Parental monitoring of adolescent's behaviour:

Trajectories, risk factors, and associated outcomes

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Executive Summary – Parental monitoring of adolescent's behaviour:

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Objectives

1) To use national, longitudinal data to describe patterns of perceived parental monitoring among Canadian children through the early adolescent years (ages 10 to 15 years);

2) To explore the associations between these patterns and several child- and family-level socio-demographic factors; and

3) To examine the association between patterns of perceived parental monitoring and other behavioural and academic outcomes for youth ages 14 to 15.

Data Source and Methods

Data for the current study were drawn from cycles 2 (1996/97) through 6 (2004/05) of the National Longitudinal Survey of Children and Youth (NLSCY), a biennial survey of children's health and development conducted conjointly by Statistics Canada and Human Resources and Skills Development Canada.

Perceived parental monitoring was modelled for youth ages 10 through 15. The measure of perceived parental monitoring used in the NLSCY were based on scales developed by Lempers and colleagues (1989). Using a 5-point Likert scale (never, rarely, often, sometimes, and always), children and youth were asked to indicate the frequency with which their parent(s) exhibited each of five monitoring behaviours. The scale ranged from 0 to 20, with higher scores indicating greater perceived parental monitoring.

Longitudinal trajectories of perceived parental monitoring were modelled using semi-parametric group-based modelling (Jones, Nagin, & Roeder, 2001; Nagin, 2005), whereby individuals that share similar patterns of responses over time are grouped together. Socio-demographic factors were added to trajectory models to determine their association with patterns of perceived parental monitoring over time.

Using regression models, the relationship of perceived parental monitoring trajectories with several behavioural and academic outcomes was examined when youth were ages 14 and 15: behaviour problems (direct aggression, emotional disorder, hyperactivity, indirect aggression, property offences), self-esteem, pro-social behaviours, academic skills and behaviours (math skills, homework completion, skipping school, school suspension), and drug use (daily smoking, drunkenness, weekly marijuana use).

Results

Three trajectories of perceived parental monitoring were examined. One trajectory depicted high levels of perceived parental monitoring for youth ages 10 through 15 (*high monitoring* group, 57% of youth), while another depicted moderate levels of parental monitoring across this age span (*moderate monitoring* group, 32% of youth). The third trajectory depicted levels of perceived parental monitoring that were relatively high when children were 10 years old but which dropped precipitously into early adolescence, resulting in relatively low levels of perceived parental monitoring when youth where 14 or 15 (*decreasing monitoring* group, 11% of youth).

Of the baseline characteristics examined (when children were ages 10 to 11) – child gender, child birth order, parental age, single-parent family, parental education, and household

income – only two distinguished youth in the moderate from youth in the high monitoring group.

Children who were not first-born were more likely than first-born children to follow the

moderate monitoring trajectory rather than the high monitoring pattern. Furthermore, as

household income increased, the likelihood of belonging to the moderate over the high

monitoring trajectory decreased.

In models examining behavioural and academic outcomes at ages 14 and 15, as a youth's

probability of belonging to the moderate perceived parental monitoring trajectory increased, they

were significantly more likely to report high levels of direct aggression, indirect aggression, and

property offences, low levels of pro-social behaviour, were less likely to report completing their

homework at least most of the time, and were more likely to report skipping school or ever being

drunk. Findings from the present study also showed that lower levels of monitoring were

associated with lower math scores, a decreased likelihood of completing homework, and

increased odds of youth skipping school or being suspended.

Introduction

Parents' supervisory behaviours have a strong impact on their children's development. Measures of parental monitoring have been associated with various risk behaviours among children and youth. For example, low levels of parental monitoring have been associated with increased levels of smoking, alcohol and drug use (Barnes, Reifman, Farrell, & Dintcheff, 2000; Beck, Boyle, & Boekeloo, 2004; Cottrel, Li, Harris, D'Alessandri, Atkins, Richardson et al., 2003; Dick, Viken, Purcell, Kaprio, Pulkkinen, & Rose, 2007; Li, Stanton, & Feigelman, 2000; Rai, Stanton, Wu, Li, Galbraith, Cottrell et al., 2003; Veal & Ross, 2006; Webb, Bray, Getz, & Adams, 2002). Children and youth who are less highly monitored by their parents also show greater signs of conduct problems, aggression, and antisocial or delinquent behaviour (Caldwell, Beutler, An, & Clayton, 2006; Crouter, Bumpus, Davis, & McHale, 2005; DiClemente, Wingood, Crosby, Sionean, Cobb, Harrington et al., 2001; Kilgore, Snyder, & Lentz, 2000; Kim, Hetherington, & Reiss, 1999). Also, youth are more likely to engage in risky sexual practices and to initiate sexual behaviour earlier when their behaviour is less highly monitored by their parents (Baker, Rosenthal, Leonhardt, Kollar, Succop, Burklow et al., 1999; Baptiste, Tolou-Shams, Miller, McBride, & Paikoff, 2007; Crosby, DiClemente, Wingood, Harrington, Davies, Hook et al., 2002; Crosby, DiClemente, Wingood, Lang, & Harrington, 2003). In contrast, greater parental monitoring has also been associated with higher levels of self-esteem among youth (Dekovic & Meeus, 1997; Parker & Benson, 2004).

Several studies have shown that the effects of parental monitoring are not the same for all children and youth. For example, Borawski and colleagues (2003) found that increased levels of parental monitoring were associated with decreased levels of alcohol use and sexual behaviour, but only for boys and not for girls. Furthermore, Lenciauskiene and Zaborskis (2008) found that

maternal monitoring was most salient for boys, while paternal monitoring was more salient for girls. Lastly, Chilcoat and Anthony (1996) found that increased parental monitoring was significantly associated with lower levels of drug use during mid-childhood but that the effect of monitoring was significantly weaker during later adolescence.

Parental monitoring has also been associated with academic success and school-related behaviours (Annunziata, Hogue, Faw, & Liddle, 2006; Li, Fang, Stanton, Su, & Wu, 2003; Li, Feigelman, & Stanton, 2000; Prelow & Loukas, 2003; Spencer, Dupree, Swanson, & Cunningham, 1996), although the direction of association is not consistent. For example, Coley and Hoffman (1996) examined the impact of parental supervision and monitoring practices on children's behaviour and academic scores. Among children in two-parent families, those who were both unsupervised and unmonitored outside of school hours had higher math and language achievement scores than children who were supervised or unsupervised but monitored (e.g. by parents' rules or phone calls). The situation was not the same for children from single-parent families, whereby children who were both unsupervised and unmonitored had the lowest math and language achievement scores. In another study of youth in Beijing, China, Li and colleagues (2003) showed that higher levels of parental monitoring were associated with better school performance and greater educational expectations. This finding was true for parents' monitoring of the youth's social life or academic life. Similarly, Spencer and colleagues (1996) found that youth who perceived greater parental monitoring were also more likely to take responsibility for their school learning than less highly monitored youth. Therefore, the significance and direction of association between parental monitoring levels and school performance may depend on the way in which monitoring is conceptualized, who provides the report, contextual factors such as family composition or cultural expectations, or the kind of outcomes that are being assessed.

Definition and Measurement of Parental Monitoring

The foundation of work examining the importance of parental monitoring is often traced back to the work of Patterson and others in the Oregon Youth Study (OYS). Patterson and colleagues developed a latent construct of parental monitoring that consisted of two elements: (i) rules and expectations regarding the kind and type of information that parents require of their children, and (ii) how much time parents spend with their child (Capaldi & Patterson, 1989). In a number of studies using OYS data, parental monitoring was shown to have a direct association with antisocial behaviour among youth and to be consistently negatively correlated with other behavioural problems (Dishion, Patterson, Stoolmiller, & Skinner, 1991; Patterson & Dishion, 1985; Patterson & Stouthamer-Loeber, 1984).

Since this seminal work, however, there has been a great deal of debate in the literature regarding the definition and measurement of parental monitoring. It has been argued that "monitoring" is not the same as supervision or surveillance, as direct observation of a child's or youth's behaviour is often not truly feasible or practical (Hayes, Hudson, & Matthews, 2003). Rather, the definitions and measures used in research often focus on what parents know regarding their child's whereabouts and the activities in which they are engaging. As such, some have suggested that the term *parental knowledge* is more accurate (Stattin & Kerr, 2000).

Parents' source of information also impacts the measurement of monitoring and its association with outcomes. Several studies have demonstrated that parents overestimate their knowledge of their child's whereabouts and activities and significantly underestimate their child's engagement in high-risk behaviours (Cottrel et al., 2003; Stanton, Li, Galbraith, Cornick, Feigelman, Kaljee et al., 2000). Conversely, adolescent reports of parental monitoring are generally thought to be more accurate than parental reports as they are significantly associated

with adolescent risk behaviours, whereas parental reports of monitoring often are not (Cottrel et al., 2003). However, in the latter case, adolescents can only provide reports of their *perceptions* of parental monitoring rather than actual parenting behaviour (Hayes et al., 2003).

Given the variety of definitions, terms and measures used in the literature, it is important that studies of parental monitoring or knowledge clearly define the behaviours represented by the particular tool or measure employed. In the current study, the term "perceived parental monitoring" will be employed, although the previously noted caveats should be held in mind.

Theories Regarding the Impact of Parental Monitoring

The predominant theory within the research literature posits that higher levels of parental monitoring will be associated with lower levels of delinquency. In this theory, parental monitoring is thought to mitigate negative behaviour and delinquent actions by limiting opportunities for children and youth to engage in such behaviours. For example, Sieverding and colleagues (2005) hypothesized that higher levels of parental monitoring were associated with lower levels of adolescent sexual engagement in the following ways. First, parental monitoring, perceived or otherwise, reduces the number and scope of opportunities available to the youth to engage in risk behaviours. Second, parental monitoring creates an environment in which there is pressure for the youth to comply with parental expectations. Third, monitoring limits a youth's exposure to high-risk peers, which thereby minimizes the youth's perception of the risk behaviour as normative among his or her peers.

Others posit that lower levels of parental monitoring are associated with greater youth delinquency, not due to poor parenting practices, but due to youth's willingness to disclose information. Youth who engage in more delinquent behaviour are hypothesized to disclose the least information to their parents, thereby resulting in lower levels of parental monitoring or

knowledge (Lahey, Van Hulle, D'Onofrio, Rodgers, & Waldman, 2008; Marshall, Tilton-Weaver, & Bosdet, 2005). However, researchers have shown that parental monitoring (knowledge) has an independent effect on adolescent outcomes even after controlling for baseline risk behaviour levels (Kilgore et al., 2000; Lahey et al., 2008).

Correlates of Parental Monitoring

Previous studies have shown that socio-demographic characteristics are strongly associated with parental monitoring practices. Two of the most commonly cited factors are the child's age and gender. There is consistent evidence that girls are more highly monitored than boys (Barnes et al., 2000; Borawski, Ievers-Landis, Lovegreen, & Trapl, 2003; Chilcoat, Breslau, & Anthony, 1996; Crouter, Helms-Erikson, Updegraff, & McHale, 1999; Rai et al., 2003; Richards, Viegas Miller, O'Donnell, Wasserman, & Colder, 2004; Svensson, 2003; Veal & Ross, 2006; Webb et al., 2002) and that levels of parental monitoring tend to decrease as the child gets older (Barnes et al., 2000; Rai et al., 2003; Richards et al., 2004). Children from socio-economically disadvantaged families tend to be less highly monitored (Chilcoat et al., 1996; Crouter et al., 1999; Pettit, Bates, Dodge, & Meece, 1999; Pettit, Laird, Dodge, Bates, & Criss, 2001) as are children from single or step-parent families (Fisher, Leve, O'Leary, & Leve, 2003; Kim et al., 1999; Pettit et al., 2001). Other parental factors associated with lower levels of parental monitoring behaviours include being never married (Chilcoat et al., 1996), being in a low-quality marital relationship (Bumpus, Crouter, & McHale, 1999), poor mental or emotional health (Chilcoat et al., 1996; Jones, Forehand, Brody, & Armistead, 2003), and increased work hours and work stress (Bumpus, Crouter, & McHale, 2006; Crouter et al., 1999). There is also evidence that firstborn children are less highly monitored than higher birth order children (Crouter et al., 1999).

Present Study

The goals of the current study were threefold. The first was to test for and examine the presence of multiple patterns of perceived parental monitoring among Canadian children through the early adolescent years (ages 10 to 15 years). Second, the associations between these patterns and several family-level socio-demographic factors were explored. Third, the association between patterns of perceived parental monitoring and other behavioural and academic outcomes were examined for youth ages 14 to 15.

Based on findings in the literature, the present study hypothesized the following. First, it was expected that more than one trajectory of perceived parental monitoring would be identified. Second, it was anticipated that at least one trajectory would show a decline in the level of monitoring as the child ages. Third, girls were hypothesized to report higher levels of parental monitoring than boys. Finally, that lower levels of perceived parental monitoring were expected to be associated with increases in adolescents' substance use and problem behaviour, poorer academic performance, and lower self-esteem at ages 14 or 15.

Methods

Data Source

The National Longitudinal Survey of Children and Youth (NLSCY), conducted jointly by Statistics Canada and Human Resources and Skills Development Canada, gathers information on the development and well-being of Canadian children. First conducted in 1994, the NLSCY is conducted every two years, with six cycles of data available at the time of this study. Due to changes in the measurement of perceived parental monitoring between cycles 2 (1996/97) and 3

(1998/99), only three cohorts of children were included in analyses: children who were aged 12

to 13 in cycle 3 (cohort 1, n=2246), children who were aged 10 to 11 in cycle 3 (cohort 2,

n=2169), and children who were aged 10 to 11 in cycle 4 (cohort 3, n=2101).

Measures: Predictors

       Socio-demographic characteristics. Socio-demographic information was provided by the

person most knowledgeable (PMK) of the child, most frequently the child's biological mother,

and was drawn from the cycle in which the child was aged 10 or 11. Characteristics of interest

were the child's gender and birth order (only child, firstborn, higher birth order), the number of

parents in the home (single- versus dual-parent families), household income, and PMK age and

highest level of educational attainment. PMK's highest educational attainment was categorized

as less than a high school diploma, being a high school graduate, or having at least some post-

secondary education. Household income was rescaled (divided by 10,000) to allow for a more

meaningful interpretation of the beta coefficient in the results.

       Perceived parental monitoring. Parenting behaviour questions used in the NLSCY were

drawn from the Western Australia Child Health Survey. Using scales developed by Lempers and

colleagues (1989), the NLSCY included measures of parental nurturance, rejection and

monitoring: parental monitoring questions were the main focus of the current study (see Table

A1 for scale items). Using a 5-point Likert scale (never, rarely, often, sometimes, and always),

children and youth were asked to indicate the frequency with which their parent(s) exhibited

each of five monitoring behaviours. After reverse coding one scale item, responses to all five

items were summed to create a parental monitoring score that ranged from 0 to 20, which higher

scores indicating greater parental monitoring. Cronbach's alpha for the monitoring scale

improved with the age of the child, but reliability was comparable between cycles (Table A2).

Given that the measure of parental monitoring is based on youth's perceptions of the degree or frequency with which parents monitor their behaviour, the term *perceived parental monitoring* will be used throughout this report to describe this measure.

Measures: Outcomes

The impact of longitudinal patterns of perceived parental monitoring was examined in relation to several youth school and behavioural outcomes at age 14 or 15. Correlations between the age-specific measures of perceived parental monitoring and the continuous outcomes are given in Table A3.

School-related outcomes. Four measures were used to describe youth's academic performance and school-related behaviour. First, youth's math skills were measured using a shortened version of the Mathematics Computation Test of the standardized Canadian Achievement Tests (CAT/2). This objective test reflects the student's skills in addition, subtraction, multiplication, division, and problem solving. The short version of the CAT/2 used in the NLSCY consisted of 20 questions at each grade level and standardized scores were derived from standards (norms) established by the Canadian Test Centre in 1992. Further information on the mathematics measure can be found in the NLSCY User's Guide (Statistics Canada, 2005).

Three other measures of academic and school behaviour were based on youth self-report. Using a 4-point Likert scale (never, once or twice, 3 or 4 times, or 5 times or more), youth were asked how often they had skipped a day of school without permission or had been suspended from school since the beginning on the school year. Responses to each question were dichotomized to classify youth who had skipped a day of school or been suspended from school at least once in the past year versus not. Youth also reported how often they completed their

homework. Responses on the 5-point Likert scale (all of the time, most of the time, some of the time, rarely, and never) were dichotomized to reflect youth who completed their homework at least most of the time versus not.

Behaviour-related outcomes. In terms of children's social and behavioural functioning, self-reported information was collected from youth. Six behavioural scales were used in the current study: direct aggression (conduct disorder and physical aggression), hyperactivity and inattention, indirect aggression, emotional disorder and anxiety, pro-social behaviour and property offences. Items for these scales were drawn primarily from the Ontario Child Health Study (Boyle, Offord, Hofmann, Catlin, Byles, Cadman et al., 1987) and the Montréal Longitudinal-Experimental Study (Tremblay, Vitaro, & Nagin, 2003). Items for the indirect aggression scale were drawn from the Direct and Indirect Aggression Scales (Björkqvist, Lagerspetz, & Österman, 1992). Individual scale items are given in Table A1.

Questions regarding youth's overall self-esteem were taken from the General-Self Scale of Marsh's Self Description Questionnaire (Marsh, 1992; Marsh & Shavelson, 1985). Four questions were included on the NLSCY (see Table A1 for individual items). Using a 4-point Likert scale (false, mostly false, sometimes false/sometimes true, mostly true), youth indicated the degree to which they felt positively about various aspects of themselves.

No imputation was done for missing items, therefore youth who failed to provide a response to one or more of the scale items did not receive a score for the measure. For all behaviour and self-esteem scale, upwards of 89% of youth provided responses to all scale-specific items. Those with missing behaviour and self-esteem measures had similar average parental monitoring scores and socio-demographic characteristics as those with complete information, with the exception that first-born children with siblings were less likely to be

missing these measures than were other children. Based on these findings, it was not felt that

excluding those with missing values on these scales (i.e. not imputing scores) would significantly

bias the findings.

      Substance use behaviours. Three measures of substance use were included in the current

study. Youth self-reported their current and past experience with smoking, drinking, and drug

use behaviour. Response scales were dichotomized to indicate the presence (or absence) of a

risk behaviour. Youth who reported smoking 6 or 7 days a week were classified as *daily*

smokers. Youth who had ever consumed alcohol (more than just a sip) were asked if they had

ever been *drunk*. Youth were also asked if they currently used marijuana and, if so, how often.

Youth who reported using marijuana at least once a week were classified as *weekly marijuana*

users.

Data Analysis

      Trajectory model estimation. A semi-parametric group-based approach was used to

identify distinct patterns of perceived parental monitoring as reported by youth from ages 10

through 15. Trajectory model estimation was used to identify clusters of individuals who follow

similar progressions of behaviour across age or time (Jones & Nagin, 2007; Jones, Nagin, &

Roeder, 2001; Nagin, 1999; Nagin, 2005; Nagin & Land, 1993). In contrast to growth curve

modeling which describes a normative developmental trajectory, the semi-parametric group-

based approach allows for qualitatively different trajectories to be identified and examined,

creating subpopulations of a behaviour, in this case, perceived parental monitoring. It should be

noted that such trajectories are latent groups and that no child actually belongs to a particular

group. Rather, his or her pattern of perceived parental monitoring is best described by a

particular pattern or trajectory (Nagin, 2005).

In the first step of trajectory modelling, exploratory analyses were performed to determine the best-fit model. The number and shape of trajectory groups were varied in sequential models to determine the most parsimonious number of groups in the model and the significance of the shape of the trajectories (flat, linear, or quadratic). The final model was chosen based on two factors: a) the model which yielded the largest (i.e., least negative) Bayesian Information Criterion (BIC), and b) a model in which all slope parameters were statistically significant (Nagin, 2005). The Bayesian Information Criterion (BIC) is a measure of model fit that takes into account the sample size and the number of parameters in the model. In model fitting, each individual is assigned a posterior probability of being classified in each trajectory group: the posterior probabilities total to 1.0 across all trajectory groups for each individual. A minimum of two response points were required for individuals to be included in the analyses.

Once the number and shape of trajectory groups were determined, covariates were added to the model to estimate their effect on membership in a particular trajectory group. The effect of covariates on trajectory group membership was assessed using multinomial logistic analysis. Coefficients are interpreted as the increased probability (odds) that an individual will follow a particular trajectory relative to a referent trajectory group.

Regression model estimation. After identifying longitudinal patterns of perceived parental monitoring, the association between the trajectories of monitoring and youth's behaviours and school-related outcomes was examined using regression models. While controlling for a series of socio-demographic characteristics, e.g., child's gender, birth order, family structure (i.e., whether the child lived with one or two parents), PMK education, age of the PMK, and household income, the effect of perceived parental monitoring trajectories was

examined by including the posterior probabilities of trajectory membership as covariates in the model.

Among the continuous scale measures examined at ages 14 to 15, only mathematics and pro-social behaviour scales conformed to the Normality assumption in linear regression models. Models for these behaviours were conducted using multivariate linear regression models. Appropriate transformations could not be found for the remaining scales. In these cases, scales were dichotomized using the 90th percentile as a cut-point indicating high levels of behaviour problems. The exception was self-esteem, for which a cut-point identifying low self-esteem was set at the 10th percentile. This approach has been taken by other researchers examining behaviour problem scales (Dooley, Curtis, Lipman, & Feeny, 1998; Lipman, Offord, & Dooley, 1996; Lumeng, Gannon, Cabral, Frank, & Zuckerman, 2003). All dichotomous outcomes were examined using logistic modelling.

Sampling weights were applied to all analyses. To adjust the standard error estimates for the complex design of the survey, bootstrap techniques were used in the regression analyses (Rust & Rao, 1996): due to software limitations, trajectory models and the resultant posterior probabilities were not bootstrapped. Statistical significance was set at the $p < .05$ level.

Attrition and Cohort Analysis

To be included in the trajectory analysis, youth had to provide at least two waves of information on perceived parental monitoring. Youth who were excluded from trajectory modeling because they did not meet with this criterion were found to be more socio-economically disadvantaged than youth who were included in analyses (Table 1). Youth excluded from the trajectory models were significantly more likely to be from single-parent families, have a PMK with less than a high school education, and to come from families with

lower household incomes compared to youth who were included in analyses. Furthermore, youth excluded from analyses were significantly more likely to be from cohort 1 than youth who were excluded from analyses. This last finding was expected given that cohort 1 youth had fewer in-scope survey cycles in which they could provide responses than did youth in the other two cohorts.

Because the study sample is comprised of three cohorts of youth, it was important to examine inter-cohort differences in the measures used for analysis. No significant differences in age-specific measures of perceived parental monitoring were found (Table A4). As such, no further adjustment to trajectory modeling was deemed necessary. However, there were some significant differences in behaviours and academic outcomes measured at ages 14 and 15. Given these differences, two dichotomous cohort identifiers (cohort 2 as the reference) were included in regression models to adjust for inter-cohort differences.

Results

Descriptive Statistics

Characteristics of the sample are provided in Table 1. Approximately half of the youth were male, 12% were only children, while a further 33% were firstborn children. The majority of children (92%) were Caucasian, and only 3% of children were immigrants. Nearly 15% of children lived in single-parent homes. In terms of the PMK characteristics of interest, the PMK was on average 39 years of age, most likely to be female (92%), and 10% had less than a high school level of education. The mean household income was approximately $68,493 and approximately 14% of children's families were considered low-income for their family size and place of residence.

Trajectory Analyses

In the trajectory model building phase of analysis, models with increasingly higher number of trajectory groups provided the best fit to the data, but additional trajectory groups were interpretively similar or represented very small proportions of the sample. The model with the greatest number of trajectory groups that still maintained enough sample (i.e. more than 2%), in each trajectory was a three-group model. This three-group model was selected to represent perceived parental monitoring behaviours for youth ages 10 through 15 (Figure 1). For ease of interpretation, these groups were labelled *high, moderate* and *decreasing* perceived monitoring. It was estimated that approximately 57% of children were best represented by the high group, 32% by the moderate trajectory, and the remaining 11% by the decreasing trajectory of perceived parental monitoring. All trajectories showed declines in the levels of reported parental monitoring between ages 10 and 15. Within the moderate trajectory, although monitoring at age 15 was lower than at age 10, there was actually a slight rise in the level of perceived parental monitoring, with peak levels being reported at age 13. The intercepts were similar between the high and decreasing trajectories (Wald chi-square=3.35, p=.07), meaning that levels of perceived parental monitoring were similar at age 10 for members of these trajectories. Intercepts were statistically different between the high and moderate trajectories (Wald chi-square=44.78, p<.0001) as well as between the decreasing and moderate groups (Wald chi-square=4.27, p=.04), meaning that levels of perceived parental monitoring were different at age 10 for members of the moderate group compared to the high or decreasing trajectory groups.

Analyses were performed to identify characteristics associated with membership in the high perceived parental monitoring trajectory group relative to the moderate and decreasing perceived parental monitoring groups. Characteristics included child gender, the child's birth

order, single vs. dual parent families, PMK education, age of the PMK, and household income.

Results revealed that none of the baseline characteristics differentiated membership in either the

decreasing or the high perceived parental monitoring trajectory (Table 2). However, children in

higher income families were less likely to be associated with the moderate perceived monitoring

group than the high monitoring trajectory, whereas higher birth order children were more likely

to be among those with high levels of perceived monitoring than the moderate perceived

monitoring group (Table 2). There was a tendency for girls to be less likely to be in the

moderate perceived parental monitoring trajectory than the high trajectory, but this association

failed to reach statistical significance (p=.06).

Regression Analyses

The posterior probabilities of membership in each of the three trajectory groups were

used as predictors in multivariate regression models. For each youth, their probability of

belonging to each of the moderate and declining trajectories were entered into the models, with

the probability of belonging to the high monitoring trajectory group as the reference category.

Behavioural outcomes. Using the 90th percentile as cut-points on the behaviour scales, the

following proportion of children had high levels of behaviour problems: 7% for direct

aggression, 9% for emotional disorder, 6% for hyperactivity, 6% for indirect aggression, and 7%

for property offences. Using the lowest decile of scores as a cut-point, 8% of 14- to 15-year-olds

had low levels of self-esteem.

Perceived parental monitoring trajectories were significantly associated with four of the

seven behavioural outcomes (Table 3). As the probability of belonging to the moderate

perceived monitoring trajectory increased, the odds of reporting high levels of direct aggression,

indirect aggression and property offences increased, while the pro-social behaviour score

decreased. Similarly, as the probability of belonging to the decreasing perceived monitoring trajectory increased, the odds of reporting high levels of property offences increased while pro-social scores decreased. There was also a tendency for higher probabilities of belonging to the decreasing trajectory to be associated with an increased likelihood of reporting high levels of direct aggression, although this association did not reach statistical significance (p=.07).

Regarding the effect of socio-demographic characteristics on youth's behavioural outcomes, girls were less likely than boys to report high levels of direct aggression or property offenses, scored higher in pro-social behaviours, but were more likely to exhibit high levels of emotional disorder and low self-esteem. Higher birth order children were more likely to have low self-esteem than firstborn children. Youth with the youngest parents were significantly more likely to report high levels of direct aggression and property offences. Finally, higher household income was associated with higher pro-social behaviour scores and a decreased likelihood of reporting low self-esteem.

Academic and school-related outcomes. Overall, 76% of 14 to 15-year-olds reported that they completed their homework at least most of the time, 27% reported skipping school without permission at least once since the beginning of the school year, and 7% reported being suspended from school at least once since the beginning of the school year. As the probability of belonging to the moderate perceived monitoring group increased, the likelihood of completing homework at least most of the time decreased, while the likelihood of skipping a day of school or being suspended from school increased (Table 4). Furthermore, as the probability of belonging to the decreasing monitoring trajectory increased, math scores decreased while the likelihood of being suspended from school increased. There was also a tendency for higher probabilities of belonging to the decreasing monitoring trajectory to be associated with a decreased likelihood of

completing homework at least most of the time, although this association did not reach statistical significance (p=.07).

Several socio-demographic factors were also significantly associated with school outcomes (Table 4). Girls had lower math scores than boys, were more likely to complete their homework, and were less likely to be suspended from school. Youth in single-parent families were more likely to skip a day of school than youth in dual-parent families, although other academic outcomes did not show differences by the number of parents in the home. Youth whose PMK had some post-secondary education scored significantly higher in the math test than youth whose PMK had no more than a high school education. Youth's math scores also differed significantly with the age of their parents: youth with the youngest parents had lower math scores while youth with older parents scored significantly higher. Youth with the youngest parents were also more likely to skip a day of school. Household income was also positively related with mathematics scores and inversely related with the likelihood of being suspended.

Substance use outcomes. Overall, 7% of youth reported being current daily smokers at the age of 14 or 15, 35% reported ever being drunk, and 8% reported currently using marijuana on a weekly basis. Perceived parental monitoring trajectory membership was only found to be significantly associated with the likelihood of ever being drunk, whereby the odds reporting ever being drunk also increased as the probability of belonging to either the moderate or decreasing perceived parental monitoring trajectories increased (Table 5). There was also a tendency (p=.07) for the odds of being a daily smoker to increase with an increase in the probability of belonging to the moderate perceived parental monitoring trajectory.

Few of the baseline socio-demographic characteristics included in the models were significantly associated with substance using behaviours. Girls were significantly more likely to

be daily smokers and significantly less likely to report using marijuana on a weekly basis than boys. Youth from single-parent families were significantly more likely to be daily smokers, while youth from higher income households were less likely to be daily smokers.

Discussion and Conclusions

This study examined youth's reports of parental monitoring behaviours over time using Canadian longitudinal survey data. Results showed three distinct patterns of perceived parental monitoring from ages 10 through 15. All trajectories showed declining levels of parental monitoring into mid-adolescence, suggesting that as youth age they perceive their parents to monitor their behaviours less frequently. In conjunction with this age-related decline, one trajectory depicted relatively high levels of perceived parental monitoring over time, a second depicted moderate levels of monitoring, and a third trajectory depicted a trajectory of perceived parental monitoring that began relatively high in late childhood but declined precipitously to relatively low levels in mid-adolescence. Slightly more than half of youth (57%) reported levels of parental monitoring that were consistent with the high perceived parental monitoring trajectory, while the pattern of decreasing perceived parental monitoring was consistent with significantly fewer youth (11%).

In this study, youth from lower income families were more likely to be members in the moderate perceived parental monitoring trajectory than they were to be in the high monitoring group. While this is consistent with other studies that have shown parental monitoring to be associated with socioeconomic status (Pettit et al., 1999; Pettit et al., 2001), the present study did not find an association between trajectory membership and parents' educational attainment. The

latter may be due to the fact that children with less educated parents were more likely to be lost to follow-up in the survey and not contribute to the present analysis.

The present study also found that higher birth order youth were more likely to be characterized by the moderate perceive parental monitoring trajectory than they were by the high trajectory. This is in contrast to other studies that have found that higher birth order children tend to be more highly monitored. However, the work by Crouter and colleagues (1999) did not distinguish age effects from the effect of birth order, where second-born children were necessarily younger than firstborn children within a family, and therefore more likely to be more highly monitored. Examination of the impact of birth order on levels of perceived parental monitoring should be explored in future research to determine the direction of association and impact.

Youth are assigned posterior probabilities of belonging to each of the three trajectory groups considered in the present study. In examining the relationship between these probabilities and other outcomes for youth at ages 14 and 15, several significant associations were seen. As a youth's probability of belonging to the moderate perceived parental monitoring trajectory increased, they were significantly more likely to report high levels of direct aggression, indirect aggression, and property offenses, low levels of pro-social behaviour, were less likely to report completing their homework at least most of the time, and were more likely to report skipping school or ever being drunk.

None of the baseline socio-demographic characteristics distinguished between the high and decreasing perceived parental monitoring trajectories. However, this is reasonable given that, at age 10, the levels of parental monitoring in these two groups were indistinguishable. It was only as the children aged that the two groups experienced disparate levels of parental

monitoring. It is possible, therefore, that other factors or events that occurred post-baseline may help to distinguish these two trajectories. Although this was beyond the scope of the present study, future research may seek to determine which factors differentiate youth who perceived significant declines in their parents' monitoring behaviour relative to those who maintained a relatively high level of perceived parental monitoring.

Patterns of perceived parental monitoring were associated with youth's behavioural, academic and lifestyle behaviours at ages 14 and 15. Findings from the present study support the notion that lower levels of parental monitoring are associated with higher levels of behaviour problems, school-related delinquency, and drug use behaviours. This study also makes a significant contribution to the small literature on the effects of parental monitoring on academic and school-related behaviours. The findings show that lower levels of monitoring were associated with lower math scores, a decreased likelihood of completing homework, and increased odds of youth skipping school or being suspended. Most of the significant associations between trajectory membership and these outcomes were found for the probability of membership in the moderate perceived parental monitoring trajectory, although some significant associations were found for the probability of belonging to the decreasing trajectory.

Although the present study took a longitudinal approach, the findings are not causal. That is to say, although the behavioural outcomes examined in the study occurred at the end of the study period (ages 14 to 15), this study does not conclude that parental monitoring practices cause certain adolescent behaviours. In fact, many of the adolescent outcomes examined themselves will follow longitudinal patterns, such as stable or changing levels of behaviours. Therefore, future research may wish to extend the findings of the present study by examining the

simultaneous association between longitudinal patterns of perceived parental monitoring and patterns of behavioural and academic outcomes.

An attrition analysis within the present study found that youth from economically disadvantaged situations were less likely to be included in the analysis than more economically advantaged youth. Therefore, the reader should use caution when generalizing the present findings to the general population of Canadian children and youth. Findings may not be generalizable to youth from economically disadvantaged situations. However, the present sample does include children from a variety of family and economic backgrounds, allowing for variability in the findings. Replicating the present study with another data source would be useful for determining the robustness of the current findings.

The measure of parental monitoring used in this study also has certain limitations. As a youth-reported item, the item only measures the youth's perception of their parents' monitoring behaviour. There is no comparable measure of monitoring practices from the parent's perspective. Although others have found that youth reports of parental monitoring are more reliable than parents' own reports (Cottrel et al., 2003), a more objective measure of parental monitoring may have yielded different findings. Furthermore, the measure of monitoring had low internal reliability (Table A2). An examination of the individual items comprised by the scale showed that the measure of reliability could be improved by excluding the fourth item in the scale, "My parents find out about my misbehaviour", but the improved reliability still remained low (less than .70).

The findings of this study point to the heterogeneity in parental monitoring practices as well as the association between levels of parental monitoring and adolescent behaviours. Overall, this study underscores the important role played by parents in their child's development,

even as the child enters adolescence and exerts greater independence. Future research may wish

to examine which monitoring behaviours or practices have the greater impact on children's

development, and the period during which their importance is most salient.

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Table 1. Socio-demographic characteristics among those who were included in and excluded from the trajectory analysis

Baseline (age 10-11) characteristics	Included in trajectory models (n=4237)	Excluded from trajectory models (n=2279)	p-value
Cohort, %			
1 (Age 10-11 in Cycle 2)	27.84	48.87	<.0001
2 (Age 10-11 in Cycle 3)	36.23	28.65	<.0001
3 (Age 10-11 in Cycle 4)	35.93	22.48	<.0001
Child is male, %	50.02	51.25	.57
Birth order,			
Only child, %	12.31	11.94	.80
Firstborn with siblings, %	33.02	32.63	.83
Not firstborn, %	54.66	55.44	.70
Caucasian child, %	92.41	88.58	.06
Child is immigrant, %	3.21	3.26	.96
Single-parent family, %	14.70	18.19	.03
PMK Education			
Less than high school, %	9.87	14.53	.0007
High school graduation, %	20.47	21.08	.75
More than high school, %	69.66	64.39	.02
Age of PMK, mean (se)	39.45 (0.19)	39.06 (0.21)	.17
Female PMK, %	92.12	89.44	.06
Income, mean (se)	$68,493.30 ($1891.11)	$58,805.88 ($2931.13)	.005
Low income, %	14.24	22.23	<.0001

Table 2. Baseline risk factors associated with likelihood of trajectory group membership (n=4036), odds ratios (95% confidence intervals)

Baseline (age 10 or 11) risk factors	Decreasing vs. High	Moderate vs. High
Female child	0.40 (0.13, 1.20)	0.66 (0.43, 1.01)
Single parent	0.72 (0.29, 1.77)	1.13 (0.62, 2.05)
PMK educational attainment		
Less than high school	1.96 (0.62, 6.23)	0.73 (0.31, 1.70)
High school graduate (ref.)	1.00	1.00
At least some post-secondary	1.07 (0.54, 2.13)	1.19 (0.78, 1.83)
Birth order		
Only child	2.23 (0.40, 12.34)	0.80 (0.41, 1.55)
Firstborn with siblings (ref.)	1.00	1.00
Not firstborn with siblings	2.11 (0.83, 5.35)	**1.68** (1.07, 2.62)
Age of the PMK		
Less then 30	0.20 (0.02, 2.47)	2.09 (0.53, 8.26)
30 to 34	0.73 (0.25, 2.19)	0.69 (0.36, 1.34)
35 to 39 (ref.)	1.00	1.00
40 to 44	0.54 (0.27, 1.08)	0.90 (0.53, 1.53)
45 and up	1.48 (0.64, 3.42)	0.96 (0.47, 2.00)
Household income (per $10,000 unit)	0.93 (0.79, 1.10)	**0.92** (0.85, 0.98)

Estimates in bold are statistically significant at p<.05

Table 3. Association of perceived parental monitoring trajectory membership and socio-demographic factors with adolescents' behaviours at age 14 and 15, effects from multivariate models

	Direct aggression (n = 3586)	Emotional disorder (n = 3575)	Hyper-activity (n = 3364)	Indirect aggression (n = 3605)	Property offenses (n = 3583)	Low self-esteem (n = 3425)	Pro-social behaviour (n=3581)
	Odds ratios (95% confidence intervals)						Betas (SE)
Probability of moderate perceived monitoring	**1.13** (1.05, 1.23)	1.04 (0.96, 1.13)	1.08 (0.96, 1.21)	**1.13** (1.03, 1.24)	**1.13** (1.05, 1.22)	1.05 (0.97, 1.13)	**-0.24** (0.06)
Probability of decreasing perceived monitoring	1.06 (0.99, 1.13)	1.01 (0.94, 1.08)	1.01 (0.94, 1.08)	0.98 (0.89, 1.07)	**1.13** (1.06, 1.21)	1.04 (0.97, 1.10)	**-0.16** (0.04)
Female child	**0.44** (0.28, 0.70)	**2.54** (1.69, 3.82)	0.72 (0.46, 1.12)	0.82 (0.49, 1.26)	**0.54** (0.34, 0.86)	**2.04** (1.40, 2.95)	**2.95** (0.19)
Single-parent family	0.98 (0.52, 1.82)	1.24 (0.74, 2.07)	0.92 (0.50, 1.72)	1.23 (0.52, 2.96)	0.97 (0.60, 1.57)	0.98 (0.58, 1.66)	0.23 (0.30)
PMK educational attainment							
Less than high school	0.77 (0.35, 1.67)	0.99 (0.42, 2.30)	0.98 (0.37, 2.59)	0.93 (0.41, 2.10)	0.77 (0.34, 1.78)	1.03 (0.54, 1.94)	0.73 (0.52)
Some post-secondary	1.05 (0.60, 1.81)	1.23 (0.75, 2.04)	1.26 (0.74, 2.15)	1.78 (0.94, 3.37)	1.00 (0.60, 1.67)	0.91 (0.57, 1.48)	0.49 (0.25)
Birth order							
Only child	1.08 (0.55, 2.12)	1.58 (0.86, 2.90)	1.33 (0.59, 3.00)	0.36 (0.12, 1.11)	0.91 (0.44, 1.89)	1.09 (0.57, 2.09)	0.19 (0.37)
Not firstborn	1.23 (0.78, 1.94)	1.27 (0.86, 1.89)	1.08 (0.66, 1.75)	1.07 (0.60, 1.90)	0.82 (0.49, 1.36)	**1.70** (1.11, 2.62)	0.02 (0.22)
Age of the PMK							
Under age 30	**4.04** (1.75, 10.27)	1.29 (0.51, 3.25)	2.51 (0.75, 8.34)	1.42 (0.37, 5.52)	**2.69** (1.00, 7.24)	1.10 (0.36, 3.36)	0.15 (0.58)
Age 30-34	1.46 (0.87, 2.45)	0.99 (0.63, 1.58)	1.28 (0.65, 2.50)	0.80 (0.41, 1.56)	1.27 (0.74, 2.20)	0.77 (0.44, 1.35)	-0.23 (0.30)
Age 40-44	0.97 (0.57, 1.68)	0.91 (0.59, 1.42)	0.75 (0.44, 1.28)	0.91 (0.51, 1.62)	1.35 (0.79, 2.33)	0.74 (0.48, 1.15)	0.05 (0.25)
Age 45 and up	1.25 (0.62, 2.51)	1.35 (0.73, 2.53)	0.87 (0.38, 1.99)	0.59 (0.20, 1.75)	0.89 (0.45, 1.72)	0.60 (0.29, 1.24)	0.16 (0.35)
Household income (per $10,000 change)	0.97 (0.92, 1.01)	0.98 (0.93, 1.02)	0.99 (0.95, 1.04)	1.00 (0.90, 1.11)	0.98 (0.94, 1.03)	**0.91** (0.84, 1.00)	**0.07** (0.02)

Estimates in bold are statistically significant at p<.05; Estimates also adjusted for the child's cohort, although estimates are not presented

Table 4. **Association of perceived parental monitoring trajectory membership and socio-demographic factors with school outcomes at ages 14-15, effects from multivariate models**

	Math n = 3254	Homework completion n = 3543	Skip a day of school n = 3608	Suspended from school n = 3600
	Beta (SE)	Odds ratios (95% confidence intervals)		
Probability of moderate perceived monitoring (per increase of 10%)	-0.07 (1.26)	**0.92** (0.86, 0.98)	**1.13** (1.07, 1.20)	1.04 (0.97, 1.12)
Probability of decreasing perceived monitoring (per increase of 10%)	**-3.24** (0.90)	0.95 (0.91, 1.00)	1.03 (0.99, 1.08)	**1.10** (1.03, 1.19)
Female child	**-9.99** (4.94)	**1.60** (1.20, 2.13)	0.84 (0.65, 1.09)	**0.43** (0.28, 0.64)
Single-parent family	-4.40 (8.87)	0.81 (0.56, 1.18)	**1.37** (1.00, 1.86)	1.20 (0.74, 1.94)
PMK educational attainment				
Less than high school	-11.16 (9.16)	0.97 (0.60, 1.56)	0.95 (0.60, 1.50)	1.31 (0.65, 2.62)
Some post-secondary	**18.63** (5.85)	0.87 (0.62, 1.20)	0.80 (0.60, 1.06)	0.99 (0.62, 1.58)
Birth order				
Only child	-3.02 (7.87)	1.14 (0.73, 1.78)	0.83 (0.55, 1.25)	0.85 (0.47, 1.55)
Not firstborn	-6.19 (5.72)	0.89 (0.65, 1.23)	1.15 (0.87, 1.52)	1.06 (0.67, 1.65)
Age of the PMK				
Under age 30	**-37.85** (14.08)	0.63 (0.31, 1.27)	**2.07** (1.06, 4.04)	1.33 (0.50, 3.52)
Age 30-34	**-20.00** (7.59)	1.03 (0.70, 1.53)	1.00 (0.70, 1.42)	1.15 (0.72, 1.86)
Age 40-44	5.98 (6.40)	1.18 (0.84, 1.65)	0.91 (0.68, 1.22)	0.77 (0.46, 1.29)
Age 45 and up	**19.92** (8.20)	1.47 (0.89, 2.42)	0.77 (0.50, 1.20)	0.58 (0.25, 1.36)
Household income (per $10,000 change)	**2.20** (0.70)	1.02 (0.98, 1.05)	0.97 (0.94, 1.00)	**0.88** (0.82, 0.95)

Estimates in bold are statistically significant at p<.05; Estimates also adjusted for the child's cohort, although estimates are not presented

Table 5. **Association of perceived parental monitoring trajectory membership and socio-demographic factors with substance use behaviours at ages 14-15, effects from multivariate models**

	Daily smoker n =3613	Ever been drunk n = 3608	Weekly marijuana use n = 3629
		OR (95% CI)	
Probability of moderate perceived monitoring (per increase of 10%)	1.07 (0.99, 1.16)	**1.08** (1.02, 1.14)	1.07 (0.99, 1.16)
Probability of decreasing perceived monitoring (per increase of 10%)	0.98 (0.92, 1.04)	**1.08** (1.04, 1.13)	1.00 (0.91, 1.09)
Female child	**1.98** (1.32,2.99)	1.19 (0.95, 1.49)	**0.67** (0.47, 0.96)
Single-parent family	**1.76** (1.08, 2.86)	1.26 (0.92, 1.71)	1.46 (0.90, 2.36)
PMK educational attainment			
Less than high school	0.90 (0.47, 1.71)	0.86 (0.53, 1.39)	0.70 (0.31, 1.55)
Some post-secondary	0.81 (0.52, 1.25)	0.82 (0.61, 1.10)	1.18 (0.75, 1.86)
Birth order			
Only child	0.75 (0.39, 1.46)	1.14 (0.79, 1.65)	1.01 (0.57, 1.80)
Not firstborn	0.66 (0.41, 1.06)	1.17 (0.91, 1.52)	1.10 (0.63, 1.91)
Age of the PMK			
Under age 30	1.01 (0.30, 3.38)	1.00 (0.51, 1.97)	1.80 (0.62, 5.25)
Age 30-34	0.96 (0.60, 1.56)	0.93 (0.68, 1.27)	1.21 (0.68, 2.15)
Age 40-44	1.04 (0.62, 1.75)	0.85 (0.64, 1.13)	1.16 (0.68, 1.97)
Age 45 and up	0.75 (0.33, 1.71)	**0.57** (0.38, 0.84)	0.89 (0.43, 1.82)
Household income (per $10,000 change)	**0.91** (0.84, 0.98)	1.01 (0.99, 1.04)	1.01 (0.97, 1.06)

Estimates in bold are statistically significant at p<.05; Estimates also adjusted for the child's cohort, although estimates are not presented
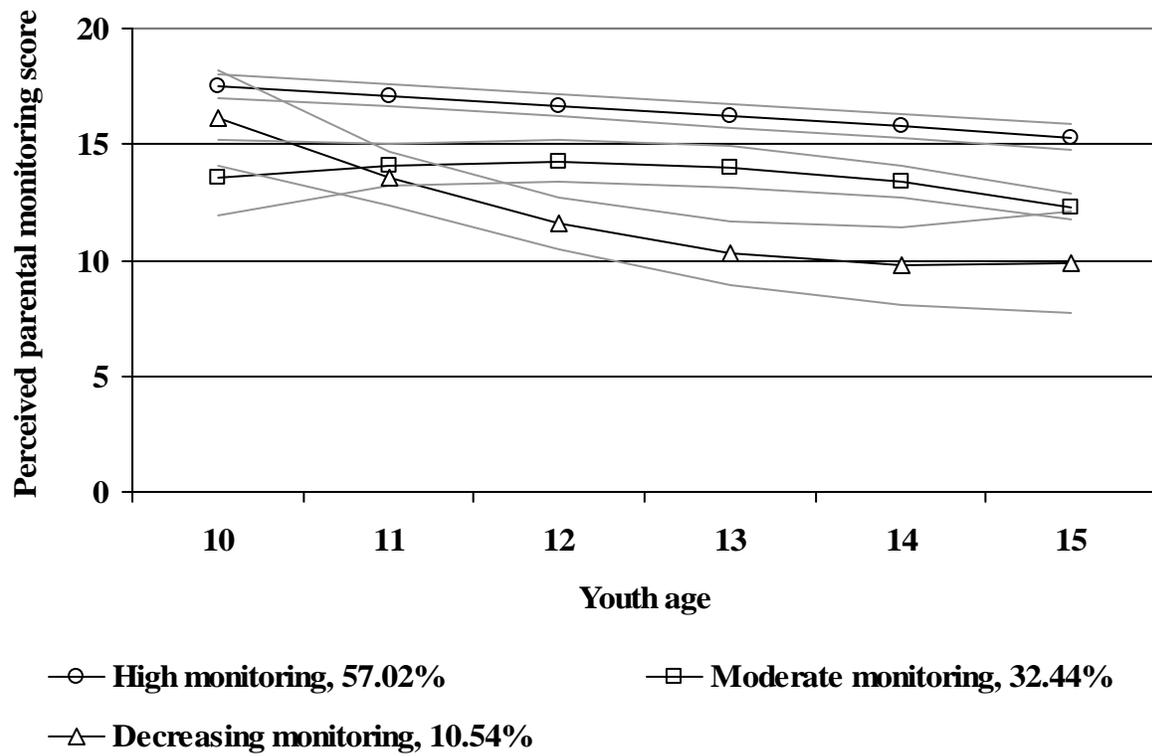
Figure 1. Trajectories of perceived parental monitoring, ages 10 to 15.
Grey lines indicate 95% confidence intervals

Appendix A

Table A1. NLSCY items for perceived parental monitoring, behaviour and school outcomes

Scale and items	Response categories
Perceived parental monitoring items (scale range: 0-20)	5-point Likert:
My parents…	(0) Never
a) want to know exactly where I am and what I am doing	(1) Rarely
b) let me go out any evening I want (*reverse coded*)	(2) Sometimes
c) tell me what time to be home when I go out	(3) Often
d) find out about my misbehaviour	(4) Always
e) take an interest in where I am going and who I am with	
Direct aggression items (scale range: 0-12)	3-point Likert:
a) I get into many fights.	(0) Never or not
b) When another young person accidentally hurts me I assume that he/she	true
meant to do it, and I react with anger and fighting.	(1) Sometimes or
c) I physically attack people.	somewhat true
d) I threaten people.	(2) Often or very
e) I bully or am mean to others.	true
f) I kick or hit other people my age.	

Scale and items	Response categories
Hyperactivity and inattention items (scale range: 0-14)	3-point Likert
a) I can't sit still, I am restless.	(0) Never or not
b) I am easily distracted. I have trouble sticking to any activity.	true
c) I can't concentrate, I can't pay attention	(1) Sometimes or
d) I am impulsive, I act without thinking.	somewhat true
e) I have difficulty waiting for my turn in games or group activities.	(2) Often or very
f) I cannot settle to anything for more than a few moments.	true
g) I am inattentive, I have difficulty paying attention to someone.	
Indirect aggression items (scale range: 0-10)	3-point Likert
a) When I am mad at someone, I try to get others to dislike him/her.	(0) Never or not
b) When I am mad at someone, I become friends with another as revenge	true
c) When I am mad at someone, I say bad things behind his/her back	(1) Sometimes or
d) When I am mad at someone, I say to others, "Let's not be with him/her"	somewhat true
e) When I am mad at someone, I tell that person's secrets to a third person.	(2) Often or very
	true
Emotional disorder and anxiety items (scale range: 0-14)	3-point Likert
a) I am unhappy or sad.	(0) Never or not
b) I am not as happy as other people my age.	true
c) I am too fearful or nervous.	(1) Sometimes or
d) I worry a lot.	somewhat true
e) I cry a lot.	(2) Often or very

Scale and items	Response categories
f) I am nervous, high-strung or tense.	true
g) I have trouble enjoying myself.	

Pro-social behaviour items (scale range: 0-20)	3-point Likert
a) I show sympathy to (I feel sorry for) someone who has made a mistake.	(0) Never or not true
b) I try to help someone who has been hurt.	
c) I offer to help clear up a mess someone else has made.	(1) Sometimes or somewhat true
d) If there is an argument, I try to stop it.	
e) I offer to help other young people (friend, brother or sister) who are having difficulty with a task.	(2) Often or very true
f) I comfort another young person (friend, brother, or sister) who is crying or upset	
g) I help to pick up things which another young person has dropped	
h) When I am playing with others, I invite bystanders to join in a game.	
i) I help other people my age (friends, brother or sister) who are feeling sick.	
j) I encourage other people my age who cannot do things as well as I can.	

Property offence items (scale range: 0-12)	3-point Likert
a) I destroy my own things.	(0) Never or not true
b) I steal at home.	

Scale and items	Response categories
c) I destroy things belonging to my family or other young people.	(1) Sometimes or
d) I tell lies or cheat.	somewhat true
e) I vandalize.	(2) Often or very
f) I steal outside my home.	true
Self-esteem items (scale range: 0-16)	5-point Likert
a) In general, I like the way I am.	(0) False
b) Overall I have a lot to be proud of.	(1) Mostly false
c) A lot of things about me are good.	(2) Sometimes
d) When I do something, I do it well.	false/ Sometimes
	true
	(3) Mostly true
	(4) True

Table A2. Reliability (standardized Cronbach's alpha) of scale items for measures of perceived parental monitoring and other outcomes measured at ages 14-15, by NLSCY cycle

	Cycle 3	Cycle 4	Cycle 5	Cycle 6
Perceived parental monitoring				
Age 10-11	0.49	0.50	n/a	n/a
Age 12-13	0.58	0.58	0.57	n/a
Age 14-15	n/a	0.61	0.64	0.62
Age 14-15 measures				
Direct aggression	n/a	0.81	0.82	0.79
Emotional disorder	n/a	0.81	0.79	0.78
Hyperactivity	n/a	0.78	0.78	0.80
Indirect aggression	n/a	0.73	0.75	0.70
Property offences	n/a	0.70	0.75	0.69
Pro-social behaviour	n/a	0.87	0.87	0.87
Self-esteem	n/a	0.82	0.83	0.84

Table A3. Pearson correlation coefficients between age-specific measures of perceived parental monitoring and the continuous outcomes measures

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1. Monitoring, age 10-11	---	**.35**	**.27**	**-.10**	-.02	-.03	**-.05**	**-.10**	**.13**	**.09**	**.13**
2. Monitoring, age 12-13		---	**.41**	**-.10**	-.01	**-.06**	**-.04**	**-.10**	**.15**	**.12**	**.07**
3. Monitoring, age 14-15			---	**-.17**	-.03	**-.06**	**-.06**	**-.16**	**.25**	**.15**	**.11**
4. Direct aggression				---	**.24**	**.40**	**.44**	**.62**	**-.25**	**-.21**	**-.17**
5. Emotional disorder					---	**.39**	**.27**	**.27**	**.10**	**-.47**	-.03
6. Hyperactivity						---	**.32**	**.43**	**-.10**	**-.27**	**-.14**
7. Indirect aggression							---	**.39**	**-.10**	**-.20**	**-.09**
8. Property offences								---	**-.22**	**-.26**	**-.11**
9. Pro-social behaviour									---	**.18**	**.11**
10. Self-esteem										---	**.06**
11. Mathematics score											---

Correlations in bold type are statistically significant at p<.05

Table A4. Inter-cohort differences in parental knowledge measures and behaviours measured at ages 14 and 15

	Cohort 1	Cohort 2	Cohort 3	Significant contrasts
Perceived parental monitoring				
Age 10, mean (se)	…	15.76 (0.18)	16.01 (0.17)	ns
Age 11, mean (se)	…	16.15 (0.19)	15.76 (0.19)	ns
Age 12, mean (se)	15.39 (0.18)	15.50 (0.20)	15.81 (0.18)	ns
Age 13, mean (se)	14.70 (0.23)	14.52 (0.20)	14.84 (0.21)	ns
Age 14, mean (se)	14.20 (0.21)	14.23 (0.17)	14.41 (0.18)	ns
Age 15, mean (se)	13.84 (0.21)	14.11 (0.22)	13.58 (0.20)	ns
Age 14-15 measures				
Direct aggression, mean (se)	1.11 (0.08)	1.27 (0.09)	1.02 (0.07)	(2,3): p=0.0239
Emotional disorder, mean (se)	3.43 (0.14)	3.50 (0.13)	3.48 (0.13)	ns
Hyperactivity, mean (se)	3.81 (0.13)	4.10 (0.12)	3.88 (0.14)	ns
Indirect aggression, mean (se)	1.40 (0.08)	1.34 (0.08)	1.12 (0.07)	(1,3): p=0.0129 (2,3): p=0.0349
Property offences, mean (se)	1.08 (0.06)	1.09 (0.07)	1.01 (0.07)	ns
Pro-social behaviour, mean (se)	12.20 (0.18)	11.62 (0.16)	12.14 (0.19)	(1,2): p=0.0122 (2,3): p=0.0319
Self-esteem, mean (se)	12.99 (0.13)	12.24 (0.13)	12.70 (0.11)	(1,2): p<0.0001 (2,3): p=0.0055
Math, mean (se)	600.75 (4.92)	590.50 (4.84)	581.18 (4.19)	(1,3): p=0.0023
Homework completion at least most of the time, %	78.77	77.13	73.87	ns
Skipped school in past year, %	25.01	26.67	29.62	ns
Suspended from school in past year, %	6.60	7.83	7.80	ns
Daily smokers, %	9.73	6.67	4.00	(1,3): p=0.0001
Ever drunk, %	36.60	34.96	32.42	ns
Weekly marijuana users, %	7.66	9.18	7.59	ns