materials

may have influenced children's linguistic output and may have under-represented their language abilities. Thus, future research should broaden the methods of data collection, in consideration of the type of variables and measures to be investigated.

Despite these limitations, this study contributes to expanding the literature on language development of at-risk populations. Furthermore, to our knowledge, no prior studies of language complexity in disadvantaged children have been conducted with French-speaking populations. Most of the French language studies involving mother-child linguistic interactions in the literature are based on elicited speech rather than on naturalistic free-play speech samples, and focus on older language groups (Hamman et al., 2003). Accordingly, this is one of the first studies to extend the findings on predictors of maternal and child language complexity in high-risk populations to French-speaking samples.

A future direction for this research project will involve examining these children's linguistic abilities as they prepare for transition to high school, and investigating whether the selected linguistic precursors continue to predict their social, academic, and behavioural development. In order to further our understanding of which pathways are responsible for these language and academic difficulties in these children, future research should include both quantitative and qualitative measures of language analysis.

The finding that parents' history of childhood social withdrawal was shown to predict academic achievement in both Language Arts and Math report card grade scores even when general cognitive functioning and linguistic complexity were accounted for statistically, suggests the possibility that an additional pathway may be mediating this

relationship, beyond language complexity. This should also be considered in future investigations.

Finally, the study highlights the potential importance of early intervention programs aimed at improving parents and young children's language skills prior to school entry. One such study that examined five-mother child dyads (Hancock, Kaiser & Delaney, 2002) showed that low-SES mothers of at-risk children could be taught to increase their linguistic output and language complexity (as evidence by their MLU) when interacting with their children. Further, these linguistic changes generalized beyond the teaching situation, to other parenting behaviours. Children also showed increased language production, but in contrast to the parents, maintenance and generalization of these changes remained questionable. Given the AB small-sample design used in this study and the mounting evidence of the importance of mothers' language complexity for children's early development, a larger trial of this approach seems clearly warranted.

Concluding Comments

In sum, the present study highlights the input of maladaptive childhood behaviour in the transfer of risk from parent to offspring. The findings suggest a pathway through which mothers' childhood history of social withdrawal may potentially lead to continued maladaptive behaviours in adulthood, particularly with respect to mothers' child-directed speech. The findings also suggest that maternal language also serves to influence children's language development, which in turn affects their academic achievement in both language-related and non language-related subjects. Further investigation will be to address the issue of whether this pattern continues as these children enter higher levels of education.

References

- Abidin, R.R. (1986). *Parenting Stress Index-Manual*. Charlottesville, VA: Pediatric Psychology Press.
- Alexander, K.L., & Entwisle, D.R. (1988). Achievement in the first 2 years of school: Patterns and processes. *Monographs of the Society for Research in Child Development*, 53 (2, Serial No. 218).
- Bayley, N. (1993). *The Bayley Scales of Infant Development: Second Edition*. New York: The Psychological Corporation.
- Berk, L.E. & Spuhl, S.T. (1995). Maternal interaction, private speech, and task performance in preschool children. *Early Childhood Research Quarterly*, 10, 145-169.
- Bernstein, D.K. & Tigerman-Faber, E. (1997). *Language and communication disorders in children* (4th ed.). Boston, MA: Allyn & Bacon.
- Bornstein, M.H., Haynes, M.O., & Painter, K.M. (1998). Sources of child vocabulary competence: A multivariate model. *Journal of Child Language*, 25, 367-393.
- Bouchard, T.J., Lykken, D.T., McGue, M., Segal N.L. & Tellegen, A. (1990). Sources of human psychological differences: the Minnesota study of twins reared apart, *Science*, 250, 223-228
- Breznitz, Z. & Sherman, T. (1987). Speech patterning of natural discourse of well and depressed mothers and their young children. *Child Development*, 58, 395-400.
- Brown, R. (1973). *A first language: The early stages*. Cambridge, MA: Harvard University Press.
- Caldwell, B., & Bradley, B. (1984). *Home observation for measurement of the*

environment. Homewood, CA: Dorsey

- Caspi, A., & Elder, G.H. (1988). Childhood precursors of the life course: Early personality and life disorganization. In E.M. Hetherington, R.M. Lerner, & M. Perlumutter (Eds.), *Child development in lifespan perspective*, (pp. 115-142). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Center for International Statistics, Canadian Council on Social Development. *Poverty Statistics, Canada*, 1998.
- Derogatis, L.R. (1983). SCL-90-R (2nd edition). Towson, MD: Clinical Psychometric Research.
- Devlin, K. (2000). *The math gene: How mathematical thinking evolved and how numbers are like gossip*. New York: Basic Books.
- Dollaghan, C.A., Campbell, T.F., Paradise, J.L., Feldman, H.M., Janosky, J.E., Pitcairn, D.N. et al. (1999). Maternal education and measures of early speech and language. *Journal of Speech, Language and Hearing Research*, 42, 1432-1443.
- Hamann, C., Ohayon, S., Dube, S., Frauenfelder, U.H., Rizzi, L., Starke, M., & Zesiger, P. (2003). Aspects of grammatical development in young French children with SLI, *Developmental Science*, 6, 151-158.
- Hancock, T.B., Kaiser, A.P., Delaney, E.M. (2002). Teaching parents of preschoolers at risk: Strategies to support language and positive behavior. *Topics in Early Childhood Special Education*, 22, 191-212.
- Hart, B. & Risley, T. (1992). American parenting of language-learning children: Persisting differences in family-child interactions observed in natural home environments. *Developmental Psychology*, 28, 1096-1105.

- Hart, B. & Risley, T. (1995). *Meaningful differences in the everyday experience of young American children*. Baltimore: Brookes.
- Hardy-Brown, K. & Plomin, R. (1985). Infant communicative development: evidence from adoptive and biological families for genetic and environmental influences on rate differences, *Developmental Psychology*, 21, 378-85.
- Herrera, E., Reissland, N., & Shepherd, J. (2004). Maternal touch and maternal child-directed speech: effects of depressed mood in the postnatal period. *Journal of Affective Disorders*, 81, 29-39.
- Hoff, E. (2003). The specificity of environmental influence: Socioeconomic status affects early vocabulary development via maternal speech. *Child Development*, 74, 1368-1378.
- Hoff, E., & Naigles, L. (2002). How children use input in acquiring a lexicon. *Child Development*, 73, 418-433.
- Huttenlocher, J., Haight, W., Bryk, A., Seltzer, M., & Lyons, T. (1991). Early vocabulary growth: Relation to language input and gender. *Developmental Psychology*, 27, 236- 248
- Hyde, J.S. & Linn, M.C. (1998). Gender differences in verbal ability: a meta-analysis. *Psychological Bulletin*, 104, 53-69.
- Kemp, K. & Klee, T. (1997). Clinical speech and language sampling practices: Results of a survey of speech-language pathologists in the United States. *Child Language Teaching and Therapy*, 13, 161-176
- Landau, S., Milich, R., & Whitten, P. (1984). A comparison of teacher and peer assessment of social status. *Journal of Clinical Child Psychology*, 13(1), 44-49.

- Lipman, E.L., Offord, D.R., Racine, Y.A., & Boyle, M.H. (1994). Psychiatric disorders in adopted children: A profile from the Ontario Child Health Study. *Canadian Journal of Psychiatry*, 37, 627-633.
- Lyons, J., Serbin, L.A., & Marchessault, K. (1988). The social behaviour of peer-identified aggressive, withdrawn, and aggressive-withdrawn children. *Journal of Abnormal Child Psychology*, 16, 539-552.
- MacWhinney, B. (1996). The CHILDES System. *American Journal of Speech-Language Pathology*, 5, 5-14.
- MacWhinney, B. (2000). *The CHILDES Project: Tool for analysing talk*. Third Edition. Mahwah, NJ: Lawrence Erlbaum Associates. Available FTP: Hostname: CHILDES.psy.cmu.edu.
- Milling Kinard, E., & Reinherz, H. (1987). School aptitude and achievement in children of adolescent mothers. *Journal of Youth and Adolescence*, 16, 69-87.
- Moseley, D.V. (1997). Assessment of spelling and related aspects of written expression. In J.R. Beech & C. Singleton (Eds.), *The Psychological Assessment of Reading* (pp. 204-223). London: Routledge.
- Nelson, N.W. (1998). *Childhood language disorders in context: Infancy through adolescence* (2nd ed.). Boston, MA: Allyn & Bacon.
- Owens, R.E.(1999). *Language disorders: A functional approach to assessment and intervention* (3rd ed.). Boston, MA: Allyn & Bacon.
- Pekarik, E.G., Prinz, R.J., Liebert, D.E., Weintraub, S., & Neale, J.N. (1976). The pupil evaluation inventory: A socio-metric technique for assessing children's behavior. *Journal of Abnormal Child Psychology*, 4, 83-97.

- Pianta, R.C. (1997). Adult-child relationship processes and early schooling. *Early Education and Development*, 8, 11-26
- Pianta, R.C. & Walsh, D. (1996). *High-risk children in the school: Creating sustaining relationships*. New York: Routledge.
- Pike, S.L. (1998). Mother-child discourse: Cultural and socioeconomic factors across three situations. *Dissertation Abstracts International: Section A: Humanities and The Social Sciences*, 58, 2463.
- Rollins, P.R., Snow, C.E., Willett, J.B. (1996). Predictors of MLU: Semantic and morphological developments. *First Language* 16, 243-259.
- Rutter, M. (1987) Psychosocial resilience and protective mechanisms. *American Journal of Orthopsychiatry*, 57, 316-331.
- Saltaris, C., Serbin, L. A., Stack, D.M., Karp, J. A., & Schwartzman, A. E. (2004). Nurturing cognitive competence in preschoolers: A longitudinal study of intergenerational continuity and risk. *International Journal of Behavioral Development*, 28, 105-115.
- Serbin, L.A., Cooperman, J.M., Peters, P.L., Lehoux, P.M., Stack, D.M., & Schwartzman, A.E. (1998). Inter-generational transfer of psycho-social risk in women with childhood histories of aggression, withdrawal or aggression and withdrawal. *Developmental Psychology*, 34 (6), 1246-1262.
- Serbin, L.A., Stack, D.M., Schwartzman, A.E., Cooperman, J., Bentley, V., Saltaris, C. & Ledingham, J.E. (2002). A longitudinal study of aggressive and withdrawn children in adulthood: Patterns of parenting and risk to offspring. In R. De V. Peters & R. McMahon (Eds.), *Children of disordered parents*. KluwerAcademic/

Plenum.

- Stack, D.M., Serbin, L.A., & Schwartzman, A.E. (2005). Girls' aggression across the life course: Longterm outcomes and intergenerational risk. Invited chapter to be published in D. Peplar, K. Madsen, C. Webster, & K. Levene (Eds.), *Development and treatment of girlhood aggression*. NJ: Erlbaum.
- Stackhouse, J. (2000). Barriers to literacy development in children with speech and language difficulties. In D.V.M. Bishop & L.B. Leonard (Eds.), *Speech and language impairments in children: Causes, characteristics, intervention, and outcome* (p. 73-97). Hove, UK: Psychology Press.
- Statistics Canada. Selected income statistics for individuals, families and households, 1991 and 1996 censuses. Available at:
<http://www.statscan.ca/english/Pgdb/famil61b.htm>. Retrieved, June 10, 2005.
- Telleen, S. (1985). *Parenting social support reliability and validity*. Chicago: The University of Illinois at Chicago, School of Public Health.
- Thorndike, R. L., Hagen, E.P., & Sattler, J.M. (1986). *The Stanford-Binet Intelligence Scale: Fourth Edition*. Chicago: Riverside.
- Velez, C.N., Johnson, J., & Cohen, P. (1989). A longitudinal analysis of selected risk factors for childhood psychopathology. *Journal of the Academy of Child and Adolescent Psychiatry*, 28, 861-864.
- Walker, D., Greenwood, C.R., Hart, B., & Carta, J. (1994). Prediction of school outcomes based on early language production and socioeconomic factors. *Child Development*, 65, 606-621.
- Weizman, Z.O., Snow, C.E., (2001). Lexical input as related to children's vocabulary

Acquisition: Effects of sophisticated exposure and support for meaning.

Developmental Psychology, 37, 265-279.

Werner, E.E., & Smith, R.S. (1992). *Overcoming the odds: High risk children from birth to adulthood*. London: Cornell University Press.

Whitehurst, G.J. (1997). Language processes in context: Language learning in children reared in poverty. In L.B. Adamson & M.A. Ronski (Eds.), *Research on communication and language disorders: Contribution to theories of language development* (p. 233-266). Baltimore, MD: Brookes.

Appendix A

"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 B**PARENT-CHILD/HEALTH CANADA:
Full Protocol**

May 15, 1996

DAY 1 PROTOCOL:

1- Examiner: - takes care of introductions,
 - builds rapport with child,
 - explains general Day 1 procedures to Ss,
 - makes sure mother has read and signed consent form,
 - administers HOME interview items as part of the warm-up conversation,
 - explains saliva sampling and obtains a sample from both of them **immediately before standard testing** (record the time that all samples are taken on the appropriate form).

Interviewer: - chooses the most appropriate room for interaction series,
 - sets up camera and materials for Series 1 in the standard order (see toy lay-out sheet),
 - removes all other unnecessary materials,
 - unplugs that room's telephone if present,
 - and attempts to remain as invisible to the child as possible until Series 2. (**+20 min.**).

2- Examiner: - begins administering Bayley II or SB4.

Interviewer: - **a)** if mother does not need to stay with child (for SB4): Interviewer begins administering the demographic, obstetric, temperament and health questionnaires to her;
 - **or b)** if mother needs to stay with her child, the Interviewer can supervise siblings, do HOME observation items, score/enter data, or read a good book!!!

(30-60 min. or whatever the child can handle)

BREAK - The 2nd saliva sample is taken from both mother and child **immediately (+10 min.)** following standard testing. Examiner asks mother to come, if she's with Interviewer.

- Make sure you ask Ss if they need to go to the bathroom or get a change of diaper.

- If needed, Interviewer informs Examiner of interaction setup location.)

3- Before bringing Ss to the interaction room, the Examiner gives mother the following Series 1 instructions.

Série 1

"Maintenant, on aimerait vous voir jouer ensemble. Comme tu sais, on va enregistrer ça sur vidéo. Donc, pour être sûr que vous restiez tous(tes) les deux bien en vue pendant qu'on filme, c'est très important que vous restiez assis(es) tous(tes) les deux sur le tapis qu'on a mis par terre. Moi, je vais rester silencieuse derrière la caméra pour être bien sûr qu'elle fonctionne bien. Donc, essayez d'être le plus naturels possible et faites comme si je n'étais pas là. Alors, la première chose qu'on aimerait que tu fasses est simplement de jouer avec (ENFANT) comme vous le faites d'habitude pendant environ 15 minutes. Vous pouvez prendre n'importe quel des jouets sur le tapis. Puis, quand tu entendras l'alarme sonner, tu pourras arrêter de jouer. As-tu des questions? C'est très important aussi que tu attendes mon signal avant de commencer à jouer, OK?"

Examiner then gets Ss settled on the carpet and instructs child (if s/he can understand such instructions) to remain within its limits; e.g.:

"Maintenant, (CHILD), tu vas jouer avec maman, mais j'aimerais que tu restes sur le tapis. Fais comme si le tapis était ton carré de sable et que c'est défendu de sortir du carré de sable..." etc.

Examiner goes behind the camera and tells mother they can begin. Examiner is responsible for timing Series 1,2, and 3. The beeper should be started and stopped over the microphone so the coders are clear about when to begin and end coding that episode. [If there is an interruption of filming during the **first** half of the series (e.g., bathroom), reset the timer to 15 min. and start over. If the interruption occurs in the **second** half of the series **and** lasts less than 2 min., just pause and restart timer when the interaction resumes; but if the trip takes **more** than 2 min., Series 1 will have to be repeated at the end of Day 2.]

At the end of Series 1, Examiner administers "Maternal perceptions" questionnaire. If mother reports a score of 1 or 2, thus indicating that either her or her child's behavior was not natural, Series 1 should be repeated on Day 2.

(+20 min.)

BREAK - Everybody leaves interaction room during break so that the (+10 min.) Interviewer can reposition materials for Series 2, and position a barrier (e.g., Fisher Price gate, a playpen) that will safely prevent 12-36 mo. child from leaving interaction room during separation episode.

- Bathroom check

4- While the Examiner supervises the child away from the interaction room, she asks mother to join the Interviewer there. The Interviewer will then give mother the following Series 2 instructions so as not to be heard by child. (If child becomes upset about his/her mother's departure, Examiner will give her the instructions in the child's presence.)

Série 2

FREE PLAY (4 MIN)

"La prochaine période de jeux va aussi être filmé mais va avoir 4 parties: En premier, tu va recommencer à jouer avec (ENFANT) comme tantôt, mais juste pour une couple de minutes jusqu'à ce que tu entendes l'alarme sonner, comme tantôt."

PUZZLES (7 MIN, 4 MIN for 12-36 cohort)

"A ce moment-là, pousse les jouets de côté et choisis un casse-tête à faire avec (ENFANT). (FOR OLDER COHORT, EXPLAIN TO MOTHER THE LABELLED BAGS OF PUZZLE PIECES AND THEIR CORRESPONDING BOARDS). Si vous finissez ce casse-tête-là, vous pouvez travailler sur un autre. Après quelques minutes, l'alarme va sonner de nouveau et je vais entrer pour m'asseoir ici." (PRESS BEEPER WHEN THEY BEGIN WORKING ON THE PUZZLE)

Interviewer comes in at the beep and waits next to the door until mother has left.

Then s/he puts the barrier in place (for 12-36 mo. cohort) and sits down on a chair so as not to face child directly. Interviewer then gets busy with paperwork interacting as little as possible with child (i.e., s/he should not look at, speak to, or touch the child unless s/he is in danger of harming him/herself).

SEPARATION AND REUNION (2+4=6 MIN)

"A ce moment-là, tu sortiras de la pièce pour laisser (ENFANT) jouer tout seul avec les jouets. Et pour être sûr qu'il/elle ne te suivra pas quand tu va sortir, je vais placer une barrière en travers la porte/arche. Bien sûr, si (ENFANT) devient trop dérangé par ton absence, ou si tu te sens mal à l'aise, on arrêtera puis tu pourras le/la rejoindre. Sinon, après une couple de minutes, je vais sortir pour te dire que c'est le temps d'aller rejoindre (ENFANT) sur le tapis. Puis, tu passera 3-4 minutes de plus avec lui/elle et on te laissera savoir quand tout est fini."

Examiner programs beeper for 6 min. and presses "start" when mother exits the room. Then, after 2 minutes, she signals Interviewer to go get mother by pressing "pause" and presses "start" again when mother comes in. Examiner should keep child in view during separation and reunion episodes.

"Donc, pour résumer, commencez par jouer ensemble comme vous le faites d'habitude; puis, quand tu entendras l'alarme, pousse les jouets de côté et choisis un casse-tête. Quand tu me verras entrer, sors de la pièce jusqu'à ce que je te dise te rejoindre (ENFANT). J'ai une petite liste qui pourra t'aider à te souvenir des étapes, et je vais la placer juste ici. As-tu des questions? J'aimerais juste te rappeler encore de rester sur la

couverture pour que vous puissiez rester bien en vue. J'aimerais aussi quand tu sortiras que tu restes invisible pour (ENFANT), mais assez près pour entendre l'alarme. N'oublie pas d'attendre le signal avant de commencer, OK?"

At the end of Series 2, Interviewer takes cortisol sampling and **then** administers "Maternal perceptions" questionnaire. If mother reports a score of 1 or 2, Series 2 should be repeated on Day 2. The interviewer then takes the final saliva sample from both the parent and her child.

(+25 min.)

5- At the end of Day 1, Interviewer administers Day 1 Touch Questionnaire, gives instructions for mother and father questionnaire packages, and summarizes Day 2 procedures.

N.B. If child needs to nap during Day 1, Interviewer can take that opportunity to begin interviews with mother.

Total time, 2-3 hours

Fill out the VideoTape log sheet. Clean Bayley II and toys between each visit

DAY 2 PROTOCOL:

1- Examiner reconnects with child. Rapport building between Interviewer and mother, this includes Day 2 general instructions.

(+15 min)

2- Examiner finishes Bayley II or SB4. If mother does not need to stay with child, Interviewer answers any questions she might have about the questionnaires and finishes interviewing her. But if mother still needs to stay with child, Interviewer can set up Series 3 materials.

BREAK - Series 3 setup, if not done already

(+10 min.)

- Bathroom check

3- While Examiner supervises child away from interaction room, she tells mother to go to the interaction room to meet Interviewer who gives her the following Series 3 instructions so as not to be heard by child. If child becomes upset about mother's departure, the Examiner gives her the instructions in the child's presence.

Série 3

FREE PLAY (4 MIN)

"C'est la dernière fois qu'on va vous filmer, et il y a 4 choses qu'on aimerait que vous fassiez ensemble. D'abord, comme l'autre jour, on aimerait que tu joues avec (ENFANT) comme vous le faites d'habitude avec les jouets jusqu'à ce que tu entendes l'alarme sonner.

COMMAND TASK (3 MIN) NOT DONE FOR 12-24 MO. CHILDREN

A ce moment-là, vous aller arrêter de jouer pour faire quelque chose de complètement différent. Pour les 2-3 prochaines minutes, j'aimerais que tu demandes à (ENFANT) de faire quelques petites tâches pour toi. Tiens, voilà une liste de tâches que tu peux utiliser (GIVE HER THE PAD). Comme tu peux voir, il y en a qui sont plus difficiles que d'autres; c'est parce qu'on visite différentes familles avec des enfants d'âges différents. Celles du début sont plus faciles que celles de la fin (READ FIRST 3 AND LAST 3). On aimerait que tu prennes au moins 4 ou 5 des tâches de la liste. Tu peux en prendre plus si tu veux et tu peux même inventer tes propres tâches, mais pourvu que (ENFANT) n'ait pas à sortir de la pièce. Le pad sera placé tout près du tapis. (PRESS BEEPER WHEN MOTHER BEGINS INTRODUCING TASK)

INTERFERENCE TASK (3 MIN)

Quand tu entendras l'alarme sonner, vous arrêterez pour faire autre chose encore. On aimerait voir comment (ENFANT) réagit quand tu es très occupée. Tu sais comment c'est des fois quand tu es au téléphone ou bien en train de faire à manger et que c'est pas possible de lui donner toutes l'attention qu'il/elle demande. Pour observer ça, on aimerait que tu tournes la page sur ton pad pour remplir les questionnaires qui sont juste en-dessous (SHOW HER). Et pendant que tu les remplis, on aimerait que tu te retournes un peu pour lui faire comprendre que ce que tu fais est très important. (ENFANT) pourra continuer à jouer avec les jouets pendant ce temps-là; mais assure-toi encore qu'il/elle reste assis(e) sur le tapis. Tu continueras de travailler sur les questionnaires jusqu'à ce que tu entendes une autre alarme. (PRESS BEEPER WHEN MOTHER BEGINS QUESTIONNAIRE)

FREE PLAY (4 MIN)

A ce moment-là, mets le pad de côté et recommence à jouer avec (ENFANT) comme vous le faites d'habitude jusqu'à ce l'alarme te dise que c'est fini. N'oublie pas de rester à l'intérieur des limites du tapis pour que la caméra puisse vous garder tous les deux bien en vue.

Donc, en résumé, commencez par jouer avec (ENFANT) comme vous le faites d'habitude; ensuite, quand tu entends la 1ère alarme, prends le pad et fais-lui faire des tâches; puis, à la 2e alarme, commence à travailler sur le questionnaire jusqu'à ce que tu entendes la 3e alarme. A ce moment-là, tu recommences simplement à jouer avec (ENFANT). Comme la dernière fois, on a une petite liste qui va t'aider à te rappeler des étapes. As-tu des questions? N'oublie pas d'attendre le signal avant de commencer, OK?"

At the end of Series 3, Interviewer administers "Maternal perceptions" and "Touch" questionnaires.

(+25 min.)

BREAK
±10 min.

- 4- Examiner administers the "Parenting Practices Interview", investigate any clinical concerns that might have arisen through other questionnaires, administers the remaining HOME interview items and the SCID modules (if required). Meanwhile, the Interviewer administers the Peabody to the child. When Examiner is done with her interviews, the Interviewer joins her for the wrap-up.

(±60 min. or more, as needed)

Total time, 2-3 hours.

Fill out the VideoTape log sheet. Clean Bayley II and toys between each visit.

Appendix C**"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 durant la période de classe, à avoir accès à son dossier scolaire et à avoir ybe copie du dernier bulletin de l'année en cours. Je suis informée que durant la rencontre, mon enfant aura à remplir quelques questionnaires permettant d'évaluer son rendement scolaire et aussi, à répondre à différentes questions portant sur sa vie scolaire et aussi, à répondre à différentes questions portant sur sa vie à l'école. Je comprends que tout l'information recueillie demeurera confidentielle et qu'elle ne servira qu'à des fins de recherche.

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

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 : () _____

Rue

Adresse : _____

rue

ville

code postal

Appendix D**PUPIL EVALUATION INVENTORY**AGGRESSION ITEMS

3. Those who can't sit still.
4. Those who try to get other people into trouble
7. Those who act stuck-up and think they are better than everyone else.
8. Those who play the clown and get others to laugh.
9. Those who start a fight over nothing.
12. Those who tell other children what to do.
15. Those who always mess around and get into trouble.
16. Those who make fun of people.
18. Those who do strange things.
20. Those who bother people when they're trying to work.
21. Those who get mad when they don't get their way.
22. Those who don't pay attention to the teacher.
23. Those who are rude to the teacher.
26. Those who act like a baby.
27. Those who are mean and cruel to other children.
29. Those who give dirty looks.
30. Those who want to show off in front of the class.
31. Those who say they can beat everybody up.
33. Those who exaggerate and make up stories.
34. Those who complain nothing seems to make them happy.

WITHDRAWAL ITEMS

5. Those who are too shy to make friends easily.
6. Those whose feelings are too easily hurt. (*Not used*)
10. Those who never seem to be having a good time.
11. Those who are upset when called on to answer questions in class. (*Not used*)
13. Those who are usually chosen last to join in group activities.
17. Those who have very few friends.
24. Those who are unhappy or sad.
28. Those who often don't want to play.
32. Those who aren't noticed much.

LIKEABILITY ITEMS

2. Those who help others.
14. Those who are liked by everyone.
19. Those who are your best friends.
25. Those who are especially nice.
35. Those who always seem to understand things

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, 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: _____

Tes tâches: _____

Combien d'heures/sem.? _____

Salaires de l'heure _____ \$

travailler:

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

AN MO

___/___/

As-tu déjà eu un emploi?

Oui Non

↓

En quoi?

Pendant combien de temps?

___ an(s) ___ mois

Quand as-tu arrêté de

date: ___/___/

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):**

AN MO JR

a) Son nom: _____

b) Date de naissance ___ ___ ___

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\la mère de tes enfants (si n'habite pas avec toi)

AN MO JR

a) Son nom: _____

b) Date de naissance _____

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) ____ / ____

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

_____ Rue _____ app.

_____ Ville _____ Code postal _____

Téléphones: Personnel: () _____ - _____

Travail: () _____ - _____

Parents: () _____ - _____

Autre _____: () _____ - _____

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

Adresse électronique: _____

Adresse des parents: _____
