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Do Factors Other than SES Explain Differences in Child Outcomes Between Children of Teenage and Older Mothers for Off-Reserve First Nations Children?

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Abstract
This study used data from the Aboriginal Children's Survey (ACS) to explore differences in behavioural outcomes for First Nations children born to teen and older mothers living off-reserve in Canada. Of particular interest was an examination of socio-economic and contextual influences, and their contributions to differences in child outcomes. Findings from this study demonstrate that off-reserve First Nations children born to teen mothers (aged 12 - 19 years when they started childbearing) had poorer behavioural outcomes compared to off-reserve First Nations children born to older mothers (aged 25 and over when they started childbearing). These differences were found for emotional symptoms, inattention and hyperactivity, and conduct disorder scores, but not for prosocial behaviours. Contextual factors differed for children born to teen mothers as compared to older mothers, but parenting behaviors and the number of people involved in raising the child was similar for both groups. While differences in the behaviour of children born to teen mothers are often attributed to poorer socio-economic conditions, this study demonstrates that other contextual factors (e.g., breastfeeding, social support, screen time, residential mobility) may be as important as socio-economic factors in their contribution to the behavioural outcomes of children of teen mothers.

Keywords
mental health, behaviour, teen mother, socioeconomic status, First Nations, off-reserve

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Do Factors Other than Socio-Economic Status Explain Differences in Outcomes Between Children of Teenage and Older Mothers for Off-Reserve First Nations Children?

Differences in physical and mental health outcomes between children of teen and older mothers are well documented. For example, children of teen mothers have been shown to be in poorer health, are more likely to be born prematurely or born small for gestational age, and are more likely to experience injuries (Chen et al., 2007; Ekéus, Christensson, & Hjern, 2004; Fraser, Brockert, & Ward, 1995). Furthermore, children of teen mothers are at greater risk for behavioural problems compared to children of older mothers (Howard, Burke Lefever, Borkowski, & Whitman, 2006; Wolfe & Perozek, 1997). Socio-economic status (SES) factors that may be associated with teen motherhood such as lower levels of education, income, and single marital status (Corcoran, 1998; Hofferth, Reid, & Mott, 2001; Hoffman, 2006; Turley, 2003) have been studied as possible explanations for differences in child outcomes. For instance, teen mothers have a greater likelihood of not completing or delaying high school, resulting in a low level of education and consequently are more likely to have children who experience behaviour problems (Brooks-Gunn & Duncan, 1997). However, several other factors such as parenting practices, social support, and father involvement have also been considered to be influential factors for both child and adolescent outcomes (Black et al., 2002; Dahinten, Shapka, & Willms, 2007; Luster, Bates, Fitzgerald, Vandenbelt, & Key, 2000; Nagin, Pogarsky, & Farrington, 1997; Pogarsky, Thornberry, & Lizotte, 2006).

Little is known, however, with regard to the physical and mental health outcomes of Aboriginal children born to teen mothers in comparison with those born to older mothers. The inclusion of Aboriginal mothers in the study of teen motherhood is particularly relevant given a higher birth rate among Aboriginal mothers. For example, among registered First Nations women, the teen birth rate is significantly higher (1 in 10) than the teen birth rate (1 in 50) for all Canadian women (Guimond & Robitaille, 2008; Robitaille, Kouaouci, & Guimond, 2004). Based on Canadian data from the 2006 Aboriginal Children's Survey, Guèvremont and Kohen (2013) found few differences in physical health for First Nations children born to teenage mothers not living on reserve. No differences were found between children of teen and older mothers in parent-rated health status, presence and number of chronic conditions, presence of asthma, or prevalence of ear infections. However, off-reserve First Nations children who had teen mothers were more likely to have dental problems compared to off-reserve First Nations children who had older mothers. Additional differences were found when mental health outcomes were examined. Compared to children of older mothers, First Nations children of teen mothers living off-reserve had lower scores on maternal-reported behavioural outcomes, including lower prosocial scores (e.g., shares, gets along with other children), higher emotional symptoms (e.g., worries, fears), higher inattention-hyperactivity (e.g., fidgeting, restless), and higher conduct problem scores (e.g., fights, bullies).

Although some differences in mental health outcomes between children of teen and older mothers were explained by SES factors, which differed by maternal age (Garner, Guimond, & Senécal, 2013), other differences persisted even when SES was considered (Guèvremont & Kohen, 2013). For example, while children of teen mothers showed lower prosocial scores than did children of older mothers, this association was not maintained once maternal income and education were controlled, suggesting that lower levels of maternal income and education were important contributors to the difference in

outcomes rather than maternal age per se. By comparison, children of teen mothers were rated by mothers as more hyperactive, even after controlling for maternal income and education, suggesting that children of teen mothers had greater hyperactivity scores regardless of maternal SES conditions. Although SES is an important contributor, this study considers the role of other contextual factors in explaining the differences in behaviour problems between First Nations children of teen and older mothers not living on reserve.

Contextual Influences on Child Outcomes

Breastfeeding. Children's development is largely influenced by their environment, which includes the prenatal environment, parental behaviours, stimulation in and outside the home, interactions with extended family, and influences from the broader community. Notably, early health behaviours such as breastfeeding may influence later child outcomes, including behaviour problems (Oddy et al., 2009). Both the Canadian Paediatric Society and the World Health Organization recommend exclusive breastfeeding for the first six months after birth (Canadian Paediatric Society, Dietitians of Canada, & Health Canada, 1998; World Health Organization, 2003). Although the majority of Aboriginal mothers do report breastfeeding, fewer Aboriginal mothers (First Nations not living on reserve, Inuit, and Métis) have reported initiating breastfeeding (78%) compared to non-Aboriginal mothers (88%) (Health Canada, 2012). Furthermore, reports suggest that Canadian teen mothers aged 15 to 19 are less likely to breastfeed their child (Public Health Agency of Canada, 2009).

Parenting. Parenting practices, including parenting behaviour styles and parents' interactions with children, have long been associated with children's outcomes (Chao & Willms, 2002; Spera, 2005;Thomas, 2004), with positive and consistent parenting behaviours associated with reducing the odds of behaviour problems in children, and hostile and punitive parenting increasing the odds of behaviour problems (Bornstein, 2012). Research has suggested that teen mothers display less supportive behaviours and more negative behaviours toward their children than do older mothers (Berlin, Brady-Smith, & Brooks-Gunn, 2002) and parenting practices have been found to be important in reducing the differences in behaviour problems of children of teen mothers as compared to older mothers (Dahinten et al., 2007; Pogarsky et al., 2006). For example, in a study of third grade children born to teen mothers, Rhule, McMahon, Spieker and Munson (2006) found positive parenting to be associated with children's positive adjustment in the behavioural, social, and academic domains.

Cognitive stimulation. Similarly, the provision of cognitively stimulating experiences in the home has repeatedly been linked to children's development (Bradley et al., 1989; Bradley, Whiteside, & Mundfrom, 1994). However, adolescent mothers have been shown to score significantly lower than older mothers in terms of overall and less varied opportunities in daily stimulation (Schilmoeller & Baranowski, 1985). Luster and colleagues (2000) found that low-income adolescent mothers who demonstrated more cognitively stimulating behaviours when children were between 24 and 36 months of age had children who scored higher on a measure of receptive language at 54 months of age. Although earlier work with the Aboriginal Children's Survey suggested that, in general, young First Nations children are regularly exposed to cognitively stimulating early learning activities (Statistics Canada, 2008a), differences between First Nations children of teen mothers as compared to older mothers have not been examined.

Screen time. It is generally accepted that increased screen time (time spent watching television, playing video games, or using a computer) is associated with negative effects for children (Iannotti, Kogan, Janssen, & Boyce, 2009), including increased aggressive behaviour (Manganello & Taylor, 2009). Children of teen mothers may watch more hours of television per day than do children of older mothers (Burgess, 2005); yet, to our knowledge no study has specifically examined the impact of television viewing and screen time for Aboriginal children of teen mothers.

Support network. Having a support network may be influential for both child outcomes and parental well-being. Such a support network may include the child's father, grandparents, extended family, or other people involved in raising the child. Past research has shown a connection between parental social support and child mental health (Armstrong, Birnie-Lefcovitch, & Ungar, 2005; Sommer et al., 2000). Furthermore, the benefits of a support network, and father involvement in particular, may be advantageous for children at risk for poor outcomes (Howard et al., 2006). Wakschlag and colleagues (2000) found that father absence was associated with conduct disorder in boys aged 7 to 18, although father absence did not mediate the relationship between maternal age at first birth and conduct disorder.

Fewer studies have investigated the role of support from other household members, although one study (Garcia Coll, Vohr, Hoffman, & Oh, 1986) found that child care support (or the number of people available to help) mediated the relationship between maternal age and child development at 8 months of age. Child development was assessed by a multifaceted assessment of neurological, cognitive, and motor assessments, and the relation persisted even after controlling for family SES. This line of inquiry is particularly important from an Aboriginal perspective as a high percentage of off-reserve First Nations children live in large households (Bougie, Tait, & Cloutier, 2010), or have four or more people involved in raising the child (Guèvremont, 2010). However, while some research has indicated that the adolescent's mother is an important source of social support (Musick, 1994), others have reported that when the mother (and child) and grandmother lived together, both were found to be less supportive and displayed more negative parenting attitudes and behaviours compared to mothers and grandmothers who lived apart (Chase-Lansdale, Brooks-Gunn, & Zamsky, 1994). Thus, the evidence for the role of support from parents (e.g., the child's grandparent) is mixed.

Child care. High quality child care has also been shown to be associated with positive outcomes for children (NICHD Early Child Care Research Network, 2002; NICHD Early Child Care Research Network, 2003), including benefits for children of teen mothers (Sadler et al., 2007). Sadler and colleagues (2007) found that children of teen mothers who were attending a formal child care program had better behavioural outcome scores than did children in non-formal care arrangements; formal child care arrangements are generally of higher quality than non-formal arrangements (Romano, Kohen, & Findlay, 2010). Given that more than half of all Aboriginal children are in some form of child care (Findlay & Kohen, 2012), its impact is an important area of study, particularly for children of teen mothers.

Communities. Finally, community-level features have been associated with child outcomes. For example, family mobility, or frequent moves, have been shown to have negative impacts on healthy child development (Rumbold et al., 2012; Wood, Haflon, Scarlata, Newacheck & Nessim, 1993). Aboriginal people in general have been shown to have increased mobility, experiencing more frequent moves than the general Canadian population (Statistics Canada, 2008b).

In addition, even in the early years, neighbourhood factors have been shown to be influential for young children's outcomes (Carpiano, Lloyd, & Hertzman, 2009; Kohen, Leventhal, Dahinten, & McIntosh, 2008; Leventhal & Brooks-Gunn, 2000), including both neighbourhood structural features (e.g., SES conditions) and organizational features (e.g., safety, cohesion). Specific to First Nations children living off-reserve, neighbourhood features have been shown to be associated with child mental health, including prosocial behaviour, inattention and hyperactivity, and emotional symptoms (Kohen & Oliver, 2010), as well as language outcomes (Findlay & Kohen, 2012). Features such as the SES conditions of the neighbourhood as well as the safety and supports available have been shown to impact young children's outcomes via family processes such as maternal mental health, parenting behaviours, and activities in the home (Kohen et al., 2008) and may play an important role for teen mothers in particular. However, the specific effects of neighbourhood features on outcomes of First Nations children of teen mothers remain largely unexplored.

Methods

Research Questions

Thus, there are a multitude of factors that can play an important role for young children's outcomes and many of these factors can differ for teen versus older mothers. In addition, many of the factors described have been shown to be differentially associated with child outcomes for the First Nations population. To our knowledge, however, no large-scale population-based Canadian studies have examined differences in these factors and their associations with child outcomes specifically for off-reserve First Nations children of teen as compared to older mothers.

In this study, we examine the possible impact of contextual factors and their contribution to the outcomes of children of First Nations teen mothers living off-reserve in Canada, over and above the contribution of SES factors. We consider the following questions:

1. Do contextual factors differ for off-reserve First Nations children of teen mothers as compared to off-reserve First Nations children of older mothers?

2. Is having a teen mother associated with behavioural outcomes for off-reserve First Nations children if we control for contextual factors in the child's environment?

3. Is having a teen mother associated with behavioural outcome differences for off-reserve First Nations children if both SES and contextual factors are controlled? Does the indirect effect of non-SES factors explain variation in behavioural outcomes over and above the effects explained by SES?

Data Source

This study is based on data from the 2006 Aboriginal Children's Survey (Statistics Canada, 2008b). The Aboriginal Children's Survey (ACS) provides information on the early development of Aboriginal children and the social and living conditions in which they are growing and learning. The ACS provides extensive data about Aboriginal (Métis, Inuit, and off-reserve First Nations) children less than six years of age in urban, rural, and northern locations across Canada. The present study focuses on First Nations

children aged 2 to 5 years not living on reserve (n = 2,697). Mental health outcomes are only available in the ACS for children aged 2 and older, and data is not available for First Nations children living on-reserve. Therefore, this study is representative of First Nations children aged 2 to 5 living off-reserve in Canada.

Age of Mother at First Birth

Children were included in the study if the person who responded to the survey was their birth mother (Statistics Canada, 2008b). The age of the child's mother at her first birth was determined by looking at the difference between the mother's current age and the age of the oldest sibling living in the household. If the difference between the mother's age on the day of the survey and the age of the oldest child was less than 20 years, she was classified as a teenage mother. If the difference was greater than or equal to 25 years that mother was categorized as an older mother. If the difference was less than 12 years, the child was excluded. Results for children of mothers aged 20 to 24 at first child's birth were also included in the tables for informational purposes, but are not discussed in the text due to space constraints.

The age of the mother at first child's birth (regardless of her age when she had the survey child) was used in this study as opposed to age of mother when the survey child was born. The age of mother at first birth was selected on the assumption that the factors that led the mother to begin childbearing during adolescence would likely influence not only the child or children born when the mother was a teen but children born later as well (Turley, 2003). In addition, circumstances in the mother's life caused by having a child during adolescence may also have long-term effects (Pogarsky et al., 2006). Other research has found that age of mother at first birth is more predictive of children's outcomes than the age of mother at the birth of the target child (Turley, 2003).

Child Mental Health

Child mental health was assessed with the Goodman Strengths and Difficulties Questionnaire (SDQ) (R. Goodman, 1997). The SDQ is a parent-reported instrument designed to provide information on children's behaviours and relationships. The SDQ consists of 25 items grouped into 5 subscales. In the ACS, mothers responded about their child's behaviour. In a study by Oliver, Findlay, McIntosh, and Kohen (2009), validity of the questionnaire and its subscales was demonstrated on 4 of the 5 original subscales for First Nations children living off-reserve surveyed in the ACS; however, results suggested that the peer problems subscale had poor validity. All questions included the following possible responses: not true, somewhat true, or certainly true. Exact wording of all items is in Appendix A. In the present study, we used the four sub-scales suggested by Oliver et al. (2009):

a. Prosocial behaviour (ten items) (e.g., "Is he/she … considerate of other peoples' feelings?"),

b. Emotional symptoms (five items) (e.g., "Is he/she … often unhappy, depressed or tearful?"),

c. Conduct problems (four items) (e.g., "He/she … often fights with other children or bullies them?"), and

d. Inattention/hyperactivity (three items) (e.g., "Is he/she … constantly fidgeting or squirming?").

Potential SES and Contextual Mediators

We examined SES factors as well as other contextual factors to determine their role in explaining differences in outcomes between children of teen and older mothers. Child level factors included mother-reported age, sex, and whether the child was a Registered or non-Registered Indian.

SES variables. Maternal education was categorized into two variables: (a) Currently in school versus not in school, and (b) not a high school graduate versus high school graduate or currently in school. Family structure was indicated by whether the child lived in a lone parent or two-parent family (mother either married or in a common-law relationship) at the time of the survey. Low-income family (i.e., below the low-income cut-off [LICO]) was based on information on household income from the 2006 Census. The LICO is a statistical measure of the income threshold below which families are likely devote a larger-than-average share of their income to the necessities of food, shelter, and clothing (Statistics Canada, 2009). Household size was based on the number of people living in the household, which was obtained from information from the 2006 Census. Finally, urban areas were defined as areas with a population of at least 1,000 or more people and a minimum of 400 people per square kilometer.

Contextual factors. Mothers who breastfed their child were asked how long they had breastfed. Children were categorized as being breastfed for more than 6 months or not (breastfed 6 or fewer months or not breastfed at all). A parenting practices score was based on 12 items about how mothers interact with their children (e.g., "How often is he/she praised with words?"). Six response options were: more than once a day, once a day, more than once a week, once a week, less than once a week, and never. Based on factor analysis, one item from the original scale was excluded ("How often does he/she receive physical punishment?") since it did not load on the same factor as the other items. Cronbach's alpha for the remaining items was 0.63.

Children were considered as participating in a high number of learning activities if they participated in six or more of the following ten activities: heard stories daily, read or looked at books daily, counted daily, did arts and crafts daily, played outside daily, role played (e.g., superhero) daily, participated or attended traditional First Nations activities monthly (such as singing or drum dancing), participated in seasonal activities monthly (such as gathering goose eggs or wild plants), and had gone hunting, fishing or camping monthly. Furthermore, children were considered as having a low amount of screen time if they spent less than three hours per day watching television, videos, DVDs, or playing computer or video games.

Mothers were also asked whether anyone else was involved in raising the child, including a birth, step, adoptive, or foster father. A child was categorized as living with grandparents if they lived with their grandparents either alone or with his or her parents. The total number of people raising the child was summed and dichotomized into less than four versus four or more people. In terms of social support, mothers were asked how satisfied they were with their support network, support from family, friends, and others (satisfied or very satisfied).

Mothers reported whether or not the child was currently receiving regular child care, and how many times the child had moved during his or her life. This was categorized as less than three moves versus more than three moves. Finally, mothers were asked a number of questions about how they felt about their community on a scale of 1 (poor) to 5 (excellent) on the following items: (a) as a place with good schools, nursery schools, and early childhood education programs; (b) as a place with adequate facilities for children (e.g., community centers, rinks, gyms, parks); (c) as a safe community; (d) as a place with health facilities; (e) as a place with actively involved members of the community; and (f) as a place with First Nations, Métis, and Inuit cultural activities. The five items all loaded on to a single factor in a factor analysis. Cronbach's alpha for the five items was 0.82.

Analysis

Descriptive analyses (chi-square or t-tests) were conducted to explore differences in both socio-economic and contextual features of children born to teen and older mothers. We then proceeded to try to further explain differences in outcomes beyond SES factors by including the contextual factors.

Mediation occurs when the relationship between two variables is explained by another variable or by a set of variables (Baron & Kenny, 1986). To determine whether SES and/or contextual factors mediated the relationship between having a teenage mother and children's behaviour, a first step was to examine whether the factors of interest differed between off-reserve First Nations children of teen (aged 12 to19 at their first birth) and older mothers (aged 25 and older at their first birth). Next, to select the contextual factors to include in the multivariate regression models, we examined whether the variables were associated with having a teenage mother. Variables that were significantly associated with having a teenage mother were included in the models.

Regression models were conducted to examine the role of the various possible mediators (SES and contextual) in reducing the differences in behavioural outcomes between children of teen mothers compared to children born to older mothers. Four sets of models predicting each of the four child behavioural outcomes were conducted. In the first set of models, each of the outcome variables (prosocial behaviour, emotional symptoms, conduct problems, inattention and hyperactivity) was predicted by the following control variables that are not easily modifiable: age of mother at first birth, child age, gender, and status (Registered or non-Registered Indian). The second set of models included the control variables as well as SES characteristics (mother's education, family structure, low-income family, household size, and urban dwelling). The third set of models included the control variables along with contextual characteristics of the child's environment (with no socio-economic conditions). The fourth and final sets of models included all of the variables.

The correlation between the SES and contextual factors was examined to ensure that collinearity was not a problem in our regression models. Of the SES factors, living in a low-income family was negatively correlated with both being a high school graduate (r = -0.30, p < .05) and living in a lone parent family (r = -0.43, p < .05). As well, having a father involved in raising the child was negatively correlated with living in a lone parent family (r = -0.53, p < .05). However, all other Pearson correlations were less than r = 0.30. Excluding father involvement did not change any model results.

To test whether the size of the association between having a teenage mother and behavioural outcomes was significantly different in the above models (e.g., between Model 2 and Model 4), we used the Sobel

test, adjusted for use with dichotomous outcomes using methods described by MacKinnon and Dwyer (1993) and for use with multiple mediators as described by Preacher and Hayes (2008). We assessed the difference between Models 1 and 2 to test the significance of the indirect effect of socio-economic conditions, Models 1 and 3 to test the significance of the indirect effect of contextual factors, and Models 2 and 4 to test the significance of the indirect effect of contextual factors over and above socio-economic conditions. Therefore, a significant Sobel test (i.e., significant differences between the models) allowed for the interpretation of any significant mediation effects.

Results

Descriptive Analyses Comparing All Covariates by Age of Mother at First Birth

Two of the examined factors did not differ for off-reserve First Nations children born to teen mothers (aged 12 to 19 at their first birth) as compared to First Nations children living off-reserve born to older mothers (aged 25+ at their first birth): the parenting behaviour score and having four or more people involved in raising the child. Since these did not differ, they were not considered as possible mediators in further model testing.

All of the other contextual factors were associated with age of mother at first birth (see Table 1). That is, off-reserve First Nations children born to teen mothers (aged 12 to 19 at their first birth) were less likely to have been breastfed for more than 6 months compared to off-reserve First Nations children born to older mothers (aged 25 or older at their first birth). Children of teen mothers were also less likely to have participated in learning activities such as reading and counting, and more likely to have spent more than 3 hours per day in front of a computer or television. They also differed in social support as demonstrated by the following: compared to off-reserve First Nations children of older mothers, off-reserve First Nations children of teen mothers were less likely to have father involvement, were more likely to live with grandparents, and were less likely to have mothers who were satisfied with their social support. Children of teen mothers were less likely to participate in non-parental childcare, but if they were they were equally likely to be in centre-based care arrangements as in non-centre-based care. In terms of community factors, children of teen mothers were more likely to have experienced more than three moves since birth and also had mothers who rated their communities more poorly.

Models Examining Various Mediating Factors

Prosocial behaviours. Prosocial behaviours included behaviours such as sharing and being kind to younger children. No significant differences were apparent in the prosocial behaviours of off-reserve First Nations children of teen mothers (aged 12 to 19 at their first birth) compared to off-reserve First Nations children of older mothers (aged 25 and older at their first birth) once registered status, child gender, and child age were controlled.[1] Factors that accounted for the difference included gender (boys were less prosocial) and age (older children were more prosocial). Since there was no difference in prosocial behaviour for First Nations children of teen mothers as compared to First Nations children of older mothers, no further models were examined.

[1] These results differ from Guèvremont & Kohen (2013) because of variations in the study sample. In the current study, only children who had valid scores for all of the contextual factors were included in the analyses.

Table 1. Descriptive Characteristics by Age of Mother at First Birth

Variable	Age of Mother at First Birth			Total
	12 - 19 (N = 807)	20 - 24 (N = 974)	25+ (N = 916)	(N = 2,697)
Socio-Economic Status Factors				
Maternal education				
Currently in school %	25.43***	17.44***	9.74	17.11
Not currently in school and has not completed high school %	38.73***	24.53***	11.97	24.33
Not currently in school and completed high school %	35.83***	58.03***	78.29	58.56
Lone parent family %	59.99***	50.55***	33.30	47.32
Low-income family %	70.73***	49.52***	27.69	48.08
Living in rural area %	16.80***	20.89	25.03	21.13
Contextual Factors				
Breastfed 7+ months %	27.10***	31.48***	43.55	34.38
Parenting behaviours mean score (standard deviation)	1.97 (0.02)	1.97 (0.02)	1.94 (0.02)	1.96 (0.01)
High learning activities score (6 - 10) %	83.17***	87.00**	91.39	87.44
3+ hours screen time daily %	41.76***	33.33***	24.75	32.82
Father (birth, step, or adoptive) involved in raising child %	70.20***	73.70***	85.36	76.77
Lives with grandparents (with or without parent) %	11.48***	8.14***	3.91[E]	7.65
4+ people involved in raising child %	33.70	33.45	30.56	32.52
Satisfied with social support %	39.05***	48.02	50.09	46.13
In child care %	44.41***	50.70*	56.51	50.90
3+ moves since birth %	34.76***	30.33***	17.37	27.14
Community perception mean score (standard deviation)	3.18*** (0.04)	3.42 (0.03)	3.49 (0.04)	3.38 (0.02)

Note. Source: Aboriginal Children's Survey 2006

[E] indicates unreliable estimate, use with caution.

*p < 0.05, **p < 0.01, ***p < 0.001

Emotional symptoms. Emotional symptoms included behaviours such as having many worries or fears and easily losing confidence. Children of teen mothers (12 to 19 years at their first birth) had poorer emotional symptoms than children of mothers aged 25 and over at their first birth.

Neither the difference in emotional symptoms after including SES factors in the model nor the Sobel test for the difference between Models 1 and 2 were significant, indicating that the mediating effect of the SES variables was not significant (see Table 2). However, the Sobel test of the difference between Models 1 and 3 was significant, indicating that the contextual factors mediated the relationship between age of mother at first birth and emotional symptoms. In particular, less than 3 hours of screen time, satisfaction with social support, less than 3 moves since birth, and more positive perceptions of the community were found to be important factors.

In the final model that considered the complete list of factors (i.e., both the SES and the contextual factors), none of the SES factors remained significant. This is further evidence suggesting that the contextual factors played a crucial role in reducing the differences in emotional symptoms between children born to teen as compared to older mothers.

Conduct problems. Conduct problems included behaviours such as fighting and losing one's temper. Children of mothers aged 12 to 19 had poorer conduct scores than children of older mothers. When controlling for SES factors, the Sobel test was significant, indicating that SES variables (in particular, maternal education greater than high school) partially mediated the relationship between mother's age at first birth and the child's conduct problem scores (see Table 3).

When contextual factors were considered, differences in conduct problem outcome scores between children of younger mothers were also reduced but still remained significant. The Sobel test between Models 1 and 3 was not significant, indicating that the contextual factors did not explain the differences in conduct problems between off-reserve First Nations children of teen and older mothers. Although they did not mediate the differences, less than 3 hours of screen time, and a more positive community perception score were both associated with lower conduct problems scores. In the final model, all of these factors remained significant; however, children of younger mothers maintained higher conduct problem scores as compared to children of older mothers. Again, the Sobel test was not significant for the difference between Models 2 and 4, indicating that the contextual factors did not explain the difference in scores for children of teen and older mothers, over and above SES.

Inattention and hyperactivity. Inattention and hyperactivity included behaviours such as being overactive and restless. Children born to mothers aged 12 to19 at first birth had higher inattention and hyperactivity scores compared to children born to mothers aged 25 and over at first birth. When controlling for SES factors, these differences were reduced slightly but remained statistically significant (see Table 4). The Sobel test was significant, indicating that SES factors partially mediated the relationship between mother's age at first birth and inattention-hyperactivity. Maternal education greater than high school, mother currently in school, and larger household size were associated with lower inattention and hyperactivity scores for children.

Table 2. Regression Predicting Emotional Symptoms

Variable	Model 1	Model 2	Model 3	Model 4
Demographic Factors				
Age of mother at first birth				
12 - 19	0.04 (0.02)*	0.01 (0.02)	0.00 (0.02)	-0.01 (0.02)
20 - 24	0.02 (0.02)	0.00 (0.02)	-0.00 (0.02)	-0.01 (0.02)
25+	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Non-Registered Indian (vs. Registered Indian)	-0.04 (0.02)**	-0.04 (0.02)*	-0.03 (0.02)	-0.03 (0.02)
Male (vs. female)	-0.02 (0.02)	-0.02 (0.02)	-0.03 (0.02)	-0.03 (0.02)
Child age at interview (in years)	0.02 (0.01)*	0.02 (0.01)*	0.01 (0.01)*	0.02 (0.01)*
Socio-Economic Status Factors				
Mother's education				
Currently in school		-0.07 (0.03)*		-0.04 (0.03)
Completed high school		-0.06 (0.02)*		-0.03 (0.02)
Did not complete high school		*Ref.*		*Ref.*
Not lone parent		-0.01 (0.02)		0.02 (0.02)
Not low-income		-0.05 (0.02)*		-0.03 (0.02)
Number of people in household		-0.01 (0.01)		-0.01 (0.01)
Urban (vs. rural)		-0.00 (0.02)		0.01 (0.02)
Contextual Factors				
Breastfed 7+ months			-0.01 (0.02)	-0.01 (0.02)
High number of learning activities			-0.04 (0.03)	-0.04 (0.03)
Less than 3 hours screen time			-0.05 (0.02)**	-0.05 (0.02)**
Father involved with child			-0.03 (0.02)	-0.03 (0.02)
Does not live with grandparent(s)			-0.00 (0.03)	-0.02 (0.03)
Satisfied with social support			-0.04 (0.02)**	-0.04 (0.02)*
In child care			-0.00 (0.02)	0.00 (0.02)
Less than 3 moves since birth			-0.04 (0.02)*	-0.04 (0.02)*
Community perception mean score			-0.03 (0.01)**	-0.03 (0.01)**

Variable	Model 1	Model 2	Model 3	Model 4
R-squared	0.01	0.02	0.04	0.05
N	1,834	1,834	1,834	1,834
		Difference between Model 1 and Model 2	Difference between Model 1 and Model 3	Difference between Model 2 and Model 4
Sobel test		1.42	2.22*	2.20*

Note. Source: Aboriginal Children's Survey 2006. Regression coefficients with standard errors in brackets.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 3. Regression Predicting Conduct Problems

Variable	Model 1	Model 2	Model 3	Model 4
Demographic Factors				
Age of mother at first birth				
12 - 19	1.69 (0.05)***	1.85 (0.07)***	2.01 (0.09)***	2.07 (0.10)***
20 - 24	0.16 (0.03)***	0.10 (0.03)**	0.11 (0.03)***	0.08 (0.03)*
25+	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Non-Registered Indian (vs. Registered Indian)	-0.02 (0.02)	-0.01 (0.02)	-0.01 (0.02)	-0.01 (0.02)
Male (vs. female)	0.01 (0.02)	0.01 (0.02)	0.00 (0.02)	0.01 (0.02)
Child age at interview (in years)	-0.05 (0.01)***	-0.05 (0.01)***	-0.05 (0.01)***	-0.05 (0.01)***
Socio-Economic Status Factors				
Mother's education				
Currently in school		-0.13 (0.04)***		-0.11 (0.04)**
Completed high school		-0.14 (0.03)***		-0.11 (0.03)***
Did not complete high school		*Ref.*		*Ref.*
Not lone parent		0.01 (0.03)		0.02 (0.03)
Not low-income		-0.05 (0.03)		-0.04 (0.03)
Number of people in household		0.00 (0.01)		0.00 (0.01)
Urban (vs. rural)		-0.02 (0.03)		-0.01 (0.03)

Variable	Model 1	Model 2	Model 3	Model 4
Contextual factors				
Breastfed 7+ months			-0.01 (0.02)	-0.01 (0.02)
High number of learning activities			0.01 (0.04)	0.02 (0.04)
Less than 3 hours screen time			-0.13 (0.03)***	-0.12 (0.03)***
Father involved with child			0.02 (0.03)	0.01 (0.03)
Does not live with grandparent(s)			-0.04 (0.04)	-0.05 (0.04)
Satisfied with social support			-0.01 (0.02)	0.00 (0.02)
In child care			0.02 (0.02)	0.04 (0.02)
Less than 3 moves since birth			-0.05 (0.03)	-0.04 (0.03)
Community perception mean score			-0.04 (0.01)**	-0.03 (0.01)*
R-squared	0.04	0.06	0.07	0.08
N	1,814	1,814	1,814	1,814
		Difference between Model 1 and Model 2	**Difference between Model 1 and Model 3**	**Difference between Model 2 and Model 4**
Sobel test		3.25**	1.06	1.30

Note. Source: Aboriginal Children's Survey 2006. Regression coefficients with standard errors in brackets.
*p < 0.05, **p < 0.01, ***p < 0.001

Table 4. Regression Predicting Inattention and Hyperactivity

Variable	Model 1	Model 2	Model 3	Model 4
Demographic Factors				
Age of mother at first birth				
12 - 19	0.17 (0.04)***	0.13 (0.04)**	0.08 (0.04)*	0.09 (0.04)*
20 - 24	0.10 (0.04)**	0.08 (0.04)*	0.05 (0.04)	0.06 (0.04)
25+	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Non-Registered Indian(vs. Registered Indian)	0.03 (0.03)	0.04 (0.03)	0.06 (0.03)	0.05 (0.03)
Male (vs. female)	0.13 (0.03)***	0.14 (0.03)***	0.12 (0.03)***	0.13 (0.03)***
Child age at interview (in years)	-0.02 (0.01)	-0.02 (0.01)	-0.02 (0.01)	-0.02 (0.01)
Socio-Economic Status Factors				
Mother's education				
Currently in school		-0.13 (0.05)**		-0.08 (0.05)
Completed high school		-0.13 (0.04)**		-0.07 (0.04)
Did not complete high school		*Ref.*		*Ref.*
Not lone parent		-0.01 (0.04)		0.04 (0.04)
Not low-income		-0.04 (0.04)		-0.02 (0.04)
Number of people in household		-0.02 (0.01)*		-0.03 (0.01)**
Urban (vs. rural)		0.03 (0.04)		0.05 (0.04)
Contextual Factors				
Breastfed 7+ months			-0.07 (0.03)*	-0.07 (0.03)*
High number of learning activities			-0.04 (0.05)	-0.04 (0.05)
Less than 3 hours screen time			-0.13 (0.03)***	-0.12 (0.04)***
Father involved with child			-0.04 (0.04)	-0.04 (0.04)
Does not live with grandparent(s)			-0.07 (0.06)	-0.13 (0.06)*

Variable	Model 1	Model 2	Model 3	Model 4
Satisfied with social support			-0.07 (0.03)*	-0.06 (0.03)*
In child care			-0.03 (0.03)	-0.03 (0.03)
Less than 3 moves since birth			-0.08 (0.03)*	-0.07 (0.03)*
Community perception mean score			-0.03 (0.02)*	-0.03 (0.02)*
R-squared	0.03	0.04	0.06	0.07
N	1,816	1,816	1,816	1,816

	Difference between Model 1 and Model 2	Difference between Model 1 and Model 3	Difference between Model 2 and Model 4
Sobel test	1.96*	2.36*	2.29*

Note. Source: Aboriginal Children's Survey 2006. Regression coefficients with standard errors in brackets.
*p < 0.05, **p < 0.01, ***p < 0.001

When contextual factors were considered, associations between the inattention and hyperactivity scores of children born to teen mothers compared to children born to older mothers were reduced. The Sobel test was significant, indicating that the contextual factors partially mediated the relationship between age at first birth and inattention and hyperactivity.

Of the contextual determinants, having been breastfed for more than 6 months, less than 3 hours of screen time daily, satisfaction with social support, fewer than 3 moves since birth, and more positive perceptions of the community were particularly important in reducing differences in inattention/ and hyperactivity scores between children born to teen and children born to older mothers.

The final model considered both the SES and contextual factors. Of the SES factors, only household size maintained significance; yet, all the contextual factors maintained their significance. The Sobel test between Models 2 and 4 was significant, indicating that the contextual variables partially explained the difference between mother's age at first birth and hyperactivity and inattention (over and above the socio-economic variables). However, even after considering SES and contextual factors, children of the youngest mothers still had significantly poorer inattention and hyperactivity scores as compared to children of older mothers.

Discussion

Findings from the current study demonstrate that off-reserve First Nations children born to teen mothers had poorer behavioural outcomes compared to those born to older mothers. These differences were found for emotional symptoms, conduct disorder scores, and inattention and hyperactivity but not for prosocial behaviours, which were similar for both groups of children. Differences in children born to

teen mothers are often attributed to poorer SES conditions (Corcoran, 1998; Guèvremont & Kohen, 2013; Hoffman, 2006; Turley, 2003), conditions which often persist over time and continue to have a significant impact on children's outcomes (Jaffee, Caspi, Moffitt, Belsky, & Silva, 2001).

This study also demonstrates that other contextual factors may be as important as SES factors in their contribution to the behavioural outcomes of children of teen mothers. Two of the contextual factors, parenting behaviours and having four or more people involved in raising the child, did not differ for off-reserve First Nations children of teen and older mothers, suggesting that these did not differ by maternal age group at childbirth. However, for the other contextual factors examined, differences were apparent, including being less likely to be breastfed for more than 6 months, more likely to have 3 or more hours of screen time daily, less likely to have a father involved in raising the child, less likely to have a mother satisfied with her level of social support, and more likely to have experienced 3 or more moves since birth.

For inattention and hyperactivity, controlling for contextual factors had a similar mediating effect as controlling for SES differences (indicated by the Sobel test) suggesting that contextual factors such as breastfeeding, decreased screen time, satisfaction with social support, less than three moves, and positive community perceptions can have a comparable impact as SES characteristics such as maternal education and household size for this outcome. However, for emotional symptoms, the Sobel test indicated that contextual factors had a significant mediating effect, whereas SES factors did not. That is, lower screen time, satisfaction with social support, less than three moves, and positive community perception scores were important in explaining differences in emotional symptoms scores for children of teen mothers compared to older mothers. Conversely, for conduct problems, SES factors such as being in school or a high school graduate had a significant mediating effect, whereas contextual factors did not. The SES and contextual factors were not highly correlated, suggesting that poor SES conditions do not necessitate poorer environments as assessed by the contextual factors included here. An exception to this was living in a lone parent family and having father involvement, which were correlated but neither of which were significantly associated with the behavioural outcomes.

Even after controlling for SES as well as a host of contextual factors, differences in inattention/hyperactivity and conduct scores for children of teen and older mothers remained. However, the total percentage of variance explained (R-squared values) was relatively low for all outcomes ranging from 5% to 13% for the complete model. This suggests that there are many other factors contributing to behaviour problems of 2 to 5 year old off-reserve First Nations children of teen mothers not accounted for in the present study. Although a comprehensive set of SES and contextual factors were included, other important factors may have been missing: for example: an indicator of maternal mental health, detailed information about social and other types of supports available to the mothers, and a measure of longer-term household income. These factors have also been shown to be important in explaining the differences between children of teen and older mothers (Turley, 2003).

The present study has several limitations. The measure of age at first birth is based on the age of the oldest sibling in the household derived from the ACS household roster. It is possible that this child was a step, foster, or adoptive child, and not a birth child, which could lead to inaccuracy in determining mother's age at first birth. As well, it is possible that the oldest sibling might not be living in the household (e.g., if they have been adopted, are in custody of social services, or living with another

relative), which could also lead to inaccuracy in the mother's age at first birth. This problem is easily remediated by the inclusion of a single survey item asking about mother's age at first birth.

Secondly, all the behavioural outcomes and contextual factors are based on maternal-reported information. Mothers' responses could be influenced by the way they think they should respond, by their own experiences, or by their subjective views of their child and his or her behaviour. However, mothers are experts about their children and one of the strengths of the current is study was having the mothers themselves report about their First Nations children. Another limitation is that this study was restricted to what was asked in the survey. Other variables like maternal depression (S. H. Goodman et al., 2011) are likely associated with both maternal age at first birth and children's behavioural problems, but could not be examined.

Finally, although the particular behaviour problems included in the current study have been shown to be associated with school readiness, later school achievement, and mental health (A. Goodman & Goodman, 2009), and have been used in other studies of Aboriginal children (Kohen & Oliver, 2010; Zubrick, Lawrence, De Maio, & Biddle, 2006), these behaviours may not be the most relevant or important behaviours for First Nations children living off-reserve.

The strengths of this study include a population-based sample of 2- to 5-year-old off-reserve First Nations children, information on mother's age at first childbirth, and the inclusion of a large number of SES and contextual factors. As well, children's behaviour problems were based on maternal reports from a standardized measure, which has been validated for off-reserve First Nations, Métis, and Inuit children using the 2006 ACS (Oliver et al., 2009). In addition, this study used a comparison group of off-reserve First Nations children of older mothers, which is a more relevant comparison group than, for example, older mothers in the general population.

Despite these limitations, this study demonstrated differences not only in children's behaviours, but also in a variety of contextual factors for off-reserve First Nations children of teen and older mothers. Differences in the behavioural outcomes of off-reserve First Nations children of teen and older mothers were based on both the SES and contextual factors. Indeed, when SES and contextual factors were included in the models, emotional problem scores of children of teen and older mothers did not differ. In particular, the effects of maternal education, hours of screen time, three or more moves, satisfaction with social support, and community perception scores were important. However, hyperactivity and conduct problems were not completely mediated by SES or contextual factors suggesting that differences for children of teen and older mothers are likely attributable to other factors not considered in the present study. Some additional characteristics that should be considered in future studies include maternal mental health and more details about the types of social support provided.

Finally, replication of these findings using other data sources, qualitative research studies about the experiences of teen mothers and their children's behaviours, as well as longitudinal data for First Nations children would enhance our understanding of child outcomes among off- reserve First Nations children of teen mothers.

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Appendix A

Wording of Mental Health Items from the Strength and Difficulties Questionnaire

Prosocial Behaviour

Considerate of other peoples' feelings
Shares readily with other children, for example, toys, treats, pencils
Helpful if someone is hurt, upset or feeling ill
Kind to younger children
Often offers to help others including parents, teachers, other children
Generally well-behaved, usually does what adults request
Has at least one good friend
Generally liked by other children
Can stop and think things out before acting
Good attention span, sees work through to the end

Emotional symptoms

Often complains of headaches, stomach-aches, or sickness
Many worries or often seems worried
Often unhappy, depressed, or tearful
Nervous or clingy in new situations, easily loses confidence
Many fears, easily scared

Conduct problems

Often loses temper
Often fights with other children or bullies them
Often argumentative with adults
Can be spiteful to others

Inattention/Hyperactivity

Restless, overactive, cannot stay still for long
Constantly fidgeting or squirming
Easily distracted, concentration wanders

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