

**Parenting Stress, Maternal Perception, and Child Development in Families
Experiencing Adversity**

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Contribution Statement

K.M. and C.G. are co-first authors. K.M., C.G., H.S., C.D., and K.B. contributed to the design and implementation of the research. K.M. analysed the data, and all authors contributed to the writing of the manuscript.

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Childhood is a critical period for growth and development that lays the foundation for affective stability, cognitive ability, and physical health well into adulthood (Pechtel & Pizzagalli, 2011; Shonkoff et al., 2012). Child development is affected by family environment, where parental stress can affect children's social and behavioural development (Anthony et al., 2005). Stress can be intergenerational and cyclical; children living in families with low income are more susceptible to developmental delays when exposed to chronic stress in the family, and links between parenting stress, child behaviour, and parent behaviour influence each other throughout childhood (Burt, McGue, Krueger, & Iacono, 2005; Mackler et al., 2015; Schermerhorn et al., 2013). Chronic stress, or any type of repeated, sustained, or extreme stress occurring in the absence of supportive parent-child relationships, and that overwhelms children's coping strategies, can become toxic stress (Shonkoff et al., 2012). There is variability among children in their vulnerability to adverse rearing conditions and their openness to nurturing environments (Bouvette-Turcot, Bernier, & Meaney, 2013). In comparison to children not exposed to chronic stress, those exposed focus on meeting basic survival needs, therefore experiencing more limited opportunities for learning and brain development (Pechtel & Pizzagalli, 2011). Chronic stress can occur from cumulative exposure to: (a) family and social risk (e.g., mother single and unemployed, income below the poverty line, on public assistance, unable to meet basic needs, unable to meet medical needs, severe maternal depression); (b) low language and literacy stimulation; and (c) low maternal warmth and responsiveness (Mistry, Benner, Biesanz, Clark, & Howes, 2010). Children of parents experiencing high stress are likely to be exposed to chronic stress, since parenting stress is associated with: (a) less maternal warmth and responsiveness; (b) use of negative control strategies; (b) failure to adequately monitor children; and (c) failure to

provide cognitive stimulation (Baker, Jacobson, Raine, Lozano, & Bezdjian, 2007; Cprek, Williams, Asaolu, Alexander, & Vanderpool, 2015; Pinderhughes, Dodge, Bates, Pettit, & Zelli, 2000; Shah, Sobotka, Chen, & Msall, 2015).

In this paper, low income is defined as less than half the low-income cut-off (LICO), or spending at least 20% more of the family income on food, shelter, and clothing than the average Canadian family (Statistics Canada, 2012). Low income is the term used throughout this paper except when other authors use terms such as poverty or socio-economic status (SES), more recently referred to as socio-economic position. SES for Canadians refers to a number of factors including income, education, occupation, literacy, and cultural characteristics (Blisshen, Carroll, & Moore, 1987). SES is associated with prenatal and early neural system development, quality of parent-child interactions, cognitive stimulation, and brain development (Hackman, Farah, & Meaney, 2010). Children living with low income are at risk of persistent and poor developmental outcomes, and the strength of the association increases as the duration of living with low income increases (Hackman et al., 2010; McEwen & Stewart, 2014).

Parental distress experienced by families living with poverty can negatively impact parental responsiveness and discipline efficacy, ultimately leading to adverse child outcomes (Mistry, Vandewater, Huston, & McLoyd, 2002). Children of families living with low income and entering the school system are at a disadvantage compared to their peers, with long-term implications such as ability to complete high school, achieve meaningful employment, and maintain social and physical well-being as adults (Goodman et al., 2011; Pechtel & Pizzagalli, 2011). Dysfunctional parent-child interaction can occur more readily in families living with poverty, as strained parent-child relationships can be associated with a more negative and punitive parenting style, less access to sources of childhood enrichment, and decreased maternal mental health (Evans & Kim, 2013; Goodman et al., 2011; Huang,

Costeines, Kaufman, & Ayala, 2014). However, decreasing exposure to adverse experiences for children can increase well-being, and engaging in functional ways to handle stressful experiences can increase well-being (Ellis & Del Giudice, 2014).

Higher levels of chronic stress in the family can increase negative affectivity, such as self-reported negativity in the relationship between mother and child, and decrease positive affectivity, such as self-reported reciprocity and warmth between mother and child (Deater-Deckard, Li, & Bell, 2016). The perception of a difficult child by mothers living with low income impacted children's behavioural and social development, subsequently increasing maternal parenting stress (Barbot, Crossman, Hunter, Grigorenko, & Luthar, 2014).

However, the literature is limited regarding types of parenting stress and maternal perceptions of children's behaviour that influence child development particularly in families living with low income.

Purpose and Research Questions

The purpose of this study was to determine the role of maternal stress on child development in families on intake to a two-generation preschool program. The research question was as follows: What is the association between maternal parenting stress and risk of child developmental delay in personal social and adaptive domains? Bronfenbrenner's bioecological theory guided our research: (a) the microsystem, often unaccounted for in a research setting, the immediate environment such as home or school; (b) the mesosystem, or the intersecting relationships between microsystems; (c) the exosystem, an extension of the mesosystem containing social structures such as neighborhood; and (d) the macrosystem, an overarching societal blueprint such as culture, customs, or legal systems; most important of which are those which determine the place and priority of children and their caregivers (Bronfenbrenner, 1977). Masten (2018) identified these broader interdependent societal systems contribute to children's resiliency, leading to lifelong health and wellbeing.

Bronfenbrenner was influenced by Lewin (1890-1947), a Jewish scholar who fled Berlin during WWII. Lewin's (1948) diagrams depicted how social and environmental influences influenced individuals depending on personality, and groups, depending on homogeneity and size. Lewin's theories are congruent with current research regarding differential susceptibility, or that children differ in their susceptibility to environmental influences (Belsky, Bakermans-Kranenburg, & van IJzendoorn, 2007). This suggests that children who experience adversity may be particularly responsive to supportive environments (Hartman & Belsky, 2015).

Methods

This study was conducted in a large urban centre (> 1.3 million) in Western Canada between 2002 and 2008 at CUPS. CUPS is a non-profit community organization offering a wide range of programs and services for at-risk families living with low income in Calgary, AB. This preschool program was highlighted in a policy report by the National Center for Children in Poverty as the Canadian example of a successful two-generation, whole-family approach to developing resilience in families living with low income (Wilson-Simmons, Jiang, & Aratani, 2017). Details of this two-generation program are discussed fully in other publications (Benzies, et al., 2014; Benzies, et al., 2009).

Participants and setting. Families were referred to CUPS through community agencies working families living with low income, and by word of mouth. The target age for children at program intake was age 3 years, but children could enroll between age 2.5 and 5 years, and each family could enroll more than one child. Eligibility for this program included families living with low income (indicated by income less than half of Canada's low-income cut-off), mental illness, addiction, and/or social isolation, and the program had availability for approximately 50 children each year. Our longitudinal study of this two-generation preschool

program had intake data for 134 children, and of these 134, 88 mother-children dyads had data on parenting stress and child development.

Child measure. The Battelle Developmental Inventory- Screening Test 2nd ed. (BDI-ST) was used by program experts to assess children's development at program intake. The BDI-ST is a standardized, 100 item observational measure of global development for children aged 0 to 7 years (Newborg, Stock, Wnek, Guidubaldi, & Svinicki, 2005). The BDI-ST (Newborg et al., 2005) records development in five domains: Adaptive (self-care and personal responsibility); Personal-social (adult interaction, peer interaction, self-concept, and social role); Communication (receptive and expressive communication); Motor (gross, fine, and perceptual motor); and Cognitive (attention and memory, reasoning and academic skills, and perception and concepts). Raw scores with validated cut-offs were obtained and used to assign *pass*, *borderline*, or *fail* in each domain. In our study, we included two domains, personal-social and adaptive. For the purposes of the analysis, scores in the borderline or fail range were collapsed into one category (fail - in clinical range). Test-retest reliability for the five domains ranges from 0.77 to 0.90, and Cronbach's alphas from 0.85 to 0.96 (Newborg et al., 2005).

Maternal measure. Mothers' parenting stress was assessed at program intake using the Parenting Stress Index-Short Form (PSI-SF). The PSI-SF is a 36-item, self-reported measure of parenting stress with three subscales: Parental Distress; Parent-Child Dysfunctional Interaction; and Difficult Child. Items are scored on a 5-point Likert scale, with 1 representing *strongly agree* and 5 representing *strongly disagree* (Abidin, 1995). Higher scores indicate greater parenting stress on all three subscales, and scores above the 85th percentile are considered to be in the clinical range. Cronbach's alphas for the Parental Distress, Parent-Child Dysfunctional Interaction, and Difficult Child subscales are 0.87, 0.80, and 0.85, respectively (Abidin, 1995).

Procedures. Measures of global child development were administered at CUPS by trained research assistants and staff. Mothers completed other child developmental screeners, surveys, and psychological distress scales. Maternal consent and children's assent was obtained, and families received a \$40 gift certificate for their time. This research was conducted in accordance with the Declaration of Helsinki principles, and the University of Calgary Conjoint Health Research Ethics Board (CHREB) approved the study (E ID # 17566).

Data analysis.

We conducted the analyses in two steps. First, we ran bivariate associations among: (a) the PSI-SF subscale scores (Parental Distress; Parent-Child Dysfunctional Interaction; and Difficult Child); (b) the two BDI-ST domains (Adaptive and Personal-social); and (c) socio-demographic factors and all two preceding BDI-ST domains. We used Pearson's correlations for continuous variables and Phi/Cramer V associations for categorical variables. Second, based on significant findings ($p < .05$) in step 1, we conducted two multivariable logistic regression models to investigate the association between PSI-SF subscales and BDI-ST Adaptive and Personal-social domains. We used SPSS version 25.0 (SPSS, 2017) with significance set at $p < .05$ for both bivariate and multivariable models.

We found the missing data across all study variables included in the analysis averaged 9.2%. We imputed missing data in SPSS using multiple imputations (Lee & Simpson, 2014; Sterne et al., 2009), and creating ten datasets under a multivariate normal model. We reported pooled estimates for all proportions and model parameters generated by SPSS in our results. We conducted logistic regression analyses using: (a) the total sample with imputed data; and (b) only cases with complete data. There were minimal differences between the two sets of analysis, results from the imputed dataset are presented in Table 4.

Results

Socio-demographic characteristics of mothers and their children are presented in Table 1. The mean ages of participating children and mothers were 3.57 ($SD = 0.74$) and 29.85 ($SD = 6.41$) years, respectively. See Table 1.

Table 1

Socio-demographic Characteristics of the Participants

Variables	<i>N</i>	Frequency (%)
Children		
Gender (% male)	88	45(51.1)
Mothers		
Partnered	82	47(57.3)
Completed high school	83	50(60.2)
Culture	88	
Indigenous		27(30.7)
Other Canadian-born		40(45.5)
Recent Immigrants		21(23.9)

Note. Sample size varies because of missing data.

The proportion of children who scored at risk of developmental delay on the BDI-ST personal social domain was 39.5% and 35.5% on the BDI-ST adaptive domain. See Table 2.

Table 2

Means, Standard Deviations, Frequencies, and Percentages of BDI-ST and PSI-SF Scores in Clinical Range

Variables	<i>N</i>	<i>M (SD)</i>	Frequency (%)
BDI-ST			
Adaptive	76	—	27(35.5)
Personal-social	76	—	30(39.5)
PSI-SF			
Parental Distress	88	30.1(8.4)	—
Parent-Child Dysfunctional Interaction	88	22.1(6.4)	—
Difficult Child	88	29.2(7.7)	—

Note. Sample size varies because of missing data.

BDI-ST Battelle Developmental Inventory Screening Test - Second Edition.

PSI-SF Parenting Stress Index-Short Form.

We found significant positive correlations between the three PSI-SF subscale scores and BDI-ST personal-social and adaptive domains. Scores on all three PSI-SF subscales were significantly and positively correlated with risk of delay in personal-social and adaptive domains. However, we found no significant associations between socio-demographic factors and the BDI-ST personal-social and adaptive domains and therefore were not included in the final model. See Table 3.

Table 3

Correlations/associations between BDI-ST Personal-social and Adaptive Domains, PSI-SF Parenting Subscales, and Socio-demographics

Subscales	Variables	1	2	3	4	5	6	7	8	9	10
1	BDI-ST Personal-social Domain	—	0.47**	.37**	.31**	.51**	-.17 ⁺	.18 ⁺	-.22 ⁺	.13 ⁺	-.07
2	BDI-ST Adaptive Domain		—	.38**	.29*	.49**	-.21 ⁺	.05 ⁺	-.06 ⁺	-.03 ⁺	.02
3	PSI-SF Parental Distress			—	.52**	.71**	-.08	.16	-.02	-.13	-.13
4	PSI-SF Parent-Child Dysfunction				—	.52**	.06	.22	-.01	-.24	.19
5	PSI-SF Difficult Child					—	-.13	.16	.00	-.02	-.17
6	Child sex						—	.12 ⁺	-.15 ⁺	-.16 ⁺	.09
7	Mother partnership status							—	.09 ⁺	-.30* ⁺	.01 ⁺
8	Mother completed high school								—	.20 ⁺	.86
9	English spoken at home									—	.01
10	Culture										—

Note. ** $p < .01$; * $p < .05$; ⁺ Phi/Cramer V association

Our logistic regression model demonstrated the PSI-SF difficult child subscale was associated with an increased risk of delay on BDI-ST personal-social and BDI-ST adaptive domains. Children of mothers scoring high on the PSI-SF difficult child subscale were 1.03 and 1.18 times more likely to have an increased risk of delay on BDI-ST personal-social and adaptive domains. See Table 4.

Table 4

Risk of Delay in Personal-social and Adaptive BDI-ST Domains

	BDI-ST Personal-social Domain		BDI-ST Adaptive Domain	
	OR (95% CI)	<i>p</i> Value	OR (95% CI)	<i>p</i> Value
PSI-SF Parental Distress	1.00 [.91–1.09]	.94	1.05 [.95–1.15]	.34
PSI-SF Parent-Child Dysfunction	1.03 [.93–1.13]	.61	1.03 [.92–1.12]	.79
PSI-SF Difficult Child	1.18 [1.04–1.32]	.01	1.15 [1.03–1.29]	.01

We found that mothers scoring high in parenting stress on the PSI-SF difficult child subscale (maternal perception of a difficult child), were more likely to have children with significant risk of developmental delay in personal-social and adaptive behaviours. These results are consistent with previous research showing that maternal stress and early childhood adversity in families living with low income has a negative impact on cognitive, behavioural, and socioemotional development (Conger & Donnellan, 2007; Evans & Kim, 2013; Goodman et al., 2011; Mistry et al., 2010; Shonkoff et al., 2012). Throughout the literature, higher levels of stress were more detrimental to child development than lower levels of stress (Ayoub, Vallotton, & Mastergeorge, 2011; Huang et al., 2014; Palmer et al., 2013). Another

study identified increased parenting stress in parents was associated with behavioural and personal-social problems in preschool children (Webster, Majnemer, Platt, & Shevell, 2008). A similar study reported that children of parents with high levels of stress had difficulties coping with interpersonal, emotional, and social demands (Cappa, Begle, Conger, Dumas, & Conger, 2011). Parenting is a process requiring much skill along with substantial physical, emotional, and mental resources; living with a lack of personal and social resources contributes to stress, and parenting compounds it. Bronfenbrenner (1986) emphasized mindfulness of elements of social structure, particularly child and family policies affecting children's development, warned of the growing gap between rich and poor in society, with detrimental effects on families, and identified the responsibility of science to investigate, design, and evaluate strategies to create positive social and family environments contributing to human health and development.

There exists a transactional relationship between parenting stress and child behaviour problems (Neece, Green, & Baker, 2012). An Italian study exploring parenting stress treatment and positive behaviour outcomes in children with Autism Spectrum Disorder identified the negative influence of parental perception of a difficult child impeded children's developmental outcomes, particularly in those outcomes requiring reciprocal interactions between parent and child (Strauss et al., 2012). Bronfenbrenner (1999) described reciprocal proximal processes occurring in children's immediate environment such as mother's continued responsiveness, and regular, ongoing, parent-child interactions as powerful predictors of developmental outcomes. Cooley (1926) first wrote about the interaction newborns required to grow, as resembling a tennis game that no one can play alone. These reciprocal processes may now be considered "serve and return" interactions (National Scientific Council on the Developing Child, 2015). As proximal processes are engaged in, the characteristics of the process, person, context, and time must be examined as having potential

to influence the processes and subsequent outcomes. A Netherlands study examining the relationship between maternal perceptions of family stress and children's behaviour problems in second-generation immigrant mothers (Yaman, Mesman, van IJzendoorn, & Bakermans-Kranenburg, 2010) identified that maternal perceptions of competency as a parent was a strong predictor of child behaviour in toddlerhood. Another study examining the relationship between behaviour problems in children with global delay identified increased parenting stress contributed to child behavioural problems and difficult parent-child interactions (Tervo, 2012). Our research focused on: (a) the role of the proximal (immediate) environment and interactions with others in that environment, on children's development; (b) the potential of interlinking environmental stresses to affect children's development; and (c) increased stress within the family system contributing to poorer outcomes for children (Bronfenbrenner, 1977, 1986).

One study reported parenting stress affecting children's social behaviour (Anthony et al., 2005), while another reported higher parenting stress when children had lower self-regulation skills, similar to the BDI-ST adaptive domain (Ayoub et al., 2011). Bidirectional parent-child interactions were also demonstrated in a comprehensive review of the association between parent's emotional socialization behaviours (ESB's, or processes by which parents socialize their children to emotions) and children's behaviour problems, with negative parental ESB's (such as avoidance of emotional discussion and punitive reaction to emotions) having greater effects than positive parental ESB's (Johnson, Hawes, Eisenberg, Kohlhoff, & Dudeney, 2017). A lack of goodness of fit, or match between a mother and child, was found to contribute to parenting stress, developmental delay and child behaviour problems in another recent study (Newland & Crnic, 2017). A study using the PSI long version identified that PSI distractibility/hyperactivity scores parents reported (parenting stress in relation to the child's distractibility as an infant), were significant predictors of

behaviour problems at age 7, which may represent a negative stable parental cognitive representation potentially unrelated to child characteristics or behaviour (Benzies, Harrison, & Magill-Evans, 2004). Parenting stress has extensive influence on children's health and development, highlighting the importance of finding ways to decrease parenting stress, especially in families living with low income (Evans & Kim, 2013; Kim & Kochanska, 2012; Kochanska & Kim, 2013; Newland, Crnic, Cox, & Mills-Koonce, 2013). Our identification of the association between higher maternal stress in relation to children's adaptive and personal-social development adds to the existing literature, however the effect of social support on parenting stress is an area for further research. Lewin (1946) described the need for courage, co-operation, and equality when engaging in research with vulnerable groups, emphasizing that those in the majority have a responsibility for those in the minority. Bronfenbrenner identified that although disruption in family units and resultant adverse effects have occurred, an "immunizing" factor is evident through strong support from others such as relatives, neighbours, churches, and child programs through attention to the child and assistance for the parent (Bronfenbrenner & Morris, 2006, p. 284). Masten (2018) outlined the necessity of a systems approach, mindful of the intergenerational effects of adversity and the multiple opportunities for facilitating resiliency. For families living with intergenerational cycles of low income, mental illness, addiction, and social isolation, there exists much societal responsibility in providing environments facilitating resiliency.

Limitations and Future Directions

This study explored the relationship between maternal parenting stress and the risk of child developmental delay using an observational measure. To our knowledge, no previous study has reported the association between maternal parenting stress and perception of difficult child in relation to children's personal-social and adaptive development in families experiencing adversity. However, this study is limited by a small sample size of 88 mothers

and their children. Also, capturing parenting stress of mothers only fails to acknowledge the contribution to child development of parenting stress experienced by fathers (Ramey et al., 2015). The study used the short form of the PSI to avoid respondent burden. Although the PSI-SF is valid and reliable, the full PSI version may have provided additional information regarding parenting stress. The study did not include variables such as parenting behaviours and parental conflict, which may have mediated maternal stress and child development. This study also did not include certain child variables including preterm birth, birth weight, small for gestational age (SGA), and/or mother's smoking and/or substance use. The sample for this study included families living with low income in a large urban center and results may not be generalizable to other populations.

Future studies with larger samples with measures of parenting stress in both mothers and fathers are recommended. Further research may also explore other factors that have the potential to impact child development and resiliency in families living with low income and managing multiple stressors, including parenting perceptions of children, parent and child behaviours, parental conflict, and parent-child interaction.

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