Maternal Parenting and Individual Differences in Young Children’s Prosocial Abilities: Risk and Resilience

Doctor of Philosophy 2012
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Abstract

The purpose of these studies was to examine moderation processes for the influence of early maternal parenting practices on young children’s prosocial outcomes. Data for both studies were drawn from the Kids, Families, and Places study. Observational measures of mothers’ parenting practices and children’s cooperation outcomes were collected in the home, and both mothers and fathers reported on their children’s prosocial conduct. Study 1 was a longitudinal analysis of the interaction between maternal sensitivity after birth (Time 1) and children’s joint attention (JA) skills (Time 2, 18 months later) on children’s cooperation skills at 18 months. Findings indicated that children’s concurrent Responding to JA (RJA) was associated with cooperation and early maternal sensitivity moderated this relationship. Children high in RJA showed good cooperation irrespective of maternal sensitivity. However, low RJA was associated with high cooperation in the presence of high maternal sensitivity. Study 2 used person-oriented analyses to examine patterns of maternal parenting associated with young children’s concurrent prosocial behaviour across socioeconomic contexts. Latent Profile Analysis identified 3 profiles of parenting: Positive (14%), Negative (36%), and Combined (moderate levels of both positive and negative practices; 50%). Mothers from low-income families and those living in disadvantaged neighbourhoods were more likely to belong to the Negative or the Combined profiles. Moderation analyses indicated the protective
influence of the Combined profile of parenting for children residing in impoverished socioeconomic contexts. In the context of low family SES and high neighbourhood disadvantage, children were rated as more prosocial if mothers use a combined style of parenting. A protective-enhancing effect was found, in which these high-risk children were actually rated better than those children who did not live in such adversity. Together, results highlight the importance of studying the association between parenting and prosocial outcomes within an ecological and contextual framework, with interactions amongst both child-level and distal factors, for understanding individual differences in prosocial development.
Acknowledgements

I am indebted to many individuals who have contributed instrumentally to the completion of this project and to my training in general, and to whom I would like to express my most sincere appreciation. I have been most fortunate to work with Dr. Jenny Jenkins, my academic advisor. Jenny, you have been an inspiration and mentor to me throughout every stage. Thank you for your instruction and guidance in academic matters, and insightful counseling in difficult personal times. Your influence will be everlasting. I was equally fortunate to have Dr. Michal Perlman and Dr. Janet Astington as members of my thesis committee. Your valuable insight and feedback improved this thesis’ quality substantially. Thank you also to the families who participated in the Kids, Families, and Places study, and without whom this project would not have been possible. To my fellow lab members, Krista, Rossana, Connie, Aarti, Amelia, Dillon, Heather, Mark, Jean-Christophe, and Mira, thank you for being my OISE family – your support and humour made this process motivating and enjoyable. I am most indebted to my loving family. To my parents, Frank and Diane, I cannot express in words the gratitude and love I feel for you both. Without you, my achievements would not have been possible. Thank you for supporting and encouraging me unconditionally, and teaching me to persevere with confidence to reach every dream. To my brothers, Aaron and Ben, and sister-in-law, Kalina, thank you for being a consistent stronghold and reminding me of the value of family. To my joyful niece, Elena, thank you for making me laugh. It has been such a joy to watch you grow. To my friends in Toronto, Vancouver, and around the world, thank you for your support that has overcome all distances. To my love and best friend Jeremy, aka Tape, thank you for your unconditional encouragement, understanding, and flexibility during this lengthy pursuit. I am so excited for what our future may hold.
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General Introduction

Prosocial behaviour, broadly defined as one’s voluntary responses to the needs of others to promote their well-being, is arguably the most central and the most adaptive quality of human nature. A range of affective and behavioural elements comprise a broad scope of prosocial characteristics, including compassion, conscience, empathy, sympathy, sharing, helping, cooperation and comforting. Over the last several decades, the study of developmental trends in prosocial conduct has received increased attention. Findings highlight normative age-related progression, with rapid development in other-oriented behaviour over the first few years of life (Eisenberg, Fabes, & Spinrad, 2006). Early abilities in this domain are a key indicator of concurrent and subsequent social, cognitive, and emotional abilities (Eisenberg et al., 2006).

Less understood are those influences that may contribute to observed individual differences in children’s acquisition of early prosocial milestones. In fact, very few studies have examined prosocial development in early childhood within an individual differences framework. Previous studies have highlighted various individual and social influences of interest (Eisenberg et al., 2006). Indeed, these relatively divergent lines of research, several to be reviewed here, have contributed meaningfully to our current understanding of the ontogeny and development of prosocial behaviour, but none can explain variance in this outcome in entirety. Rather, an integrative approach is necessary and children’s prosocial outcomes are likely determined by numerous additive and interacting factors (Eisenberg et al., 2006). The present studies attempt to elucidate interactive processes associated with interindivudual differences in children’s prosocial conduct during its emergent stage.
Two prominent theories guide the current studies’ main premises: biopsychosocial theory (Engel, 1977) and ecological systems theory (Bronfenbrenner, 1979). In general, these theories propose that developmental psychopathology is the consequence of an ongoing, dynamic, transactional interaction amongst factors from various layers of influence, including proximal factors (e.g., parenting socialization), child dispositional propensities (e.g., social cognition) and/or distal factors (e.g., the larger ecology such as culture or neighbourhood). Their unique interplay across development will differentiate individual differences in child outcomes.

Within this conceptual framework, moderation processes are investigated in Study 1 and Study 2. In such models, interaction effects are investigated to examine the extent to which the influence of a variable on an outcome is contingent on levels of a moderator variable (Baron & Kenny, 1986). Identifying significant interactions may highlight multiple simultaneous pathways through which children acquire competent prosocial abilities (Cicchetti & Rogosch, 1996; Kochanska, 1997). Moreover, it is possible to gain insight into factors that promote resilience amongst adversity (Luthar, Cicchetti, & Becker, 2000; Masten, 2001).

The bulk of research to date has focused primarily on the role of maternal socialization practices on children’s prosocial acquisition (Grusec, Davidov & Lundell, 2002; Hastings, Utendale, & Sullivan, 2007). Recent reviews agree on a consistent profile of childrearing amongst mothers of more prosocial children. Such parents are authoritative in style, marked by sensitivity, warmth, contingency and flexible positive control. They avoid authoritarian tactics, such as expressions of hostility, negativity or harsh criticism and punishment. An authoritative parenting context seems to be optimal for the learning and internalization of prosocial other-oriented behaviour (Hastings et al., 2007). Still, important questions remain in our
understanding of early socialization’s putative influences. Particularly, very little is known about interactive factors that may moderate the association between parental practices and child prosocial outcomes. Thus, two important extensions are examined in the current studies: (1) the role of child-level factors as moderators of this association, and (2) the nature of context-specific profiles of parenting, and their influence on prosocial outcomes as a function of contextual variables.

Study 1 examines a person-context moderation model. No doubt, children are born with varying dispositional capacities to be prosocial. Behavioural genetics research indicates that the disposition to be prosocial is, to some extent, an inherited trait (Zahn-Waxler, Robinson, and Emde, 1992). Beyond genetics, additional child correlates associated with better prosocial skills include being a girl, being older, and having a disinhibited temperament (Eisenberg et al., 2006). Although few studies have examined interactive processes amongst parenting and child factors, no doubt these developmental forces are in constant dynamic interaction, representing the potential for multiple pathways to competent prosocial development. Exemplary studies highlighting such complex processes have demonstrated the moderating role of gender and temperament (Hastings, Rubin, & DeRose, 2005; Kochanska, 1997). For example, the link between positive parenting and children’s prosocial behaviour has been shown to be more positive with more highly inhibited girls (Hastings et al., 2005).

In Study 1, children’s cooperation was investigated as a specific and unique prosocial outcome emerging in the second year. It distinctly requires both the social-cognitive capacity and the motivation to share intentions and coordinate behaviours to achieve a mutually effective social interaction with others (Brownell & Carriger, 1990; Tomasello, Carpenter, Call, Behne, & Moll, 2005). In this light, the child factor of interest in Study 1 is children’s Joint
Attention (JA), a critical social-cognitive ability emerging in the latter end of the first year. It includes a child’s ability to coordinate social attention with others regarding events or objects via nonverbal means, such as gaze and pointing. Indeed, it has received recent attention for its contribution to children’s cooperation abilities in the second year of life (Brownell, Ramani, & Zerwas, 2006; Tomasello & Carpenter, 2007). For reasons identified in the following pages, it is proposed that children’s joint attention abilities will interact with early maternal sensitive practices to influence children’s cooperation abilities.

Study 2 expands focus to the child’s broader ecology. The outcome in this study includes parental perceptions of their children’s prosocial behaviours in their milieu, including their demonstration of sympathy, help, and comfort towards others. Distal factors such as socioeconomic disadvantage are important, albeit rarely studied, determinants of such outcomes (Eisenberg et al., 2006). Their influence typically works via and in interaction with proximal processes including parenting socialization practices (Bronfenbrenner, 1979). Our understanding of associations between parenting and prosocial outcomes as they broaden to diverse contexts is rather limited, however, as data from most studies are drawn from samples of majority populations (e.g., European American, middle-class, two-parent families). This raises two important questions: First, are typologies of maternal parenting practices similarly defined across diverse socioeconomic contexts? Second, do they have similar influences on child prosocial outcomes across contexts, or are there unique profiles of “optimal” parenting associated with better prosocial skills amongst low-SES groups?

An ecological model of parenting (Garcia Coll et al., 1996) supports the notion that different sociocultural ecologies influence the perception, expression and function of parenting behaviours. It is reasonable to assume that optimal parental socialization goals and behaviours
will differ based on normative expectations and conditions of the environments in which families reside. Typically, parenting in economically disadvantaged contexts is marked by authoritarian practices (McLoyd, 1998). However, researchers have suggested that typical variable-oriented methodologies, such as factor analysis and linear regression, fail to capture variations in parenting across diverse groups of people (Bergman, 2002). Alternative person-oriented analyses may be used to identify qualitatively different subgroups of homogeneous individuals based on patterns of parenting behaviours (Bergman, 2002; Von Eye & Bergman, 2003). It is possible that common and optimal parenting in such contexts is characterized by a unique style of parenting rarely captured in the mainstream population.

A handful of studies have investigated variations in patterning of parenting practices specific to high-risk groups of African American mothers and their children living in disadvantaged circumstances (e.g., Baldwin, Baldwin, & Cole, 1990; Brody & Flor, 1998; McGroder, 2000). Preliminary results suggest that parenting is commonly characterized by a unique combination of both authoritative and authoritarian parenting practices. Furthermore, some evidence suggests that this profile appears to be necessary and adaptive for children’s positive outcomes amongst adversity (Baldwin et al., 1990; Brody & Flor, 1998). Study 2 extends these findings. It utilizes person-oriented methodology, Latent Profile Analysis, to (1) explore the nature of parenting profiles across a sample of mothers diverse in ethnicity and socioeconomic status, (2) identify contextual factors predictive of parenting profiles, and (3) examine associations between parenting profiles and children’s prosocial abilities as a function of socioeconomic variables, after controlling for ethnicity. The crux of this study is to identify a unique patterning of parenting behaviours that may contribute to resilient prosocial outcomes for at-risk children from disadvantaged socioeconomic contexts.
Study 1

Maternal Sensitivity and Children’s Joint Attention:

Multiple Pathways to Individual Differences in Cooperation in the Second Year

The development of cooperation represents a signal achievement for young children. It is a fundamentally distinct ability from other prosocial skills such as empathy, helping, and sharing, in that it requires the motivation and the social-cognitive capacity to share intentions and coordinate behaviours to achieve a mutually effective social interaction with others (Brownell & Carriger, 1990; Warneken & Tomasello, 2007). Arguably, this constitutes the foundation of human culture, distinguishing us from our nonhuman primates (Tomasello et al., 2005). Surprisingly, however, there have been few efforts to understand sources of interindividual variability in children’s cooperation in comparison to other forms of prosocial conduct, representing a significant gap in the literature. This is a critical area of research given that cooperation is a significant indicator of concurrent and subsequent cognitive, social-emotional and behavioural competencies (Alessandri, 1992; Brownell & Carriger, 1990).

The aim of the current longitudinal study was to identify sources of individual differences in cooperation within a person-context moderation model. Two lines of research highlight the influence of (1) maternal socialization experiences (Hastings et al., 2007; Kochanska, 1995), and (2) children’s social-cognitive competencies (Brownell et al., 2006; Tomasello et al., 2005). While these divergent lines of research are important in their own right, influences of social and child factors no doubt work in interaction (Beauchamp & Anderson, 2010; Bell, 1968; Sameroff, 1975), and moderating influences must also be examined. Although other prosocial outcomes have been of focus, this model has yet to be
extended to the study of cooperation. The current study examined the interactive influences of early maternal sensitivity and children’s joint attention skills on cooperation during its emergent stage.

The current study applied a longstanding methodology in developmental psychology that uses experimental tasks and manipulations of young children’s engagement with others in cooperative problem solving or games (e.g., Warneken, Chen, & Tomasello, 2006). Research using this methodology has provided tremendous insight into the early developmental progression of cooperation and into how young children understand social roles (Brownell & Carriger, 1990; Warneken et al., 2006). In contrast, parent report or parent-child observational measures of cooperation are more commonly used in larger scale studies of individual differences (e.g., Kochanska, Akson, & Carlson, 2005). Using this methodology is potentially problematic because abilities may reflect preestablished relational patterns and familiar routines, rather than on children’s true propensity for cooperation. Few studies have employed experimental methodology in an individual differences framework (for an exception, see Brownell et al., 2006). The current study used structured tasks in the home to measure children’s cooperation with unfamiliar adults at 18 months.

**Maternal Sensitivity and Children’s Cooperation**

Maternal sensitivity refers to mothers’ ability to accurately perceive and respond to infants’ signals in a prompt and appropriate manner (Ainsworth, Blehar, Waters, & Wall, 1978). It is a critical developmental context, with broad impact on child prosocial outcomes (Hastings et al., 2007), including empathic responsiveness (Kochanska, Forman, & Coy, 1999), conscience formation (Kochanska, 1995), and general social competence (Leerkes, Blankson, & O’Brien, 2009). Indeed, maternal sensitivity engenders a positive reciprocal mother-child
interchange, likely fostering the child’s internalization of motivated and competent self-other relating over the first year (Ainsworth et al., 1978; Eisenberg et al., 2006; Kochanska et al., 1999). In terms of cooperation more specifically, Kochanska and colleagues (2005) found that maternal responsiveness at 7 months old predicted children’s receptive cooperation with their mothers at 15 months old. Another study found that 6- to 8-week old infants considered “at risk” based on mothers’ observed low sensitivity and responsiveness were seen as least cooperative and most passive when interacting with their mothers at 2 years of age (Kemppinen et al., 2007). Although such studies suggest a positive link between maternal sensitivity and children’s cooperation, they did not examine children’s cooperation with unfamiliar adults and therefore it is unknown whether children’s competence merely reflected the quality of the mother-child relationship established over time. This limitation was addressed by assessing cooperation with unfamiliar adults using experimental methodology.

We expected early maternal sensitivity, assessed via observations when infants were 2 months old, to be positively associated with children’s cooperation abilities at 18 months.

**Children’s Joint Attention Skills and Cooperation**

Infants also demonstrate an innate disposition for social interaction. There are rapid and systematic changes in children’s social understanding in the first two years of life. Joint attention (JA) is a significant milestone that emerges between 9 to 18 months old. It includes a triadic interaction in which a child coordinates social attention with another regarding an event or object in the environment via nonverbal means, such as pointing or gaze (Carpenter, Nagell, & Tomasello, 1998; Moore, 1999). Many researchers have suggested that JA is a critical developmental precursor to cooperation (Brinck & Gärdnfor, 2003; Tomasello & Carpenter, 2007), as both outcomes require the child to engage in shared intentionality with a partner
Therefore, developmental changes in cooperation may be related, at least in part, to children’s burgeoning JA abilities around the same time of development (Brownell et al., 2006; Dunn, 1988). In one cross-sectional study, Brownell and colleagues (2006) examined the link between children’s JA and their concurrent cooperation with peers in structured experimental tasks. They examined three age groups – 19, 26, and 36 months old – and found that children’s ability to respond to adults’ bids for JA was significantly related to their ability to cooperate with peers, even after accounting for age. A similar association was found between children’s JA and cooperation outcomes on experimental tasks in a sample of preschoolers with autism (Colombi et al., 2009).

There are different behavioural manifestations of JA with different social communicative functions to consider (Mundy et al., 2007; Seibert, Hogan, & Mundy, 1982). Responding to Joint Attention (RJA) includes children’s responses to others’ bids to engage in shared attention (e.g., following one’s point or gaze), and Initiating Joint Attention (IJA) includes children’s own bids to engage others in shared attention (e.g., child engages another in eye contact). Although some researchers suggest that all facets of JA reflect common processes with similar influences on development (Carpenter et al., 1998), recent findings support a multiprocess model in which different JA behaviours reflect divergent processes (e.g., Mundy et al., 2007). For example, RJA and IJA are not typically correlated and show different developmental trajectories between 9 and 18 months old (Mundy et al., 2007). They also appear to be associated with distinct neuropsychological functions (Mundy, Card, & Fox, 2000; Mundy et al., 2007). Thus, it is reasonable to expect that RJA and IJA may be differentially related to children’s cooperation. In one study of children who were exposed to cocaine in utero, average RJA, but not IJA, across 12-, 15-, and 18-month old assessments predicted
teacher ratings of prosocial abilities at 36 months (Sheinkopf, Mundy, Claussen, & Willoughby, 2004). In a study of a similar sample, however, this pattern did not maintain at 6 years old, but it was instead early IJA that predicted later social outcomes (Acra, 2006). With cooperation as an outcome more specifically, Brownell et al.’s (2006) study also found that only RJA, and not IJA, was associated with 2-year-olds’ cooperation with peers. The influences of IJA and RJA on cooperation may depend on the developmental period of interest, with RJA being more important for social outcomes in the first two years. Data on both RJA and IJA were collected at 18 months, and it was hypothesized that RJA, not IJA, would be related to concurrent cooperation outcomes.

**Person-Context Interaction: Moderating Influences**

Developmentalists have been increasingly aware that to understand and explain sources of interindividual variance in normative developmental outcomes, research must move beyond main effects models. Recently, Beauchamp and Anderson (2010) proposed a conceptual framework for understanding social development within a biopsychosocial framework, called the “Socio-Cognitive Integration of Abilities” (SOCIAL). This model substantiates the theoretical premise that development of cooperation is the result of an ongoing, dynamic, and transactional interaction between child social-cognitive factors and social context.

Empirical evidence may be drawn from exemplary studies of other prosocial outcomes that have focused on the interaction between maternal behaviours and children’s temperament (e.g., Hastings et al., 2005; Kochanska, 1997; Kochanska et al., 2005; Robinson, Zahn-Waxler, & Emde, 1994). Kochanska and colleagues (1997, 2005) have tested a series of longitudinal moderation models examining the interplay between child temperament and maternal socialization practices on the development of prosocial outcomes. The influence of children’s
temperament has consistently been shown to be moderated by maternal child-rearing practices. For example, maternal responsiveness had a positive effect on 15 month old infants’ receptive cooperation, particularly for those who were highly anger prone as younger infants (Kochanska et al., 2005). Similarly, Hastings and colleagues (2005) examined the interaction between positive maternal parenting practices and children’s gender and behavioural inhibition. These child factors moderated the link between positive parenting and children’s prosocial behaviour 2 years later, with more highly inhibited girls benefiting more from maternal positive parenting (Hastings et al., 2005).

It is important to elucidate the pathways through which children are most vulnerable or most resilient in their development of cooperation. The substantive focus of the current research study was to examine multiplicative person-context (JA-maternal sensitivity) influences to identify moderator(s) of the development of cooperation. We might expect there will be detrimental effects on development when “mismatches” of risk factors between parents and children occur (e.g., low sensitivity and low JA; Kochanska, 1995). Alternatively, in the event children demonstrate limited JA skills, they may still achieve successful cooperation with others if their early relational environment is sufficiently sensitive to be compensatory, thereby providing a buffer (Kochanska, 1995).

Overview and Hypotheses

This is one of the first studies to examine sources of individual differences in cooperation development using experimental methodology. This paradigm allowed us to directly measure children’s engagement with an unfamiliar adult in structured tasks; in order to succeed, children had to share intentions and coordinate behaviours towards a mutual goal of the task (Warneken et al., 2006). Maternal sensitivity and infant JA skills were hypothesized to
have a positive influence on children’s ability to cooperate with an adult at T2. The main question of interest, however, includes the interactive effects of T1 maternal sensitivity and T2 JA skills on children’s cooperation behaviour at T2: Are the concurrent effects of JA moderated by early maternal sensitivity? It was hypothesized that poor JA in infancy would only be associated with compromised cooperation skills in children if it was also preceded by low maternal sensitivity. If children demonstrated poor JA, children with an early sensitive rearing environment would be protected and would nonetheless show competent interpersonal cooperation. Due to the unique developmental patterns and processes of IJA and RJA (Mundy et al., 2007), both types of JA were examined in separate analyses. However, we expected to find stronger effects of children’s RJA.

Several child and family-level factors were controlled for due to their putative effects on the predictors and outcome of interest. In particular, child age, gender, expressive language, and behavioural inhibition were covaried in the analyses as these child dispositional factors have all been found to be significantly related to children’s prosocial development (Brownell & Carriger, 1990; Eisenberg et al., 2006; Hastings et al., 2005). It was also important to include covariates that reflected the diversity of the current sample to control for their putative effects on child development (Eisenberg et al., 2006), including indicators of family socioeconomic status (income and assets), family type, and ethnicity.

Method

Participants and Procedures

The Kids, Families, and Places study is an ongoing longitudinal study of a cohort of newborns and their families in Toronto and Hamilton, Ontario. Five hundred and one families
with a newborn (the target child) and at least one older sibling under the age of 4 years old were recruited through a program called *Healthy Babies Healthy Children*, run by Toronto and Hamilton Public Health, in which the parents of all newborns were contacted within several days of the newborn’s birth. Inclusion criteria for participating in the study also included an English-speaking mother and a newborn > 1500 grams. Participants for the current study were drawn from Time 1 (T1, \( n = 501 \)), when the target children were newborns (mean age of 2 months old) and Time 2 (T2, \( n = 397 \)), 18 months later. We compared our sample with the general population of Toronto and Hamilton using 2006 Canada Census Data, limiting the census data to women between 15 and 54 years. Families were similar to the census data on family size, income, immigration status and marital status. Education levels of mothers in the study sample were higher than those in the general population.

Only the target children (newborns at T1) and their mothers were included in the current study. In addition, only those children who had complete data on maternal sensitivity at T1, and JA and cooperation at T2 were retained. A total of 199 infants had these complete data. The mean age of the current sample at T1 was 1.9 months old (range = 0 – 5 months; \( SD = 0.97 \)), and at T2 was 19.3 months old (range = 17 – 24 months; \( SD = 1.90 \)). There were 104 boys (53%) and 95 girls (47%).

Observational data were collected during home visits at both T1 and T2 with female interviewers/testers. During home visits, observational tasks were videotaped and were later coded. In addition, mothers participated in an interview and completed paper and pencil questionnaires regarding demographic and family life items at both time points.
**Measures: Predictors**

**Maternal sensitivity.** At T1, mothers were videotaped interacting with their newborn infants for a period of 15 minutes, including 5 minutes without a toy, 5 minutes with a toy, and 5 minutes while completing a questionnaire. Videotapes were coded using a 25-item short form of the Maternal Behaviour Q-Set (MBQS; Tarabulsy et al. 2008), and the Ainsworth attachment scales (Ainsworth et al., 1978). The MBQS describes maternal interactive behaviour using the q-sort technique (Waters & Deane, 1985). Coders placed 25 items into 5 piles representative of qualities that were most characteristic of the mother to least characteristic. The MBQS sensitivity score was obtained by correlating the extent to which the mother was similar to a prototypical sensitive mother. Thus, the score potentially ranges from -1 (no sensitivity) to 1 (high sensitivity). The actual range in the current sample ranged from -.92 to .94 ($M = .30$, $SD = .45$). The Ainsworth attachment rating scales include four scales that indicate key features of maternal care that help organize early attachment behaviour: sensitivity vs. insensitivity, cooperation vs. interference, availability vs. neglect, and acceptance vs. rejection. Coders rated each dimension of mothers’ behaviour on a 9-point scale, with higher numbers indicating more secure attachment behaviours observed. Six coders that were extensively trained by experts coded both sensitivity measures. All coders began coding independently after achieving an $\alpha > .75$ with their expert. Fifteen percent of videotapes were double coded to assess interrater reliability; an average $\alpha$ of .82 was obtained (ranging from .63 - .96). A maternal sensitivity composite was constructed by deriving the mean of the standardized scores of the MBQS and the four Ainsworth scales. The internal consistency of these five items in the current study was $\alpha = .91$. 
**Joint attention skills.** At T2, children were administered three tasks in which their ability to Respond to Joint Attention (RJA) and Initiate Joint Attention (IJA) were videotaped and coded. A total of 358 children were administered these tasks in the home. Two of the three tasks – gaze following and book presentation – were drawn from the Early Social Communication Scale (ESCS; Mundy et al., 2003; Seibert et al., 1982). The ESCS is a structured assessment designed to measure infants’ and toddlers’ nonverbal social communication skills. A third task included presenting children with a fun, novel toy (a large ball that lights up, makes noise, and moves), and then removing the toy.

RJA was measured with the gaze following task from the ESCS. Children sat with their mothers across from the experimenter. Two colourful pictures (e.g., a boat, a duck) were placed approximately 7 feet to each side of the children, within their view (at approximately 60 degrees from the children’s midline). Another two posters were placed slightly behind both sides of the children, approximately 7 feet away, outside of their view (at approximately 150 degrees from the children’s midline). The tester first ensured she had the attention of each child by calling their name, tapping the table or gently touching them. She then proceeded to point to the four posters in a systematic order: tester’s (a) left, (b) left-behind, (c) right, and (d) right-behind. The point consisted of the tester turning her entire torso and visually orienting to a poster while pointing at it. The experimenter always pointed with the elbow of the pointing arm in contact with her side, with a short-arm point. During the pointing trial, if a child did not immediately redirect his or her attention to the poster, the tester proceeded to say the child's name three times. If a child still did not redirect his or her attention, the tester paused before redirecting attention to the child. This task was administered twice during the home visit, separated by another activity, for a total of 8 possible RJA observations for each child. A
trained coder viewed videotapes and coded children’s ability to redirect attention to the focal object along a 4-point scale. If children immediately redirected attention to the poster after the tester’s point, they received full credit, a score of 4. If children redirected attention only after the tester said their name, the child received a score of 3. If children delayed redirection of attention until after the tester’s point was finished, but before the next trial commenced, they received a score of 2. Finally, if children failed to redirect attention to a poster, they received the lowest score of 1. Interrater reliability of 11% of the videotapes was $\alpha = .94$.

A task analysis revealed significant mean differences between side point ($M = 3.90, SD = 0.27$) and behind point ($M = 3.30, SD = 0.91$) trials, $t(279) = 11.77, p < .01$. Very little variability at the top end of the scale was observed in the side points in comparison to the behind points, indicating that following points within children’s frontal line-of-view was a simple task for most 18-month-olds. Conversely, variability observed in children’s scores for behind points indicates that this task was more difficult, and perhaps more appropriate for identifying individual differences in children’s RJA ability at 18 months (Butterworth & Jarrett, 1991). Indeed, only the behind points, and not the side points, correlated significantly with children’s concurrent vocabulary ($r = .22, p < .01$), indicating more robust construct validity for the behind points in the current sample. Thus, for each child, only the 4 observations of the behind trials were used as the measure of RJA. Also of note, videotapes from 115 of the 358 children administered the RJA task, and more specifically the behind RJA trials, could not be coded due to incomplete administration, child noncompliance, lack of visibility (e.g., child went off camera), mother intrusion (e.g., directing her child’s attention), or tester administration error (e.g., not following standardized protocol).
IJA was operationalized as children’s engagement in eye contact (EC) with another. A trained coder coded EC across three tasks from videotape. First, a book presentation task drawn from the ESCS, was administered. The tester presented a picture book to the children. The children’s instances of EC with the tester or their mother during the course of the task were coded. In another task, children were presented with a fun toy – a ball that lights up and plays music. Here, the number of times children tried to initiate eye contact during the course of this task was coded twice, once when they were holding the toy, and once when the toy was removed from them. In all tasks, the tester was directed not to initiate communication with the children, so that instances coded were purely initiated by the children. The total frequencies of EC were then divided by the total number of seconds each child was exposed to the respective task, to receive a proportion of EC score for each task. Eleven percent of videotapes were double coded by independent coders and the interrater reliability across all tasks was \( \alpha = .92 \) (individual tasks’ interrater reliability ranged from \( \alpha = .81 \) to \( .94 \)). As expected, all three IJA tasks loaded significantly onto one single factor, accounting for 49% of the variance, and with item loadings ranging from \( .67 \) to \( .71 \). A mean proportion of eye contact was derived across tasks.

**Measures: Respondent Variable**

**Cooperation.** Children’s cooperation skills were measured with two previously developed cooperation tasks, drawn from Warneken et al.’s (2006) work. The cooperation tasks included the trampoline and double tube tasks (see Warneken et al., 2006). These are controlled tasks that assess the extent to which children will cooperate with the tester towards a goal, requiring children to change their behaviour to succeed. In the trampoline task, children were invited by the tester to help her make a bear dance on a hand-held trampoline, and thus
child ren were required to replicate the same behaviour as the tester. The first 10 seconds of the task were allowed as a learning phase, and were not coded. Subsequently, discrete 10-second intervals were coded on a 5-point scale, up to a maximum of 80 seconds. The scale ranged from 1 (no success) to 5 (high engagement). A mean of each child’s scores on the trampoline trials was derived. In the double tubes tasks, children were invited to help the experimenter complete a sequence of actions in which she rolled a ball down one of two tubes and asked children to catch it at the bottom. In contrast to the trampoline task, children were required to engage in different but complementary behaviours to the tester; therefore, to be successful, children could not simply replicate the tester. The first catch trial was allowed as a learning phase, and was not coded. Subsequently, each catch invitation was coded on a 5-point scale, and up to a maximum of 8 trials were coded. The scale ranged from 1 (no attempt) to 5 (complete success). A mean of each child’s scores on the double tubes catch trials was derived. After each of the trampoline and double tubes tasks was completed, coders rated a global cooperation score for both tasks, or the overall extent to which children were cooperative and engaged with the tester. The global cooperation score was coded along a 4-point scale, based on percentage of the task children were cooperative (0-25%, 26-50%, 51-75%, 76-100%). Finally, after tasks were completed, coders also rated the number of times children were uncooperative throughout the tasks, from none (0) to 3 or more times (3); the items were reverse coded. Ten percent of videotapes were double coded by independent coders and the mean interrater reliability across all cooperation scores was $\alpha = .86$ (ranging from .68 to .96). All of the five cooperation scores loaded significantly onto the same factor, explaining 47% of the variance, and with item loadings ranging from .54 to .76. A composite cooperation variable
was constructed by taking the mean of the tasks’ standardized scores, and internal consistency of the composite was $\alpha = .71$.

**Measures: Child-Level Covariates**

**Child age and gender.** From maternal report, children’s age was coded in years and months. The child’s gender was dummy coded such that 0 = boy and 1 = girl.

**Vocabulary.** Children’s vocabulary at T2 was measured with the MacArthur Communication Development Inventory, Level 2 Short Form (Fenson et al., 2000). On this mother-report vocabulary checklist of 100 words, children’s current expressive vocabulary proficiency was rated. A count score, out of 100, was tallied based on the total number of words mothers rated their children as being able to produce. The mean number of words endorsed in the current sample was 27.9 ($SD = 21.3$).

**Behavioural inhibition.** At T2, children’s behavioural inhibition was measured with two tasks drawn from the Preschool Laboratory Temperament Assessment Battery (PS Lab-TAB; Goldsmith, Reilly, Lemery, Longley, & Prescott, 1993). Children were exposed to an unpredictable and scary mechanical spider and a scary mask worn by the tester. Coding of children’s responses and affectivity was coded in 10-second intervals, to a maximum of 70 seconds, starting directly after the introduction of the mask or spider. The extent to which children showed positive affect, negative affect, and close proximity was coded. The average number of interval trials in which children showed these behaviours was calculated separately for each behaviour. Most children showed the same reaction across all periods, with only a small number of children showing differing degrees of variability across the interval trials. If children did not show the behaviour across all trials they received a score of 0, if they showed the behaviour across all of the trials they received a score of 2, and if they showed change in
behaviour across the trials they received a score of 1. Children’s scores for each behaviour across the spider and mask tasks were (re)coded such that higher scores reflected higher negative reactivity, and were standardized. A composite mean score was then derived ($\alpha = .92; M = .12, SD = .84$).

**Measures: Family-Level Covariates**

**Socioeconomic indicators: T2 family income and assets.** At T2, mothers reported on their families’ total income, from all sources, before taxes and deductions. There were 16 categories, ranging from *no income* (1) to an *income of $105 000 or more* (16); category ranges were $5000 to $10 000. In the current sample, family income ranged from 2 to 16 ($M = 12.88, SD = 3.4$).

At T2, mothers also reported on three indicators of assets owned by the family: how many rooms in the family’s residence (total number), ownership or coownership of their residence (yes/no), and ownership or coownership of a vehicle (yes/no). Items were standardized, and a mean was derived, with higher numbers representing more assets owned ($M = 0.03, SD = 0.7$).

**Family type.** At T1, three family types were defined: biological intact family type (91%), single family type (4%) and step/other family type (5%). Biological intact family was the reference category.

**Ethnicity.** Five ethnicity groups were defined from mother report: European/Caucasian (59%), South Asian (15%), East or South East Asian (13%), African Canadian/Black (4%) and Other (e.g., Mixed ethnicity, Aboriginal, South American; 9%). European/Caucasian ethnicity was the reference category.
Missing Data

The sample was limited to those children who had complete data at T1 and T2 on measures of maternal sensitivity, JA, and cooperation, resulting in a final sample of 199 children. No differences in child- or family-level covariates emerged between the children retained \((n = 199)\) and not retained \((n = 198)\). Mean IJA scores differed significantly between the retained sample \((M = .06, SD = .04)\) and those children with IJA data who were excluded \((n = 152, M = .04, SD = .04)\), \(t(349) = -2.44, p < .05\). Children in the study’s sample had better IJA scores than those children who were excluded. This could reflect underlying differences in the two subsamples not captured in the current analyses. No other differences in the predictor or response variables emerged.

Missing data points on covariates ranged from 0% to 11.1% \((M = 2.9\%)\). In order not to introduce further bias into the sample through listwise deletion, an imputation technique was used. Missing values on covariates were replaced through multiple imputation, with SPSS, version 18.0. Five sets of imputations were created using all variables in the model and additional auxiliary variables; the imputation then aggregated across the 5 datasets, and these pooled data were used in the analyses.

Results

Descriptives and Intercorrelations

Table 1 gives descriptive statistics for the predictors and the response variable in the analyses. Prior to conducting analyses, all continuous predictor variables were centered in order to facilitate interpretation and to reduce multicollinearity between the predictor variables \((Aiken & West, 1991)\).
Several intercorrelations between covariates and predictors or outcome should be highlighted (not tabled). Although the sample showed a limited age range, child age was significantly and positively correlated with cooperation ($r = .17$, $p < .05$), highlighting the dynamic maturation of this developmental outcome over the first two years of life. Child vocabulary was also significantly positively associated with concurrent RJA ($r = .22$, $p < .01$), IJA ($r = .17$, $p < .05$), and cooperation ($r = .35$, $p < .01$). Family income was positively correlated with maternal sensitivity ($r = .25$, $p < .01$) and child cooperation ($r = .21$, $p < .01$). Single mothers displayed lower levels of maternal sensitivity with their infants ($r = -.15$, $p < .05$). Also, being of European descent was associated with higher levels of maternal sensitivity ($r = .21$, $p < .01$) and children’s cooperation ($r = .14$, $p < .05$), and being of South Asian descent was associated with lower levels of maternal sensitivity ($r = -.22$, $p < .01$). Associations amongst the predictors and response variable are presented in Table 2. RJA and IJA were not significantly correlated with each other at 18 months ($r = .12$, ns). T1 maternal sensitivity also did not correlate significantly with RJA or IJA, but was correlated with children’s cooperation at T2 ($r = .14$, $p < .05$). RJA, but not IJA, was significantly positively associated with concurrent cooperation at T2 ($r = .25$, $p < .01$).
### Study 1 Descriptive Statistics of Predictors and Outcome

<table>
<thead>
<tr>
<th></th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal sensitivity T1</td>
<td>-2.43</td>
<td>1.58</td>
<td>-0.05</td>
<td>0.90</td>
</tr>
<tr>
<td>RJA T2</td>
<td>1.00</td>
<td>4.00</td>
<td>3.29</td>
<td>0.92</td>
</tr>
<tr>
<td>IJA T2</td>
<td>0.00</td>
<td>0.20</td>
<td>0.06</td>
<td>0.04</td>
</tr>
<tr>
<td>Cooperation T2</td>
<td>-2.24</td>
<td>0.67</td>
<td>-0.49</td>
<td>0.63</td>
</tr>
</tbody>
</table>

*Note. T1 = Time 1; T2 = Time 2; IJA = Initiating Joint Attention; RJA = Responding to Joint Attention; Maternal sensitivity and Cooperation are mean composites of standardized scores.*
Table 2

*Study 1 Intercorrelations amongst Predictors and Outcome*

<table>
<thead>
<tr>
<th></th>
<th>Maternal Sensitivity T1</th>
<th>IJA T2</th>
<th>RJA T2</th>
</tr>
</thead>
<tbody>
<tr>
<td>IJA</td>
<td>.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RJA</td>
<td>-.09</td>
<td>.12</td>
<td></td>
</tr>
<tr>
<td>Cooperation T2</td>
<td>.14*</td>
<td>.08</td>
<td>.25**</td>
</tr>
</tbody>
</table>

* * p < .05; ** p < .01

*Note.* T1 = Time 1; T2 = Time 2; IJA = Initiating Joint Attention; RJA = Responding to Joint Attention
Predicting Children’s Cooperation Outcomes at 18 Months

Hierarchical regression analyses were conducted to explore the main questions of interest. At Step 1, child-level and family-level covariates were entered. At Step 2, T1 maternal sensitivity and T2 children’s JA skills were entered, to assess their main effects on T2 child cooperation. At Step 3, the interaction between T1 maternal sensitivity and T2 children’s JA was entered to examine their interactive influences. Separate analyses were conducted for IJA and RJA. None of the main or interaction effects were significant for IJA. As a consequence, these analyses are not presented further.

At Step 1, children’s vocabulary \((B = 0.01, SE = 0.00)\) and family income \((B = 0.06, SE = 0.02)\) were positively associated with children’s cooperation, and family assets \((B = -0.21, SE = 0.08)\) was negatively associated. Child age, gender, behavioural inhibition, family type and ethnicity were not significant.

Table 3 shows the results for the main and interactive effects of RJA after controlling for covariates. At Step 2, the main effects of maternal sensitivity were not statistically significant, but RJA was significantly and positively associated with concurrent cooperation outcomes \((B = 0.14, SE = 0.05, p < .01)\). Finally, the interaction between T1 maternal sensitivity and T2 RJA was added to the model, and was significant \((B = -0.11, SE = 0.05, p < .05)\). Together, the addition of RJA and the interaction term accounted for an additional 6% of the variance in children’s cooperation, over and above the variance accounted for by covariates.

To understand the nature of this interaction, maternal sensitivity scores and RJA scores falling one standard deviation above and below the mean were plotted (see Figure 1). Further testing of simple slopes revealed that the slope of the line representing high RJA abilities is not
significantly different from zero, $t(183) = -0.46, p = .65$, but the slope of the line representing low RJA abilities is significantly different from zero, $t(183) = 2.50, p < .05$. The nature of the interaction suggests that children who have both low maternal sensitivity and RJA scores fare the worst in their cooperation skills. Not surprisingly, those children who have both high maternal sensitivity and high RJA skills are faring well. Finally, the interaction also revealed divergent compensatory effects, whereby if children have poor scores in one of maternal sensitivity or RJA, but high scores in the other, they fare well in their cooperation. That is, both proficiency in dispositional social-cognition or experiencing a sensitive maternal relationship are protective for children when exposed to the other “risk.”
Table 3

*Study 1 Regression Analysis: Predictors of Cooperation after Controlling for Covariates*

<table>
<thead>
<tr>
<th></th>
<th>Step 2</th>
<th>Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>B (SE)</em></td>
<td><em>B (SE)</em></td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.49 (0.07)</td>
<td>-0.49 (0.07)</td>
</tr>
<tr>
<td>T1 Maternal sensitivity</td>
<td>0.07 (0.05)</td>
<td>0.07 (0.05)</td>
</tr>
<tr>
<td>T2 RJA</td>
<td>0.14 (0.05)**</td>
<td>0.15 (0.05)**</td>
</tr>
<tr>
<td>T1 Maternal sensitivity X T2 RJA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.11 (0.05)*</td>
</tr>
<tr>
<td>R²</td>
<td>.25</td>
<td>.27</td>
</tr>
<tr>
<td>R² change from previous model</td>
<td>.04</td>
<td>.02</td>
</tr>
</tbody>
</table>

* p < .05; ** p < .01

*Note. T1 = Time 1; T2 = Time 2; RJA = Responding to Joint Attention; B = pooled unstandardized coefficient; R² = average R² across the five imputed datasets*
Figure 1

*Study 1 Interaction Between T1 Maternal Sensitivity and T2 Children’s RJA in the Prediction of T2 Children’s Cooperation*

Note. T1 = Time 1; T2 = Time 2; RJA = Responding to Joint Attention
Discussion

The current longitudinal study is the first to adopt a person-context moderation model to investigate individual differences in child cooperation development. Joint attention was conceptualized as a social-cognitive attribute of the child. Maternal sensitivity was conceptualized as an environmental effect. Their individual and joint influences were tested to elucidate pathways in the development of children’s cooperation. As expected, children’s RJA was associated with children’s concurrent cooperation abilities, but IJA was not. The strength of the relationship between RJA and children’s cooperation abilities was contingent on children’s experiences of maternal sensitivity in the infancy period. In the presence of maternal sensitivity, joint attention only showed a weak association to children’s cooperation. In the absence of early sensitivity, the strength of the association between joint attention and children’s cooperation was much stronger. This supports the theoretical approaches that emphasize complex biopsychosocial interactions in the development of social proficiency (Beauchamp & Anderson, 2010).

Past literature has emphasized early socialization experiences as a crucial developmental context of children’s prosocial proficiency (Hastings et al., 2007). The current study did not support the hypothesis that early maternal sensitivity would be directly associated with 18-month-olds’ cooperation skills. This contrasts with other studies linking maternal sensitivity in the first year to children’s observed cooperation with their mother in the second year (Kemppinen et al., 2007; Kochanska et al., 2005), although no previous studies have examined it in relation to cooperation with unfamiliar adults in experimental tasks. Perhaps the discrepancy in results highlights differences in measurement and the nature of the cooperation measured. In addition, the timing at which maternal sensitivity was measured may moderate its
influence, with sensitivity having a greater direct influence in later infancy when the infant has reached increased social maturation (Gaffan, Martins, Healy, & Murray, 2010).

Importantly, however, the nature of the significant interaction indicates that the influence of maternal sensitivity is indeed important and is contingent on levels of children’s RJA. That is, it emerged as a social-environmental moderator of early cooperation development. Sensitivity was particularly important for infants with poorly developed RJA. With highly sensitive mothers, infants with poor RJA were cooperative, but with mothers showing low early sensitivity, children were much less cooperative. This suggests that despite deficits in social-cognition, positive development of cooperation can nonetheless be compensated by high levels of early maternal sensitivity. We can only speculate about processes that are responsible for this protective effect. A sensitive mother may be more attuned to her child’s needs and compensate by encouraging a mutual and rewarding relational experience, fostering their child’s internalization of self-other security and conduct. In turn, this may promote the child’s social and affective motivation to engage in cooperative social interaction (Kochanska, 1997).

Individual trajectories of cooperation are also shaped by dispositional social-cognitive abilities. JA is a critical social-cognitive communicative skill that helps infants effectively navigate increasingly novel and socially challenging interactions. RJA was significantly associated with concurrent cooperation abilities as a main effect, a finding consistent with other studies (Brownell et al., 2006; Colombi et al., 2009). The nature of the RJA by maternal sensitivity interaction also suggests protective influences of RJA regardless of levels of maternal sensitivity. These results are not surprising given previous emphasis on JA as a social-cognitive precursor to cooperation (Brinck & Gardenfors, 2003; Tomasello & Carpenter,
Inherent in JA is the ability to share thoughts and intentions with another person regarding a third event, which is a parallel social-cognitive process to the beginnings of a cooperative act, which requires shared intentionality towards a mutual goal. One step further, however, cooperation then requires children to interpret how these psychological states can guide coordinated social behaviour and then act on these assumptions. It thus seems plausible that children’s burgeoning JA is a developmental precursor that facilitates children’s cooperation ability (Brinck & Gardenfors, 2003; Tomasello & Carpenter, 2007; Tomasello et al., 2005).

Taken together, these findings support the notion of equifinality in development, or that children may arrive at similar developmental outcomes via multiple pathways (Cicchetti & Rogosch, 1996; Kochanska, 1997). It is possible there are relational-environmental and/or social-cognitive routes to the positive development of cooperation, and each are sufficient mechanisms to competency, whereby in lack of one, the other can compensate. Maternal sensitivity and RJA seem to each provide a unique facet of support towards children achieving competent cooperation, and these diverse mechanisms are of interest. Perhaps maternal sensitivity provides a social-affective resilience, whereby a sensitive mother will buffer the child’s positive social motivation to engage in cooperative social interaction (Kochanska, 1997). On the other hand, RJA may provide a social-cognitive resilience, whereby the child’s competency in social understanding will foster the child’s ability to succeed in a shared intentionality with another (Tomasello & Carpenter, 2007). Needless to say, the children who fare worst in their cooperation abilities are those vulnerable in terms of person and context.

IJA was not associated with cooperation as a main or interactive influence. Brownell et al. (2006) and Sheinkopf et al. (2004) also found that RJA, but not IJA, in infancy was linked
to cooperation skills and more prosocial behaviours in their samples of toddlers. Observed RJA and IJA at 18 months old were also not correlated in the current study, similar to others’ findings (e.g., Mundy et al., 2007). This may be because RJA generally has an earlier onset and a steeper developmental progression up to 18 months old (the mean age of the current sample at T2) compared to IJA (Mundy et al., 2007). Findings from neurological imaging studies also shed light on the functional uses of JA types in early development, which may help to explain the associations found. RJA is associated with parietal activation in the posterior attention system, an area that develops significantly in the first year and serves to regulate involuntary orienting to stimuli. It is associated with social information processing, attention regulation, coordination, and compliance (Tomasello & Carpenter, 2007). These abilities are those that appear crucial for succeeding in cooperation in a structured adult-initiated task at this developmental stage. Conversely, IJA is associated with activation of frontal systems in the anterior attention system (Mundy et al., 2000), which develops later in infancy and regulates volitional attentional behaviours. It is linked to children’s motivation for spontaneous sharing and initiating of affective experience, which are not as critical for succeeding in the current cooperation tasks. However, IJA appears to become more important later in development as children are required to initiate and navigate more complex social interactions. This is supported in studies of older school-age children, where IJA was found to be associated with social outcomes and RJA associated with cognitive and language outcomes (Acra, 2006; Travis, Sigman, & Ruskin, 2001). Clearly, these associations are not straightforward and future longitudinal studies should continue to tease apart the relative influences of RJA and IJA across development.
The current study adds to a small but growing body of research that examines the interaction between child and social processes that may be involved in the development of normative developmental outcomes. Important extensions of the current study’s contributions should thus be carried forward. A relatively small percentage of the variance in children’s cooperation was explained in the current study (6%) leaving open a wide range of additional influences to be investigated. Continuing to examine multiplicative person-context influences will be crucial, as well as examining the possibility that such factors operate via different mechanisms. For example, mediation pathways may exist, whereby maternal sensitivity influences children’s cooperation via its influence on social cognition (e.g., Hobson, Patrick, Crandell, Garcia Perez, & Lee, 2004) or other dispositional traits; although, this was not found to be the case in the current study. In addition, infants’ early manifestations of social-cognitive abilities may influence the extent to which mothers are engaged and sensitive with their infants (Hobson et al., 2004). A process-oriented research design that includes multiple and repeated assessments of biological, social-cognitive, and social-environmental variables will help elucidate important influences and their mechanisms across development.

Limitations in the current study should also be noted. First, the natural context of the home-based measurement increases ecological validity, but also increases the likelihood of measurement error. Unique challenges were present when conducting observations and experimental tasks in the home that are not encountered in a lab environment. Increased unpredictability (e.g., noise, other siblings, unanticipated events) made it difficult for examiners to adhere to standardized protocol. As a consequence, we excluded cases whose administration of RJA was not standardized, including cases in which other factors played a role (e.g., visibility, mother intrusion), therefore increasing potential bias into the sample.
Another limitation is that we limited the sample to those children who had complete data on all observational measures used. The final sample retained was found to have children with better IJA performance, but was not significantly different on any other variables from the group of children excluded from analyses. Still, this loss of data may have introduced further unknown bias into the sample. We were reluctant to introduce methods of data imputation for observational measures as this is not generally the way in which missing data are handled for developmental studies. Also, IJA may not have emerged as significantly related to cooperation due to its lack of variability and/or differences in task demands. IJA was assessed via naturalistic assessment as opposed to the experimental tasks for RJA and cooperation, and this may have contributed to differences in findings across these predictors. Finally, it will be important to replicate these findings with JA and cooperation measured at two different time points, to help tease apart direction of influence amongst these variables, and to determine if the interaction between maternal sensitivity and joint attention maintains over time.

Cooperation is an imperative skill and new efforts to understand its developmental origins are needed. It will be important to integrate findings from such studies in designing efficacious assessment and treatment models of early social developmental outcomes. That is, practitioners should be cognizant of the various levels of influence, and their interaction, when assessing young children’s cooperation, and more general social development. Similarly, treatment should follow suit and target the critical child-level or environment-level deficit that contributes to a child’s deviance in social functioning, while also promoting resiliency.
Study 2

Parenting Patterns Across Socioeconomic Contexts and Children’s Prosocial Outcomes:
A Person-Oriented Approach

The toddler and preschool years mark a formative stage for children’s development of prosocial abilities. Effective parenting practices play an important role. This stage of development marks the beginning of parents’ active socialization efforts to direct and limit children’s behaviour such that it is in line with perceived social norms (Hastings et al., 2007). There is broad consensus that an optimal profile of parents’, particularly mothers’, childrearing practices consists of high amounts of warmth, responsiveness and inductive reasoning to foster children’s internalization of other-oriented, prosocial conduct. In contrast, negative or authoritarian parenting, marked by harsh interactions, low responsiveness and punitive, critical and strict control tactics is linked to negative child affect, defiant behaviour, and poor prosocial outcomes (Eisenberg et al., 2006; Grusec et al., 2002; Hastings et al., 2007).

Although these associations are well established, research on prosocial socialization has important limitations to consider. There is an implicit assumption that these developmental processes are universal (e.g., Rowe, Vazsonyi, & Flannery, 1994), yet findings are generally drawn from studies of majority European American/Canadian, middle-class samples (Ensminger & Fothergill, 2003). In addition, parenting typologies are most often indexed as continuous, bipolar dimensions, with a positive end associated with positive outcomes, and a negative end associated with negative outcomes (Masten, 2001); parenting styles in practice are complex and multifaceted, and parents’ behaviour may not fit a single defined “good” or “bad” style, especially across contexts and depending on parents’ goals (Hastings & Grusec,
As research is broadening to samples containing minority populations and using methodologies that allow for the emergence of group differences, it is becoming increasingly evident that the field has not yet elucidated the nature of effective parenting for child prosocial development across diverse contexts, including socioeconomic disadvantage (Leyendecker, Harwood, Comparini, & Yalcinkaya, 2005). Thus, the goal of the current study was to examine patterns of maternal parenting behaviours across a diverse sample using person-oriented methodology, and to identify a common and optimal profile of parenting associated with young children’s prosocial competency amongst families of low socioeconomic status (SES).

The Socioeconomic Context of Prosocial Socialization

Economic hardship has been consistently associated with ineffective, negative parenting (McLoyd, 1998). In turn, deficient parenting practices are often a causal mechanism of interest related to poor child development amongst disadvantaged households, including prosocial development (e.g., Lichter, Shanahan, & Gardner, 2002; Mistry, Vandewater, Huston, & McLoyd, 2003). However, cross-context studies have typically adopted a variable-oriented main effects comparison model that assumes developmental processes of interest are universal across groups (Rowe et al., 1994). As such, parenting processes amongst minority populations are evaluated against what is considered normative amongst mainstream populations, and variations are interpreted as parenting deficits and risk (Baumrind, 1972; Spencer, 1990). Little research has considered qualitative variability that may exist amongst minority populations’ parenting, and its potential contribution to child resiliency (Kelley, Power, & Wimbush, 1992).

Synonymous with ecological models of socialization, aspects of the family’s social context may contribute to meaningful and adaptive differences in parenting (Bronfenbrenner & Morris, 1998; Garcia Coll et al., 1996). For example, the meaning of certain parenting practices
and acceptance of child behaviours have been shown to differ across ethnic groups, leading to cross-group variations in children’s psychosocial outcomes (Chao, 1994; Ho, Bluestein, & Jenkins, 2008). Beyond ethnicity, similar processes may also occur according to the family’s socioeconomic culture. Parents’ values and goals for the socialization of child conduct vary according to SES. High-SES parents value children’s self identity, autonomy and confidence, whereas parents of low SES tend to value child courtesy, obedience, respectability and conformity to external social norms and authority (Hoff, Laursen, & Tardif, 2002; Kohn, 1969). This distinction may be crucial for socialization of prosocial behaviour, as low-SES parents may not prioritize self interest over the welfare of others, but instead teach adherence to egalitarian values and feelings of compassion (Piff, Kraus, Côté, Cheng, & Keltner, 2010). In the same light, however, an impoverished environment also entails harsh demands and dangers from which parents must protect their children (Brody & Flor, 1998). In turn, adaptive and maladaptive parenting may look very different depending on parents’ values and ideas about what their children need to survive. Parenting styles may not be directly comparable across families of diverse SES backgrounds.

A small body of preliminary research has explored qualitative differences in parenting behaviours according to characteristics of the population(s) under study. Almost all of the studies reviewed explored parenting amongst homogeneous groups of disadvantaged populations, mainly low-income African American families living in high-risk neighbourhoods (e.g., Baldwin et al., 1990; Baumrind, 1972; Brody & Flor, 1998; Brody, Flor, & Gibson, 1999; Brody, Murry, Kim, & Brown, 2003; Kelley et al., 1992; McGroder, 2000; Pinderhughes, Dodge, Bates, Pettit, & Zelli, 2000). For example, McGroder (2000) employed cluster analysis, a person-oriented methodology, in an exploratory study of parenting in low-income African
American families. Although factor analysis revealed typical parenting typologies (i.e., Aggravation, Nurturance, Cognitive Stimulation), cluster analysis revealed an additional distinct profile of parenting named “Aggravated but Nurturant,” which included parents’ simultaneous use of aggravated and nurturant parenting behaviours. This cluster represented the largest portion of the sample, about one third. Although McGroder (2000) did not significantly link this profile of parenting to positive child outcomes, other research suggests this style of combined harsh-affectionate parenting may be optimal and protective for high-risk children. Baldwin, Baldwin, and Cole (1990) compared child rearing practices in high- and low-SES African American families of children who were significantly above average in cognitive functioning. Although both groups demonstrated positive parenting (e.g., warmth and responsiveness), the low-SES group also demonstrated more restrictive and harsh parenting practices with their children. Finally, in another study, Brody and Flor (1998) identified a similar, distinct style of parenting in rural, impoverished African American families, which they called “no nonsense parenting,” characterized by both affectionate and harsh, controlling behaviours. In turn, this no nonsense style of parenting predicted children’s positive self-regulation skills (see also Brody et al., 2002).

These findings provide evidence that the expression and influence of maternal parenting behaviours differ according to the sociocultural context of the family. When examining context-specific patterns of parenting (or the covariation amongst various parenting behaviours), we shed a different light on what we may consider “optimal” amongst minority groups. Findings suggest that a common style of combined harsh and affectionate parenting emerges amongst mothers in disadvantaged contexts, one that is not typically identified amongst low-risk majority samples. Brody and Flor (1998, p. 813) describe this profile as
“fall[ing] between authoritative and authoritarian styles,” and suggest that it is a natural adaptation to harsh life conditions and unique socialization goals of a high-risk demographic group. More research is needed, however, to substantiate this unique parenting style and the aim of the current study was to address this issue.

To the extent that this unique pattern of parenting emerges amongst mothers, it was also of interest to better understand determinants of this parenting style. A significant drawback of previous studies is the number of confounding factors that make interpretations difficult. African American and other ethnic minority families, particularly immigrants within Western industrialized nations, are disproportionately represented in low-SES and risky neighbourhoods (McLoyd, 1998). It is also the case that these families vary on other risk correlates, such as single motherhood and parental psychopathology (McLoyd, 1998). Consequently, researchers may speculate about different conclusions as to what is driving parenting strategies (Hill, 2006) – ethnicity, family SES, neighbourhood disadvantage, or other correlates? The current study draws upon an ethnically and socioeconomically diverse sample to help tease apart determinants of parenting.

Finally, it is also uncertain whether such parenting promotes context-specific resiliency in children’s prosocial outcomes. Resiliency is defined as children’s positive adaptation despite significant risk or adversity (Luthar et al., 2000). Although disadvantaged children are typically characterized as less prosocial and more antisocial than children from higher SES contexts (e.g., Lichter et al., 2002), many also show tremendous resiliency (Garmezy, 1991; Masten, 2001). It is critical to determine which mechanisms foster positive child outcomes in adverse environments to inform policy and clinical practice. A pattern of covarying positive
and negative parenting may be optimal for children’s prosocial abilities in the context of economic hardship. To this extent, it will be called “parenting-for-risk” in the current paper.

**Defining the Socioeconomic Context: Family SES and Neighbourhood Disadvantage**

In the current study, family-level SES and collective neighbourhood disadvantage were defined as unique constructs of interest. Although they are no doubt related, they are not reciprocal, and many researchers suggest that family- and neighbourhood-level economic conditions reflect disparate influences (Duncan, Brooks-Gunn, & Klebanov, 2008; Garbarino & Sherman, 1980). The family economic climate, which in the current study consists of financial resources and assets, correlates with more proximal influences, including quality and chaos of the home environment (McLoyd, 1998). Community-level SES encompasses influences of the larger social context on parenting, such as neighbourhood safety or violence (Garbarino, 1999), collective efficacy (Sampson, Raudenbush, & Earls, 1997), peer groups, and access to recreational and institutional resources (Leventhal & Brooks-Gunn, 2000). Studies have indicated that neighbourhood quality is associated with parenting and child outcomes even after family-level income is controlled for, albeit modestly (Kupersmidt, Griesler, DeRosier, Patterson, & Davis, 1995; Leventhal & Brooks-Gunn, 2000). Therefore, family- and neighbourhood-level measures of SES were both included.

**Person-Oriented Methodology**

The person-oriented design of the current study reflects an endeavour to better understand the developmental and sociocultural processes in question (Bergman, 2002; Richters, 1997). Variable-oriented statistical techniques such as factor analysis and linear regression often fail to effectively describe the complexity and nonlinearity seen in parenting processes across dynamic systems (Bergman, 2002). Although they may provide a useful
approximation, their communication of relationships as a unilinear and universal causal system does not capture the richness of processes at play. Person-oriented methodology effectively complements variable-oriented approaches, and also addresses some of its shortcomings (Bergman, 2002; Richters, 1997; Von Eye & Bergman, 2003). It seeks to identify qualitatively different subgroups of homogeneous individuals based on their patterning of variables. The current study used Latent Profile Analysis (LPA; Magidson & Vermunt, 2004) to produce empirically derived profiles of mothers that exhibit similar constellations of parenting behaviours. LPA is similar to factor analysis, in which factors are extracted that account for common variance amongst variables of interest, except that participants take the place of variables. That is, the sample of participants is reduced into groups that represent similar patterns of behaviours.

**Overview and Hypotheses**

In summary, the current study investigated parenting profiles across socioeconomic contexts, and their associations with young children’s prosocial behaviour. Person-oriented methodology (LPA) was used to help identify dominant profiles of parenting that describe homogeneous subpopulations of parents in a diverse population. The first goal of the study was to further explore and substantiate parenting patterns. Prototypical parenting profiles were hypothesized, including positive and negative profiles; however, it was also hypothesized that a third profile will be established, characterized by a unique covariation of positive and negative parenting behaviours.

A second goal of the current study was to explore family-level and child-specific factors that distinguish profiles’ subpopulations. A variable-oriented extension of LPA can be used in which predictors of profile membership are added through multinominal logistic
regression (Clark & Muthén, 2009). The question of interest here is to determine the extent to which profiles are represented across socioeconomic conditions, namely family-level SES and neighbourhood quality. It was hypothesized that typical associations will be observed between SES and prototypical parenting profiles (e.g., high SES – positive parenting, low SES – negative parenting associations). However, it was also expected that low-SES mothers living in riskier neighbourhoods will also be more likely to exhibit a unique combined profile of parenting.

The final goal was to determine associations between parenting profiles and children’s prosocial outcomes; again, a variable-oriented extension of LPA can be used in which profiles are used as predictors of a distal outcome, through mixture regression modeling. A resiliency question was of interest in which a combined profile of parenting was hypothesized to buffer child prosocial development in the context of one or both of low family SES and high neighbourhood disadvantage, and is thus a parenting-for-risk profile. This question investigates the interactive effects of parenting profile with SES and neighbourhood quality, while also accounting for ethnicity by profile interactions.

Method

Participants and Procedure

The current study used data from Time 2 (T2) of the Kids, Families, and Places study, an ongoing longitudinal study of a cohort of newborns and their families in Toronto and Hamilton, Ontario. Five hundred and one families with a newborn (the target child) and at least one older sibling under the age of 4 years old were recruited through a program called Healthy Babies Healthy Children, run by Toronto and Hamilton Public Health, in which the parents of
all newborns were contacted within several days of the newborn’s birth. Inclusion criteria for participating in the study also included an English-speaking mother and a newborn greater than 1500 grams. A diverse sample was recruited. We compared our sample with the general population of Toronto and Hamilton using 2006 Canada Census Data, limiting the census data to women between 15 and 54 years. Families were similar to the census data on family size, income, immigration status and marital status. Education levels of mothers in the study sample were higher than those in the general population.

At T2, 18 months later, 397 families participated in the study. The target child (S1; approximately 18 months at T2) and their next oldest sibling (S2) were included in the current study, as they and their mothers were administered observational parenting measures; 743 mother-child dyads in 374 families had complete data on parenting measures and were included in the current analyses. The mean age of all children was 2 years 8 months old ($SD = 1$ year 3 months). The mean age of S1s ($n = 369$) was 1 year 6 months old ($SD = 1.4$ months), and of S2s ($n = 374$) was 4 years 0 months old ($SD = 7.5$ months). Fifty two percent of the sample was boys.

Data for the current study were collected during home visits with female interviewers. Mothers participated in an interview and both mothers and fathers completed paper and pencil questionnaires regarding demographic, family life, and child behaviour items; fathers were allowed to mail in their questionnaires. Observational data were administered with mothers and children in the home. They were videotaped and later coded by trained coders.

**Measures: Outcome Variable**

**Children’s prosocial skills.** Children’s prosocial skills were rated by both mothers and fathers on questionnaire scales adapted from the Prosocial Behaviour Questionnaire (Weir &
Duveen, 1981). Mothers and fathers were independently asked five questions regarding each of their child’s prosocial abilities, including the child’s propensity to show sympathy, offer help, and comfort others who are hurt. They were asked to rate each child’s behaviour on a 3-point scale, with higher scores representing better prosocial abilities. Internal consistency of the items was $\alpha = .86$ for mothers and $\alpha = .86$ for fathers. A composite was developed by taking the mean of both parents’ ratings.

**Measures: Parenting Indicators of LPA**

Six continuous parenting indicators drawn from naturalistic observation were used to inform latent profile membership. Mothers were videotaped interacting with each child independently in the home for 15 minutes consisting of three 5-minute tasks: (1) a free play task without toys, (2) a structured task with a toy, and (3) a storybook reading task. Six parenting behaviours were coded using the Coding of Attachment Related Parenting (CARP; Matias, Scott & O’Connor, 2006) and the Parent Child Interaction System (PARCHISY; Deater-Deckard, Pylas, & Petrill, 1997) paradigms. The parenting behaviours were: (1) Mutuality (quality of shared positivity within the dyadic interaction), (2) Sensitive Responding (degree of mother’s awareness and responsiveness to the child’s needs), (3) Positive Control (use of praise, explanation, and/or open-ended questions to guide children’s behaviour), (4) Negative Affect (degree of mother’s overall negative mood), (5) Intrusiveness (degree of maternal interference and dominance of the dyadic interaction), and (6) Negative Control (use of criticism and/or physical control to limit children’s behaviour). They were each coded separately along a 7-point scale, from 1 (no evidence of the behaviour in question) to 7 (pervasive abundance of the behaviour observed). The target child and the next oldest sibling in the family were separately observed interacting with their mother by different coders. Thus,
each mother-child dyad received a separate score for each task. An expert coder coded 10% of
data to ensure interrater reliability. In some cases, when two coders were reliable with the
expert, we compared 10% of their data to each other rather than to the expert. Discrepancies
were resolved through discussion with the ultimate decision made by the expert. Interrater
reliability was sufficient, with alphas ranging from .66 to .96 (M = .84). A mean of each
parenting behaviour was taken across the three tasks for each child; internal consistency alphas
of these scales ranged from .56 to .96 (M = .74). The final scores were centered around their
grand mean to aid in interpretation of the Latent Profile Analysis.

Measures: Predictor Variables

Family SES. Family SES was defined as a composite score of family income and
assets. At T2, mothers reported on their families’ total income, from all sources, before taxes
and deductions. There were 16 categories, ranging from no income (1) to an income of $105
000 or more (16); category ranges were $5000 to $10 000. They also reported on three
indicators of assets owned by the family: how many rooms in the family’s residence (total
number), ownership or coownership of their residence (yes/no), and ownership or coownership
of a vehicle (yes/no). Factor analysis on all income and assets items revealed a single factor,
representing 62% of the variance. Individual items’ loadings ranged from .68 to .86. All
responses were standardized and a mean was derived, with higher numbers representing higher
family SES. The internal consistency of this scale was α = .80.

Neighbourhood disadvantage. Quality of neighbourhood in which each family resided
was assessed using data from the 2006 Census of Canada and interviewer observations of the
neighbourhood immediately surrounding the family’s home. Seven items were obtained from
the 2006 Census of Canada and based on the census tract (CT) in which each participating
family lived. Items included the median household income in thousands of dollars (reverse coded), the percentage of lone parent families, the percentage of rental dwellings, the percentage of families with household incomes below the poverty line, the percentage of area income accounted for by government transfer payments, the percentage of population aged 15 years and older who are unemployed, and the percentage of population aged 25 years and older who have not graduated from high school. A factor analysis revealed that these seven items produced a one factor solution accounting for 71% of the variance, and with factor loadings ranging from .72 to .94. The internal consistency of this CT scale was $\alpha = .93$.

In addition, neighbourhood physical and social disorder was measured using a modified 7-item version of the Block Environment Inventory (Perkins, Meeks, & Taylor, 1992). Five items covering the general condition of the residences and buildings on the street, the presence of safety precautions (e.g., metal gates or bars) on building fronts, the volume of street traffic, the presence of litter, garbage, and broken glass, and the number of teenagers and adults loitering in the street were rated by an interviewer visiting the family home on a 4-point scale, with higher ratings being indicative of more disorder. Two items assessing how safe the neighbourhood would feel to an individual during the daytime and at night time were also rated on a 6-point scale, with higher ratings being indicative of more fear. The area boundary used to rate each of these items ranged from 50 to 600 feet of the family’s home. For at least 10% of families, two interviewers independently completed the seven neighbourhood items. Rater agreement across the scale was $\alpha = .98$. A mean was taken across the items and the internal consistency of the scale was $\alpha = .86$. Given that the CT and the neighbourhood social and physical disorder scales were strongly correlated ($r = .90$, $p < .01$) and a factor analysis that included all 14 items indicated one predominant factor accounting for 52% of the variance, a
weighted factor score was taken to represent neighbourhood disadvantage. The internal consistency of this new scale was $\alpha = .94$.

**Measures: Auxiliary and Covariate Variables**

**Child age and gender.** Children’s age and gender were obtained from maternal report. Child age was divided into four groups of age ranges each representing 25% of the sample: (1) 9 months to 18 months, (2) 18 months to 2.5 years, (3) 2.5 years to 4 years, and (4) 4 years to 6 years old. The child’s gender was dummy coded such that 0 = girl and 1 = boy.

**Behavioural inhibition.** At T2, children’s behavioural inhibition (BI) was measured with three tasks drawn from the Preschool Laboratory Temperament Assessment Battery (PS Lab-TAB; Goldsmith et al., 1993). Children were exposed to three separate stimuli: a stranger (the interviewer), an unpredictable and scary mechanical spider, and a scary mask worn by the interviewer. Children’s responses and affectivity were coded in 10-second intervals, to a maximum of 70 seconds, starting directly after the stimulus introduction. The extent to which children showed positive affect, negative affect, and close proximity was coded, and the average number of interval trials for each affect and proximity was calculated for each stimulus. Most children showed the same reaction across all periods, with only a small number of children showing differing degrees of variability across the interval trials. If children did not show the behaviour across all trials they received a score of 0, if they showed the behaviour across all of the trials they received a score of 2, and if they showed change in behaviour across the trials they received a score of 1. Children’s scores for each behaviour across the stranger, spider and mask tasks were coded such that higher scores reflected higher negative reactivity, and were standardized. Interrater reliability was $\alpha = .92$. Factor analysis showed that the first
factor with all three BI scores accounted for 46% of the variance, and factor loadings ranged from .41 to .78 on this factor. A composite mean score across tasks was then derived.

**Ethnicity.** Three ethnicity groups were included in the analyses based on maternal report: South Asian (13%), East or South East Asian (13%), and African/Caribbean Canadian (5%). European/Caucasian (62%) and other ethnicities (e.g., Mixed ethnicity, Aboriginal, South American; 7%) were included as the reference category.

**Family type.** Two family types were included in the analyses based on maternal report: single family type (7%) and step family type (5%). The reference category included biological intact family type (88%).

**Maternal depression.** Maternal depression symptoms were measured with the Center for Epidemiologic Depression Scale (CES-D; Radloff, 1977), a self-report measure of 20 questions regarding a variety of common symptoms of psychological distress in adults in the general population. Mothers rated each item on a 4-point scale, ranging from 0 (*rarely or none of the time*) to 3 (*most or all of the time*). Items were (re)codified such that higher scores indicated more depression. If a respondent did not have any missing data on any of the items (i.e. she responded to all 20 items), a sum was calculated of all the items. If a respondent had missing items, a mean score was derived based on the items answered, and then multiplied by 20. The potential range of the scale is 0 to 60, but the actual range in the current sample was 0 to 33 (*M* = 7.90, *SD* = 6.39). The internal consistency of this scale was *α* = .83.
Results

Analytic Strategy

Latent Profile Analysis (LPA) was used with Mplus version 6.1 (Muthén & Muthén, 2010). LPA is a statistical method used to identify subgroups, or profiles, of like-individuals (e.g., parents) using a set of continuous observed variables. It is a type of latent variable mixture model, with latent variable referring to a latent categorical variable of cluster membership (i.e. parenting profile) that is not directly observed, and mixture referring to the notion that the data come from a population that cannot be described by a single probability distribution. Instead, the population can only be described by a mix of distributions, one for each cluster, with each distribution characterized by a unique composite of indicators. Differing from factor analysis, which is a variable-oriented approach that reduces behaviours into factors or behavioural domains, this person-oriented approach serves to delineate intercorrelations, or patterning, of the variables amongst individuals. Moreover, LPA is a more robust analysis than cluster analysis, as the latent specification has the advantage of modeling the measurement error in the observed indicators of the latent profile model, and it uses fit statistics to ensure reliable profile formation and identification (Magidson & Vermunt, 2004).

Mixture model parameters were estimated with the expectation-maximization algorithm (Muthén & Shedden, 1999). A common challenge in mixture modeling includes converging on local maxima, or false maximum likelihood. To avoid this, multiple random sets of start values were used (Hipp & Bauer, 2006). Five hundred random sets of start values were a priori requested for each model, with the 20 best retained for the final optimization. All of the models reported here converged successfully on a replicated solution, thus reflecting a global, or “real,” maximum likelihood. In addition, because the data are nested, with children within
families, family ID was modeled as a clustering variable in order to account for nonindependence of observations via the “type=complex” option in Mplus, using maximum likelihood estimation with robust standard errors (MLR) (Yuan & Bentler, 2000).

Overview of Analyses

The primary research questions included (1) determining the number and nature of latent profiles of maternal parenting behaviours, (2) describing determinants of group membership, particularly with respect to sociodemographic factors, and (3) relating profiles to a distal outcome, children’s prosocial outcomes, as a function of sociodemographic factors. Accordingly, a three-stage analysis framework addressed these questions. In the first stage, a LPA was run with the six parenting indicators to determine whether meaningful latent parenting profiles could be identified that fit the available data, and to describe the nature of the profiles. In the second stage, these profiles were modeled as latent nominal outcome variables via multinomial logistic regression; predictors were added to the model to predict the likelihood of mothers belonging to a particular profile. In the final stage, the profiles were simultaneously modeled as a categorical predictor of a distal outcome, by which differences in the outcome were modeled via mixture regression modeling.

In contrast to traditional methods in which individuals are assigned to a profile based on posterior probabilities and then used in subsequent analyses, the current method has the advantage of avoiding biases in the estimation of the model parameters because it allows for error in profile assignment (Hagenaars, 1993). That is, participants were allowed to “flip flop” across profiles with the addition of new predictor and distal variables, thereby not constraining them to any one profile. Across analyses, predictors’ estimates and standard errors are provided, in which an estimate that is twice the size of its standard error is significant, $p < .05$. 
In the case of logistic regression, the estimate provided refers to the log odds estimate, and a derived odds ratio estimate is also provided in table to help interpretation. The Satorra-Bentler scaled chi-square difference test was used to assess model fit of nested model(s), based on loglikelihood values and scaling correction factors obtained with the MLR estimator (Satorra, 2000).

**Missing Data**

In Mplus, missingness in the data was accounted for by the robust ML estimation, under the assumption that values are missing at random (Schafer & Graham, 2002). However, Mplus does not allow for missing data on covariates or predictor variables. Missing data points on family-level variables ranged from 0% to 8.8% (M = 2.8%), and on child-level variables ranged from 0% to 1.3% (M = 0.4%). In order not to introduce bias into the sample through listwise deletion, ML estimates using the EM algorithm (Little & Rubin, 2002), with SPSS version 19.0, were used to impute missing data. Given the low levels of missing data, multiple imputation was not warranted. Follow up analyses demonstrated that substantive findings remained the same between analyses using nonimputed and imputed data.

**Descriptive Statistics and Intercorrelations**

Descriptive statistics (mean and standard deviations for noncentered data; see Table 4) and bivariate Pearson correlations were computed for parenting indicators, child- and family-level covariates and predictor variables, and the prosocial composite of interest. As shown in Table 5, the parenting indicators mutuality, sensitive responding and positive control correlated strongly with each other (r = .59 - .67, p < .01). Generally, mothers who employed these parenting attributes were more likely to have older children, have lower levels of maternal depression, be from intact two-parent households, be of European Canadian descent, live in
higher SES homes, and also live in higher quality neighbourhoods. Conversely, the parenting indicators negative affect, intrusiveness, and negative control correlated strongly with each other ($r = .54 – .70$, $p < .01$). Mothers who employed these parenting attributes were more likely to have younger children, have greater psychological distress, be from single- or step-family households, be of non-European descent, live in lower SES homes, and also live in lower quality neighbourhoods. With respect to the outcome of interest, older children ($r = .40$, $p < .01$), girls ($r = .09$, $p < .05$), and children who were less behaviourally inhibited ($r = .16$, $p < .01$) were more likely to demonstrate greater prosocial proficiency.
Table 4

*Study 2 Descriptive Statistics*

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
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<tbody>
<tr>
<td>Mutuality</td>
<td>3.90</td>
<td>1.00</td>
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<tr>
<td>Sensitive responding</td>
<td>4.07</td>
<td>0.92</td>
</tr>
<tr>
<td>Positive control</td>
<td>3.24</td>
<td>0.98</td>
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<tr>
<td>Negative affect</td>
<td>1.35</td>
<td>0.51</td>
</tr>
<tr>
<td>Intrusiveness</td>
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<td>0.82</td>
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<td>Negative control</td>
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<td>0.73</td>
</tr>
<tr>
<td>Age group</td>
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<tr>
<td>Boy</td>
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<td>.50</td>
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<tr>
<td>Behavioural inhibition</td>
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<td>0.69</td>
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<tr>
<td>Maternal depression</td>
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<td>6.39</td>
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<td>Intact family</td>
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<td>.32</td>
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<tr>
<td>Single family</td>
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<td>Step family</td>
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<tr>
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<td>.49/</td>
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<tr>
<td>African/Caribbean Canadian</td>
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<td>.09</td>
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<tr>
<td>South Asian</td>
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<td>.34</td>
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<tr>
<td>East/South East Asian</td>
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<tr>
<td>Family SES</td>
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<td>0.39</td>
</tr>
<tr>
<td>Neighbourhood disadvantage</td>
<td>-0.01</td>
<td>0.95</td>
</tr>
<tr>
<td>Child prosocial abilities</td>
<td>2.43</td>
<td>0.48</td>
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</tbody>
</table>

*Note.* SES = Socioeconomic Status; Parenting indicators reported in table are not centered; Behavioural inhibition and Family SES variables are means derived from standardized scores; Neighbourhood disadvantage variable is a weighted factor score.
### Table 5
#### Study 2 Intercorrelations among Parenting Indicators, Auxiliary and Predictor Variables, and Child Prosocial Outcome

<table>
<thead>
<tr>
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<td>1. Mutuality</td>
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<tr>
<td>2. Sensitivity</td>
<td>.67**</td>
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<td>.64**</td>
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<td>4. Neg affect</td>
<td>-.38**</td>
<td>-.40**</td>
<td>-.20**</td>
<td>-</td>
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<td>5. Intrusive</td>
<td>-.45**</td>
<td>-.48**</td>
<td>-.25**</td>
<td>.54**</td>
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<td>.03</td>
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<td>.02</td>
<td>-.04</td>
<td>.04</td>
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<td>-.48**</td>
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<td>-.15**</td>
<td>-</td>
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<td>18. Fam SES</td>
<td>.07</td>
<td>.12**</td>
<td>.09*</td>
<td>-.04</td>
<td>-.06</td>
<td>-.11**</td>
<td>.04</td>
<td>-.01</td>
<td>-.04</td>
<td>-.09*</td>
<td>.03</td>
<td>-.09*</td>
<td>.04</td>
<td>.16**</td>
<td>.02</td>
<td>-.09*</td>
<td>-.12**</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>19. Ngh dis</td>
<td>-.21**</td>
<td>-.31**</td>
<td>-.23**</td>
<td>.18**</td>
<td>.18**</td>
<td>.19**</td>
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<td>-.04</td>
<td>.03</td>
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<td>-.40**</td>
<td>.31**</td>
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<td>-</td>
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<tr>
<td>20. Prosocial</td>
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<td>.05</td>
<td>-.01</td>
<td>-.06</td>
<td>-.09*</td>
<td>.40**</td>
<td>-.09*</td>
<td>-.16**</td>
<td>-.03</td>
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<td>.05</td>
<td>.09*</td>
<td>-.08*</td>
<td>-.05</td>
<td>.10**</td>
</tr>
</tbody>
</table>

* p < .05; ** p < .01

**Note:** Pos = Positive; Neg = Negative; cont = Control; Mat dep = Maternal depression; Sing = Single; Fam = Family; S = South; E = East; SES = Socioeconomic Status; Ngh dis = Neighbourhood disadvantage; BI = Behavioural Inhibition
Latent Profile Analysis: Identifying and Describing Profiles

A sequence of models with differing numbers of profiles (1 to 6) was fit to ensure the most optimal baseline model of appropriate profiles fit the available data. Profiles are determined by a case’s posterior probability to belong in a certain class (similar to factor loadings in factor analysis). When a class is distinct, the posterior probabilities are closer to one for a profile, and closer to zero for the remaining profiles. Still, a challenge to many researchers is determining the number of profiles, and a variety of statistical tests can be used to assess model fit and help in the decision process (McLachlan & Peel, 2000), including the loglikelihood chi-square statistic, Bayesian Information Criterion (BIC), sample-size Adjusted BIC (ABIC), and the Mendel, Lo and Rubin Likelihood Ratio Test (MLR-LRT). The BIC and ABIC can be used to compare competing models, with lower values being preferable. The MLR-LRT statistic uses classical likelihood ratio tests and if significant, it indicates that \( k \) classes is a better fit than \( k-1 \) classes. Entropy, or the quality of the classification probabilities, should also be considered, with scores closer to 1.0 representing better classification of the cases. Finally, model interpretability is important to consider, including the theoretical and meaningful differences between profiles.

A 3-profile model was found to be the best fit to the available data (see Table 6). BIC and ABIC decreased substantially from 1 to 3 profiles, and began to level off thereafter; in addition, the MLR-LRT statistic is significant for a 3-profile model, but not for models with 4, 5, or 6 profiles. Finally, entropy is very high across models, indicating sufficient classification between profiles. A 3-profile classification also fits with a priori expectations based on previous findings and theory. As expected, the profile formations indicated a prototypical Negative profile (profile 1) and Positive profile (profile 2) of parenting, but also indicated a
third profile characterized by moderate levels of Combined positive and negative parenting
behaviours (profile 3). See Table 7 for indicator means as a function of profile, and see Figure
1 for a visual representation of profile formations as a function of parenting indicator means.
Fourteen percent ($n = 107$) of mothers were in the Negative profile, 36% ($n = 263$) were in the
Positive profile, and 50% ($n = 371$) were in the Combined profile. There was very good
classification of mother-child dyads into profiles (see Table 8), with high probability of a
mother being classified into only one profile (ranging from .91 to .97) and little probability of
belonging to another profile (ranging from .00 to .09).
Table 6

*Study 2 Latent Profile Analysis Fit Statistics for 1 – 6 profiles*

<table>
<thead>
<tr>
<th></th>
<th>1 Profile</th>
<th>2 Profiles</th>
<th>3 Profiles</th>
<th>4 Profiles</th>
<th>5 Profiles</th>
<th>6 Profiles</th>
</tr>
</thead>
<tbody>
<tr>
<td># free parameters</td>
<td>12</td>
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<td>26</td>
<td>33</td>
<td>40</td>
<td>47</td>
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<tr>
<td>Log-likelihood</td>
<td>-5352.94</td>
<td>-4745.21</td>
<td>-4486.09</td>
<td>-4390.67</td>
<td>-4308.37</td>
<td>-4238.72</td>
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<tr>
<td>BIC</td>
<td>10785.20</td>
<td>9616.03</td>
<td>9144.07</td>
<td>8999.49</td>
<td>8881.17</td>
<td>8788.14</td>
</tr>
<tr>
<td>Adjusted BIC</td>
<td>10747.10</td>
<td>9555.70</td>
<td>9061.51</td>
<td>8894.70</td>
<td>8754.16</td>
<td>8638.90</td>
</tr>
<tr>
<td>LMR LRT</td>
<td>n/a</td>
<td>p = .00</td>
<td>p = .00</td>
<td>p = .21</td>
<td>p = .28</td>
<td>p = .71</td>
</tr>
<tr>
<td>Entropy</td>
<td>1.00</td>
<td>.89</td>
<td>.83</td>
<td>.79</td>
<td>.81</td>
<td>.83</td>
</tr>
</tbody>
</table>
Table 7

*Study 2 Means of Indicators for each Profile*

<table>
<thead>
<tr>
<th></th>
<th>Profile 1 Negative</th>
<th>Profile 2 Positive</th>
<th>Profile 3 Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mutuality</td>
<td>-1.21</td>
<td>0.75</td>
<td>-0.51</td>
</tr>
<tr>
<td>Sensitive responding</td>
<td>-0.81</td>
<td>1.03</td>
<td>-0.15</td>
</tr>
<tr>
<td>Positive control</td>
<td>-0.58</td>
<td>0.76</td>
<td>-0.36</td>
</tr>
<tr>
<td>Negative affect</td>
<td>0.75</td>
<td>-0.23</td>
<td>-0.09</td>
</tr>
<tr>
<td>Intrusiveness</td>
<td>1.27</td>
<td>-0.48</td>
<td>-0.03</td>
</tr>
<tr>
<td>Negative control</td>
<td>1.33</td>
<td>-0.39</td>
<td>-0.12</td>
</tr>
</tbody>
</table>
Figure 2

*Study 2 Latent Profile Formations*

![Graph showing mean of parenting indicators across different dimensions: Mutuality, Sensitivity, Positive control, Negative affect, Intrusiveness, Negative control. The graph illustrates the mean values for Negative, Positive, and Combined categories.](image-url)
Table 8

*Study 2 Average Latent Class Probabilities for Most Likely Latent Class Membership (Row) by Latent Class (Column)*

<table>
<thead>
<tr>
<th></th>
<th>Negative</th>
<th>Positive</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
<td>.97</td>
<td>.00</td>
<td>.03</td>
</tr>
<tr>
<td>Positive</td>
<td>.00</td>
<td>.91</td>
<td>.09</td>
</tr>
<tr>
<td>Combined</td>
<td>.02</td>
<td>.07</td>
<td>.91</td>
</tr>
</tbody>
</table>
Once an optimal number of profiles was determined, auxiliary variables were included into the model using MPlus’ “AUXILIARY e” function. This exploratory method provides the advantage of comparing the probabilities-based profiles on a range of variables without including them in the model. They are in a sense “inactive covariates” and are used in the current study as a means to describe characteristics of each profile, and to determine which variables to retain as predictors of latent profiles in the second stage of analyses (Clark & Muthén, 2009). It relies on a Wald chi-square test based on pseudo-class draws, and tests whether an auxiliary variable has some impact on the latent profiles in terms of mean differences without taking into account any other factors. Profiles were compared on the child-level variables of child age, gender and behavioural inhibition, and family-level variables of maternal depression, family type, ethnicity, family SES, and neighbourhood quality. See Table 9 for the results of the overall and pairwise chi-square tests of mean equality of the auxiliary analyses. Table 10 provides the means of the auxiliary variables for each profile.
Table 9

*Study 2 Results from the Wald Chi-Square Tests of Mean Equality of the Auxiliary Analyses*

<table>
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<tr>
<th></th>
<th>Overall $\chi^2$</th>
<th>Neg vs. Pos</th>
<th>Neg vs. Comb</th>
<th>Pos vs. Comb</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>27.58*</td>
<td>21.39*</td>
<td>4.73*</td>
<td>11.43*</td>
<td>1 &lt; 3 &lt; 2</td>
</tr>
<tr>
<td>Boy</td>
<td>1.08</td>
<td>0.10</td>
<td>0.40</td>
<td>0.28</td>
<td>1 = 2 = 3</td>
</tr>
<tr>
<td>Temperament</td>
<td>1.44</td>
<td>0.10</td>
<td>0.40</td>
<td>1.42</td>
<td>1 = 2 = 3</td>
</tr>
<tr>
<td>European</td>
<td>46.47*</td>
<td>30.71*</td>
<td>4.41*</td>
<td>22.89*</td>
<td>1 &lt; 3 &lt; 2</td>
</tr>
<tr>
<td>Black</td>
<td>5.08</td>
<td>2.92</td>
<td>0.44</td>
<td>2.73</td>
<td>1 = 2 = 3</td>
</tr>
<tr>
<td>South Asian</td>
<td>24.68*</td>
<td>14.05*</td>
<td>2.54</td>
<td>12.38*</td>
<td>1 = 3; 2 &lt; 1,3</td>
</tr>
<tr>
<td>East/South East Asian</td>
<td>2.77</td>
<td>2.19</td>
<td>0.63</td>
<td>1.03</td>
<td>1 = 2 = 3</td>
</tr>
<tr>
<td>Maternal depression</td>
<td>15.90*</td>
<td>11.95*</td>
<td>3.10</td>
<td>6.90*</td>
<td>1 = 3; 2 &lt; 1,3</td>
</tr>
<tr>
<td>Intact family</td>
<td>21.33*</td>
<td>17.10*</td>
<td>7.71*</td>
<td>5.53*</td>
<td>1 &lt; 3 &lt; 2</td>
</tr>
<tr>
<td>Single family</td>
<td>26.26*</td>
<td>17.91*</td>
<td>8.07*</td>
<td>8.29*</td>
<td>2 &lt; 3 &lt; 1</td>
</tr>
<tr>
<td>Step family</td>
<td>0.34</td>
<td>0.16</td>
<td>0.00</td>
<td>0.22</td>
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<tr>
<td>SES</td>
<td>13.61*</td>
<td>6.19*</td>
<td>0.22</td>
<td>9.31*</td>
<td>1 = 3; 2 &gt; 1,3</td>
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<tr>
<td>Ngh disadvantage</td>
<td>39.19*</td>
<td>25.43*</td>
<td>4.84*</td>
<td>19.57*</td>
<td>2 &lt; 3 &lt; 1</td>
</tr>
</tbody>
</table>

* $p < .05$

*Note. 1 = Neg = Negative profile; 2 = Pos = Positive profile; 3 = Comb = Combined profile; Ngh = Neighbourhood*
Table 10

Study 2 Means of Auxiliary Variables for Each Profile

<table>
<thead>
<tr>
<th></th>
<th>Negative profile</th>
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<th>Positive profile</th>
<th></th>
<th>Combined profile</th>
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<td></td>
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<td></td>
<td>$M$ ($SE$)</td>
<td></td>
<td>$M$ ($SE$)</td>
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</tr>
<tr>
<td>Age group</td>
<td>2.13 (0.11)</td>
<td></td>
<td>2.74 (0.07)</td>
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<td>2.41 (0.06)</td>
<td></td>
</tr>
<tr>
<td>Boy</td>
<td>.56 (.05)</td>
<td></td>
<td>.50 (.03)</td>
<td></td>
<td>.52 (.03)</td>
<td></td>
</tr>
<tr>
<td>BI</td>
<td>-0.01 (0.06)</td>
<td></td>
<td>-0.04 (0.04)</td>
<td></td>
<td>0.04 (0.04)</td>
<td></td>
</tr>
<tr>
<td>European</td>
<td>.45 (.05)</td>
<td></td>
<td>.77 (.03)</td>
<td></td>
<td>.57 (.03)</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>.08 (.03)</td>
<td></td>
<td>.03 (.01)</td>
<td></td>
<td>.06 (.01)</td>
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</tr>
<tr>
<td>South Asian</td>
<td>.23 (.04)</td>
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<td>.06 (.02)</td>
<td></td>
<td>.16 (.02)</td>
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</tr>
<tr>
<td>East/South East Asian</td>
<td>.16 (.04)</td>
<td></td>
<td>.10 (.02)</td>
<td></td>
<td>.13 (.02)</td>
<td></td>
</tr>
<tr>
<td>Maternal depression</td>
<td>9.63 (0.73)</td>
<td></td>
<td>6.80 (0.37)</td>
<td></td>
<td>8.18 (0.35)</td>
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</tr>
<tr>
<td>Intact family</td>
<td>.75 (.04)</td>
<td></td>
<td>.94 (.02)</td>
<td></td>
<td>.88 (.02)</td>
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</tr>
<tr>
<td>Single family</td>
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<td></td>
<td>.02 (.01)</td>
<td></td>
<td>.07 (.01)</td>
<td></td>
</tr>
<tr>
<td>Step family</td>
<td>.05 (.02)</td>
<td></td>
<td>.04 (.01)</td>
<td></td>
<td>.05 (.01)</td>
<td></td>
</tr>
<tr>
<td>SES</td>
<td>-0.05 (.05)</td>
<td></td>
<td>0.08 (0.02)</td>
<td></td>
<td>-0.03 (0.02)</td>
<td></td>
</tr>
<tr>
<td>Ngh disadvantage</td>
<td>0.34 (0.11)</td>
<td></td>
<td>-0.27 (0.05)</td>
<td></td>
<td>0.07 (0.05)</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Ngh = Neighbourhood; SES = Socioeconomic Status
Predicting Likelihood of Profile Membership

Next, predictors were incorporated into the model to predict profile membership through a multinomial logistic regression. Including predictors has the dual advantage of identifying determinants of profile membership (and thus confirming their construct validity), and verifying stability of the model (Clark & Muthén, 2009). Selection of predictors was informed by the AUXILIARY analysis described above (Clark & Muthén, 2009), and child age, ethnicity, maternal depression, family type, SES, and neighbourhood quality were included as predictors of maternal parenting profile membership. The Positive profile of parenting was the reference category in the multinomial logistic regression. Child age, maternal depression, family type, and ethnicity were first entered into the model as covariates. Predictors of likelihood of Negative and Combined profile group membership, respectively, included having younger children \((B = -0.68, SE = 0.13; B = -0.42, SE = 0.10)\), being single mothers \((B = 3.38, SE = 0.98; B = 2.20, SE = 0.89)\), and being of South Asian descent \((B = 2.14, SE = 0.49; B = 1.49, SE = 0.44)\). East and South East Asian ethnicity was significantly predictive of Negative profile membership \((B = 1.12, SE = 0.42; B = 0.59, SE = 0.32)\), but not of Combined profile. Maternal depression was marginally significantly associated with the Negative profile \((B = 0.046, SE = 0.024)\), but not the Combined profile. Step family type was not a significant predictor.

Then, family SES and neighbourhood disadvantage were entered. Adding these predictors significantly improved model fit \((-2*\text{loglikelihood change in model fit from covariates only model to present}, \chi^2 = 26.28, df = 4, p < .01)\). Mothers living in poorer, riskier neighbourhoods were significantly more likely to belong to the Negative and the Combined profiles, compared to the Positive profile \((B = 0.52, SE = 0.18; B = 0.45, SE = 0.14, \ldots)\).
respectively). There was also a trend, with marginal significance, for low-SES families to belong to the Negative profile ($B = -0.75, SE = 0.40, p = .06$). Lower SES families were significantly more likely to belong to the Combined profile ($B = -0.85, SE = 0.31$) in comparison to the Positive profile. See Table 11 for results of the final model of the multinomial logistic regression (the final model is tabled, and thus results for covariates vary from those reported in the prior paragraph because they account for the addition of SES and neighbourhood quality).

The final model was also evaluated with the Negative and the Combined profiles as the reference categories in turn (not tabled). Mothers from more advantaged neighbourhoods were more likely to belong to the Positive profile in comparison to both the Negative profile ($B = -0.52, SE = 0.18$) and the Combined profile ($B = -0.45, SE = 0.14$). Higher SES families’ mothers were also more likely to belong to the Positive profile in comparison to the Combined profile ($B = 0.85, SE = 0.31$). Finally, when comparing Negative and Combined profiles, neither family SES nor poor neighbourhood quality were significant predictors, and no differences emerged between these two profiles. This suggests that mothers who are faced with the highest sociodemographic risks are as likely to use negative parenting as they are to use a constellation of negative and positive parenting behaviours.
Table 11

**Study 2 Results from the Multinomial Logistic Regression Evaluating the Effects of Predictors on Latent Profile Membership with Positive Profile as the Reference Category**

<table>
<thead>
<tr>
<th></th>
<th>Negative profile</th>
<th></th>
<th>Combined profile</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$B^*$ (SE)</td>
<td>OR</td>
<td>$B^*$ (SE)</td>
<td>OR</td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.07 (0.44)</td>
<td>--</td>
<td>1.08 (0.34)*</td>
<td>--</td>
</tr>
<tr>
<td>Age</td>
<td>-0.68 (0.13)*</td>
<td>0.51</td>
<td>-0.42 (0.11)*</td>
<td>0.66</td>
</tr>
<tr>
<td>Black</td>
<td>0.36 (0.69)</td>
<td>1.43</td>
<td>0.42 (0.55)</td>
<td>1.52</td>
</tr>
<tr>
<td>South Asian</td>
<td>1.86 (0.52)*</td>
<td>6.42</td>
<td>1.26 (0.47)*</td>
<td>3.52</td>
</tr>
<tr>
<td>East/South East Asian</td>
<td>0.93 (0.44)*</td>
<td>2.54</td>
<td>0.40 (0.32)</td>
<td>1.49</td>
</tr>
<tr>
<td>Step family type</td>
<td>0.18 (0.69)</td>
<td>1.20</td>
<td>0.06 (0.55)</td>
<td>1.06</td>
</tr>
<tr>
<td>Single family type</td>
<td>2.91 (0.92)*</td>
<td>18.36</td>
<td>1.78 (0.83)*</td>
<td>5.93</td>
</tr>
<tr>
<td>Maternal depression</td>
<td>0.03 (0.03)</td>
<td>1.03</td>
<td>0.01 (0.02)</td>
<td>1.01</td>
</tr>
<tr>
<td>Family SES</td>
<td>-0.75 (0.40)</td>
<td>0.47</td>
<td>-0.85 (0.31)*</td>
<td>0.43</td>
</tr>
<tr>
<td>Ngh disadvantage</td>
<td>0.52 (.18)*</td>
<td>1.68</td>
<td>0.45 (.14)*</td>
<td>1.57</td>
</tr>
</tbody>
</table>

* $p < .05$

**Note.** Results from final model shown only; $a = \text{Log Odds}; \text{OR} = \text{Odds Ratio}; \text{Ngh} = \text{Neighbourhood}; \text{SES} = \text{Socioeconomic Status}
Predicting Child Prosocial Behaviour Across Contexts

The question remains: What are the influences of these parenting profiles on child prosocial development, particularly as a function of SES and neighbourhood quality? To answer this question, variation in children’s prosocial scores was examined across maternal parenting profiles, considered analogous to parenting profile main effects. In addition, the differential effects of SES and neighbourhood quality across profile membership were analyzed, considered analogous to SES X Profile and Neighbourhood X Profile interaction effects. Cross-profile differences in effects were examined with the “Model Test” feature in Mplus 6.1. That is, the equality of (1) prosocial outcome means (i.e. parenting profile main effects) and (2) SES and neighbourhood interaction regression coefficients were tested across profiles. The Model Test feature allows for tests of significant differences across profiles using a Wald chi-square test of parameter constraints.

Before accounting for covariates, mothers in the Negative profile had children with significantly lower reported levels of prosocial abilities ($M = 2.37, SE = 0.05$) than did mothers in the Positive profile ($M = 2.44, SE = 0.04; \chi^2 = 11280.79, df = 1, p < 0.01$) and the Combined profile ($M = 2.44, SE = 0.03; \chi^2 = 2836.43, df = 1, p < 0.01$); no significant differences emerged between the Positive and the Combined profiles.

The child-level covariates Child Age ($B = 0.17, SE = 0.01$) and Boy ($B = -0.09, SE = 0.03$) emerged as significant predictors, with older children and girls showing more proficient prosocial abilities; children’s behavioural inhibition was not significant. East/South East Asian ethnicity was significantly and negatively associated with child prosocial abilities in comparison to European ethnicity ($B = -0.12, SE = 0.05$). The interaction between ethnicity and profile was also included, to account for its potential moderating influence. No differences in
child outcome across profiles emerged amongst South Asian and African Canadian families, relative to European Canadians. An interaction between East/South East Asian ethnicity and maternal profile emerged between the Combined and the Negative profile ($\chi^2 = 4.13, df = 1, p < 0.05$). This ethnic group differed from the European Canadian group within the Combined profile, in which mothers of East/South East Asian descent had children with poorer prosocial skills ($B = -0.26, SE = 0.09$) relative to European Canadians. This contrasts to the Negative latent profile in which East/South East Asians and European Canadians had similar prosocial scores.

Finally, interactive effects of SES and neighbourhood disadvantage were examined to address the principle questions. Their addition significantly improved model fit (-2*loglikelihood change in model fit from the covariates model to present $\chi^2 = 15.27, df = 6, p < 0.05$). At this stage, no differences in prosocial scores emerged across the profiles (i.e. there were no profile main effects with all variables in the model; Positive profile $M = 2.00, SE = 0.06$; Negative profile $M = 1.98, SE = 0.07$; Combined profile $M = 2.11, SE = 0.05$). Before examining their differential influences across profiles, family SES and neighbourhood disadvantage were also not significant main effects of prosocial outcome. However, there were differences in the impact of family SES and neighbourhood disadvantage on children’s prosocial scores within and across maternal parenting profiles. Family SES X Parenting Profile interactions were observed between the Combined and the Negative profiles ($\chi^2 = 4.33, df = 1, p < .05$). Only the Family SES effect within the Combined parenting profile was significant ($B = -0.17, SE = 0.06$) indicating that lower SES children whose mothers belonged to the Combined profile group demonstrated better prosocial outcomes in comparison to higher SES children. This contrasts to the Negative latent profile, in which prosocial scores were similar.
across levels of family SES. Finally, there were also differences in the impact of neighbourhood disadvantage on children’s prosocial skills across maternal parenting profile, speaking to the unique influence of the neighbourhood context. Similarly, the influence of neighbourhood quality on prosocial outcomes was significantly different across the Combined profile and the Negative profile ($\chi^2 = 3.83, df = 1, p = .05$). The effect of neighbourhood quality was significant within the Combined profile, indicating that, in comparison to children living in higher quality neighbourhoods, children living in more disadvantaged neighbourhoods were rated as significantly more prosocial if mothers used a combination of both positive and negative parenting behaviours ($B = 0.05, SE = 0.02$); in contrast, no differences in the outcome emerged across neighbourhood quality in the Negative class.$^4$

To aid interpretation, the SES X Profile and Neighbourhood X Profile interactions were plotted, and depicted graphically in Figures 3 and 4, respectively; high and low family SES and neighbourhood quality were plotted at one standard deviation above and below the mean. Results support the hypothesis, and indicate the protective influence of the combined parenting profile amongst families from low-SES and disadvantaged neighbourhoods. That is, the Combined profile of parenting emerged as an optimal parenting-for-risk profile. Interestingly, the nature of the interaction also indicated a “protective-enhancing” effect (Luthar et al., 2000), such that in the event children live in high-risk environments and mothers parent-for-risk by using a constellation of both positive and negative parenting behaviours, their prosocial skills are actually rated better than those children who do not live in such adversity.
Figure 3

Study 2 Family SES by Profile Interaction

![Graph showing the relationship between Family SES and Children's prosocial abilities]

- **Low** Family SES: Green dashed line
- **High** Family SES: Blue line

Children's prosocial abilities are plotted against Family socioeconomic status, showing an inverse relationship with Family SES.
Figure 4

*Study 2 Neighbourhood Disadvantage by Profile Interaction*

![Graph showing the interaction effect of Neighbourhood Disadvantage and Profile on Children's prosocial abilities. The graph illustrates a negative correlation between Neighbourhood disadvantage and Children's prosocial abilities, with different profiles indicated by different line types.](image-url)
Variable-Oriented Analysis

As a follow-up to the main analyses, a variable-oriented analysis was conducted in interest of comparing methodological approaches to the study’s questions. An exploratory factor analysis was conducted with the six parenting indicators using Mplus 6.1. The factor solution was rotated with oblique rotation, and the Scree Test indicated that two predominant factors best represented the data: A Positive parenting factor including the variables mutuality, sensitive responding, and positive control (factor loadings ranging from .76 to .86), and a Negative parenting factor including the variables negative affect, intrusiveness, and negative control (factor loadings ranging from .69 to .87). Hierarchical regression analysis was performed to understand the influence of these parenting factors on children’s prosocial outcomes across socioeconomic conditions. To capture potential covariation of positive and negative parenting, an interaction term between the two constructs was used. The models were entered equivalently as in the mixture regression analysis above. Of interest, two- and three-way interactions with parenting factors and family SES were not significant. However, a three-way interaction was found between poor neighbourhood quality, positive and negative parenting ($B = 0.05, SE = 0.02, p < .05$). The nature of the interaction is consistent with results from the person-oriented analysis. In more disadvantaged neighbourhoods, high levels of both negative parenting and positive parenting indicates better child prosocial outcomes (see Figure 5). In contrast, in higher quality neighbourhoods, children’s prosocial abilities were best supported by high levels of positivity and low levels of negativity and least supported by high levels of both positivity and negativity (see Figure 6).
Figure 5

Study 2 Variable Oriented Analyses: Interaction between Positive Parenting Factor, Negative Parenting Factor and High Neighbourhood Disadvantage

Figure 6

Study 2 Variable Oriented Analyses: Interaction between Positive Parenting Factor, Negative Parenting Factor and Low Neighbourhood Disadvantage
Discussion

The results of the current study expand our understanding of parenting patterns and child prosocial development across a diverse sample of mothers and their young children. It adopted an ecological model of parenting, both theoretically (Bronfenbrenner & Morris, 1998; Garcia Coll et al., 1996) and methodologically (Von Eye & Bergman, 2003). Of specific interest was identification of an optimal parenting pattern amongst impoverished family and neighbourhood environments that serves to promote young children’s prosocial abilities. Person-oriented Latent Profile Analysis (LPA) was used to identify three parenting profiles – Positive, Negative, and Combined profiles. Low family and neighbourhood SES significantly predicted likelihood of membership in the Negative and Combined profiles of parenting, but not the Positive profile. Significant interactions emerged that suggested mothers’ Combined profile of parenting is optimal amongst socioeconomically disadvantaged families, or it is a parenting-for-risk profile associated with better prosocial outcomes amongst at-risk children.

Profiles of Maternal Parenting Across Socioeconomic Contexts

Traditional variable-oriented factor analysis and person-oriented LPA both indicated two similar positive and negative typologies of parenting behaviour, what would typically be characterized on the positive-negative dimensional continuum (Masten, 2001). However, using LPA, a third profile of parenting was identified – a Combined profile – marked by moderate levels of all indicators from both the Positive and Negative dimensions. This third profile reflected a unique covariation rarely captured in variable-oriented typological research.

This finding underscores the fruitfulness of adopting a person-oriented approach to characterizing parenting, particularly across a diverse population. Dimensional parenting styles are often generalized and compared across sociocultural contexts, including
socioeconomic groups. Consequently, we lose much information about the naturally occurring covariation in the population, or subpopulations, and about the dynamic, nonlinear nature of developmental processes (Bergman, 2002; Masten, 2001; Richters, 1997; Von Eye, & Bergman, 2003). Although we can capture covariation in parenting constructs with interaction terms (as was demonstrated in the follow up variable-oriented analyses), we still have difficulty understanding characteristics of the population for which this interaction is pertinent. Therefore, using LPA, the current study was able to complement and extend traditional approaches, and identify substantive patterns amongst homogeneous groups of mothers in addition to testing specific theoretical hypotheses.

Given these methodological distinctions, it is noteworthy that the predominant emergent parenting profile was the Combined profile, accounting for 50% of the sample, with fewer mothers belonging to the Positive only (35%) and the Negative only (15%) profiles. Sociodemographic factors were found to be important determinants of these distinct subpopulations. Mothers in low-income, single-parent homes living in riskier neighbourhoods were more likely to belong to the Negative and the Combined groups, in comparison to the Positive group. The association between SES and negative parenting is not surprising, and research has reliably demonstrated this linear association (McLoyd, 1998). However, a subset of low-SES mothers also commonly used a distinct combination of positive and negative practices in their interactions with their children. This suggests that economic conditions do not have uniform influences on parenting. The Combined profile of parenting found in the current study is similar to profiles described by other researchers amongst low-income African American single mothers, including the “no nonsense” parenting described by Brody and Flor (1998) and the “Aggravated but Nurturant” cluster described by McGroder (2000). Such
constructs are characterized by greater amounts of coercive (even physical; Brody & Flor, 1998) and intrusive behaviours than what is typically described as authoritative, and also greater warmth, mutuality and sensitivity than what is typically described as authoritarian. Indeed, this profile cannot be captured dimensionally, but instead falls in between these typological styles. The current study also extends these findings by demonstrating that it is possibly the family and neighbourhood economic culture that is most likely to predict Combined profile membership, beyond ethnicity.

Child factors had less predictive power, with child age emerging as the only predictor of profile membership. As age increased, mothers were more likely to belong to the Combined or the Positive profile in contrast to the Negative profile. Aggressive, oppositional and defiant behaviour peaks early in the preschool stage (Larzelere, Amberson, & Martin, 1992), while prosocial abilities increase substantially (Eisenberg, Lennon, & Roth, 1983). Perhaps the importance for parents to use positive parenting practices (either in isolation or in conjunction with negative practices) also increases with age, as children are naturally less “difficult” to manage and become more receptive to reasoning (Kuczynski, Kochanska, Radke-Yarrow, & Girnius-Brown, 1987).

**Parenting-for-Risk and Resiliency in Low-SES Contexts**

An important aim of the current study was to establish whether the Combined parenting profile promotes children’s prosocial competence in the context of economic adversity; that is, to what extent is Combined parenting indeed optimal parenting-for-risk? Significant profile by family SES and profile by neighbourhood quality interactions highlighted the protective influence of the Combined parenting-for-risk profile. Follow-up analyses with factor-derived positive and negative parenting constructs, and their interaction, corroborated this result for
neighbourhood quality, but not family SES. Together, results suggest that negative parenting does not uniformly or linearly predict worst outcomes for children in impoverished environments as previous research may suggest; instead, in the context of warm, nurturant parenting, it actually promotes prosocial outcomes. Brody and colleagues (Brody & Flor, 1998; Brody et al., 2003) found similar competence-promoting effects of “no nonsense” parenting on school-aged children’s self-regulation skills (see also Baldwin et al., 1990).

How should these socioeconomic group differences in developmental processes be interpreted? It is evident that a Combined profile of parenting is not by any means deficient, as it might be characterized with respect to the majority’s norms, but actually serves as a rational, purposeful, and child-centered adaptation to the realities and norms of impoverished environments (Kelley et al., 1992; Pinderhughes et al., 2000). Low-SES children are disproportionately exposed to greater risk correlates than their high-SES counterparts. Consequently, mothers must use optimal child-rearing practices to deter their young children from involvement with antisocial activities and prepare them to anticipate dangers in their schools or neighbourhoods (Brody & Flor, 1998; Kohn, 1969). At the same time, mothers are attuned to the context-specific values and expectations in their milieu (Hoff et al., 2002; Kohn, 1969). It is possible that, by nature, low-SES contexts value other-oriented conduct more than high-SES contexts do (Piff et al., 2010), including obedience to authority and societal rules, adherence to egalitarian principles, and greater emphasis on the compassion for the welfare of others as opposed to self-interest. Thus, optimal socialization practices in high-risk SES contexts have a dual purpose: to help children internalize prosocial values but also understand the urgency of the dangers they face. This optimal parenting may come in the form of a combination of parenting practices, including negative practices (i.e. to clarify the nature and
importance of behavioural contingencies, specifying what is and what is not acceptable) and positive practices (i.e. to encourage internalization of norms within a supportive mother-child relationship) (Baumrind, 1972; Brody & Flor, 1998). It is also possible that low-SES children do not interpret their mothers’ harshness as indication of rejection or lack of concern when combined with affection, but rather as nurturant care taking in their environment (e.g., Baldwin et al., 1990; Baumrind, 1972).

What is also remarkable is the mechanism of protection of the parenting-for-risk profile. Mothers who employed this parenting style not only buffered their children from economic adversity, but their children in fact exceeded their high-SES peers in their prosocial competence. This is consistent with a protective-enhancing effect (Luthar et al., 2000), which involves the moderator (i.e. parenting-for-risk) working in a way that permits a child to actually engage with stress, such that their competence is augmented with increasing risk. Rutter (1987) discusses a similar principle of “steeling,” in that young children may acquire steeling or toughening properties if they are able to cope with and master risks in a manner that are within their capability (see also Bugental, 2003). This concept of adversity as a potential benefit given the right protective factor is intriguing, and suggests that if children experience stress in a manner that allows recovery, they may actually develop better skills than children who were never exposed to that stress. Parenting-for-risk may provide buffering that allows children to overcome and benefit from socioeconomic stress, preparing them to adapt, survive and flourish in their risky environment (Bugental, 2003).

In contrast, it is reasonable to assume that in the case that negative practices are used in isolation, there is no mechanism of resolution to provide a corrective experience for the child; children are left without the support for steeling to occur (Bugental, 2003; Rutter, 1987), and
Thus we see deleterious developmental outcomes. An association between negative parenting and poor prosocial outcomes is well documented in the literature (Hastings et al., 2007). This association was only found in the current study before covariates were added, and did not remain significant after accounting for child- and contextual variables. Still, it will be important for future research to determine what factors determine low-SES mothers’ choice of parenting practices. No distinguishing features were found between these two groups, but it is possible that maternal psychological and personality factors play a role (Baumrind, 1972; Spinath & O’Connor, 2003). For example, authoritarian mothers are highly parent- rather than child-centered, more hyperactive to negative stimuli, make internal attributions regarding children’s behaviour, and have an extreme need to control their children out of reaction to their own inner state (Coplan, Hastings, Lagacé-Séguin, & Moulton, 2002).

Evidence for the unique contributions of family and neighbourhood SES was found. It is probable that low-SES families self-select into poorer neighbourhoods, and thus these two constructs simply account for overlapping variance (Leventhal & Brooks-Gunn, 2003). However, family SES and poor neighbourhood quality were not correlated. This suggests that these constructs represented unique attributes of the socioeconomic context. The proximal economic environment may include factors such as chaos, home resources and cognitive stimulation (McLoyd, 1998). In contrast, neighbourhoods have been shown to contribute uniquely and substantially to parental socialization practices, beyond family income (e.g., Garbarino & Sherman, 1980). It is possible that factors such as quantity and quality of neighbourhood resources (e.g., schools, parks, police protection, health and recreational services; Leventhal & Brooks-Gunn, 2000) and degree of collective socialization, such as
neighbours monitoring and enforcing norms (Sampson et al., 1997), further contribute to parental socialization practices and their influences on child prosocial development.

**Limitations, Future Directions and Implications**

Despite the noted strengths, the current study is not without limitations that should be addressed in future studies. First and foremost, the study’s cross-sectional design precludes any causal conclusions about predictors of parenting or about the influence of parenting on children’s prosocial development. Alternative to the assumption that socioeconomic characteristics cause parenting styles, it is very possible that mothers with certain personality or parenting traits self-select into higher social risk environments. Similarly, it is possible that characteristics of the child may have precluded and influenced the formation of parenting styles over time. We also cannot assume any lasting influences of socialization on prosocial behaviour across contexts. Replication of the current findings with longitudinal data and a transactional design is necessary to tease apart causal directions of influence over time.

Extensive in-home observations of mothers and children in the home environment was indeed a methodological strength, but domains of parenting and child development assessed were limited to those well established in the literature, and other behaviours of interest that may be particularly germane to minority populations were not available (e.g., use of mild physical discipline such as spanking; Deater-Deckard & Dodge, 1997). Other sources of cultural variation may also be considered, such as the role of religion (Kelley et al., 1992) and the degree of acculturation amongst immigrant families (Patel, Power, & Bhavnagri, 1996). In addition, the current study cannot speak to the influence of fathers’ parenting behaviours on prosocial outcomes (Hastings et al., 2007). Finally, the prosocial outcome was parent-report and this reflects parental perceptions of children’s behaviours, which may or may not reflect
true prosocial ability. Although using both parents’ reports helped to reduce some bias, parental or familial characteristics may influence these perceptions. To this extent, perceptions, values and expression of prosocial abilities may also change across sociocultural contexts which was not considered here (McGrath & Brown, 2008). Including observational and/or experimental measures and culturally sensitive qualitative measurements (e.g., Kelley et al., 1992) would be useful.

A final important methodological topic worth mentioning concerns the nested structure of the current dataset, with two siblings residing in one family. The study’s main goals focused on identifying between-family differences in parenting patterns and parenting-child outcome relationships. However, there is substantial interest in the literature with respect to examining multilevel processes in parenting (e.g., Jenkins, Rasbash, & O’Connor, 2003) and sibling differences in prosocial abilities (Romano, Tremblay, Boulerice, & Swisher, 2005), but this has never been extended to parenting patterns in a person-oriented design (i.e. multilevel Latent Profile Analysis). Extending the current conceptual and methodological investigation to a multilevel design would be an intriguing area of future research.

The current study represents one of few that seek to understand individual differences in the nature and influence of parenting practices across socioeconomic contexts. Sociocultural variability is extraordinarily difficult to quantify, but using a person-oriented approach proved beneficial in understanding differences in common parenting-developmental processes. Results may contribute to worthwhile clinical and policy contributions. For example, clinicians, teachers, and others in contact with children and their families should be aware of the risks associated with living in poverty, including the possibility of ineffective parenting; however, they should not assume that problem parenting and child behaviour are natural consequences of
living in poverty, nor should they assume that adaptive parenting in the majority context applies to low-SES families. A careful assessment of parenting behaviours, attitudes, goals, and both the family and neighbourhood context is necessary to understand context-specific socialization processes. The current study adds insight into family support policies for buffering young children’s prosocial development in high-risk circumstances. At a time when parental socialization is of utmost importance, interventions should tailor to effective, context-specific optimal parenting (i.e. parenting-for-risk) for promoting disadvantaged children’s prosocial skills.
General Discussion

The purpose of the present studies was to identify moderating processes of mothers’ early socialization practices that may contribute to individual differences in young children’s prosocial abilities. Although well established, the relationship between maternal positive parenting practices and child prosocial outcomes is by no means straightforward. Results indicated that children’s prosocial outcomes may be further determined by the interplay of maternal practices with both proximal and distal factors.

In the first study, children’s Joint Attention (JA), and more specifically children’s Responding to JA (RJA), emerged as a significant child-level dispositional factor that contributed uniquely to children’s cooperation with unfamiliar adults in structured tasks. It also moderated the influence of early maternal sensitivity on this outcome; in the context of low maternal sensitive parenting in early infancy, social-cognitive competence in RJA was a protective factor and such children demonstrated competent cooperation nonetheless. Interestingly, in the case that a toddler had significantly poor RJA skills, early maternal sensitivity was protective. These findings highlight the notion of equifinality in child social developmental outcomes, or the possibility of multiple pathways to competency, in this case via a child’s dispositional social-cognitive abilities or via a child’s early relational rearing environment. The study of child-context interactions, conceptualized within a biopsychosocial framework, increases our understanding of individual differences in developmental outcomes.

In the second study, profiles of maternal parenting practices were examined across diverse familial and neighbourhood socioeconomic contexts. Synonymous with an ecological systems framework, impact of the broader economic culture on proximal influences, such as parenting, is important to consider. With person-oriented analyses, findings indicated that
mothers amongst economic disadvantaged environments were more likely to be characterized by both negative parenting and a unique pattern of parenting of moderate levels of both positive and negative parenting practices. Importantly, this combined pattern was protective for their children, therefore called a parenting-for-risk profile. Amongst disadvantaged families and neighbourhoods, children whose mothers used parenting-for-risk demonstrated significantly better prosocial abilities than those children whose mothers used negative parenting practices only. This group of children also demonstrated better prosocial skills than their advantaged counterparts, highlighting a potential steeling effect, whereby parenting-for-risk provides an ultimate protective effect for children to benefit from their environment and exceed in their skills.

The current studies shed light on developmental processes associated with prosocial outcomes in early childhood. Maternal parenting is no doubt an important factor, and aspects of the child and the broader ecology moderate its function. Still, the mechanisms through which many of the associations operate remain unknown. For example, direction of influence between child and parenting associations is uncertain, and longitudinal designs will help tease this apart. Parental beliefs, values and attitudes regarding child rearing may be underlying factors of parenting patterns amongst disadvantaged families, and their influence on child development. Sibling influences and differential parenting associated with sibling differences in prosocial development are also likely playing a role.

Therefore, extensions of the current studies’ contributions should be carried forward in future research designs. The challenge to researchers will be to utilize prospective longitudinal studies to study the dynamic additive and multiplicative processes across development. A multilevel, process-oriented research design that includes multiple and repeated assessments of
child dispositional factors and social-environmental variables across the early developmental years, and with two or more siblings in the same family, will be ideal. Such designs will help elucidate important influences, the sensitive periods in development in which influences are most important, the extent to which contingent relationships occur and encourage positive development, and the mechanisms through which they influence outcomes.

There are significant clinical implications of these findings. From an assessment perspective, practitioners should be cognizant of the various levels of influence, and their interaction, when assessing young children’s social development. Furthermore, programs geared at prevention of compromised social functioning should begin in early childhood. The current studies support the perspective that such programs must consider multiple areas of influence, including the parenting context, individual social-cognitive skills, and also the wider ecology such as family SES and neighborhood quality. Target of intervention should not only focus on child outcome (e.g., promoting cooperation or prosocial skills, or decreasing antisocial behaviour), but also on areas that may promote resilience for prevention, including child social-cognitive abilities and optimal parenting practices (Conduct Problems Prevention Research Group, 1999). Indeed, single-component or single-context interventions have been shown to have limited effectiveness (Kazdin, 1987). Alternatively, exemplary comprehensive intervention programs that take into account multiple targets of intervention of early prosocial development have shown promising outcomes. One such program worth mention is the Metropolitan Area Child Study (MACS), an 8-year prevention research trial targeting elementary school children from high-risk communities; this preventive intervention model, which the authors called a “cognitive-ecological” approach, is directed at remediating both individual social-cognitive and contextual factors relevant to the early acquisition of prosocial
(and antisocial) tendencies (Guerra, Eron, Huesmann, Tolan, & VanAcker, 1997; Metropolitan Area Child Study Research Group, 2002). In a group of school-age children in urban poor communities, intervention that focused on social cognition, behaviour management, altering perceptions regarding prosocial/antisocial beliefs and norms, and also family work was most effective for preventing antisocial behaviour 8 years later, in comparison to no-treatment and partial-treatment control groups. This was only true, however, if the intervention was delivered in the early elementary school years, as opposed to later in development (Metropolitan Area Child Study Research Group, 2002). Design, evaluation, and implementation of similar programs are necessary for optimal child prosocial outcomes amongst those most at risk, particularly in the critical early developmental years.
References


Footnotes

1 Although not the focus of Study 1, a mediation model was also considered and analyzed to ensure I understood all processes related to the predictors and outcome of interest. It was thought possible that the influence of maternal sensitivity on cooperation could operate through its influence on JA. This was not supported with the current data. Maternal sensitivity was not significantly related to children’s JA skills, nor was it a direct predictor of children’s cooperation without JA in the model.

2 Additional analyses examining 2- and 3-way interactions amongst the predictors of interest and the covariates were assessed. No additional interactions emerged as significant influences on children’s cooperation.

3 Of note, this same analysis was performed with the parent report prosocial outcome used in Study 2 (see page 43 for explanation of this measure), and results of this analysis were not significant.

4 Of note, this same analysis was performed with the experimental cooperation outcome used in Study 1 (see page 17 for explanation of this measure), and results of this analysis were not significant.