

**The effect of family structure on childhood externalizing behaviour:
Results from the National Longitudinal Survey for Children and Youth**

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Introduction:

The phrase “externalizing behaviour” refers to a group of conditions characterized by one or more of the following: aggression, delinquency, or hyperactivity (Liu, 2004). They have in common symptoms that are disruptive to others (Campbell, Shaw, & Gilliom, 2000). In the DSM-IV classification (American Psychiatric Association, 1994), externalizing behaviours include the following disorders: oppositional defiant disorder (ODD), conduct disorder (CD), and attention-deficit/ hyperactivity disorder (ADHD). Approximately 10 to 15% of preschool children have mild to moderate externalizing behavioural problems (Campbell, 1995). Between 5 and 10% of children and youth ages 8 to 16 years have significant oppositional, disruptive, or aggressive behavioural problems (Hill, 2002).

Studies examining the developmental trajectories of externalizing behaviour have found that externalizing behaviour problems decrease from kindergarten through adolescence (Bongers, Koot, van der Ende, & Verhulst, 2003). Those conditions that continue or develop through middle childhood and adolescence, such as early and persistent aggression are often associated with serious impairment that can extend into adulthood. These include such outcomes as school failure or drop-out, behavioural and emotional problems, poor peer relationships, and less social contact (Campbell, Shaw, & Gilliom, 2000). Childhood externalizing behaviour is a major risk factor for later juvenile delinquency, adult criminal behaviours, and violence (Farrington, 1989; Moffitt, 1993). These problems have been shown to reduce children’s quality of life as well as that of their families (Moffitt, 1993)

Research to date has identified a broad range of factors that contribute to the development of children’s externalizing behaviours. Based on the ecological framework, these factors are grouped into the following domains: child characteristics, family factors,

and socioeconomic factors. The child characteristics include such factors as initial problem severity (Stacks, 2005), adverse temperament (Schaughency & Fagot, 1993), and being male (Moffitt, Caspi, Rutter, & Silva, 2001; Broidy et al., 2003). Difficult temperament at an early age has been shown to contribute to the maintenance and later severity of behavioural problems (Campbell & Ewing, 1990; Campbell, 1995). Family environment including parenting also plays a role; previous research has shown that being born to a young mother (Williams, Anderson, McGee, & Silvia, 1990), parental stress, social isolation (Hashima & Amato, 1994), and parental depression (Campbell, 1995; Campbell & Ewing, 1990) are risk factors for children's externalizing behaviour. Studies of parental pathology and child externalizing behaviour have found that high levels of maternal depression are associated with the onset and persistence of child externalizing behaviour (Campbell, 1995; Campbell & Ewing, 1990). Parental process factors have also shown links to externalizing behavioural problems; these include parental conflict (Abidin et al., 1992), poor supervision, low parental involvement (Shaw, Gilliom, Ingoldsby, & Nagin, 2003), harsh parental discipline, and physical abuse (Fisher & Fagot, 1993). Aggressive parental behaviour observed by children is also associated with externalizing symptoms; there is an increased likelihood of aggression in peer relationships (Patterson, 1982). Negative punitive parenting creates a coercive cycle of child-parent conflict (Patterson, 1982). Absence of positive parenting reduces the opportunity for children to learn socializing, cooperation such as sharing with others, and regulating negative emotions such as anger (Patterson, 1982). Socioeconomic risk factors for externalizing behaviour include poverty and a family history of stressful life events (Deater-Deckard, Dodge, Bates, & Pettit, 1998; McLoyd, 1998; Huston, McLoyd, & Coll, 1994). These two factors are highly correlated; families living in poverty are more likely to have a

greater number of stressful life events, such as parental divorce, multiple changes in residence or employment (Deater-Deckard, Dodge, Bates, Pettit, 1998; McLoyd, 1998).

Structure of the family is one of the key factors to consider in the ecological framework in early childhood. Family structure (e.g., two-parent versus single-parent home) is closely related to almost all environmental risk factors for externalizing behaviours identified in the literature. Studies showed that growing up in a home with a single mother is a risk factor for children's externalizing behaviour (Duncan, Brooks-Gunn, & Klebanov, 1994). There is a strong link between single-parent status and low income. In 2000, 14% of Canadian children were living in single-parent families; these families accounted for 39% of all children living in low-income families (Census of Canada, 2001). Externalizing behaviour may arise from the following mechanism; perhaps the family's low socioeconomic status directly exposes children to stress, and indirectly influences parental warmth and involvement through poverty and family stress (Dodge, Pettit, & Bates, 1994; Harnish, Dodge, & Valente, 1995). Alteration in family structure, for example, from a two-parent home to a single-parent home, can be a stressful life experience for many families. Factors such as the timing of such changes may modify this association; for example, early parental divorce or separation has been shown to have a stronger relation to externalizing behavioural problems than later divorce or separation (Lansford et al., 2006).

Family process factors could be important mediating variables in the family context. Boys from homes disrupted by parental divorce have been found more likely to become delinquent in adolescence compared to those from intact homes or where disruptions occur due to parental death (Wadsworth, 1979). Studies examining the effects of returning from a single-parent home to a two-parent home as the result of a parent's remarriage, found that

there was increased risk for children's behavioural problems including delinquency (Farrington, 1996). This suggests that even greater adversity results from alterations in family process within step-families.

Far fewer Canadian children ages 0 to 14 years currently live with married parents compared with two decades ago (Census of Canada, 2001); the proportion has fallen from 84% in 1981 to 68% in 2001 (Census of Canada, 2001). In 2001, about 19% of children ages 0 to 14 years did not live with both parents (Census of Canada, 2001). Children are experiencing parental separation at increasingly younger ages (Census of Canada, 2001). Most of these children were living with a single parent, the majority of who were single mothers (Census of Canada, 2001, Families and Household Living Arrangements). A child can live with two parents; however parents might not be married. In 2001, the proportion of children living with common-law parents was 13% (Census of Canada, 2001). This is a 50% increase since 1996 (8.5%), and fourfold increase since 1981 (3.1%) (Census of Canada, 2001). Recent trends of increasing parental cohabitation, younger ages of parental separation, and possibly more frequent changes of family structure all contribute to the increasing complexity of family environments and elevated risk for developing externalizing behaviours.

Existing information about the association between-family structure and childhood externalizing behaviours has some important limitations. First, most studies to date have been cross-sectional, thereby restricting the ability to examine the relation between two variables beyond one point in time of a child's developmental trajectory. Second, many studies suffer from small sample sizes, so there is reduced power to consider a broader range of variables in the analysis.

Large community studies with variables at the individual and family level selected based on the ecological framework provide an important opportunity to enhance our understanding of the development of externalizing behaviour. Given the increasing diversity in family structure over the past two decades, it is important to examine how these changes affect the onset and course of children's externalizing behaviour. This can assist in identifying those children at increased risk of experiencing externalizing behaviours. The National Longitudinal Survey of Children and Youth (NLSCY, Statistics Canada), a prospective study of Canadian children of their development from birth to early adulthood, provides a unique opportunity to examine how family structure affects the course of externalizing behaviour in children, while including potential mediating factors. This community-based longitudinal study has advantages in collecting information prospectively for the representative of the population. This study addresses the following research questions:

- 1) What is the trajectory for externalizing behaviour in children aged 4 to 11 years?
How does the family average of children's externalizing behaviour differ from one family to another in the initial level and the growth rate?
- 2) In children with externalizing behaviours, what is the relationship between-family structure and course of the externalizing behaviour over time taking into account of family characteristic?
- 3) What are important mediating effects in the relationship between-family structure and children's externalizing behaviour? To what extent does the effect of mediating factors vary across children and families?

We hypothesized that single-parent structure increases the risk for externalizing behaviour and that family process factors (depression and hostile parent) mediate this association.

Method:

Data:

The NLSCY began in 1994 and was jointly conducted by Statistics Canada and Social Development Canada, formerly Human Resources Development Canada. The NLSCY was designed to collect information about factors influencing a child's social, emotional and behavioural development and to monitor the impact of these factors on the child's development over time. The survey covers topics including the health of children, their physical development, learning and behaviours and their social environment (family, friends, schools and communities).

The target population of the NLSCY is a non-institutionalized civilian population (aged 0 to 11 at the time of their selection) in 10 provinces, excluding children living on First Nation reserves or Crown lands, residents of institutions, full-time members of the Canadian Armed Forces, and residents of remote regions. The survey consists of several longitudinal and cross-sectional samples. The longitudinal samples were representative of the populations at the time of sample selection. Cross-sectional weights were applied when an age cohort could also be considered to be representative of a cross-sectional population. Most samples were drawn from the Labour Force Survey's sample of respondent households. The first cohort consists of children aged 0 to 11 at the time of their selection at Cycle 1 in 1994. At Cycle 5 in 2002, the sample consisted of about 30,800 children and youth.

Sample for Analysis:

This study examined the externalizing behaviour of children between the ages of 4 to 11 years. This age range has been chosen for the analysis, because we are interested in behavioural trajectories during the early developmental stages. This provides us the opportunity for comparison with other samples involving children of similar ages. Also, in the NLSCY, children's behaviours were assessed by their parents up to the age of 11.

First, a sample of children 4 to 7 years old at Cycle 1 were identified and followed in Cycles 2, 3, and 4 with the exception of children ages 6 and 7 years old at Cycle 1. These children were followed only up to Cycle 3 at which time they reached ages 10 and 11 years. The total number of children eligible for the analysis at Cycle 1 was 7278.

Variables & Measures:

Child externalizing behaviour. The children's externalizing behaviour was identified as the summed score of the "conduct disorder/physical aggression score" and the "hyperactivity/inattention score". These behavioural scores were reported by the Person who is Most Knowledgeable about a child (PMK). The "conduct disorder/physical aggression score" was derived from eight behaviour questions, such as, "How often would you say that a child gets into many fights?" The possible response was: 0 for "never or not true", 1 for "sometimes or somewhat true", 2 for "often or very true". Non-response options were treated as missing, and excluded from the analyses. The total score ranges from 0 to 12, with a high score indicating behaviours associated with conduct disorder and physical aggression. The reliability of this measure was assessed using the Cronbach alpha and has a value of 0.770. The hyperactivity/inattention score was derived from eight behaviour questions, such

as, “How often would you say that a child cannot sit still, is restless, or hyperactive?” By using the same response options, the total score ranged from 0 to 16, with a high score indicating the presence of hyperactivity/inattentive behaviour. The Cronbach alpha value for this factor score is 0.838. The externalizing behaviour score was determined by the sum of these two scores, ranging from 0 to 28.

PMK's hostile/ineffective parenting. This measure was based on seven questions about one's parenting style answered by PMK at each cycle (time-dependent variable). The total score varies between 0 and 25, with a high score indicating hostile/ineffective interaction with children.

PMK's depression. This variable was derived from twelve depression-related questions answered by the PMK at each cycle (time-dependent variable). The total score ranges between 0 and 36, with a high score indicating the presence of depression symptoms. The Cronbach alpha value for this factor score is 0.82

Family structure. The family structure was based on PMK's report at each cycle. This is a time-varying variable coded as 0 = two-parent and 1 = single parent.

Children's age and gender. Children's age in years was centered at each cycle around the mean age at Cycle 1 (mean age=5.5). Children's centered age was then used as the time indicator in the analysis. The child gender was coded as 0=female, 1=male.

PMK's age and education. PMK's age in year and education were based on PMK's report. PMK's years of education are based on the number of years of elementary and high school education completed excluding kindergarten. PMK's years of education was originally coded as 01: no school; 02: 1 - 5 years; 03: 6 years; 04: 7 years, and so on up to 10: 13 years. To ensure this variable reflected actual years of education, it was re-coded as 0: no school; 3:

1-5 years; 6: 6 years; 7: 7 years; and so on up to 13: 13 years. PMK's age and years of education were centered around the mean value at Cycle 1 and used as fixed parental characteristics.

Total household income. The total household income was based on PMK's report at each cycle. This variable was divided by 10,000 in the analysis to make one unit of change in household income represent the increase by 10,000 dollars.

Analysis:

First, bivariate analysis of the characteristics of child, parent, and the family by family structure was conducted for each cycle. T-tests for the difference in means of all variables by family structure were conducted to describe the baseline differences in variables across family structure. These analyses were conducted using SAS software.

Second, individual growth modeling was used for analyzing the trajectories of externalizing behaviours. Individual growth modeling is a longitudinal multilevel analysis which takes into account the nested structure of the data. In this case, measurements at four cycle points were nested within each child, then, children were nested within families. Longitudinal multilevel analysis allowed us to model for the fixed parameters and the variance simultaneously.

The modeling for the variance expresses the random effects of the predictor variables in the response variables. Variance was partitioned into three levels corresponding to the nested structure. That is, Level 1 is a within-child variance, Level 2 is a between-child within-family variance, and Level 3 is between-family variance. The within-family variance estimate shows the extent to which the children within the same families differ from one

another, with values indicating differences between siblings. The between-family variance estimate indicates the extent to which the families differ from one another on the family mean of the variable. It is possible within a multilevel model to model the within and between-family variances as a function of a variance of the interest.

Multilevel model of child externalizing behaviour growth:

Individual growth modeling was structured based on the hypothesized causal pathway based on the theoretical model of the ecological framework. First, to describe the growth rates of externalizing behaviours, we examined individual trajectories for all children over four cycles with a child gender variable (Model 1). Second, to examine the potential effect of the family characteristics, we added the variables of total household income, parental education and age into Level 1 model (Model 2). Thirdly, the dichotomous family structure variable was entered to examine the effect of single-parent household, while controlling for family characteristics (Model 3). Finally, we added the parental process factors (hostile parenting and depression) to test our hypothesis that these are important mediating factors for children's externalizing behaviour. All models were developed with three levels of variability in intercept: Level 1 (within individual), Level 2 (within-family), and Level 3 (across families). Analyses were conducted using the MLWin.

Results:

Missing data:

The number of children from one family who were surveyed has been modified from a maximum of four to two at Cycle 2 (Statistics Canada). This change in method reduced the

sample size from Cycle 1 to 2 by 36.8%. Of those participants eligible at Cycle 1 (N=7,278), 2,679 were excluded from the survey at Cycle 2. From Cycle 2 (N=4,599), another 131 children (2.8%) were lost to follow-up to Cycle 3 (N=4,468). A total of 2,114 children were in age range 10 to 11 years old at the time of Cycle 4. All records were examined further for data completeness. If there was a missing response in at least one of all individual variables, the record was excluded from the analysis. The number of children excluded due to missing responses was as follows: 361 (4.9%) at Cycle 1; 274 (5.9%) at Cycle 2; 583 (13%) at Cycle 3; and 249 (11.8%) at Cycle 4. Therefore, of a total of 7,278 possible children, the following were included in the analysis: 6,919 (Cycle 1); 4,327 (Cycle 2); 3,887 (Cycle 3); and 1,865 (Cycle 4), with a total of 16,992 data points. All growth curve modeling was conducted using the final data.

Description of sample:

Table 1 provides a description of the children in the analysis. Across cycles, the proportion of male children was about 51 percent (not shown). Children who were 6 or 7 years old in Cycle 1 were also present in Cycle 2 and 3, but not in Cycle 4 due to being out of the age range. In Cycle 4, all children were 10 or 11 years old. In Cycle 1, there were 6,917 children with complete data. Of those (N=6,917), 83.7% were living in two-parent households and 16.3% were living with a single-parent. Overall, children's externalizing behaviour score declined over time as they became older. However, there was a persistent difference in externalizing behaviour scores between children living in single-parent and two-parent households. Children who were living with single parents had a mean externalizing behaviour score (7.8; SD 5.4) at Cycle 1 that was significantly higher than those living with

two-parent (6.2; S.D 4.6; $p < 0.05$). This difference persisted through four cycles. Single-parent status was associated with younger age, fewer years of education, higher depression scores, and higher scores for the hostile/ineffective parenting. The average total household income of single-parent households was less than half the average income of two-parent families.

Growth curve models:

Table 2 shows the four growth curve models for externalizing behaviour. The overall growth rate of children's externalizing behaviour is displayed in the first model (Model 1). In this model, the intercept (B0: 5.571) indicates the average externalizing behaviour score for female children at the age 5.5 years (average age at Cycle 1). Male children exhibit higher levels of externalizing behaviour by 1.778 (B2) compared to female. The random effect, expressed in the between-families variance (δu_{01} : 4.263) and the between-children variance (δu_{01} : 8.299), show the extent to which the initial externalizing behaviour score vary within each level. The variability in the initial externalizing behaviour score within the family was almost twice those between families. The fixed parameter for the time-varying child age (B1: -0.269) is the slope for the externalizing behavior score. This shows that every year all children decrease the externalizing behavior score by 0.269.

The effects of family factors (PMK's education, age, and household income) are presented in model 2. There were small but significant effects of these family factors on externalizing behaviour. Higher household income, more years of PMK's education, and older age of the PMK were associated with decreased levels of externalizing behaviour. The single-parent family structure was then entered in to the previous model (Model 3). The

fixed parameter for the single-parent status (B6: 0.752) in Model 3 indicates the large effect of single-parent status on the initial level of the externalizing behaviour score. Model 3 contains a random effect of the single-parent status. The significant family-level variance (δu_06 : 5.783) explains that there was a wide variability in externalizing behaviour across families that are explained due to single-parent status. The covariance of intercept and single-parent status: -0.748 suggests that the higher the children's initial externalizing behaviour, the greater the rates decline over time. However, this covariance term was non-significant.

The family process factors had mediating effects on the association between single-parent status and externalizing behaviour (Model 4). Hostile parenting was significantly related to increasing externalizing behaviour (B7: 0.512, SE 0.008). Parental depression had a small but significant effect on externalizing behaviour (B8: 0.079, SE 0.006). After these two family process factors were entered, the effects of child's gender, household income, PMK age and single-parent status on externalizing behaviour decreased substantially (1.778 to 1.425 in child male gender, -0.07 to -0.026 in PMK's age, 0.752 to 0.46 in single-parent status), suggesting that the effects of child gender and family characteristics on externalizing behaviour were partially due to parental depression and hostile parenting. The family process factors also reduced the variance in the intercepts. Approximately, 37% of family-level variance (reduction from 3.258 to 2.051) and 36% of within-family variance (reduction from 8.247 to 5.27) were explained by family process factors. The significant random effect variance term (δu_06 : 4.336, SE 0.758) in Model 4 indicates that the association between single-parent family structure and externalizing behaviour exhibits large variability at the family level. This large variability was explained by the significant covariance term of

intercept and single-parent status: -1.392. When controlling for parental depression and hostile parenting, higher initial levels of externalizing behaviour was significantly associated with greater reduction in externalizing behaviour over time.

Discussion

This study confirmed the risk characteristics previously identified for children's externalizing behaviour. The descriptive analysis showed that single-parent status was significantly associated with many risk characteristics for externalizing behaviour in the ecological framework. Therefore, with regard to examining the effect of family structure, it is important to assess the overall risks for externalizing behaviour associated with a single-parent family structure. Our growth curve analysis showed that parental depression and hostile parenting were strong mediating factors. These factors were also shown to have independent effects on the course of externalizing behaviour. These findings were consistent with previous research (Burke, 2003; Owens & Shaw, 2003).

We have found variability in the association between risk factors and externalizing behaviours across families. When the effects of family characteristics (household income, parental age and education, single-parent status) were examined, the covariance term of the single-parent status (intercept) and externalizing behaviour (slope) was insignificant (covariate -0.748, SE 0.537). This suggests that the association between these two variables was similar across families. However, this covariance term became significant when family process factors (hostile parenting, parental depression) were added (covariate -1.392, SE 0.415). This significant negative covariance indicates that a family who higher initial levels of children's externalizing behaviour had showed steeper declining rates compared with the

families whose children's initial externalizing behavioural levels were lower, after controlling for family process factors.

There were several limitations in this study. We were only able to assess the variability of association between the single-parent status and outcome across families. With the maximum number of children surveyed from a household being two, this was insufficient to assess the variability within the family. For example, if there was only one child in a household, there was no variability within household. Therefore, we developed the growth curve models which assessed the random effect of single-parent status across families. Another limitation was the fact that only a single informant reported on the children's externalizing behaviour; the externalizing behaviour score was based solely on the parental report. The NLSCY data included the teacher's report about children's behaviour as well as parent's; however, there was substantial sample loss in teacher's reports. For this reason, we relied exclusively on the parental report. Finally, we used the dichotomous coding (two-parent versus single-parent) for the family structure, despite the increasing complexity in the family structure. The NLSCY data had sub-classification of family structure, such as "biological mother and non biological father"; however, most of these had a small number of cases. We intended to examine the effect of key risk factors including potential mediating factors in the analysis. Rather than breaking the family structure into subcategories and thereby risking loss of statistical power, we used a dichotomous variable for family structure in the analysis.

Studying the developmental course of externalizing behaviours has involved a broad range of samples, measures, and informants as well as a variety of theoretical frameworks. These methodological differences have resulted in mixed findings regarding factors

influencing the developmental trajectory in externalizing behaviour (Leve, Kim, & Pears, 2005). This community-based study which included key variables of child, parenting, and family factors provides the evidence to support risk characteristics previously identified for children's externalizing behavioural problems.

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