

# UC Davis

## UC Davis Previously Published Works

### Title

The Influence of Parenting on Early Childhood Health and Health Care Utilization

### Permalink

<https://escholarship.org/uc/item/24s8s4sz>

### Journal

Journal of Pediatric Psychology, 39(10)

### ISSN

0146-8693

### Authors

Serbin, Lisa A  
Hubert, Michele  
Hastings, Paul D  
[et al.](#)

### Publication Date

2014-11-01

### DOI

10.1093/jpepsy/jsu050

Peer reviewed

# The Influence of Parenting on Early Childhood Health and Health Care Utilization

Lisa A. Serbin, PhD, Michele Hubert, MA, Paul D. Hastings, PhD, Dale M. Stack, PhD, and Alex E. Schwartzman, PhD

*Department of Psychology, Center for Research in Human Development, Concordia University*

Paul D. Hastings is now at the University of California Davis.

All correspondence concerning this article should be addressed to Lisa A. Serbin, PhD, Department of Psychology, Centre for Research in Human Development, PY-170, Concordia University, 7141 Sherbrooke St. West, Montreal, Quebec H4B 1R6, Canada. E-mail: Lisa.Serbin@Concordia.CA

Received June 4, 2013; revisions received June 10, 2014; accepted June 18, 2014

**Objective** This study examined whether parenting, specifically parental support, structure, and behavioral control, predicted early childhood health care use and moderated the negative effects of socioeconomic disadvantage. **Methods** A sample of 250 parent–child dyads from a longitudinal intergenerational research program participated. **Results** Greater parental support was associated with increased rates of nonemergency care and a higher ratio of outpatient to emergency room (ER) services, a pattern reflecting better health and service use. Support also moderated the negative effects of disadvantaged family background. Greater behavioral control by parents predicted lower rates of both nonemergency care and ER visits. Structured parenting and behavioral control were associated with lower rates of respiratory illness. **Conclusions** This study highlights the importance of considering parenting practices when examining variations in early childhood health and health care, and the relevance of parental behavior in designing interventions for high-risk populations.

**Key words** early health care; parenting; socioeconomic disadvantage.

Given that parents play a critical role in children's health and pediatric care, a large body of research dating back at least to the 1970's (e.g., Mechanic, 1980) has focused on parental characteristics and behavior to help explain variations in children's health care use. Recent studies confirm that a variety of health, psychological, and social characteristics impact the early health care that parents provide for their children. Specifically, parents' own use of health services has been positively associated with their children's health care, reflecting similarities in health status and patterns of help seeking between generations (Broadhurst, 2003; Janicke, Finney, & Riley, 2001). Parental depression, anxiety, and behavioral problems have been linked to decreases in children's preventative care and increases in the use of emergency care (Minkovitz et al., 2005; Serbin, Peters, & Schwartzman, 1996).

There is also evidence linking parents' sociodemographic characteristics to children's health and health care use (Braveman, Egerter, & Williams, 2011; Dow & Rehkopf, 2010). Even within universal access health care systems (e.g., U.K., Scandinavia, Canada), there is a negative gradient between family socioeconomic status (SES) and health outcomes (Braveman & Barclay, 2009; Cohen, Janicki-Deverts, Chen, & Matthews, 2010). Despite the greater health risks associated with living in conditions of disadvantage, however, individual- and neighborhood-level poverty have been associated with lower rates of primary care (Diez Roux & Mair, 2010; Larson & Halfon, 2010). Conversely, economic and social disadvantage are associated with higher rates of emergency room (ER) visits and hospitalizations (Brooks-Gunn, McCormick, Klebanov, & McCarton, 1998; Frank et al., 2010). Lower use of primary

care and greater use of emergency care and hospitalization are patterns that have been associated with poor health outcomes for disadvantaged children (Adler & Rehkopf, 2008; Starfield, Shi, & Macinko, 2005). The interrelation between disadvantage, poor health, low rates of primary care, and greater use of emergency facilities is found even within universal access health care systems, suggesting that factors in addition to financial affordability impact children's health care.

There are many possible reasons why parents' characteristics and parenting behaviors might affect children's health care. Because parents are the ones who take their children for medical care, it may be that some parents are more likely to initiate these visits. These parents may be more attentive and responsive to their children's symptoms, perceiving a need for prompt health care. It is also possible that positive parenting behaviors decrease children's health risk (e.g., by reducing stress, avoiding exposure to infection, or reducing opportunities for injury) resulting in fewer illnesses and reducing the child's need for health care.

Patterns of child-rearing that generalize across situations may play an important role in shaping daily activities, children's health, and families' patterns of health care seeking (Browne & Jenkins, 2012; De Genna, Stack, Serbin, Ledingham, & Schwartzman, 2006). To describe parenting across a wide range of situations, developmental researchers have organized important components of parenting practices into descriptive schemes or dimensions designed to capture the nature of parenting. Parental support, structure, and control are three aspects of parenting that have received attention in the child development literature (see Bugental & Grusec, 2006 for a review). Although most research on the impact of parenting dimensions has focused on personality, social competence, relationships, and emotional development, these dimensions may also have implications for children's health and service use.

"Support" refers to parents' capacity to be aware of and responsive to their children's states, needs, and goals, and also to be warm, accepting, and respectful of their children. Greater parental support has been associated with positive outcomes including greater social competence and psychosocial functioning (Root, Hastings, & Maxwell, 2012). It is possible that supportive parents create an emotionally secure environment, in which children are encouraged to express their needs and health complaints. An additional possibility is that a child who is better able to cope and is more compliant (because of parental support) may be much easier to take for well-baby visits and other preventive care.

"Structure" can be defined as the way in which parents provide organization and consistency to their children's environment. Greater parental structure has been linked to children's adjustment, competence, and compliance (Emery, 1982; Stack et al., 2012). It is possible that parents who utilize structured parenting are better at making (and keeping) appointments for health care. They may also provide a safer environment in which risks for illness and injury are minimized.

Finally, "control" can be defined as parental behaviors toward their children that guide or direct children's behavior toward acceptable and age-appropriate standards, without relying on strict or harsh punishment (Baumrind, 1989; Kochanska, 2002). Barber, Stolz, Olsen, Collins, and Burchinal (2005) have argued that control may include distinct behavioral and psychological dimensions, each impacting specific areas of children's development. "Psychological control" refers to control attempts that intrude into the psychological and emotional development of the child. "Behavioral control," in contrast, refers to parental behaviors that attempt to control or manage children's behaviors. Although this has not been examined empirically, behavioral control seems likely to be protective against injury and exposure to health risks during early childhood, particularly for families living in high-risk, unsafe home, and neighborhood environments. Using instruments such as the Parenting Dimensions Inventory (PDI; Power, 2002; Slater & Power, 1987), research over several decades has found the broad dimensions of support, structure, and behavioral control to predict parenting practices that are important for children's long-term development and well-being (Hughes, Power, Fisher, Mueller, & Nicklas, 2005).

There is some evidence suggesting that broad parenting dimensions can predict children's health care and health status. Some empirical studies have reported links between parenting, children's treatment adherence, timely use of medical services, and health. For example, supportive parenting has been associated with fewer adherence difficulties in appointment keeping and symptom-reporting in treatment of children's cancer (Manne, Jacobsen, Gorfinkle, Gerstein, & Redd, 1993; Steele, Long, Reddy, Luhr, & Phipps, 2003). Both parental structure and support have been found to predict both better adherence to treatment regimens and glycemic control in children with diabetes (Davis et al., 2001). Injury rates have also been found to relate to parenting practices, including use of structure and behavioral control (Morrongiello, 2005; Schwebel & Brezausk, 2010). In addition, there is evidence of an association between parenting practices and

children's health-related behaviors such as nutrition, physical activity, and hygiene (Lohaus, Vierhaus, & Ball, 2009). These studies provide evidence that parenting behaviors influence various aspects of illness management and health-promoting behavior, which in turn affect children's health outcomes.

As indicated above, parenting may affect children's health through several potential processes; these include parents' perception of the child's need for health services, as well as children's actual need for care. However, the association between positive parental behaviors and the frequency of consultations for various types of services and health conditions has not been examined. In addition, the effects of parenting frequently have been observed to vary as a function of the social and economic context in which a family is embedded (Conger & Dogan, 2007). Positive parenting practices might be particularly important buffers against the adverse effects of economic hardships on parents' efforts to obtain appropriate pediatric care. Again, this issue has not been previously examined in the literature or studied within a universal access system in which affordability was theoretically not an issue with regard to health care access.

The purpose of the present study was to assess the influence of parental support, structure, and behavioral control on the use of three major types of pediatric health service: nonemergency care, ER visits, and hospitalization. These represent different levels of care and are generally considered appropriate for different health needs. Relatively higher use of outpatient and lower use of ER services is considered to provide more timely and appropriate pediatric care, a pattern associated with lower health risk (Adler & Rehkopf, 2008; Starfield et al., 2005). We also examined the frequency of medical consultation for three of the most common types of childhood ailments: ear infections, acute respiratory illnesses, and injuries. Lower frequencies of these common problems would indicate better health and health practices, and may be associated with use of positive parenting behaviors. Following a multideterminant model, parenting was examined in the context of established predictors of children's health service use and health outcomes. These included family SES (Dow & Rehkopf, 2010), parental health care use during the years before the child's conception (Janicke et al., 2001), and parents' mental health (Minkovitz et al., 2005).

The study utilized comprehensive health care data collected as part of the Concordia Longitudinal Research Project, an intergenerational study of health and development in families from lower income inner-city communities initiated in 1976 (Serbin, Cooperman, Peters, Lehoux, Stack, & Schwartzman, 1998). Because of their lower

socioeconomic and neighborhood characteristics, the participants were identified as an "at-risk" sample for mental and physical illness as well as a variety of psychosocial problems such as school drop-out and single parenthood (Schwartzman, Serbin, Stack, Hodgins, & Ledingham, 2009; Serbin et al., 1996). Complete health care records were available for both children and parents via Canada's universal health care system. The present study therefore presents an unusual opportunity to learn about predictors of children's health care and health status within a lower income sample, under conditions where there is universal access to health services.

From the government insurance records, we were able to construct variables reflecting annual rates of health services of different types (e.g., outpatient care, ER visits, hospitalizations) over a 5-year period during early childhood (ages 1–6 years). These variables were selected based on the literature indicating that more frequent use of outpatient services is associated with better health in children from disadvantaged and other at-risk populations, while frequent use of the ER and hospitalizations are associated with poorer health. We also computed the average annual frequencies across this 5-year period of treatment for three of the most common categories of childhood illness in the health care data bank: including diagnoses of ear infection, respiratory illness, and injury. Each of these diagnoses is frequently made at both outpatient and emergency care settings, making it possible to examine frequencies of these diagnoses across different types of service facilities.

Three hypotheses were examined in the study. First, use of positive parenting practices, including parental support, structure, and behavioral control, was expected to predict patterns of service usage that have been associated with better child health in the literature. These included higher rates of visits for nonemergency care and decreased rates of emergency care and hospitalizations. Second, as positive parenting has been linked to better parental illness management, better health status, enhanced treatment outcomes, and more positive health-related behaviors in children, use of parental support, structure, and positive control was expected to reduce the overall rate of several categories of common childhood ailments, including ear infections, acute respiratory illnesses, and injuries. Third, given that socioeconomically disadvantaged families are at particular risk for less appropriate health service use, it was expected that effects of family disadvantage on children's service usage would be moderated by parenting behaviors. Specifically, under conditions of greater social and economic disadvantage, the beneficial effects of positive parenting practices were expected to be enhanced.

Although it was anticipated that the effects of the three parenting dimensions might differ, because of the lack of previous literature on this subject, we did not make differential predictions regarding the effects of the three parenting dimensions, support, structure, and control, on child health care outcomes.

## Method

### Participants

The present study is part of the Concordia Longitudinal Risk Project, a large prospective intergenerational longitudinal study of developmental and health outcomes in a low-income community sample, initiated in 1976 when the parents in the current analyses were children aged 6–13 years (for a detailed account, see Serbin et al., 1998). The current sample included 250 families (including 165 mothers and 85 fathers from separate families) who were original participants in the Concordia Longitudinal Risk Project, including 118 daughters and 132 sons born between 1994 and 2000. This group included all families in the ongoing Concordia Longitudinal Risk Project with a child born during these years for whom concurrent parenting and sociodemographic information was available. These 250 families did not differ significantly in terms of sociodemographic characteristics from the total sample of participating families in the Concordia project (total  $N = 550$ ; including families not selected for the present study because their children did not meet the age criterion). Data were obtained from each child's health care records across a period of 60 months, from the age of 12 months through 71 months for each child (i.e., from age 1 to 5.9 years). Participating families were French speaking from primarily French–Canadian backgrounds, with < 5% from other ethnic backgrounds. Parents signed consent forms for participation in the current study, approved by the university's institutional review board (IRB).

Although these parents showed variability with respect to their demographic characteristics, a high proportion remained in disadvantaged conditions beyond their childhood years. Parents in this sample had a mean family income equivalent to \$31,868 U.S. dollars ( $SD$  \$18,431) during the period when their children's health care usage were collected, considerably below the Canadian population mean, which was equivalent to \$42,951 U.S. dollars during this period (see Table I for means and standard deviations of demographic variables). The sociodemographic characteristics of the families in terms of parental education, high school dropout, family poverty, welfare

Table I. Means and Standard Deviations/Percentages for Sample Characteristics, Predictors, and Health

Descriptive characteristics and variables in the analyses	Mean	SD	%
Percent on welfare			30.4%
Percent below Canadian low-income cutoff <sup>a</sup>			32%
Family income (U.S. dollars) <sup>b</sup>	\$31,168	\$ 18,431	
Percent high school not completed			27%
Number of years of education	12.21	2.47	
Parent's childhood SES	39.96	11.09	
Current family SES	39.39	33.54	
Neighborhood risk factor score	-.01	1.01	
Age of parent at first child	24.00	3.24	
Parent's health care visits per year	4.65	2.91	
Depression: scale of 1 (none), 2 (below threshold) to 3 (diagnostic level)	1.37	.77	18% <sup>c</sup>
Anxiety disorder (scale of 1–3)	1.56	.80	20% <sup>c</sup>
Parental support	13.71	1.64	
Parental structure	9.15	.97	
Behavioral control	3.57	1.17	
Child's nonemergency visits per year	4.43	3.03	81% <sup>d</sup>
Child's emergency room visits per year	.89	1.16	16% <sup>d</sup>
Child's hospitalizations per year	.19	.36	3% <sup>d</sup>
Child's ear infections per year	1.09	1.23	20% <sup>d,e</sup>
Child's acute respiratory illnesses per year	.19	.36	14% <sup>d,e</sup>
Child's injuries per year	.44	.62	6% <sup>d,e</sup>

Note. <sup>a</sup>Low-income Cutoff for 2003 (Statistics Canada, 2012b).

<sup>b</sup>In U.S. dollars, conversion average for 2000–2006.

<sup>c</sup>Percentage of parents who met diagnostic criteria.

<sup>d</sup>Percentage of total number of visits across all children.

<sup>e</sup>Note that diagnostic category percentages do not add up to 100% because only three categories of diagnosis are included.

status, age at parenthood, and socioeconomic status indicated an average level of disadvantage relative to the overall Canadian and Quebec populations, respectively (Statistics Canada, 2008, 2012a).

## Measures

### Parenting Dimensions

A French translation of the PDI (Power, 2002; Slater & Power, 1987) was administered to the participating parent. The PDI is a self-report measure that assesses various aspects of parenting from which the following three scales were used for this study: parental support, structure, and behavioral control. These PDI scales have been widely

used in parenting research, including family intervention studies (e.g., Deković, Asscher, Manders, Prins, & van der Laan, 2012) and studies of health-compromised families (e.g., Murphy, Marelich, Armistead, Herbeck, & Payne, 2010). Previous item analyses of the PDI have shown that this instrument produces measures of parental practices that are comparable with those obtained by other parent self-report questionnaires and Q-sort procedures (Mills et al., 2012).

*Parental support* includes 18 items that assess parental nurturance, responsiveness to child input, and nonrestrictiveness. Sample items are: “I encourage my child to talk about his or her troubles” and “I believe that most children change their minds so frequently that it is hard to take their opinions seriously” (reverse-scored). *Parental structure* includes 12 items assessing parental consistency and organization. Sample items are “We have a regular dinner schedule each week” and “There are times I just don’t have the energy to make my child behave as he or she should” (reverse-scored). *Behavioral control* consists of 11 items involving demands for self-control and maturity. Sample items include “I try to prevent my child from making mistakes by setting rules for his/her own good” and “I try to provide freedom for my child to make mistakes and learn from them” (reverse scored). The French language version of the PDI has been used for a variety of studies and shown good concurrent and predictive validity as a predictor of observed parent–child interactions and quality of parent–child relationship, as well as correlations with current and subsequent parental psychopathology (Ellenbogen & Hodgins, 2009). Reliability (interitem consistency) in the present sample was calculated for support, structure, and control (Cronbach’s  $\alpha = .78, .68, \text{ and } .69$ , respectively).

### Medical Data

Governmental health care records were used to determine the medical history of all participants (i.e., parents and children). Comprehensive health care records have been widely used for epidemiological and other health studies in regions where centralized data are available, including Quebec (e.g., Cadieux & Tamblin, 2008). Permission to retrieve these data was granted by the “Commission d’accès à l’information du Québec” after a careful review of identity and privacy protecting procedures assuring confidentiality. These health records were drawn from databanks provided by the governmental agency responsible for universal medical care coverage in Quebec (Régie de l’assurance maladie du Québec or RAMQ). The records include all contacts with provincial health services during the specified periods (see below). The reliability of centralized health care data depends on the accuracy of reporting

by health care personnel. However, as physicians and health care facilities used these files as billing reports, it is unlikely that many health care visits were not reported. Records that were incomplete regarding information necessary for the present study (e.g., missing a diagnosis; no indication of type of health care facility) were excluded.

To preserve confidentiality, all information was connected to a sequential number that was different from the project’s own identification number. These records contained numeric codes specifying medical acts, assessments, and diagnostic information, which were used to construct the health variables used in this study based on computer algorithms. All procedures were reviewed by the university’s IRB. Each child’s medical data corresponding to their ages 1.0–5.9 years were extracted from their health care records. Given the range of birthdates of the children, between years 1994 and 2000, the medical data used for children’s health outcomes in the study were recorded between 1995 and 2006 (i.e., the period corresponding to ages 12–71 months for each child, depending on their birthdate). These data were extracted from their comprehensive health care records to determine the average rate per year of nonemergency visits (i.e., primary and specialty outpatient care), ER visits, and hospitalizations. To examine reasons for medical visits, frequencies of the most common diagnoses were examined, including ear infections, acute respiratory illness, and injuries (see Table I for means and standard deviations of these variables). Note that data used to determine frequencies of types of care and diagnostic categories are partially overlapping (i.e., some non-ER visits, ER visits, and hospitalizations did not result in a diagnosis within one of the three categories of illness analyzed in the present study).

In addition, parents’ typical health care-seeking behaviors were examined. Three years of medical data corresponding to the period before the child’s conception (i.e., up to 10 months before the child’s birth) were extracted to determine the total number of health services used, excluding obstetric and gynecological visits (see Table I). Parent’s rate of medical visits before the child’s conception was included to control for the parent’s previous pattern of health care seeking, independent of the child’s actual health care needs. Rates of parental care seeking also control for other potential confounds such as shared biological and environmental causes of illness that might affect both generations.

### Socioeconomic Status

Current as well as past levels of SES are important predictors of adult health-related behaviors (Cohen et al., 2010). Two separate indicators of family SES were considered:

parents' childhood SES and families' current SES. Parents' childhood SES (Occupational Prestige Scale; Nock & Rossi, 1979) was determined using the occupational prestige of their parents (i.e., the grandparents of the children of this sample) as recorded during a phone interview in the mid-1980s. Scores on this scale could range from 9.2 to 81.2. Children's current SES was assessed using parents' occupational prestige at the time of the collection of the children's health care data using the Standard International Occupational Prestige Scale. Scores could range from 16 to 90 (Ganzeboom & Treiman, 1996).

### Neighborhood Risk

To determine the level of neighborhood socioeconomic disadvantage of children in this sample, the first three digits of each family's postal code were entered into a program, which converted the postal code into a forward sortation area (FSA) number (FSA Computing in the Humanities and Social Sciences, 2005). The FSA was used to obtain neighborhood-level sociodemographic information about each family. The census data corresponding to the period closest to children's early childhood years were used to create a factor (mean of 0; *SD* of 1.00) based on neighborhood characteristics. Components of this factor included percentage of single-parent families, percentage of population with low education, percentage of families living in poverty, and unemployment rate. Intercorrelations between factor components ranged from .65 to .93. Lower scores on the neighborhood risk index represented less disadvantaged neighborhoods; conversely, higher scores on this index represented neighborhoods with a greater proportion of economically disadvantaged families.

### Parental Mental Health: Anxiety and Depression

A psychologist conducted the Structured Clinical Interview for DSM-IV (First, Spitzer, Williams, & Gibbon, 1995) with the parent who was the participant in the original study. Information relevant to the lifetime diagnoses of anxiety disorders and depression were considered in the analyses (see Table I). Scores for the measures of anxiety and depression, respectively, ranged from 1 to 3: 1 (no symptoms of anxiety disorder or depression), 2 (some symptoms but below diagnostic threshold), or 3 (above threshold for diagnosis).

### Design for Analysis

Hierarchical multiple regressions were used for the main analyses. Dependent variables included six measures of children's health care and service use between the ages of 1 and 6 years, including average annual rates of (1)

non-ER services, (2) ER services, (3) hospitalizations, (4) ear infections, (5) respiratory illnesses, and (6) injuries. Hierarchical multiple regressions were performed for nonemergency services, ER visits, ear infections, and acute respiratory illnesses, as they were continuous outcome variables. Because they presented bimodal distributions, the hospitalization and injury outcomes variables were analyzed as dichotomous variables with logistic regressions using the same hierarchical model design.

Each hierarchical regression analysis included four successive cumulative models. Within each of these models, a block of conceptually related predictor variables was entered. In each block, the variables were entered together as a set (i.e., using direct simultaneous entry within each of the successive regression models). Model 1 of each hierarchical regression analysis contained a block of demographic variables including parent and child gender, parent's childhood SES, age at parenthood, current family SES, and neighborhood risk. Model 2 contained a block of variables related to parental health, including parent's average annual rate of health care visits during the three years before the child's conception, parental symptoms of anxiety, and parental symptoms of depression. Model 3 contained the block of parenting variables: support, structure, and behavioral control. Model 4 of the regressions included interactions between SES and the parenting measures. All continuous independent variables were centered to facilitate interpretation of interaction effects (Aiken & West, 1991). A power analysis (Soper, 2014) revealed that this hierarchical design, with a power level of 0.80, an alpha of 0.05, and sample size of 250, could detect effect sizes as small as 0.07 in the final R-square of each full regression analysis (Cohen, Cohen, West, & Aiken, 2003).

## Results

### Preliminary Analyses

A correlation matrix showing the intercorrelations between the variables is presented in Table II. These relations were generally in the expected directions, with the established risk and parenting variables predicting the measures of child health care and diagnostic frequency. Preliminary regression analyses revealed that there were no significant interactions between parent or child gender and the parenting measures in predicting the outcome variables. For this reason, the sample was analyzed as a whole (rather than separating mothers and fathers or boys and girls), but gender was retained as a predictor with the block of demographic variables in the multiple regressions. Significant effects in the hierarchical multiple regressions are described below.

Table II. Intercorrelations Among Variables (n = 250)

Variable	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Parent's gender (M/F)	-.08	.29**	-.05	-.05	.09	-.23**	.14*	.25**	.16*	-.04	.20**	-.04	-.05	-.01	-.07	.06	-.10
2. Children's gender (M/F)	-	.00	-.03	.01	.00	.03	.07	.00	-.01	.01	.01	-.03	-.01	-.05	-.11	-.05	-.08
3. Parent's health care visits	-	-.12	-.04	.04	-.09	.21**	.08	-.07	.01	.04	.15*	.15*	.03	.10	.21**	.10	
4. Parent's childhood SES	-	.12	-.14*	.09	-.06	-.04	.14*	.10	-.02	-.05	-.27**	-.05	-.11	-.17**	-.15*		
5. Family's current SES	-	-.22**	.29**	-.14*	-.12	.29**	.09	-.12	.07	-.09	-.11	-.03	.05	-.08			
6. Neighborhood risk	-	-.14*	.09	-.01	-.09	-.04	.05	-.13*	.17**	-.06	.01	-.03	.15*				
7. Parent's age at birth	-	-.14*	-.13*	.12*	.07	-.26**	.30**	-.12	-.03	.00	.07	-.02					
8. Parental depression	-	.27**	-.04	-.01	.11	.02	.07	.12	.10	.05	.06						
9. Parental anxiety	-	.04	-.10	.04	-.06	-.03	.01	-.12*	.01	.01							
10. Parental support	-	.22**	-.03	.13*	-.06	-.10	.00	.07	-.06								
11. Parental structure	-	.09	-.04	-.13*	-.11	-.10	-.13*	-.04									
12. Behavioral control	-	-.24**	-.21**	-.16*	-.07	-.15*	.04										
13. Nonemergency visits	-	.19**	.28**	.39**	.59**	.13*											
14. Emergency room Visits	-	.38**	.23**	.48**	.31**												
15. Hospitalizations (no/yes)	-	.24**	.19**	.01													
16. Ear infections	-			.31**	.01												
17. Acute respiratory illnesses	-				.13*												
18. Injuries (no/yes)	-																

Note. Level of statistical significance \*\*  $p < .01$ , \*  $p < .05$ .

### Prediction of Health Care Outcomes

The hierarchical regressions were significant for nonemergency visits [final adj.  $R^2 = .15$ ,  $F(12, 237) = 4.66$ ,  $p < .01$ ], ER visits [adj.  $R^2 = .15$ ,  $F(12, 237) = 4.72$ ,  $p < .01$ ], ear infections [adj.  $R^2 = .05$ ,  $F(12, 237) = 2.07$ ,  $p < .01$ ], and acute respiratory illnesses [adj.  $R^2 = .08$ ,  $F(12, 237) = 2.84$ ,  $p < .01$ ], such that these full regression models accounted for a significant proportion of the variance in children's health care usage. In Tables III and IV, the R-square change associated with each successive model (i.e., with each of the blocks of variables when entered) in the regressions is shown. Standardized beta values are presented for each of the predictors, which can be squared to estimate the amount of variability associated with that predictor within each model. The logistic regressions for hospitalizations and injuries did not reach statistical significance [ $\chi^2(12, 237) = 19.95$ , ns;  $\chi^2(12, 237) = 20.25$ , ns, respectively]; because these equations were not statistically significant, these regressions were not included in Tables III and IV or discussed below.

### Effects of Demographics and Parent Health on Children's Health Care

Before addressing the main hypotheses of the study concerning parenting and child health care outcomes, we examined the effects of the demographic and parent health-related variables entered in Models 1 and 2 of the

regressions. Beta values included in the text below relate to the model in which the relevant predictor was entered, unless these changed meaningfully in successive models (as indicated). Demographic and parent health variables were generally predictive of the children's health care outcomes in the anticipated directions. Parent's childhood SES was protective against ER visits by offspring ( $\beta = -.25$ ,  $p < .01$ ) and also frequency of respiratory infections ( $\beta = -.18$ ,  $p < .01$ ). That is, higher SES in childhood was associated with fewer ER visits and respiratory infections in offspring over two decades later. In contrast, *current* family SES was not related to any of the child health care outcomes. Consistent with the literature, children of older parents made relatively more outpatient visits ( $\beta = .31$ ,  $p < .01$ ). They also made fewer visits to ER facilities, although this effect is only seen in Models 3 and 4 of the regression predicting ER visits, after the parenting variables have entered the equation ( $\beta = -.15$ ,  $p < .05$ ). As anticipated, greater neighborhood risk also predicted a pattern of health care for offspring associated with poorer health, specifically, relatively greater use of ER services ( $\beta = .13$ ,  $p < .05$ ).

In Model 2 of the regressions, parental health care usage before the child's conception was a significant predictor of both non-ER and ER services for their children (see Table III;  $\beta = .17$ ,  $p < .01$  and  $\beta = .14$ ,  $p < .05$ , respectively) and higher rates of respiratory illness (see



Table III. Results of the Final Equation of Regression Models for Type of Health Service Use (n = 250)

Predictors	Nonemergency visits (β)				Emergency room visits (β)			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
<b>Block 1: Demographics</b>	R <sup>2</sup> change = .11**; Adj. R <sup>2</sup> = .09; F = 4.90**				R <sup>2</sup> change = .11**; Adj. R <sup>2</sup> = .09; F = 4.84**			
Parent gender	.04	-.00	-.01	.00	-.10	-.13	-.10	-.10
Child gender	-.05	-.05	-.04	-.06	-.01	-.01	-.02	-.01
Parents' childhood SES	-.09	-.07	-.08	-.08	-.25**	-.23**	-.23**	-.23**
Current family SES	-.03	-.03	-.08	-.05	-.00	-.00	-.03	-.02
Age at birth of child	.31**	.31**	.27**	.25**	-.10	-.10	-.15*	-.16*
Neighborhood risk	-.11	-.11	-.12 <sup>†</sup>	-.10	-.13*	-.13*	-.13*	-.13*
<b>Block 2: Parent health</b>	R <sup>2</sup> change = .03*; Adj. R <sup>2</sup> = .11; F = 4.36**				R <sup>2</sup> change = .021; Adj. R <sup>2</sup> = .10; F = 3.91**			
Parents' health care		.17**	.18**	.17**		.14*	.14*	.13*
Parental depression		.04	.06	.05		.03	.05	.05
Parental anxiety		-.06	-.08	-.07		-.04	-.06	-.06
<b>Block 3: Parenting</b>	R <sup>2</sup> change = .05**; Adj. R <sup>2</sup> = .15; F = 4.66**				R <sup>2</sup> change = .07**; Adj. R <sup>2</sup> = .15; F = 4.72**			
Parental Support			.15*	.11			.06	.04
Parental Structure			-.08	-.07			-.09	-.09
Behavioral Control			-.17**	-.16**			-.24**	-.23**
<b>Block 4: Interactions</b>	R <sup>2</sup> change = .02**; Adj. R <sup>2</sup> = .17; F = 4.95**				R <sup>2</sup> change = .00; Adj. R <sup>2</sup> = .15; F = 4.44**			
Parental support X Childhood SES				-.16**				-.06
Parental Structure X Childhood SES				.02				.02
Behavioral Control X Childhood SES				-.00				.02

Note. Level of statistical significance \*\*p < .01, \*p < .05.

Table IV; β = .19, p < .01). Finally in terms of mental health problems, parental depression predicted more visits for treatment of ear infections in offspring (see Table IV; β = .14, p < .05). Unexpectedly, higher parental anxiety predicted fewer visits for ear infections (β = -.16, p < .05).

**Effects of Parenting on Child Health Outcomes**

To address the main hypotheses of the study, we examined the effects of the three parenting practices—support, structure, and behavioral control—with the above factors controlled in the third model of the regression analyses (see Tables III and IV). First, the overall effect of parenting on each outcome was computed from the R-square change associated with Model 3, when they were entered together as a block. The three parenting variables together accounted for the following percentages of variance in the outcome variables when they entered the equations, controlling for the SES and parent health predictors entered in the previous models: nonemergency care, 5%, p < .01; emergency care, 7%, p < .01; ear infections, 2%, ns; acute respiratory infections, 4%, p < .01.

We next examined the specific effects of the three parenting dimensions on each health care outcome. Consistent with our first hypothesis, parental support was a significant predictor of the rate of nonemergency service use (β = .15, p < .05). However, support did not

affect children’s rate of ER visits. In other words, more supportive parents took their children to the doctor for nonemergency care more often than less supportive parents. In addition, parent’s childhood history of family disadvantage was moderated by supportive parenting, as described below.

There were also significant effects of behavioral control on children’s rate of nonemergency service use and ER visits. Greater control decreased children’s rates of both nonemergency care and ER visits (β = -.17, p < .01 and β = -.24, p < .01, respectively). That is, the children of more controlling parents used both types of health services less frequently than children of less controlling parents. Children of more controlling parents also had fewer visits for treatment of respiratory illness (β = -.13, p < .05). Parental structure did not significantly affect the rate of visits for either nonemergency or ER care, but it specifically predicted a lower rate of consultation for acute respiratory illnesses (β = -.14, p < .05).

**Moderation of SES by Parenting**

The interactions between parents’ childhood and current SES and parental support, structure, and control were examined in the final model of each regression. Current SES did not interact with any of the parenting variables and, as noted above, also had no main effects in any of the regressions. To reduce the total number of terms in the analyses

Table IV. Results of the Final Equation of Regression Models for Type of Physical Ailment (n = 250)

Predictors	Ear infections (β)				Respiratory illnesses (β)			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
<b>Block 1: Demographics</b>	R <sup>2</sup> change = .03; Adj. R <sup>2</sup> = .01; F = 1.29				R <sup>2</sup> change = .05; Adj. R <sup>2</sup> = .02.; F = 2.03			
Parent gender	-.07	-.07	-.07	-.07	.08	.03	.03	.03
Child gender	-.11	-.12 <sup>†</sup>	-.12 <sup>†</sup>	-.13*	-.06	-.06	-.06	-.07
Parents' childhood SES	-.12	-.11	-.11	-.11	-.18**	-.16*	-.16*	-.16**
Current family SES	-.02	-.02	-.02	-.01	.04	.04	.01	.03
Age at birth of child	.00	.01	-.00	-.02	.09	.10	.06	.06
Neighborhood risk	.00	-.02	-.02	-.01	-.04	-.04	-.04	-.03
<b>Block 2: Parent health</b>	R <sup>2</sup> change = .04*; Adj. R <sup>2</sup> = .04; F = 2.14*				R <sup>2</sup> change = .03; Adj. R <sup>2</sup> = .05; F = 2.37*			
Parents' health care		.09	.10	.09		.19**	.20**	.19**
Parental depression		.14*	.15*	.13*		.03	.04	.03
Parental anxiety		-.16*	-.18**	-.17*		-.01	-.04	-.03
<b>Block 3: Parenting</b>	R <sup>2</sup> change = .02; Adj. R <sup>2</sup> = .05; F = 2.07*				R <sup>2</sup> change = .04**; Adj. R <sup>2</sup> = .08; F = 2.84**			
Parental Support			.08	.05			.11	.09
Parental Structure			-.12	-.11			-.14*	-.14*
Behavioral Control			-.06	-.05			-.13*	-.12
<b>Block 4: Interactions</b>	R <sup>2</sup> change = .02*; Adj. R <sup>2</sup> = .06; F = 2.29**				R <sup>2</sup> change = .01; Adj. R <sup>2</sup> = .09; F = 2.87**			
Parental support X Childhood SES				-.14*				-.11
Parental Structure X Childhood SES				.00				.04
Behavioral Control X Childhood SES				-.03				.02

Note. Level of statistical significance \*\*p < .01, \*p < .05.

and enhance the clarity of the tables, only interactions between childhood SES and parenting were retained in the models shown in Tables III and IV. When these interactions were included in Model 4 of the analyses, associations between parents' childhood SES and children's rates of nonemergency care ( $\beta = -.16, p < .01$ ) and treatment of ear infections ( $\beta = -.14, p < .05$ ) were moderated by parental support. Simple slope analyses (Hayes & Matthes, 2009) revealed that under conditions of highly supportive parenting, children whose parents came from lower socioeconomic childhood backgrounds received more nonemergency care and had higher rates of medical treatment for ear infections ( $\beta = -.49$  and  $-.44$ , respectively, both  $p < .01$ ). In contrast, among children whose parents were less supportive, parents' childhood socioeconomic background had no significant association with rates of care ( $\beta = .16$  and  $.05$ , both ns, for non-ER care and ear infections, respectively).

### Discussion

The aim of the present study was to examine whether parenting behaviors affect patterns of health care for young children. The results of the study generally support a multideterminant model of early health care: Including parenting behaviors in addition to other established predictors such as parents' own health-seeking behaviors,

parents' mental health problems, neighborhood characteristics, and family demographics. Greater parental support was associated with increased rates of nonemergency care and a higher ratio of outpatient to ER services, a pattern typically reflecting better health and effective use of health services (Starfield et al., 2005). Supportive parenting was particularly important for children whose parents came from lower socioeconomic backgrounds. For those children, more supportive parenting was associated with greater use of nonemergency facilities. In addition, use of behavioral control by parents predicted lower rates of both nonemergency care and ER visits, as well as fewer diagnosed respiratory illnesses.

Some important and unique features of the present study include the inclusion of early health care usage within a developmental conceptual framework, use of comprehensive government health care records to ensure systematic reporting, and inclusion of both parent and child health care records to control for parental patterns of health care use and common factors, which affect both parent's and child's health. Use of a lower income longitudinal community-based sample with identified risk for a variety of health problems is another unusual feature of the study. Finally, the study was carried out within the Canadian "universal" health care system. It is likely, therefore, that factors other than affordability were determinants of health care usage.

Possible mechanisms for the positive effects of parental support on children's care are speculative, as discussed above, but include the possibility that supportive parenting creates an environment in which children are encouraged by parents to express their symptoms and needs. Supportive parenting may also enhance children's coping ability and compliance, resulting in pleasanter, easier, and more frequent visits for preventive and health care treatments. Contrary to expectations, parental structure was not associated with the rate of use of nonemergency care, ER visits, or hospitalization. This is particularly surprising given that organizational skills are important when it comes to making and keeping appointments. However, it is possible that little parental consistency and organization are actually required to provide appropriate health care when children's health problems warrant medical attention, such that parental structuring would not neatly translate to rates of service use. As hypothesized, parental structure was associated with fewer treatments for respiratory illness, suggesting that structure may have beneficial effects on children's health.

As predicted, children of behaviorally controlling parents had lower rates of emergency visits. However, in contrast to what we expected, these children also had lower rates of nonemergency visits. Although this finding was not consistent with our predictions, it may suggest that at least during early childhood, the greater use of behavioral control may have a protective effect on health, resulting in lower rates of ambulatory care (i.e., nonemergency care and ER visits). More controlling parents may be avoiding dangerous situations (e.g., installing baby gates to keep kids nearby and safe from hazards; selecting more structured child care environments for out of home care), and avoiding infections (providing clean and clutter free homes, less unsupervised contact with peers). Consistent with this interpretation, parental control was associated with fewer diagnosed respiratory illnesses.

The final hypothesis of this study was that disadvantaged conditions (parents' history of SES during their childhood; families' current SES) would be moderated by parenting behaviors. That is, the beneficial effects of positive parenting behaviors would be most visible under conditions of family disadvantage. Of the two indices of family SES and the three parenting practices, only two interaction effects emerged as significant. Under conditions of highly supportive parenting, children whose parents had experienced lower socioeconomic conditions received higher rates of outpatient nonemergency care, including more visits for treatment of ear infections. This is the pattern expected for predictors of positive health outcomes (Starfield et al., 2005).

It is possible that parents' behavior, in terms of parenting style and health care, models their own child care and health care experiences. In the 1950s and early 1960s, lower income families in Canada had less access to primary health care (which was not covered by universal health insurance at that time) than more affluent families. Mothers from lower income families were less likely to learn about the importance of regular nonemergency visits to health care providers from their own childhood experiences. For these mothers, having a more nurturing and supportive approach to child rearing might overcome their lack of direct experience, helping them to recognize the importance of appropriate and timely health service use for their own children. Interestingly, families' current SES did not predict health care usage for their children. This confirms the idea that when affordability is attained across the population through universal health insurance, multiple factors such as parenting, parent's mental health, neighborhood characteristics, parent's background in terms of disadvantage, and other established risk factors continue to play a role in determining patterns of health care for children.

In terms of intergenerational patterns, parents' own health care during the years before the child's conception was a predictor of children's early childhood care. We are unaware of other studies reporting this "nonoverlapping" longitudinal intergenerational finding (i.e., parental health history before the child's conception and birth, predicting pediatric health care between ages 1 and 6 years), but it is consistent with reports of correlations between parental and offspring health care and service usage (i.e., usage by parents and children during the same or an overlapping period; Broadhurst, 2003; Janicke et al., 2001).

### **Limitations and Directions for Future Research**

Though this study provides new insight into the factors that influence child health and service use, there are some limitations that merit acknowledgement and suggest directions for further research. First, the amount of explained variance in this study was small to moderate, with standardized beta coefficients for significant parenting effects ranging in size from .13 to .24. However, modest effect sizes are relatively common in health service research, as there are many factors that contribute to children's patterns of health care use (e.g., Browne & Jenkins, 2012; Morrongiello, 2005; Schwebel & Brezaussek, 2010). A power analysis confirmed that some small effect sizes for the full regressions may not have been detected with the current design and sample size of 250 parent-child dyads. Another limitation due to measurement issues is that the reliability coefficients for two of the parenting dimensions

(structure,  $\alpha = .68$ ; control,  $\alpha = .69$ ) are below the usual standard of  $.70$ . As a result of the relative inconsistency between items within these two scales, relations between these dimensions and the health outcomes may be underestimated. Another limitation of the present study is that it was carried out within a specific geographic, ethnic, and cultural context. In addition, only one parent's social and health history was available in each family. Replication in other populations and health care systems, larger samples, and including both parents in the design would clarify the generality of the present findings.

A more conceptual limitation of the present design is that the processes that relate parenting to children's health care are not specified. It could be that some parents are more likely to take their children in for timely outpatient care, or alternatively, that parenting behaviors affect children's actual health and therefore their need for different types of care. Future research may be focused more directly on the processes relating parenting to children's health and use of health care services.

This issue relates directly to an inherent limitation in the use of data from health service usage: The ambiguous nature of medical treatment rates as an indicator of health. Depending on the context, high rates of treatment may indicate that a child is more often ill, or alternatively, that parents are more likely to take their children for appropriate treatment. However, the validity of the assumptions in this study (e.g., that non-ER care often reflects timely use of services, preventive interventions, and responsiveness to early signs of illness) is supported in the literature (Adler & Rehkopf, 2008; Larson & Halfon, 2010). Replication and extension of these findings should include complementary measures of both health status and care, potentially including parent and physician reports, self-reports from older children and adolescents, and potentially even results of laboratory or other confirmative diagnostic tests. Other measures of general health, such as children's nutritional status, would also be interesting, especially among economically disadvantaged populations.

### **Implications for Prevention and Applied Clinical Practice**

The present findings suggest that parenting practices may play a potentially important role in improving and optimizing care, particularly among economically disadvantaged and other "at-risk" populations. Many of the available programs focusing on improving parental support for children's health focus on specific health-related practices (e.g., hand washing, food preparation, safety-proofing homes). Although these programs may be effective for

achieving specific goals, it is likely that teaching parents' more broadly applicable approaches to child rearing may also be beneficial for early health.

Pediatric, health, and developmental psychologists may be in a unique position to design, implement, and evaluate new programs focusing on their established areas of expertise in parenting and child development. Children in families with disadvantaged backgrounds and living in poor neighborhoods are known to be at high risk for poor health and less than optimal usage of health care. The present findings suggest that they may also stand to gain the most benefits from interventions aimed at improving parenting skills.

### **Acknowledgments**

The Concordia Longitudinal Risk Project was initiated in 1976 by Jane Ledingham and Alex Schwartzman. The authors wish to thank Claude Senneville, Guang Hui Li, Alessandra Rivizzigno, and the Concordia Project team for their assistance in data collection, analysis, and manuscript preparation. Finally, the authors are most indebted to the participants in the study.

### **Funding**

This research was partially supported by grants from the Canadian Institutes of Health Research (grant number MOP-82876), the Social Sciences and Humanities Research Council of Canada (grant number 410-2005-1599), and the Fonds québécois de la recherche sur la société et la culture (grant number 125058).

*Conflicts of interest:* None declared.

### **References**

- Adler, N. E., & Rehkopf, D. H. (2008). U.S. disparities in health: Descriptions, causes, and mechanisms. *Annual Review of Public Health, 29*, 235–252. doi:10.1146/annurev.publhealth.29.020907.090852
- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage.
- Barber, B. K., Stolz, H. E., Olsen, J. A., Collins, W. A., & Burchinal, M. (2005). Parental support, psychological control, and behavioral control: Assessing relevance across time, culture, and method. *Monographs of the Society for Research in Child Development, 70*, 1–147. Retrieved from Wiley on behalf of the Society for

- Research in Child Development: <http://www.jstor.org/stable/3701442>
- Baumrind, D. (1989). Rearing competent children. In W. Damon (Ed.), *Child development today and tomorrow* (pp. 349–378). San Francisco: Jossey Bass.
- Braveman, P., & Barclay, C. (2009). Health disparities beginning in childhood: A life-course perspective. *Pediatrics*, *124*, S163–S175. doi:10.1542/peds.2009-1100D
- Braveman, P., Egerter, S., & Williams, D. R. (2011). The social determinants of health: Coming of age. *Annual Review of Public Health*, *32*, 381–98. doi:10.1146/annurev-publhealth-031210-101218
- Broadhurst, K. (2003). Engaging parents and carers with family support services: What can be learned from research on help-seeking? *Child and Family Social Work*, *8*, 341–350. doi:10.1046/j.1365-2206.2003.00289.x
- Brooks-Gunn, J., McCormick, M. C., Klebanov, P. K., & McCarton, C. (1998). Health care use of 3-year-old low birth weight premature children: Effects of family and neighborhood poverty. *The Journal of Pediatrics*, *132*, 971–975. doi.org/10.1016/S0022-3476(98)70393-2
- Browne, D. T., & Jenkins, J. M. (2012). Health across early childhood and socioeconomic status: Examining the moderating effects of differential parenting. *Social Science and Medicine*, *74*, 1622–1629. doi.org/10.1016/j.socscimed.2012.01.017
- Bugental, D. B., & Grusec, J. E. (2006). Socialization processes. In N. Eisenberg (Vol. Ed.), W. Damon, & R. M. Lerner (Eds.), *Handbook of child psychology, Vol. 3: Social, emotional, and personality development* (pp. 366–428). Hoboken, NJ: Wiley.
- Cadieux, G., & Tamblin, R. (2008). Accuracy of physician billing claims for identifying acute respiratory infections in primary care. *Health Research and Educational Trust*, *43*, 2223–2238. doi:10.1111/j.1475-6773.2008.00873.x
- Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.
- Cohen, S., Janicki-Deverts, D., Chen, E., & Matthews, K. A. (2010). Childhood socioeconomic status and adult health. *Annals of the New York Academy of Sciences*, *1186*, 37–55. doi:10.1111/j.1749-6632.2009.05334.x
- Conger, R. D., & Dogan, S. J. (2007). Social class and socialization in families. In J. E. Grusec, & P. D. Hastings (Eds.), *Handbook of socialization: Theory and research* (pp. 433–460). New York: Guilford.
- Davis, C. L., Delamater, A. M., Shaw, K. H., La Greca, A. M., Eidson, M. S., Perez-Rodriguez, J. E., & Nemery, R. (2001). Parenting styles, regimen adherence, and glycemic control in 4- to 10-year-old children with diabetes. *Journal of Pediatric Psychology*, *26*, 123–129. doi:10.1093/jpepsy/26.2.123
- De Genna, N. M., Stack, D. M., Serbin, L. A., Ledingham, J. E., & Schwartzman, A. E. (2006). From risky behavior to health risk: Continuity across two generations. *Developmental and Behavioural Pediatrics*, *27*, 297–309. doi:10.1097/00004703-200608000-00004
- Deković, M., Asscher, J. J., Manders, W. A., Prins, P. J. M., & van der Laan, P. (2012). Within-intervention change: Mediators of intervention effects during multisystemic therapy. *Journal of Consulting and Clinical Psychology*, *80*, 574–587. doi:10.1037/a0028482
- Diez Roux, A. V., & Mair, C. (2010). Neighborhoods and health. *Annals of the New York Academy of Sciences*, *1186*, 125–145. doi:10.1111/j.1749-6632.2009.05333.x
- Dow, W. H., & Rehkopf, D. H. (2010). Socioeconomic gradients in health in international and historical context. *Annals of the New York Academy of Sciences*, *1186*, 24–36. doi:10.1111/j.1749-6632.2009.05384.x
- Ellenbogen, M. A., & Hodgins, S. (2009). Structure provided by parents in middle childhood predicts cortisol reactivity in adolescence among the offspring of parents with bipolar disorder and controls. *Psychoneuroendocrinology*, *34*, 773–785. doi:10.1016/j.psyneuen.2008.12.011
- Emery, R. (1982). Interparental conflict and the children of discord and divorce. *Psychological Bulletin*, *92*, 310–330. doi 10.1037/0033-2909.92.2.310
- First, M. B., Spitzer, R. L., Williams, J. B. W., & Gibbon, M. (1995). *Structured clinical interview for DSM-IV-patient edition (SCID-P)*. Washington, DC: American Psychiatric Press.
- Frank, D. A., Casey, P. H., Black, M. M., Rose-Jacobs, R., Chilton, M., Cutts, D., . . . Cook, J. T. (2010). Cumulative hardship and wellness of low-income, young children: Multisite surveillance study. *Pediatrics*, *125*, 1115–1123. doi:10.1542/peds.2009-1078
- FSA Computing in the Humanities and Social Sciences. (2005). Canadian Census Analyzer. University of

- Toronto. Retrieved from [http://datacentre.chass.utoronto.ca/census/2001\\_pc\\_pccf\\_vfeb05.html](http://datacentre.chass.utoronto.ca/census/2001_pc_pccf_vfeb05.html)
- Ganzeboom, H. B., & Treiman, D. J. (1996). Internationally comparable measures of occupational status for the 1988 international standard classification of occupations. *Social Science Research, 25*, 201–239. doi:org/10.1006/ssre.1996.0010
- Hayes, A.F., & Matthes, J. (2009). Computational procedures for probing interactions in OLS and logistic regression: SPSS and SAS implementations. *Behavior Research Methods, 41*, 924–936. doi:10.3758/BRM.41.3.924
- Hughes, S. O., Power, T. G., Fisher, O., Mueller, S., & Nicklas, T. A. (2005). Revisiting a neglected construct: Parenting styles in a child-feeding context. *Appetite, 44*, 83–92. doi:org/10.1016/j.appet.2004.08.007
- Janicke, D. M., Finney, J. W., & Riley, A. W. (2001). Children's health care use: A prospective investigation of factors related to care-seeking. *Medical Care, 39*, 990–1001. doi 10.1097/00005650-200109000-00009
- Kochanska, G. (2002). Committed compliance, moral self, and internalization: A mediational model. *Developmental Psychology, 38*, 339–351. doi:10.1037/0012-1649.38.3.339
- Larson, K., & Halfon, N. (2010). Family income gradients in the health and health care access of US children. *Maternal and Child Health Journal, 14*, 332–342. doi:10.1007/s10995-009-0477-y
- Lohaus, A., Vierhaus, M., & Ball, J. (2009). Parenting styles and health-related behavior in childhood and early adolescence: Results of a longitudinal study. *Journal of Early Adolescence, 29*, 449–475. doi:10.1177/0272431608322954
- Manne, S. L., Jacobsen, P. B., Gorfinkle, K., Gerstein, F., & Redd, W. (1993). Treatment adherence difficulties among children with cancer: The role of parenting style. *Journal of Pediatric Psychology, 18*, 47–62. doi:10.1093/jpepsy/18.1.47
- Mechanic, D. (1980). The experience and reporting of common physical complaints. *Journal of Health and Social Behavior, 21*, 146–155. doi:10.2307/2136734
- Mills, R. S. L., Hastings, P. D., Helm, J., Serbin, L. A., Etezadi, J., Stack, D. M., ... Li, H. H. (2012). Temperamental, parental, and contextual contributors to early-emerging internalizing problems: A new integrative analysis approach. *Social Development, 21*, 229–253. doi:10.1111/J.1467-9507.2011.00629.X
- Minkovitz, C. S., Strobino, D., Scharfstein, D., Hou, W., Miller, T., Mistry, K., & Swartz, K. (2005). Maternal depressive symptoms and children's receipt of health care in the first 3 years of life. *Pediatrics, 115*, 306–314. doi:10.1542/peds.2004-0341
- Morrongiello, B. A. (2005). Caregiver supervision and child-injury risk: I. Issues in defining and measuring supervision; II. Findings and directions for future research. *Journal of Pediatric Psychology, 30*, 536–552. doi:10.1093/jpepsy/jsi041
- Murphy, D. A., Marelich, W. D., Armistead, L., Herbeck, D. M., & Payne, D. L. (2010). Anxiety/stress among mothers living with HIV: Effects on parenting skills and child outcomes. *AIDS Care, 22*, 1449–1458. doi:10.1080/09540121.2010.487085
- Nock, S., & Rossi, P. (1979). Household types and social standing. *Social Forces, 57*, 325–345. doi:10.1093/sf/57.4.1325
- Power, T. G. (2002). *Parenting dimensions inventory—short version (PDI-S): A research manual*, (Unpublished manuscript). University of Houston, Texas.
- Root, A. E., Hastings, P. D., & Maxwell, K. L. (2012). Environmental contributions to the development of social competence: Focus on parents. In V. Anderson, & M. Beauchamp (Eds.), *Developmental Social Neuroscience and Childhood Brain Insult: Implications for Theory and Practice* (pp. 91–115). New York: Guilford Press.
- Schwartzman, A. E., Serbin, L. A., Stack, D. M., Hodgins, S., & Ledingham, J. (2009). Likeability, aggression, and withdrawal in childhood, psychiatric status in maturity: A prospective study. *European Journal of Developmental Science, 3*, 55–67. doi:10.3233/DEV-2009-3107
- Schwebel, D. C., & Brezausek, C. M. (2010). How do mothers and fathers influence pediatric injury risk in middle childhood? *Journal of Pediatric Psychology, 35*, 806–813. doi:10.1093/jpepsy/jsp130
- Serbin, L. A., Cooperman, J. M., Peters, P. L., Lehoux, P., Stack, D. M., & Schwartzman, A. E. (1998). Inter-generational transfer of psychosocial risk in women with childhood histories of aggression, withdrawal or aggression, and withdrawal. *Developmental Psychology, 34*, 1246–1262. doi:10.1037/0012-1649.34.6.1246
- Serbin, L. A., Peters, P. L., & Schwartzman, A. E. (1996). Longitudinal study of early childhood injuries and acute illnesses in the offspring of adolescent mothers who were aggressive, withdrawn, or aggressive-withdrawn in childhood. *Journal of Abnormal*

- Psychology*, 105, 500–507. doi:10.1037/0021-843X.105.4.500
- Slater, M. A., & Power, T. G. (1987). Multidimensional assessment of parenting in single parent families. In J. Vincent (Ed.), *Advances in family, intervention assessment, and theory* (Vol. 4, pp. 197–228). Greenwich, CT: JAI.
- Soper, D.S. (2014). Post-hoc Statistical Power Calculator for Multiple Regression [Software]. Retrieved from <http://www.danielsoper.com/statcalc>
- Stack, D. M., Serbin, L. A., Girouard, N., Enns, L. N., Bentley, V. M., Ledingham, J. E., & Schwartzman, A. E. (2012). The quality of the mother-child relationship in high risk dyads: Application of the emotional availability scales in an intergenerational, longitudinal study. *Developmental Psychopathology*, 24, 93–105. doi:10.1017/S095457941100068X
- Starfield, B., Shi, L., & Macinko, J. (2005). Contribution of primary care to health systems and health. *Milbank Quarterly*, 83, 457–502. doi:10.1111/j.1468-0009.2005.00409.x
- Statistics Canada. (2008). *Fertility: Overview*. Ottawa: Industry Canada, Catalogue number 91-209-X.
- Statistics Canada. (2012a). Low-income lines. Ottawa: Income Statistics Division. Catalogue number 75F0002M.
- Statistics Canada. (2012b). Low income cut-offs (1992 base) before tax. Retrieved from <http://www.statcan.gc.ca/pub/75f0002m/2012002/tbl/tbl02-eng.htm>
- Steele, R. G., Long, A., Reddy, K. A., Luhr, M., & Phipps, S. (2003). Changes in maternal distress and child-rearing strategies across treatment for pediatric cancer. *Journal of Pediatric Psychology*, 28, 447–452. doi:10.1093/jpepsy/jsg035