A Latent Growth Curve Analysis of Neighbourhood and Family Influences on Canadian Children's Prosocial Behaviour Developmental Trajectories

by

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“Let love be genuine, hate what is evil, hold fast to what is good, love one another with brotherly affection, outdo one another in showing honour” Rom 12:9-10

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Abstract

Prosocial behaviour is an important building block of children's future social relationships and overall life achievement. The purpose of this study is to increase our knowledge of how various social pathways influence the developmental trajectories of prosocial behaviour in children between the age of 4 and 11. Conceptually, this study rests on the family stress model and its mediating effects, augmented by parental perceptions of neighbourhood social relationships moderating those family pathways. Research is conducted using data from Statistics Canada's National Longitudinal Survey on Children and Youth (NLSCY), and latent growth models (LGM) in four parenting domains: positive interaction, effectiveness, consistency, and rationality. The study supports the hypothesis that family pathways, such as parental depression, family dysfunction, and parenting practices, mediate the relationship between family SES and children's prosocial development. Study findings also demonstrate the important direct effect sizes of all parenting practices on children's prosocial growth. Results suggest that the magnitude of the direct effects of parenting practices on prosocial behaviour, which are non-negligible and positive, are to a great extent negatively affected by the variables defined in the family stress model. Moreover, this research provides new insights about the types of moderation, and the focus of these moderating effects on the family stress model. Thus, findings support the hypothesis that parents' perceptions of neighbourhood cohesion and social support mitigate one or more family pathways more proximal to the child. Overall, this research study contributes in a distinctive manner to the current literature on children's prosocial behaviour development.

List of Abbreviations and Symbols Used

AMOS	Analysis of Moment Structures
FIML	Full Information Maximum Likelihood
GMM	Group Mixture Model
HLM	Hierarchical Linear Model
LCA	Latent Class Analysis
LGM	Latent Growth Model
MAR	Missing at Random
MCAR	Missing Completely at Random
NLSCY	National Longitudinal Survey on Children and Youth
NMAR	Not Missing at Random
PMK	Person Most Knowledgeable
SES	Socioeconomic Status
SEM	Structural Equation Model

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Chapter I: Introduction

Prosocial behaviour, an integral part of children's social competence, is defined as the degree to which children voluntarily support, help and provide comfort, and empathize with others (Eisenberg and Mussen 1989; Bosacki and Astington 1999; Carlo and Randall 2001). Prosocial behaviour in children stems from the emotional and cognitive development of social understanding in the early years (Liddle and Nettle 2006; Carpendale and Lewis 2006). There is a hypothesized relationship between children's social understanding at an early age, which becomes an integral part of their moral development, and their future prosocial and altruistic behaviour (Eisenberg and Fabes 1990; Lalonde and Chandler 1995; Watson et al. 1999; Eisenberg 2000; Gruhn 2008).

The development of prosocial behaviour in children's early years is considered to be a fundamental building block of their beneficial social transactions and relationships in later years (Singer 2006; Meltzoff 2007). As pointed out by Eslinger (1998), the way individuals relate to one another in society is fundamental for any interactive activities where individuals are brought together for the purpose of occupation, leisure or other mutual interests. Prosocial behaviour in children is generally associated with lower levels of social misconduct, greater achievement in school, and overall life success and social involvement (Caprara et al. 2000; Brown and Lichter 2005; Aviles et al. 2006; Lacourse et al. 2006).

Piaget (1970) argues that prosocial behaviour appears progressively in children over time through fixed and sequential stages of development. Fabes and Eisenberg (1996) challenge this rigid view of child development, and point out that developmental paths in children's prosocial behaviour are relatively complex and varied. For instance,

Eisenberg and Mussen (1989), Fabes and Eisenberg (1999), and Hay et al. (1999) show inconsistent evidence of positive age-increasing change in prosocial behaviour. More recently, Letourneau et al. (2006) and Moraes (2009) demonstrate that prosocial behaviour development follows a linear growth pattern or remains stable, while Aber et al. (2003) otherwise conclude to non-linearity and increasing rate of growth.

Eisenberg et al. (1997), Fabes et al. (1999), and Eisenberg et al. (2006) suggest there are individual differences in prosocial behaviour trajectories in children and adolescents. More specifically, Romano et al. (2005), Letourneau et al. (2006), Michalik et al. (2007), and Zahn-Waxler et al. (2008) propose prosocial behaviour may be moderated by gender, and boys and girls may display different developmental trajectories[1]. Eisenberg and Fabes (1998), argue that disparities across children's prosocial trajectories can be fully understood only through determining the influence of the social environment on children and adults. Although the literature on prosocial behaviour has increased steadily in the past decade, the actual pathways through which social processes associated with neighbourhood and family determinants influence children's prosocial development have been rarely studied longitudinally (Tremblay et al. 2001; Romano et al. 2005; Edwards and Bromfield 2009; Moraes 2009).

Determinants of Children's Prosocial Behaviour

The determinants that explain differences in the trajectories of children's prosocial behaviour are intertwined, and rely on transactional processes within neighbourhoods, and within and across families and children (Roosa et al. 2003; Knafo

[1] Moderation usually refers to how an explanatory variable may modify the magnitude of an effect occurring between two variables in a causal relationship (Kraemer et al. 2001).

and Plomin 2006; Eisenberg et al. 2006). Overall, it is proposed in the literature that children experiencing poor neighbourhood conditions show higher likelihood of lasting negative developmental effects (Brooks-Gunn et al. 1993; Duncan et al. 1994; Haveman and Wolfe 1995; Leventhal and Brooks-Gunn 2000; Bradley and Corwyn 2002; Harper et al. 2003; Edwards and Bromfield 2009).

Tremblay et al. (2001) propose neighbourhoods may have direct influences related to community disadvantages, as well as the indirect influence of the perceptions of the community. Findings show direct neighbourhood influences, captured for example by such measures as community level SES, generally account for a smaller proportion in the total variance of children's outcomes than do individual factors (Leventhal and Brooks-Gunn 2003). Tremblay et al. (2001) and Willms (2003) demonstrate direct neighbourhood effects on the development of children's behaviours that are statistically significant, but remain limited after controlling for the effects of individual and family processes.

Klebanov et al. (1994) and Roosa et al. (2003) propose that perceived social support and neighbourhood cohesion may indirectly influence the development of prosocial behaviour in children. Roosa et al. (2003) propose neighbourhoods may impact prosocial behaviour by influencing positive or negative family processes, which in turn affect the child. Edwards and Bromfield (2009) found that perceptions of neighbourhood safety and belonging mediate the influence of neighbourhood disadvantages on the development of conduct problems and prosocial behaviour[2]. Nonetheless, children living in neighbourhoods with poor social cohesion are shown to have lower levels of prosocial

[2] Mediation usually refers to an underlying pathway through which an explanatory variable may intervene in the relationship between a dependent variable and an independent variable (Baron and Kenny 1986).

behaviour, and higher levels of aggression and internalizing behaviour such as anxiety (Tremblay et al. 2001; Xue et al. 2003).

These findings suggest a multifaceted relationship amongst family determinants of children's prosocial behaviour (Brooks-Gunn et al. 1995; Brooks-Gunn and Duncan 1997). For instance, children's prosocial development may be shaped by the environment they live in, but proximal processes within the family may play a more important role in the early years of life (Racine and Boyle 2002). Guo and Harris (2000) and Dearing (2008) theorize the influence of three family pathways through which family SES may influence negatively children's development: first and second, limited material and psychosocial investment models related to the home learning environment; and third, the family stress model, also called the parental socialisation model. Within that framework, low family SES increases exposure to negative life event stressors, affecting parents' capacity to socially interact and in turn enhancing parenting practices that are detrimental to meaningful learning experiences (McLoyd 1998; Conger et al. 1994).

It is evident from the literature that family SES, by itself, fails to adequately explain the intricate nature of individual differences in children's prosocial development (Adler et al. 1994; Evans 2004; Farah et al. 2006). The few empirical studies on the specific influence of family SES on children's prosocial behaviour trajectories show weak and inconsistent findings (Letourneau et al. 2006; Moraes 2009). Tremblay et al. (2001) observed that family SES and family structure did not have a significant direct effect on the level of prosocial behaviour in children. This is in contrast with Eisenberg and Mussen (1989), Eisenberg et al. (2006), and Lichter et al. (2002), who indicate that children living in low SES families have a lower level of prosocial behaviour. Even so,

the direct influence of family SES on children's prosocial developmental trajectories remains marginal or insignificant in the limited empirical literature (Tremblay et al. 2001; Parilla et al. 2002). Although some of the discrepancies in research findings have methodological and statistical underpinning, results suggest the effect of SES is not particularly large.

In light of these findings, some empirical studies conclude that child and family determinants have substantial influence above and beyond that of family SES (Romano et al. 2005; Letourneau et al. 2006). For instance, Romano et al. (2005) found neither neighbourhood nor family SES had statistically significant influences on children's prosocial behaviour trajectories. In the same study, parental depression, family functioning, and parenting practices were significant predictors of prosocial behaviour in children. Letourneau et al. (2006) show parental depression affects children's prosocial behaviour in the early years and may persist to eight years of age and beyond. However they suggest the effect of parental depression on prosocial behaviour was weaker when parenting practices were taken into account. These limited empirical findings point to a potential mediating role for family functioning and parenting practices in the relationship between family SES and prosocial behaviour.

Hay and Pawlby (2003), King et al. (2005), and Foster et al. (2008) propose dysfunctional family relationships, single-parenthood, and maternal depression jointly and negatively influence children's prosocial behaviour, and more so for boys. Klebanov et al. (1994) found parenting disruptions were due to the cumulative effects of negative marital and neighbourhood experiences and were not specific to depressive parents. This view is supported by Lichter et al. (2002), who propose that the negative effects related to

family SES may arise through impaired emotional development associated with family structure breakdown. Thus, family functioning is proposed to have an influence on children's emotional and behavioural functioning; which in turn influence the development of prosocial behaviour (Pettit et al. 1997; Eisenberg et al. 1997).

Supportive parenting is expressed through parents' warmth, rewards and encouragement, and is necessary to the creation of an empathic home climate (Grusec and Goodnow 1994; Carlo et al. 1998; Randall and Roesch 2007). McDowell et al. (2002), Spera (2005), and Eisenberg et al. (2006) all suggest parenting is the most important socialisation mechanism in a child's early years: effective, positive and rational parenting being associated with increased prosocial behaviour. More specifically, Letourneau et al. (2006) show the influence of family SES on prosocial behaviour is mediated by parenting practices. Allhusen et al. (2005) and Verhoeven et al. (2007) suggest that low SES parents are more likely to display negative parenting practices which in turn affect the development of prosocial behaviour in their child. Tremblay et al. (2001) show that children living in a less dysfunctional family, and who experience more positive and consistent mother-child social interactions, are more prosocial. Moreover, Tremblay et al. (2001) found the influence of parents' depression symptoms on children's prosocial behaviour is mediated by parenting practices. Moraes (2009) also supports the hypothesis of a mediating role for parenting practices in the relationship between family SES and prosocial behaviour.

In summary, the literature is conclusive on the weak direct effect of family SES on prosocial development in children, and for that reason other determining pathways must be considered. These pathways, through which family and neighbourhood

environments may mutually influence children‘s prosocial behaviour, are only partially understood and further research is needed (Tremblay et al. 2001; Parilla et al. 2002; Romano et al. 2005; Edwards and Bromfield 2009; Moraes 2009).

Although the essential role of parenting practices on prosocial development is acknowledged in the literature, little is known about how other family and neighbourhood processes work together to influence prosocial behaviour trajectories (Letourneau et al. 2006). For instance, King et al. (2005) propose that perceptions of neighbourhood cohesion and social support may influence children's prosocial behaviour through the mediating effect of family functioning. Alternatively, Cook et al. (1997) and Roosa et al. (2003) propose the influence of family functioning on children prosocial trajectories, may be moderated by parents' perceptions of neighbourhood conditions.

These preliminary findings also demonstrate the empirical challenges of studying prosocial behaviour developmental changes over time, and in the broader family and neighbourhood contexts. Therefore, a longitudinal analysis of the mediating influence of family determinants of children's prosocial development, beyond that of family SES, and accounting for the potential moderating role of neighbourhood perceptions, would be particularly beneficial in order to inform child development policies and programs in Canada. Overall, such empirical research is essential in order to promote socially valued life courses and avoid unnecessary detrimental social outcomes for Canadian children.

Purpose of the Study

The purpose of this study is to increase our knowledge of how complex social pathways, within family and neighbourhood environments, determine the development of prosocial behaviour in Canadian school age children.

The specific research objectives are as follows:

Objective 1: to assess individual and group differences in prosocial behaviour developmental trajectories, for children between the age of 4-5 and 10-11; and

Objective 2: to assess the mediating role of family dysfunction, parental depression and parenting practices in the relationship between family SES and children's prosocial behaviour developmental trajectories; and

Objective 3: to assess the moderating role of gender, family structure, and perceptions of social support and neighbourhood cohesion, in the relationship between family SES, family determinants, and children's prosocial behaviour developmental trajectories.

Chapter II: Review of the Literature

The multifaceted determinants influencing intra-individual, inter-individual, and group differences in children's prosocial behaviour trajectories are reviewed in this chapter. The review of the literature is divided into four sections. The first section provides a conceptual definition of prosocial behaviour and a review of literature on prosocial behaviour developmental trajectories. The second and third sections provide a critical review of the literature on neighbourhood and family environments' influence on children's prosocial behaviour development. Based on insights from the review of the literature, the study's research questions are provided in the fourth section.

Definition of Prosocial Behaviour

Prosocial behaviour, an integral part of children's social competence, has been defined as the degree to which children voluntarily support, help and provide comfort, and empathize with others (Eisenberg and Mussen 1989; Bosacki and Astington 1999; Carlo and Randall 2001). The capacity to empathize, to share feelings and emotions with others, is proposed to be at the heart of the concept of prosocial behaviour (Moore 1990; Singer and Fehr 2005). Zahn-Waxler and Radke-Yarrow (1990) define empathy as an emotional response that refers to experiencing another individual's emotional state and condition, which has an affective as well as a cognitive component. Empathy, in contrast to sympathy, is posited to represent a shared affect or "balanced focus between the self and others" (Strayer 1987).

Some academics believe that prosocial behaviour in children stems from emotional and cognitive development of social understanding in the early years (Liddle

and Nettle 2006; Carpendale and Lewis 2006). Moore et al. (1998), Carpendale (2000), and Veenstraa et al. (2008) propose that the development of cognitive ability, through its influence on moral reasoning and understanding of conflicting perspectives, may play a role in determining prosocial behaviour later in life. According to the Theory of Mind, these individual feeling and thought processes in children at a very young age define the children's capacity to make inferences about other people's mental states, thoughts, beliefs, and emotions (Premack and Woodruff 1978; Baron-Cohen 1994; Dunn and Cutting 1999; Gruhn et al. 2008).

The development of children's representational ability is believed to have significant consequences for children's social interactions (Jenkins and Astington 2000; Frith and Frith 2001). Scholars hypothesize that the development of children's social understanding at an early age, progressively becomes an integral part of their moral development, and their future prosocial and altruistic behaviour (Eisenberg and Fabes 1990; Lalonde and Chandler 1995; Watson et al. 1999; Eisenberg 2000; Gruhn 2008). The relationship between social understanding and prosocial behaviour is shown however to depend on conceptual constructs (Bosacki and Astington 1999). The same conclusion on the appropriateness of the empirical construct is suggested to the relationship between measures of empathy and prosocial behaviours (Roberts and Strayer 1996).

Carlo and Randall (2002) have identified two broad measures of prosocial behaviour: first, situation-specific prosocial behaviour, and second, global prosocial behaviour. While situation-specific prosocial behaviour is self-explanatory, global prosocial behaviour occurs across situations and generally includes social compliance, emotional bonding with others, and altruistic and socially desirable motives (Carlo and

Randall 2002; Moraes 2009). Compliant and socially desirable motives are respectively based on the individual need to respond to social request and gain the respect of others (Eisenberg et al. 1981; Carlo and Randall 2002). Emotional prosocial behaviour has been defined as an orientation toward helping others "under emotionally evocative circumstances" (Carlo and Randall 2002). Eisenberg and Fabes (1998) defined altruistic prosocial behaviour as motivated primarily by the welfare of others. According to Moraes (2009), these types of global prosocial behaviour differ only in their motives rather than the children's overt behaviour. Because of obvious difficulties in capturing the motives behind prosocial behaviours, the most common definition of prosocial behaviours in the literature includes elements of overt cooperation, support, sharing and empathy (Caprara et al. 2000; Carlo and Randall 2002; Hastings et al. 2007; Moraes 2009).

Prosocial Behaviour Developmental Trajectories

Piaget (1970) proposed that prosocial behaviour emerges progressively in the early years of childhood and develops as children grow older. Hay (1994) proposed that prosocial behaviour emerges in the second year of life and may decline as behaviours become more regulated. Hay (1994) believes it will also be differentiated on the basis of gender and personality. Radke-Yarrow et al. (1983) and Eisenberg et al. (1996) postulate that prosocial behaviour increases with age when children mature cognitively, regulate their emotions, and experience successful socialisation.

According to Eisenberg and Fabes (1998), changes in prosocial behaviour must be explained in the context of the social processes within which children are developing. The authors argue that changes brought by puberty, which involve physical and hormonal

adjustments, explain only partially adolescents' increase in prosocial interests and competence. Eisenberg and Fabes (1998) propose that delayed physical maturation and puberty can create social conditions where prosocial behaviour and moral tendencies are impaired as well.

The evidence of an age-increasing change in children's prosocial behaviour is inconsistent. Eisenberg and Mussen (1989), Fabes and Eisenberg (1999), and Hay et al. (1999) do not agree on this issue. Fabes and Eisenberg (1996) and Fabes et al. (1999) conducted a meta-analysis of age differences in prosocial behaviour from infants to adolescents, and their results support the hypothesis of age-increasing prosocial behaviour. Fabes and Eisenberg (1996) note their results were, in part, determined by the characteristics of the studies and the prosocial measures analyzed. In addition, a number of studies found there are also significant individual differences in prosocial behaviour trajectories in both children and adolescents (Eisenberg et al. 1997; Fabes et al. 1999; and Eisenberg et al. 2006).

As pointed out by Moraes (2009), relatively few studies have analyzed the relationship between prosocial behaviour and age with longitudinal data and methods. Aber et al. (2003) analyzed prosocial behaviour in a sample of low income urban children in New York using a Hierarchical Linear Model (HLM) framework and concluded that the rate of growth in prosocial behaviour increased with age[3]. Parilla et al. (2002), Letourneau et al. (2006), and Moraes (2009), using HLM to analyze a sample of children

[3] Hierarchical linear modeling (HLM) is a form of advanced linear statistical regression methodology applied to the study of change. HLM is appropriate when using longitudinal and nested data, and allows variance in outcome variables to be analyzed at multiple hierarchical levels. The longitudinal analysis of children outcomes using a multi-level methodology includes defining developmental trajectories (initial level and rate of growth) as a first level HLM, and other predictors (mediators and moderators) as second and third levels (Singer and Willett 2003).

between the age of 7 and 11, 2 and 8, and 4 and 11 respectively from the National Longitudinal Survey on Children and Youth (NLSCY), conclude that prosocial behaviour increases linearly with age. All three studies used a growth curve model specification to assess initial status (intercept) and rate of growth (slope) in prosocial behaviour as influenced by a range of child, family, and neighbourhood determinants. A number of determinants such as family SES, social support, maternal education, single-parent status, and consistent parenting, were used to assess their effects on prosocial measures repeated over three subsequent cycles. Letourneau et al. (2006), in an HLM study of the effect of maternal depression on various child behaviours, also found a significant age-increase in prosocial behaviour. Parilla et al. (2002) and Moraes (2009) found that prosocial behaviour development, represented by a linear function, was statistically significant for a sample of children between the age of 7 and 11.

Kokko et al. (2005) and Cote et al. (2002) use a Latent Growth Model (LGM) framework and group mixture methodology developed by Nagin (1999) to define several trajectories in children's prosociality[4]. Cote et al. (2002) used a semi-parametric group-based mixture method to analyze low, medium and high prosocial trajectories in a sample of over 1,800 children in Quebec. The study showed that the level of prosocial behaviour in about half of the children remained stable between the age of 6 and 12. Kokko et al. (2006), using a group-based semi-parametric method to conduct an analysis of prosocial behaviour trajectories in a sample of 1,161 boys from the Montreal Longitudinal and

[4] Latent growth modeling (LGM) is an advanced statistical methodology used for the longitudinal analysis and estimation of individual outcome growth trajectories. Latent growth models are used to study inter-individual variability in developmental paths by modeling repeated measures of a dependant outcome as a function of underlying latent level and growth for the whole population sample. This methodology is useful for the analysis of how predictors (mediators and moderators) may influence these latent level and growth; and population sub-group variability (Tisak and Meredith 1990; Kline 2005).

Experimental Study, show that contrary to Fabes and Eisenberg (1996) prosocial behaviour generally decreases over time. Carlo et al. (2007), also using a LGM approach to study the determinants of prosocial behaviour in a sample of approximately 500 rural American adolescents, found prosocial behaviour to decline until late high school and rebound in grade 12. The LGM used by Carlo et al. (2007) fits the data well with both intercept and slope factors mean and variance being statistically significant. This declining trend was also observed by Caprara et al. (2000) in a sample of Italian children aged 7 to 13.

Fabes and Eisenberg (1996) and Eisenberg and Fabes (1998) found gender effects across childhood and adolescence (girls being more prosocial than boys); and that gender differences in prosocial behaviour increase significantly between childhood and early adolescence. These results are supported by Hay et al. (1999) who found higher levels of prosocial behaviour in preschool girls. Tremblay et al. (2001) analyzed a cross-section of children from the NLSCY using a HLM and also found that boys have significantly lower levels of prosocial behaviour.

The longitudinal studies reviewed in this chapter also support evidence of gender differences in prosocial behaviour. For instance, Parilla et al. (2002) found prosocial behaviour differs significantly across gender, as girls generally display higher levels of prosociality. Romano et al. (2005), and Aber et al. (2003) and Letourneau et al. (2006), using cross-sectional and longitudinal NLSCY samples respectively, also found boys had significantly lower levels of prosocial behaviour than girls. More specifically, Moraes (2009) found the gender effect in favour of girls' prosocial behaviour is independent of family SES. Parilla et al. (2002), Letourneau et al. (2006) and Moraes (2009) introduced

gender as an effect on the intercept and slope of the growth curve developed within their HLM framework.

Cote et al. (2002) found in their sample three distinct trajectories of low, moderate and high prosocial trajectory that boys account for a very small percentage of the latter. Cote et al. (2002) found 2% and 27% of boys and girls respectively, follow a stable high prosocial trajectory, while 44% and 15% of boys and girls respectively, follow a low prosocial behaviour trajectory. On the other hand, the study by Kokko et al. (2006) found no evidence of boys in the high prosocial trajectory, pointing to a significant gender difference. Thus, boys were overrepresented in the lower prosocial behaviour trajectories in both studies. Carlo et al. (2007), using a LGM approach, found that girls in grade 7 start out with significantly higher prosocial behaviour than boys, and the decline in prosocial behaviour in subsequent years is greater for boys than for girls.

Family Environment and Prosocial Behaviour

The family environment is best described first as parent-parent and parent-child socialisation processes, and second as physical and material home environment (Brooks-Gunn et al. 1995; Dearing 2008). Racine and Boyle (2002) propose that children's prosocial behaviour is shaped by the environments they live in, and more specifically, that family proximal processes play a key role in influencing development in the early years of life. Proximal family processes are defined by Parilla et al. (2002) as the relationship between the child and the immediate family environment. It is this relationship that fosters the child's competencies. Family dynamics, in terms of family functioning, parenting practices and parental well-being, is theorized as having a

significant contribution to the development of healthy child behaviours (Schaffer 1998; Foster et al. 2008). On the other hand family structure, specifically single-parenthood, is also suggested to have significant detrimental impacts on a range of child outcomes including socio-emotional well-being through family proximal processes (Walker and Hennig 1997; Adams and Ryan 2000).

Underlying Family Pathways

Guo and Harris (2000) propose there are two main pathways or mechanisms through which parental SES can influence children's developmental outcomes. First, the financial capital model attempts to explain differences in educational and socio-emotional outcomes due to a lack of, or difficult access to, family material resources. In that respect, factors such as adequate housing and child care have a potential impact on children's intellectual and social development. Votruba-Drzal (2003) also suggests the importance of a home learning environment that is conducive to learning and intellectual and social stimulation. A second convincing argument is related to the family process itself within the context of the parental socialisation model or family stress model, emphasizing the supportive role of parents in terms of monitoring, parenting and responsiveness to their children (Brooks-Gunn et al. 1995; Brooks-Gunn and Duncan 1997; Guo and Harris 2000).

Similarly, Dearing (2008) distinguishes three family pathways through which poverty affects children and youth outcomes: first and second, limited material and psychosocial investments models in a home learning environment (e.g., housing quality, parental stimulation); and third, the family stress model. Within the family stress model,

parents' SES increases their likelihood of exposure to negative life events stressors, and consequently decreases their capacity to interact, socialize and provide meaningful learning experiences to their children (Conger et al. 1994). Dooley et al. (1998) suggest family breakdown, such as children living in single-parent or step families, show higher likelihood of emotional and behavioural problems. However, Verhoeven et al. (2007) posit family SES may influence parenting because parents' social status acts as a predictor of differences in parental values, goals and aspirations. Bradley et al. (2001) and Bradley and Corwyn (2002) suggest the effect of poverty on children's home environment is not linear; the lower family SES range having a stronger association with negative family processes and child development than the higher ranges.

Parenting Styles and Practices

According to Thiessen (2007), the family stress model is an attempt to study child development in a more holistic way. The family stress model associates parental economic resources with children's development through a sequence of causality involving parental stress and its effect on parenting styles and parenting practices (McLoyd 1998; Adams and Ryan 2000). Darling and Steinberg (1993) define parenting styles as a set of communicated emotional attitudes towards the child. Parenting style is proposed to foster children's prosocial development through the creation of a home climate that rewards and encourages empathy towards others (Grusec 1991; Grusec and Goodnow 1994). Parenting practices are defined as behaviours that parents use to socialize their children, this process referring to the acquisition of skills, attitudes and behaviours through proper education and experience (Darling and Steinberg 1993; Ladd

and Pettit 2002; Spera 2005). Moraes (2009) argues that parenting practices, with their emphasis on "goal-directed behaviours" are usually used in recent studies because of their accuracy in predicting child outcomes.

Belsky (1984) originally proposed a model of the determinants of parenting that relies on child characteristics, parental personality, and contextual features. McDowell et al. (2002), Spera (2005), and Eisenberg et al. (2006) propose that parenting is the most important socialisation mechanism in a child's early years, and effective, positive and rational parenting practices are usually associated with increased prosocial behaviour development in children. The role of supportive parenting on prosocial behaviour in children is also emphasized in the prosocial behaviour literature through the role of parents' warmth and interpersonal closeness (Baumrind 1999; Carlo et al. 1998; Randall and Roesch 2007). Dunn (1988), Fabes et al. (1999), and Carlo et al. (2007) suggest that socialisation with siblings in the early years has a positive influence on the development of children's social competence, while the quality of peer relationships has a greater influence later in adolescence.

Allhusen et al. (2005), Letourneau et al. (2006), Verhoeven et al. (2007) and Moraes (2009) show parenting practices have significant mediating impact on the relationship between family SES and children's prosocial behaviour. Allhusen et al. (2005), in a study of social cognitive and social development in 1341 participants, show that the relationship between poverty, categorized by groups based on the occurrence of poverty over time and child outcomes, was partly mediated by less positive parenting. However, Verhoeven et al. (2007), in a study of the contribution of child, family and contextual characteristics to parenting categorized in five domains such as support,

structure, positive discipline, psychological control, and physical punishment, found that supportive parenting and use of psychological control are influenced by parental characteristics such as personality. The Verhoeven et al. (2007) study, using Structural Equation Modeling (SEM), demonstrates that discipline and physical punishment are better predicted by family characteristics such as marital satisfaction and family SES[5].

Pettit et al. (1997) found that supportive parenting can have a moderating effect on the relationship between SES, family stress and behavioural problems in children. However, cross-time changes in family SES and single-parenthood variables are not considered for consistency of temporal ordering in the study by Pettit et al. (1997). In order to overcome this issue, Moraes (2009) introduces parenting practices as time-varying determinant of prosocial behaviour in a HLM and show positive interaction parenting practices are associated with higher levels of prosocial behaviour, while hostile or ineffective parenting practices are associated with lower levels of prosocial behaviour at age 4-5. On the other hand, no statistically significant association is found between level and growth in parenting practices and the growth of children's prosocial behaviour between the ages of 4 and 11 in the Moraes (2009) study.

Dearing (2008) also suggest that parental stress impacts children's socio-emotional functioning through the detrimental influence of parental mental health problems, which in turn affects the parents' punishment and reward behaviours towards their children. According to Billings and Moos (1983), children who live with depressed

[5] Structural equation modeling (SEM) is statistical technique used for the study of structural causal relationships between variables for theory hypothesis testing (confirmatory analysis) or theory development (exploratory analysis). This methodology allows for the use of latent variables that are not measured directly but estimated from measured variables in the model. Latent growth modeling (LGM) is an advanced extension of the structural equation statistical framework that includes the definition of time-varying predictors and outcome variables (Muthen 2001; Kline 2005).

mothers are more likely to have behavioural problems and learning deficits. As pointed out by Shaw et al. (2003), one of the most proximal factors of maternal psychological resources theorized to compromise parenting capacity and quality is the mother's depression which result in irritability and low positive affect. In this interactional framework, it is theorized that high negativity increases the parent's tendencies to be harsh and rejecting, and the parent's low positivity increases demands on the child to gain the mother's attention, thereby increasing the probability of disruptive behaviour on the part of the child and subsequently greater negativity on the part of the parent (Downey and Coyne 1990; Shaw et al. 2003). Klebanov et al. (1994) suggest that parenting disruptions are not specific to depressive parents but rather are caused by the cumulative effects of negative marital and neighbourhood experiences.

Yeung et al. (2002), using a Structural Equation Model (SEM) framework to test the relevance of the family stress model on externalizing behaviours of a sample of 753 children, found most of the association between income and externalizing behaviour was mediated through maternal emotional distress and parenting practices. Similarly, Tremblay et al. (2001) show the effects of parental depression on child behaviours are mediated by parenting practices that cause parents to be less responsive and more negative toward their children.

Parilla et al. (2002) and Romano et al. (2005) use a HLM methodology where children are nested within their respective family and neighbourhood. Their studies show most of the variance in prosocial behaviour is accounted for within the family and the individual levels. Romano et al. (2005) found that higher levels of depression in mothers and punitive parenting are associated with lower levels of prosocial behaviour in

children. In their model, inter-family differences in prosocial behaviour are also associated with parenting characteristics such as positive interaction and consistency. These results are supported by Parilla et al. (2002) who found that family level factors significantly account for a higher share of variance in children's prosocial behaviour; and higher maternal depression and lower positive interaction in parenting are significantly associated with lower prosocial behaviour.

Letourneau et al. (2006), analyze the impact of maternal postpartum depression during the first two years of a child's life on children's prosocial growth trajectories to the age of 8, and found that although there are significant differences in prosocial behaviour between children who live with a depressed mother versus those who do not live with a depressed mother, the main effect of maternal depression on prosocial trajectories tend to disappear when social support, and positive and consistent parenting are introduced. Letourneau et al. (2006) suggest these findings support the relevance for developing public interventions aimed at reducing maternal depression through parenting support. However, Hay and Pawlby (2003) analyze prosocial behaviour and maternal depression between the age of 4 and 11, and find inconsistent results depending on the period being analyzed, with the association between mother's depression and prosocial behaviour being insignificant in early childhood.

Family Structure and Functioning

Williams et al. (1990) and Parilla et al. (2002) found that family functioning, family structure and parental depression explain a significant proportion of inter-individual variability in children's socio-emotional competence and may represent

potential compound risk when they interact together. Family functioning is defined by how well family members work together as a unit in terms of communicating with and treating each other (GoC, 2003). In this simplistic framework, family functioning is proposed to have a positive effect on children's emotional and behavioural functioning, which in turn influences the development of prosocial behaviour (Pettit *et al.* 1997; Eisenberg *et al.* 1997). According to a study by Racine and Boyle (2002), children living in dysfunctional families are about 35% more likely to display signs of challenging behaviours than their counterparts living in families that are functioning well.

Using a linear regression model of 151 children and youth between the age of 7 and 17, Foster *et al.* (2008) did not find a consistent mediating path between levels of maternal depression, family functioning, and child behaviours. However, the study did show that recurrent symptoms of maternal depression are negatively associated with some measures of family functioning; and that gender moderates the relationship between maternal depression and family functioning (girls being more vulnerable to maternal depression than boys). Parilla et al. (2002) found better family functioning is associated with higher scores in children's prosocial skills. Tremblay *et al.* (2001) found that children from less dysfunctional families, with positive mother-child interaction and consistent non-punitive parenting, are more prosocial. Romano et al. (2005) found that prosocial behaviour in children was associated with inter-family differences in family functioning; low functioning families having a negative impact on prosocial behaviour levels. King et al. (2005), using a SEM approach for the analysis of neighbourhood, family and child determinants of prosocial behaviour in a cross-section of NLSCY

children, found that emotional functioning (anxiety and depression) in children mediated the relationship between family functioning and prosocial behaviour.

Lichter *et al.* (2002) propose the negative effects related to childhood economic disadvantages on prosocial behaviour arise through the mediating role of impaired emotional development associated with family structure breakdown. This is supported by Dooley et al. (1998) who suggest children living in single-parent or step families show higher likelihood of emotional and behavioural problems. Nonetheless, according to Lipman et al. (2002), evidence on the relationship between family structure and child development remains ambiguous in the literature. Lipman et al. (2002), analyzing the impact of single-parenthood on NLSCY children's emotional and behavioural outcomes, concluded that children living with single-parents develop behavioural problems for the same reason as their two-parent counterparts, namely because of the underlying role of maternal depression and quality of parenting practices. Similar results were obtained by Kerr and Mishalski (2004) who analyzed the impacts on children's hyperactivity growth trajectories of living in intact, single-parent, step, or divorced families using a LGM approach.

Alternatively, Letourneau et al. (2006) found that children's prosocial behaviour was higher initially for those who lived with single parents at age 2, although their role of increase in prosocial behaviour between the age of 2 and 8 was lowered by the same variable. Letourneau et al. (2006) noted that these results are consistent with a prosocial growth curve where children with higher initial status usually experience a lower subsequent growth. These results were supported by Tremblay et al. (2001), who found that having one biological parent or not, although it had a significant impact on other

child behaviours such as aggression and anxiety, had no significant effect on children's prosocial behaviour in a cross-sectional study setting. Therefore, the literature supports the idea that a change in family structure has distinct effects depending on the child behaviour being analyzed.

Neighbourhood Environment and Prosocial Behaviour

Chaskin (1997) and Sampson et al. (1999) point to non-mutually exclusive conceptualizations of neighbourhoods that include dimensions of geographical boundaries, sets of social relations and networks, sets of institutions and cultures, and even a symbolic unit. Since Wilson's "The Truly Disadvantaged" (1987), research on the role of neighbourhood effects on a range of individual and family outcomes has increased exponentially (Wen et al. 2003). Wilson's (1987) main original argument is that economic structural changes created a concentrated underclass of jobless, and welfare dependent or single-parent families in some inner cities, which consequently generated new social pathologies. According to Leventhal and Brooks-Gunn (2000), the neighbourhood effects refer to a causation hypothesis linking place of residence and specific child outcomes. Central to the neighbourhood literature is the idea that families that are aggregated in lower income neighbourhoods are affected by a socioeconomic environment that is not conducive to healthy child development (Brooks-Gunn et al. 1997; McCulloch and Joshi 2001)

An interdisciplinary body of literature has developed around theoretical conceptions of neighbourhoods and child outcomes and numerous factors are correlated with developmental trajectories, of which neighbourhood and family socioeconomic

gradients are recurrent themes. The approach is used in a variety of applications and contexts ranging from assessing the influence of peers on adolescent drug abuse or other developmental problems to determining how the lack of institutional resources prevents children from learning (Murray et al. 1998; Luthar and Cushing 1999; Leventhal and Brooks-Gunn 2000; Duncan et al. 2001; Lambert et al. 2004; Araujo and St. Aubyn (2008); Buu et al. 2009). Overall, the literature postulates that living in poor neighbourhoods can have lasting developmental effects on children's emotional, behavioural, social and cognitive abilities and competence (Brooks-Gunn et al. 1993; Duncan et al. 1994; Haveman and Wolfe 1995; Blau 1999; Bradley and Corwyn 2002; Willms 2003).

How neighbourhoods influence children's behaviours, and more specifically their prosocial inclination, remains a question of interpretation. Parilla et al. (2002) suggest distal processes that affect a family's ability to provide support for the child or a family's social interaction with their broader environments (for instance through neighbourhood social support and trust) which affect a child's development indirectly. Similarly, Roosa et al. (2003), argue that neighbourhood characteristics rarely have direct effects on children, but rather influence children by triggering one or more family processes that are more proximal to the child's development. In light of these findings, both proximal and distal processes may influence a family's capacity to care for and socialize with a child.

Underlying Neighbourhood Pathways

Durlauf (2001) argues that there are two basic and very distinct theoretical research questions involved in neighbourhood effects: first, how do neighbourhood

characteristics affect individual decision-making, and consequently, behaviours and outcomes; and second, how do neighbourhood effects influence group membership and population composition. For Harding (2003) the urgent research question is whether differences by neighbourhood can be causally attributed to neighbourhood context or whether they are simply due to differences between individuals living in different neighbourhoods. Small and Newman (2004) suggest the delimitation of a geographical unit for capturing neighbourhood effects, for instance rural versus urban area, can be problematic because people are not randomly distributed, but rather follow social selection processes. This is mainly why Akerlof (1997) proposes other forms of proximity, such as the notion of social distance, have important associational impacts with neighbourhood effects. Social distance, as opposed to locational distance, refers to the perceived, or actual, distance between social groups in society, which can be based, for example on SES, gender, ethnicity, or sexual orientation (Akerlof 1997).

Tremblay et al. (2001) point to conceptual challenges associated with analyzing neighbourhood effects in terms of the unit of analysis, the intricate nature of contextual effects versus compositional effects, and interactional effects between individuals and their neighbourhood. Jencks and Mayer (1990) propose that the interdependence of social behaviours and social interactions induce neighbourhood effects. Akerlof (1997) proposes that those social interactions can be defined by how and why social decisions cannot be simply based just on individual considerations. At a semantic level, a broad range of processes of interaction are posited to define specific mechanisms of social interaction such as peer influences, social norms, contagion, bandwagon effect, or herd behaviour (Merton 1957; Granovetter 1979; Jencks and Mayer 1990). Akerlof (1997) and

Manski (2000) argue that the main challenge is the interpretation of neighbourhood effects as actual social interactions from an empirical point of view and, more implicitly, the identification of the form of social interactions taking place.

Jencks and Mayer (1990) propose that the similarity of behaviours generated by social interaction is due to processes operating entirely at the level of the individual. Conley and Topa (2002) agree that the most relevant social interactions occur at lower levels of aggregation in society within schools and families. Similarly, Akerlof (1997) proposes the city neighbourhood unit may be too large to encompass the social interactions involved in social exchange. Conley and Topa (2002) and Aizer and Currie (2002) found the notion of ethnic distance and occupational distance accurately define the relevant social interaction group for individuals in poor neighbourhoods. As Akerlof and Kranton (2000) point out, identity and self-perceptions affect how individuals are influenced by others and ultimately, individuals living in the same physical space may experience very different social interactions.

There are a number of theories identified for explaining how neighbourhoods affect child development, but the literature generally focuses on one of three main approaches: first, the socialisation model; second, the institutional model; and third, the environmental stress model (Jencks and Mayer 1990; Haveman and Wolfe 1995; Connor and Brink 1999; Shonkoff and Phillipps 2000). The socialisation model refers first to the effects of peers and adult role models on children's behaviours (Jencks and Mayer 1990). The peer effects, or epidemic model, states that because of individual tendency to conform to disadvantaged neighbourhood norms, negative peer influences can affect positive social support among children and create an environment conducive to antisocial

or deviant behaviours, and might even spill over (social contagion hypothesis) to other groups or neighbourhoods (Connor and Brinks 1999; Beauvais and Jenson 2003). Durlauf (2001) defines peer group effects as the impact the choices of some members of a group have on the preferences of others in assessing those same choices, and has therefore emphasized how the social environment influences individual decision-making through psychological and behavioural interactions. Durlauf (2001) also distinguishes the role of social learning in influencing subsequent choices of individuals through information translation about negative experiences of peers.

It is evident in the literature that neighbourhood effects specific to peers and role models are statistically significant for child development (Evans et al. 1992; Akerlof 1997; Leventhal and Brooks-Gunn 2000; Gaviria and Raphael 2001; Duncan et al. 2001; Kohen et al. 2002; Stinebrickner and Stinebrickner 2005). Nonetheless, Harding (2003) suggests that estimates of neighbourhood effects are extremely sensitive to family characteristics, which complicate conclusions about their overall impacts. In a social interaction framework, Akerlof (1997) states there is "no disagreement at all" about the importance of family variables and parental socialisation on child behaviours.

On the other hand, the collective socialisation model, or social control model, relies on the positive influence of adults and collectively act as an enforcer of appropriate behaviour. Along the line of Popay's (2003) shared meaning of place, collective socialisation is shown to lead to collective efficacy when individuals trust each other and work cohesively for the common good in the neighbourhood (Brooks-Gunn et al. 1993; Beauvais and Jenson 2003).

Connor and Brink (1999) and Bradley and Corwyn (2002) propose the institutional model has significant effects on child developmental outcomes through the availability of institutional resources for children and families in neighbourhoods, in terms of physical infrastructure such as parks and libraries. Small and Newman (2001) stress the important role of daycare centers, educational and recreational facilities, and cultural centers in supporting successful child upbringing in neighbourhoods. For instance, empirical research on the influence of neighbourhood effects on local public investments in education demonstrates that lower per capita school expenditures and poor educational quality negatively affect child development (Hanushek 1986; Murray et al. 1998; Araujo and St. Aubyn 2008).

Small and Newman (2001) also suggest instrumental processes such as social isolation can become important social environment limitation on individual agency. This instrumental approach posits that neighbourhood conditions may progressively lead individuals and families to detach from their social networks, which in turn may have detrimental effects on available social support to their family function and parenting capacity. Increased social isolation is also related to lower likelihood of work or residential mobility, which affects families' ability to break the cycle of poverty by seeking migration opportunities (Wilson 1987; Fitchen1994; Fitchen 1995).

A last approach focuses on exposure to neighbourhood physical stressors. Poor neighbourhoods are physically more hazardous, and noise and air pollution due to traffic and soil contamination are theorized as having detrimental impacts on child development (Beauvais and Jenson 2003; Evans 2004).

Direct Neighbourhood Effects

According to Tremblay et al. (2001), the studies of the effects of neighbourhoods on child behaviour can be defined in two broad categories: first, studies that research the objective effects of neighbourhood level variables such as neighbourhood SES, unemployment rate, geographical location, and community size capturing some notion of community disadvantage on child behaviours; and second, studies that focus on subjective parental perceptions of neighbourhood safety, support and cohesion.

The literature on the characteristics of a place of residence, measured for instance by community size and location, show mixed results (Parilla et al. 2002; Romano et al. 2005; Edwards and Bromfield 2009). Romano et al. (2005) found that the effects of community size (rural and urban) on prosocial behaviour in Canadian children were not statistically significant. Edwards and Bromfield (2009), using census tract level data, found that prosocial behaviour in children was not associated with geographic remoteness. Tremblay et al. (2001) found that rural children were less likely to display emotional problems than their urban counterparts but differences in prosocial behaviour were not significant. These limited results suggest that the influence of community geographical characteristics on children's prosocial behaviour remains limited.

Tremblay et al. (2001) and Willms (2002) found neighbourhood effects, although significant, are small after controlling for the effects of family and biological processes. Consequently, neighbourhood influences generally account for approximately 5-10% in the total variance of child outcomes (Leventhal and Brooks-Gunn 2003). Duncan and Raudenbush (1999) and Leventhal and Brooks-Gunn (2000) found that overall neighbourhood effects are stronger for children's cognitive than behavioural measures.

Edwards and Bromfield (2009) found that neighbourhood influences are greater for adolescents than for younger children because of increased social interactions with peers in neighbourhoods at adolescence. According to Schonkoff and Philipps (2001), few studies focus on early childhood experiences, although it is a fundamental element for understanding the long-term consequences of neighbourhood effects on prosocial behaviour development.

The actual mechanisms through which a neighbourhood directly or indirectly influences children's prosocial behaviour development have been rarely examined empirically and further research is needed (Tremblay et al. 2001; Parilla et al. 2002; Xue et al. 2003; Romano et al. 2005; Edwards and Bromfield 2009). Few studies actually measured the impacts of neighbourhoods on prosocial behaviours and most have adopted an empirical approach based on nesting individual data within family, school, and neighbourhood (Tremblay et al. 2001; Parilla et al. 2002; Romano et al. 2005). The nested Hierarchical Linear Model (HLM) approach usually includes neighbourhood level variables such as the number of unemployed individuals or the number of single-parent families introduced as a third level of analysis and some nesting of the data using census tracks. The explained inter-neighbourhood variance in terms of child outcome is then compared with inter-family and inter-individual variances.

Romano et al. (2005) recently used a three-level methodology to analyze prosocial behaviour for children nested within families and neighbourhoods. Results show that a large portion of the variance in prosocial behaviour, approximately 65%, is accounted for at the individual level with significant explaining variables such as gender and age, while family level variables such as family SES, maternal depression, parenting

practices and family functioning account for approximately 26% of the outcome variance. Objective neighbourhood-level variables such as place of residence in rural or urban area, and neighbourhood poverty accounted for only 9% of the total variance in children prosocial behaviour. Romano et al. (2005) explain these results by arguing that family and neighbourhood environments might impact children in a different manner because of individual characteristics. On the other hand, Boyle and Lipman (2001) and Klebanov et al. (1994) found internalizing and externalizing behaviours in children are significantly and negatively associated with neighbourhood level measures of disadvantage such as community SES.

Neighbourhood Perception Effects

Shonkoff and Phillips (2000) posit neighbourhood perceptions are at least as important as the actual levels of neighbourhood resources in determining child outcomes. Shumow et al. (1998) found the relationship between neighbourhood demographic characteristics and children's emotional and misconduct is mediated by parental perceptions of neighbourhood safety. Tremblay et al. (2001) and Xue et al. (2003) found that children living in low social cohesion neighbourhood generally display lower levels of prosocial behaviour and higher levels of aggression and internalizing behaviour. Edwards and Bromfield (2009) posit that neighbourhood SES may influence parents' perceptions of the neighbourhood where they live, which in turn may influence the extent of their social interactions and ultimately child outcomes.

Klebanov et al. (1994), Tremblay et al. (2001), and Roosa et al. (2003) propose that neighbourhoods may play a role in prosocial behaviour development through

parental perceptions of social support and social cohesion. More specifically, Elliot (1996) proposes that the relationship between objective neighbourhood disadvantage and adolescent prosocial behaviour may be mediated by social support networks within neighbourhoods. However, the literature remains unclear about the role of neighbourhood perceptions as potential moderator of the relationship between objective measures of neighbourhood SES and child outcomes.

Nonetheless, although the marital relationship often serves as the main support system for parents, there is evidence that the perception of social support by the parents, along with their own personal experience with the child may affect parenting competence and quality (Belsky 1981; Verhoeven et al. 2007). For instance, Letourneau et al. 2006 suggest formal and informal social support is related to positive interaction and confidence between adolescent mothers and their children. In addition, Cook *et al.* (1997) and Roosa *et al.* (2003) suggest that the manner in which a family adapts its family functioning to neighbourhood conditions is more critical than its parenting practices in mediating neighbourhood effects on children's prosocial development.

Few studies have empirically analyzed the specific influences of neighbourhood perceptions on prosocial behavior development in children. King et al. (2005), using a SEM approach for a pathway analysis of neighbourhood, family and child determinants of prosocial behaviour, found parents' perceptions of social support and neighbourhood cohesion mediate prosocial behaviour in children. King et al. (2005) found a significant mediating pathway where perceived higher social support and neighbourhood cohesion lead to better family functioning, which in turn affect children's behavioural functioning and thereby their prosocial behaviour.

Parilla et al. (2002), using a three level HLM, found that gender, maternal depression, family functioning, parenting practices, and perceptions of neighbourhood cohesion and safety had significant impacts on the initial level of prosocial behaviour in children, while only positive interaction and perceptions of neighbourhood cohesion had a significant effect on the growth of prosocial behaviour. According to Parilla et al. (2002), parents that had more positive perceptions of their neighbours as supportive role models and perceived less neighbourhood problems tended to rate their children as more prosocial. Their model accounted for approximately 6% of the intercept variance and 4.5% of the linear growth in children's prosocial behaviour over the analyzed period. Parilla et al. (2002) also found that child and family level models each accounted for approximately 18% of the variance in children's prosocial behaviour, which provides strong evidence for the prominent influence of proximal factors on children's prosocial behaviour. However, these findings do not imply that social support and neighbourhood cohesion have indirect effects on children's prosocial behaviour through their influence on proximal family processes such as parenting practices or family functioning. These results only suggest the variability in children's prosocial behaviour is better explained by family factors without referring to a particular mediating or moderating pathway involving neighbourhood perceptions.

Edwards and Bromfield (2009) use a nested HLM to test the mediating influence of neighbourhood perceptions on the relationship between several neighbourhood level objective variables such as neighbourhood SES, neighbourhood remoteness, and prosocial behaviour. Their results, consistent with Romano et al. (2005) and Shumow et al. (1998), show that neighbourhood SES is not directly associated with children's

prosocial behaviour. The relationship between SES and prosocial behaviour is also not mediated by perceptions of neighbourhood cleanliness. Therefore, according to these studies there seems to be no clear correlation between objective measures of neighbourhood disadvantage and the parents' perceptions of their neighbourhood. Edwards and Bromfield (2009) suggest that the lack of significance of neighbourhood effects may play a different role on prosocial behaviour as prosocial behaviour is viewed as a positive outcome as opposed to, for instance, negative externalizing behaviours such as aggression.

Tremblay et al. (2001) use both objective neighbourhood level indicators and subjective neighbourhood perceptions in their cross-sectional HLM study of children's prosocial behaviour. They found that a very small portion, approximately 9%, of the variance in children's prosocial behaviour occurs at the census tract level. More specifically, Tremblay et al. (2001) found no association between their objective measures of neighbourhood SES and subjective measures of neighbourhood perceptions and children's prosocial behaviour. Tremblay et al. (2001) argue that these results are explained by the possible lack of neighbourhood socialisation of young children, between the age of 2 and 11 in their sample, as pointed out in the literature.

Summary

A number of conclusions can be drawn from the literature review of children's prosocial behaviour (Table A25 in Appendix). Overall, the literature review shows that very few empirical studies analyze children's prosocial behaviour trajectories using longitudinal data and proper methodologies specific to the study of change. This current

study addresses these gaps in the literature. First, there is inconsistent evidence that prosocial behaviour increases with age in the literature. In addition, most attempts at modelling children's prosocial development with longitudinal data report no significance of the growth parameters in the growth curve. Therefore, the exact shape of the empirical prosocial trajectory remains uncertain, although a few empirical results from studies using NLSCY data suggest an increasing trend.

However, there is a consensus that there is important inter-individual variability in children's prosocial behaviour, as well as significant inter-group differences in trajectory as study results by gender show. Overall, the very few reviewed studies which attempt to identify prosocial trajectories show that boys are over-represented in the lower prosocial levels. In addition, little is known about prosocial trajectories across and within gender groups, and more importantly how those trajectories are influenced by family and neighbourhood attributes in the Canadian context. Therefore, important gaps still exist in understanding the socio-economic and demographic characteristics of the many types of prosocial trajectories in children.

Beyond the questions related to proper identification of prosocial trajectories, findings in the literature point to the need for using a more convincing and cohesive approach based on the family stress model for the analysis of change in children's prosocial behaviour. As emphasized in the introduction, the empirical literature failed to find a direct relationship between family SES and children's prosocial development. Although potential mediators of the relationship between family SES and prosocial behaviour are identified, few studies systematically analyze how family SES indirectly influence children's prosocial development through proximal family processes. Parental

mental health and family dysfunction for instance are identified as possibly detrimental to the parents' capacity to interact with their children in a number of parenting domains, which in turn affect the development of prosocial behaviour in children. In addition, although parenting practices as a main socialisation mechanism influencing prosocial behaviour was identified in the literature, few studies analyze how change in parenting practices influences the development of prosocial behaviour in children; and those studies seem to have limited success.

There are also conceptual and empirical shortcomings in the literature on how neighbourhood processes may interplay with more proximal family processes in influencing the development of children's prosocial behaviour. It is shown in the literature that objective neighbourhood measures such as neighbourhood SES, and area size and type explain only a small part of the variability in children's prosocial behaviour. On the other hand, family and individual determinants usually account for a larger share of overall variability in empirical studies. Consequently, there is evidence that proximal family processes, involving parent-parent and parent-child socializing are important determinants of children's prosocial behaviour. Nonetheless, these findings indicate there is still some confusion on how distal and proximal processes may jointly influence prosocial behaviour development, and a more compelling argument is needed. This issue is compounded by the lack of clarity in some reviewed empirical studies about how potential mediating and moderating effects are conceptualized and tested. For instance, few studies analyze the influence of subjective neighbourhood determinants such as social support and neighbourhood cohesion on a family's capacity for decision-making

and parenting. As to how exactly parental perceptions of neighbourhood trust and support may indirectly influence proximal family processes remains an open question.

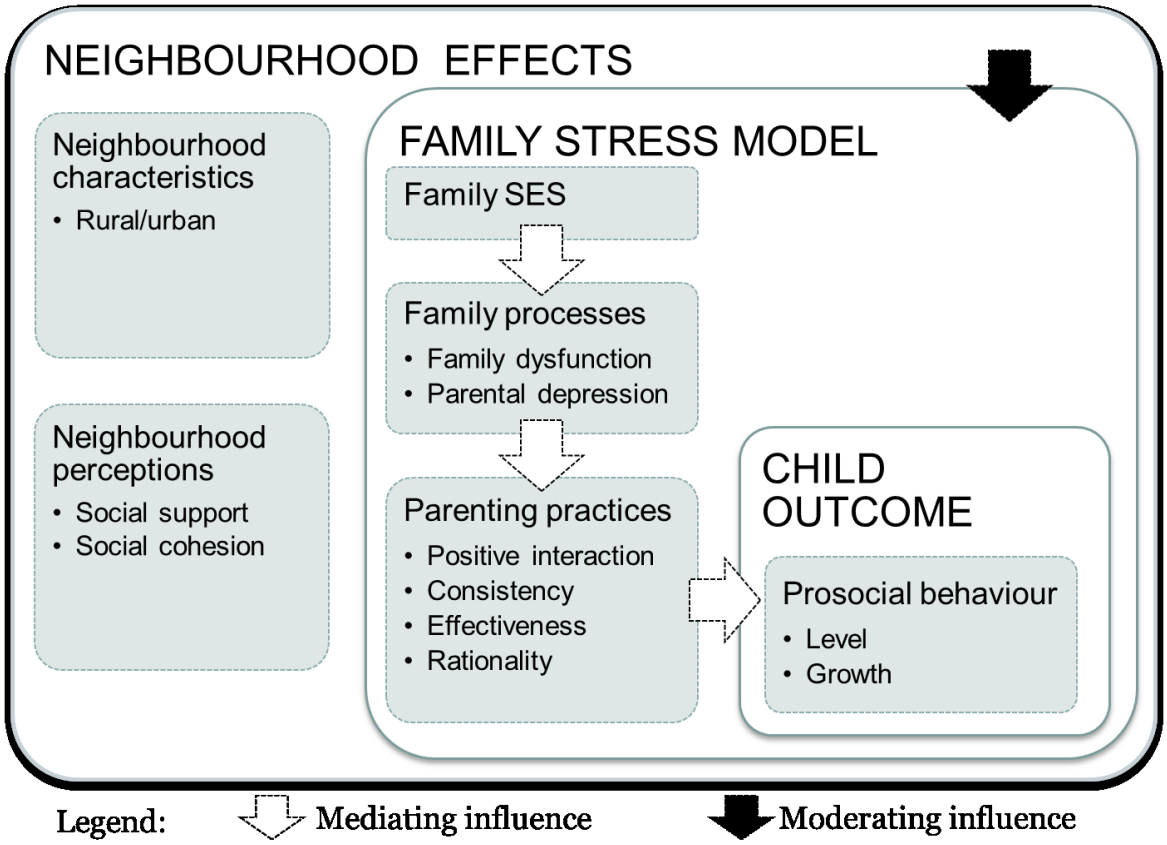
These findings emphasize the need for developing a conceptual and empirical framework that includes some elements of distal neighbourhood influences on more proximal family processes, which in turn influence the development of prosocial behaviour in children. As previously discussed, neighbourhood effects are traditionally theorized from the standpoint of socialisation and collective efficacy: peer pressure, norms and trust, adult enforcement, and social support all exert some influence on child outcomes (Jencks and Mayer 1990). Belsky (1984) and Klebanov et al. (1994) also suggest the determinants of parenting need to integrate broader environmental factors as well, for instance the role of social support networks as moderator of parenting practices. What is less clear is how neighbourhood effects may be integrated conceptually within the family stress model (Schonkoff and Philipps 2000; Dearing 20008).

As Roosa et al. (2003) point out, the analysis of neighbourhood influences on child outcomes often relies on direct aggregated measures, and is less appropriate when trying to account for family and individual differences in child outcomes. The traditional neighbourhood effect model fails to account for individual differences in perceptions of environmental conditions and usually overlook transactional aspects between a family and the neighbourhood (Roosa et al. 2003). Therefore, these conceptual shortcomings fail to account for the various ways individuals not only perceive their social environment but also respond to the same events or circumstances.

As a result, a conceptual framework is developed by integrating elements of individual perceptions of neighbourhood social support and cohesion, family

characteristics and functioning, specific parenting practices, and children's prosocial outcome. This conceptual framework is depicted in Figure 1 below and recognizes distal and proximal levels of influence on children's prosocial behaviour development as theorized in the literature. The legend at the bottom explains the proposed mediating causal pathways within the Family Stress Model shown as white arrows, and the potential moderating neighbourhood effects, shown in the diagram as a solid black arrow.

Figure 1. Conceptual Framework



Source: Adapted from Belsky (1984), Klebanov et al. (1994), and Roosa et al. (2003)

Within this conceptual framework, family dysfunction and parental depression are hypothesized as potential mediators of the relationship between family SES and parenting practices, which in turn affect prosocial development in children. Parenting practices are defined in four domains: positive parenting, effective parenting, consistent parenting, and rational parenting. This framework also recognizes that parental perceptions of social support and neighbourhood cohesion may have distal moderating influences on more proximal family processes as theorized in the Family Stress Model. In addition, gender and family structure (not shown) are also hypothesized as potential moderators of family processes in accordance with findings in the literature.

Research Questions and Hypotheses

In the light of the literature review, and in order to achieve the overall study objective of analyzing the relative influence of neighbourhood and family characteristics on Canadian children's prosocial behaviour developmental trajectories, five guiding research questions and a number of research hypotheses are developed as follows:

Research question #1: How do children's prosocial behaviour trajectories differ in both levels and rates of growth across individuals?

Hypothesis #1a: It is hypothesized that inter-individual differences in intra-individual prosocial behaviour trajectories will be significant across children. This is based on a small number of empirical studies using growth curve methodologies, demonstrating that children start at different levels of prosociality and develop at dissimilar rates of growth

as they age (Eisenberg et al 1997; Fabes et al. 1999; Letourneau et al. 2006). Prosocial behaviour is also expected to increase with age following studies by Letourneau et al. (2006) and Moraes (2009).

Research question #2: How do child, family and neighbourhood group characteristics contribute to differences in children's prosocial behaviour trajectories?

Hypothesis #2a: Children's prosocial trajectories are expected to differ significantly across gender (male and female). Further, as children grow older, prosocial behaviour is expected to become more differentiated on the basis of gender (Eisenberg and Fabes 1998; Hay 1999; Tremblay et al. 2001). Therefore, it is expected that girls will display higher levels of prosocial behaviour overall, although empirical evidence about gender differences in the rate of growth are less apparent (Parilla et al. 2002; Romano et al. 2005; Letourneau et al. 2006; Moraes 2009).

Hypothesis #2b: It is hypothesized that children's prosocial trajectories are significantly different across family structure (one and two parents). The empirical evidence of statistical differences in prosocial development according to family structure is fairly limited and the results are mixed (Lipman et al. 2002; Kerr and Mishalski 2004; Tremblay et al. 2001; Letourneau et al. 2006). For instance, both studies by Tremblay et al (2001) and Letourneau et al. (2006) found no association between prosocial levels and family structure. Nonetheless, Lichter et al. (2002) and Dooley et al. (1998) theorize that

children's prosocial development may be influenced by an event of family structure breakdown such as a divorce, and this is therefore maintained as a hypothesis.

Hypothesis #2c: Children's prosocial trajectories are hypothesized to differ by levels of perceived neighbourhood social support and social cohesion (lower and higher). This is based on the theoretical proposition that children living with parents who perceive higher levels of neighbourhood social support and cohesion may display higher levels of prosocial behaviour (Tremblay et al. 2001; Xue et al. 2003). For instance, Parilla et al. (2002) show that parents who perceive their neighbourhood more positively tend to view their children as more prosocial.

Hypothesis #2d: Children's prosocial trajectories are hypothesized to different by types of communities (rural and urban). Empirical evidence on prosocial trajectory differences based on the place of residence, or whether children live in a rural versus an urban area, show mixed results (Romano et al. 2005; Edwards and Bromfield 2009). For instance, Tremblay et al. (2001) suggest that children living in rural areas are less likely to display emotional problems but do not show difference in prosociality compared with their urban counterparts.

Research question #3: What are the latent classes (clusters) of prosocial behaviour trajectories present in the data; and what are the child, family and neighbourhood characteristics of those latent classes (clusters)?

Hypothesis #3a: It is hypothesized that male children have higher probability of belonging to lower prosocial trajectories classes than females. This is based on two empirical LGM studies by Cote et al. (2002) and Kokko et al. (2006), which found boys over-represented in lower prosocial clustered groups. A number of latent classes, to be defined endogenously by the model, are expected to capture various prosocial development trajectories.

Hypothesis #3b: It is hypothesized that children living with one parent have higher probability of belonging to lower prosocial trajectories classes than those living in intact families. Although there are no Latent Class studies analyzing specifically the impact of family breakdown, it is expected that children experiencing a change in family structure will be over-represented in poorly performing prosocial groups following the same rational developed in *Hypothesis #2b*.

Hypothesis #3c: It is hypothesized that children whose parents perceive low levels of neighbourhood social support and social cohesion have higher probability of belonging to lower prosocial trajectories classes. This follows the same theoretical proposition as in *Hypothesis #2c* about the influence of perceived collective efficacy and support networks on children's prosocial behaviour. As a result, it is expected that children's membership to lower prosocial classes will diminish when parents' neighbourhood perceptions are more positive.

Hypothesis #3d: Children living in rural communities are expected to have higher probability of belonging to lower prosocial trajectories classes. There are no Latent Class studies to date which take account of place of residence as discriminating factor of prosociality. Nonetheless, based on the same rational as *Hypothesis #2d*, it is expected rural children will be under-represented in higher prosocial clusters.

Research question #4: How do parental depression, family dysfunction, and parenting practices (positivity, effectiveness, consistency, and rationality) contribute to mediate the relationship between family SES and children's prosocial behaviour trajectories?

Hypothesis #4a: Parental depression and family dysfunction are hypothesized to mediate the relationship between family SES and parenting practices. This is based on empirical longitudinal studies suggesting that family SES does not directly influence intra and inter-individual differences in children's prosocial behaviour (Romano et al. 2005; Letourneau et al. 2006). Letourneau et al. (2006) propose that parental depression may mediate the relationship between family SES and parenting practices. On the other hand, Romano et al (2005) posit that family functioning may fully mediate the role of family SES on prosocial behaviour. Consequently, based on findings in the literature both parental depression and family functioning variables are introduced as main mediators of the relationship between family SES and parenting practices, and then are tested for their significance in the empirical model.

Hypothesis #4b: Parenting practices are hypothesized to mediate the relationship between family SES, family dysfunction and children's prosocial behaviour trajectories. This hypothesis is based on theoretical literature on the direct role of parenting practices in influencing prosocial behaviour development in children (Spera 2005; Eisenberg et al. 2006). More specifically, empirical findings suggest that parenting practices may fully mediate the effect of family SES on prosocial development (Allhusen et al. 2005; Verhoeven et al. 2007; Moraes 2009). The tested hypothesis posits that parenting practices, as the main determinants of children's prosocial behaviour, fully mediate the influence of family SES and family functioning on prosocial development.

Research question #5: How do child, family, and neighbourhood characteristics contribute to moderate the relationship between family SES, parental depression, family dysfunction, parenting practices (positivity, effectiveness, consistency, and rationality), and children's prosocial behaviour?

Hypothesis #5a: It is hypothesized that gender moderates the influence of family SES, parental depression, family dysfunction, and parenting practices on children's prosocial behaviour trajectories. There are few longitudinal studies that analyze specifically the moderating role of gender on a broad set of prosocial behaviour determinants (Moraes 2009). Rose et al. (2004) define a moderator as a variable that influence the strength of the causal relationship between a determinant and a dependent variable through an interaction effect. This hypothesis aims at identifying which prosocial determinant included in the family stress model is moderated by gender.

Hypothesis #5b: It is hypothesized that family structure moderates the influence of family SES, parental depression, family dysfunction, and parenting practices on children's prosocial behaviour trajectories. Although empirical evidence on the impacts of family structure on prosocial outcomes is mixed, it is expected the variable will interact with other determinants included in the analysis. In the few studies reviewed, family structure is generally used as mediator of relationships (Lipman et al. 2002; Kerr and Mishalski 2004; Tremblay et al. 2001; Letourneau et al. 2006). The variable is alternatively introduced in the model as moderator to test the statistical relevance of family breakdown on every family process influencing prosocial behaviour.

Hypothesis #5c: Perceptions of neighbourhood social support and social cohesion are hypothesized to moderate the influence of family SES, parental depression, family dysfunction, and parenting practices on children's prosocial behaviour trajectories. There are no known studies which used parents' neighbourhood perceptions as a moderator of family processes on prosocial behaviour. The few studies that attempt to analyze the influence of neighbourhood perceptions tested their potential mediation between objective neighbourhood measures, family processes, and prosocial development (Elliot 1996; King et al. 2005; Edwards and Bromfield 2009). Nonetheless, this follows the same theoretical proposition as in *Hypothesis #2c* and *Hypothesis #3c* about the potential influence of perceived collective efficacy and support networks on children's prosocial behaviour. Consequently, it is expected that parents' perceptions of social support and neighbourhood cohesion will moderate the causal relationships between proximal family determinants of prosocial behaviour in children. For instance, it is expected that positive

perceptions of social support will moderate the negative effects of parental depression on family functioning.

Hypothesis #5d: It is hypothesized that the place of residence moderates the influence of family SES, parental depression, family dysfunction, and parenting practices on children's prosocial behaviour trajectories. The impact of the place of residence is usually introduced in a few empirical studies with no particular mediating or moderating effects (Romano et al. 2005). Nonetheless, there is a genuine interest in knowing if rural remoteness influences any of the determinants of prosocial behaviour in children identified in this study.

Chapter III: Methodology

The research methodology used in this study is presented in this chapter in four sections. The first section describes the source of data and the sample used in this study. The second section describes the choice of variables used in the model for the analysis. The third section provides a descriptive analysis of trends and correlations between the variables used in the analysis. Finally, the fourth section describes the empirical methodology used to analyze prosocial developmental trajectories in children.

Data Source

The dataset used in this study is the National Longitudinal Survey on Children and Youth (NLSCY). The NLSCY provides national longitudinal measures on life experiences, and social, behavioural, emotional, and cognitive characteristics and of children and youth from infancy to adulthood (Statistics Canada 2008). The unit of analysis for the NLSCY is the child and eventually the young adult. The NLSCY began in 1994 with an original sample cohort of 22,000 children between the age of 0 and 11; survey questions were asked of the person most knowledgeable (PMK) about the child. In more than 90% of the cases, the PMK is the child's mother. PMKs are re-surveyed longitudinally every two years on a range of subjects concerning the child. PMKs are also asked to answer questions about family processes including family functioning and parenting practices. Survey questions are asked directly of the child from the age of 12-13 onward through self-report. Additional cohorts are added at every cycle in order to develop a comprehensive set of early childhood development paths.

The data sample used in this study follows the original survey cohort aged 0-1 in 1994 (Cycle 1) through a period that spans from 1998-1999 (Cycle 3) to 2006-2007 (Cycle 6); and the study therefore focuses on children's prosocial behaviour trajectories and its determinants between the age of 4 through the age of 11 inclusively. The choice of this specific data sample is based on limitations concerning incomplete measures of prosocial behaviour and other determinants in cycle 2, some discrepancies between PMK and self-reported measures after the age of 11, and longitudinal data availability in other cohorts. Consequently, the sample used in this study consists of 3,202 children who are effectively 4-5 years old in cycle 3 (1998-1999).

Choice of Variables

A number of variables are included in this study because they are theorized as having mediating or moderating influences on parent-child socialisation as the review of literature on prosocial behaviour demonstrates. The variables included in this study are child's prosocial behaviour, child's gender, mother's depression, family structure, family SES, family dysfunction, positive parenting, effective parenting, consistent parenting, rational parenting, perceived social support, perceived neighbourhood cohesion, and place of residence.

Prosocial Behaviour

Prosocial behaviour in children is the dependant variable in this study. The NLSCY children's prosocial behaviour scale was originally developed by Statistics Canada based on a shorter questionnaire from the Montreal Longitudinal Survey by Weir

and Duveen (1981). Cronbach's alpha measure of reliability was estimated to be 0.82 for children aged 4 to 11 in cycle 1 (1994-1995) (Statistics Canada 1995). The ten question items include parents' assessment of how caring, helpful, sympathetic, altruistic and supportive their children were (see Table 1).

Table 1. Prosocial Behaviour Survey Questionnaire Items

1. Spontaneously help to pick up object which somebody has dropped
2. Will invite others to join in a game
3. Volunteers to help clear up a mess someone else has made
4. Offers to help other children who are having difficulty with a task
5. If there is a quarrel or dispute, will try to stop it
6. Will try to help someone who has been hurt
7. Comforts a child who is crying or upset
8. Helps other children who are feeling sick
9. Helps those who do not do as well as he or she does
10. Shows sympathy to someone who has made a mistake

Source: Statistics Canada (2008)

In this study, prosocial behaviour is assessed by the PMK at four different points in time starting in Cycle 3 (1998-1999) from age 4-5 through age 6-7, 8-9, and 10-11 in cycle 6 (2004-2005). The PMK is asked to rate the extent of support provided by the child to other children in specific situations using a scale, taking either a value of 0 (never or not true), 1 (sometimes or somewhat true), or 2 (often or very true). The prosocial scale ranges from 0 to 20; higher scores indicate greater children's prosocial behaviour

(Statistics Canada 2008). Gender is measured using a categorical variable (male or female) in Cycle 1 and is used to distinguish prosocial trajectories.

Family Environment

Family characteristics are assessed with the variables family SES, family dysfunction, mother's depression, family structure, and positive, effective, consistent and rational parenting practices. Family structure is measured with a dichotomous variable in the base year when children were 4-5 years old. The measure assesses if children have one parent or two parents and is also used as a moderator in the analysis. In order to capture change in family structure, four indicator variables are calculated: first, for children who have two parents at age 4-5 and remain with their parents throughout the analyzed period; second, children who have only one parent throughout the analyzed period; third, children who have one parent at age 4-5 and two parents at age 10-11; and finally, children who have two parents at age 4-5 and only one parent at age 10-11.

Family dysfunction is measured by Statistics Canada in the NLSCY using the original questionnaire items from the McMaster Family Assessment Device (Byles et al. 1988). The scale aims to assess global family functioning and the overall quality of the social relationships between parents, and therefore focuses on six domains of functioning within the family unit such as problem solving, affective involvement and responsiveness, roles, behavioural control and communication (Statistics Canada 1995). The family dysfunction reversed scale ranges from 0 to 36, and greater score value is an indication of family dysfunction. Examples of the twelve questionnaire items include questions such as "All things considered, how satisfied or dissatisfied are you with your

marriage or relationship with your partner?"; "We don't get along well together"; or "Making decision is a problem for our family". Family dysfunction by the PMK is assessed by using a four-point response scale at value 0 (strongly agree), 1 (agree), 2 (disagree), and 3 (strongly disagree). Cronbach's alpha measure of reliability for the family dysfunction scale is estimated to be 0.82 in cycle 1 (1994-1995) (Statistics Canada 1995).Family dysfunction is also used as mediator in the analysis.

Statistics Canada's parental depression measure in the NLSCY is based on questionnaire items developed by the Center for Epidemiological Studies Depression Scale (Radloff 1977). The depression scale administered to the PMK is a shorter version of the twenty question depression scale called CES-D, and is further reduced to twelve questions with the following introduction: "How often have you felt or behaved this way during the past week". Examples of questions rated by mothers include: "I felt that I could not shake off the blues even with help from my family or friends"; "I felt hopeful about the future"; or "I had crying spells". This rating scale includes four response categories: 1 (rarely or none of the time-less than one day), 2 (some or little of the time), 3 (occasionally or a moderate amount), or 4 (most or all of the time). The parental depression scale ranges from 0 to 36, and greater score value indicates greater depressed mood. Measure of reliability for the depression scale is estimated to be 0.79 in cycle 1 (1994-1995) (Statistics Canada 1995). Parental depression is used as mediator in this study.

A measure of family SES is introduced in cycle 1 of the NLSCY based on a five-variable methodology developed by Willms and Shields (1996). The calculation includes: first, mother's educational level; second, educational level of mother's spouse; third,

mother's occupational prestige; fourth, occupational prestige of mother's spouse; and finally, household income. Family SES is generally viewed in the literature as a construct that capture reasonably well the level of human, social and financial capital in a family (Bradley and Corwyn 2002; Conger and Donellan 2007). Willms (2003) argues that income, education, and social class are proxy measures of a composite construct of the relative position of a family within the hierarchical structure of society, which is useful for gaining insights on underlying social processes. This is why this specific measure is used in this study. However, Deaton (2002) suggests that taking account of different SES components in any analysis may be useful in order to isolate the specific effects of education, income and occupation to foster the development of better targeted social policies. Nonetheless, family SES refers to the relative position of families in a hierarchical social structure based on their access to, or control over, wealth, prestige, and power (Statistics Canada 1995). Family SES is measured in cycle 2 (1996-1997) and cycle 3 (1998-1999), but is not repeated in subsequent cycles, and therefore it is used in this study as a time-invariant variable in base year when the child is 4-5 years old. The family SES measure is standardized to have a mean of zero and a standard deviation of 1, with higher scores indicating higher family SES levels.

Four different parenting scales are included in the original NLSCY based on a twenty-one items questionnaire developed by Strayhorn and Weidman (1988). The objective of the parenting scale is to measure parental practices in four domains; and the scales are focused on positive parent-child interaction, hostile/ineffective parenting, consistent parenting, and irrationality or aversive parenting practices. The questionnaire is administered to the PMK, and examples of questions include: "How often do you

praise your child by saying something like-Good for you!"; "How often do you and your child laugh together?"; or "How often do you think that the kind of punishment you give your child depends on your mood?". Four parenting practices measures are used in this study: first, positive parent-child interaction; second, a reversed scale of effective parenting; third, consistent parenting; and fourth, a reversed scale of rational parenting. These four four-point rating scales of the frequency of parenting practices range from 0 to 20, 0 to 25, 0 to 20, and 0 to 19 respectively. Measures of Cronbach's alpha reliability are respectively 0.81, 0.71, 0.66, and 0.57 (Statistics Canada 1995). In the analysis, all four parenting practices measures are estimated separately in four different models as time-varying parallel mediators of prosocial behaviour trajectories.

Neighbourhood Environment

The neighbourhood characteristics included in the analysis are perceived social support, perceived neighbourhood cohesion, and place of residence. All three measures are used as moderators in the analysis. The perceived social support scale in the NLSCY is based on six questionnaire items from the Social Provisions Scale developed by Cutrona and Russell (1987). The scale measure is administered to the PMK through the parents' questionnaire and includes three dimensions of social support: first, guidance; second, reliable alliance; and third, attachment (Statistics Canada 2008). This scale is aimed at determining the level of social support received from friends, family and others (Statistics Canada 2008). Mothers are asked to rate each item based on a four-point response scale at value 0 (strongly agree), 1 (agree), 2 (disagree), or 3 (strongly disagree). The questionnaire items include questions such as "If something went wrong, no one

would help me"; or "There is someone I trust whom I would turn to for advice if I were having problems". The perceived social support scale ranges from 0 to 18 and has good reliability property with a Cronbach's alpha of 0.82. A higher score indicates greater perceived social support.

Perceived neighbourhood cohesion is measured in the NLSCY based on a five items from Simcha–Fagan Neighbourhood Questionnaire developed by Barnes McGuire (1997). According to Romano et al. (2005), the scale is developed to be a measure of perceived collective efficacy which combines social cohesion and informal social control items. Questionnaire items include questions such as "If there is a problem around here, the neighbours get together to deal with it"; "There are adults in the neighbourhood that children can look up to"; and "People around here are willing to help their neighbours". A four-point response scale is administered to the PMK, who are asked to rate each item along the following values: 0 (strongly agree), 1 (agree), 2 (disagree), or 3 (strongly disagree). The perceived neighbourhood cohesion scale ranges from 0 to 15 and has good reliability property with a Cronbach's alpha of 0.82. Otherwise, a higher score indicates greater perceived collective efficacy.

Place of residence is assessed using a geographic derived variables provided by Statistics Canada in the NLSCY, which categorizes areas based on population size (Statistics Canada 2008). Children are classified in base year 1998-1999 as living in either a rural area of population less than 10,000, or living an urban area of population over 10,000.

Descriptive Analysis of Dataset

The initial sample includes 3,490 children who are 4-5 years old in cycle 3 (1998-1999). 288 children are excluded from the initial sample because of non-response in the prosocial behaviour domain in all cycles 3, 4, 5 and 6; or because survey questions are not responded in family and neighbourhood domains in any three cycles. Sample size for the study is 3,202 children, of which 1621 (50.6%) are male and 1581 (49.4%) are female. In the study sample, the vast majority of children (83.5%) live with two parents in cycle 3 (1998-1999), while only 16.5% live with only one parent. Most children live with their parents in urban areas totalling 2,519 (79.4%) cases, while 20.6% or 652 live in rural areas in cycle 3 (1998-1999). Most children, about 2041 (64.9%), live with parents who perceive higher social support in their neighbourhood, while 1,106 (35.1%) children live with parents who have lower perceptions of social support. Approximately 57.6% (1644) of children live with parents who perceive lower social cohesion, while 42.4% (1212) of children live with parents who have higher perceived social cohesion.

The study sample includes approximately 18% missing values across cycles and variables. Because of the longitudinal nature of the sample, a missing value analysis is performed using the Missing Value Analysis module in SPSS (SPSS 2007). Assessing the patterns of missing data is critical first for the integrity of the sample; and second to address potential concerns caused by incomplete data in the empirical analysis. Thus, sample data can be Missing Completely at Random (MCAR), Missing at Random (MAR), or Not Missing at Random (NMAR) (SPSS 2007). The probability that values in the sample are missing depending on the missing values themselves is defined as Not Missing at Random (NMAR) (Rubin 1976). On the other hand, when the pattern of

missing data is related to the observed data only, the data is deemed Missing at Random (MAR) (Rubin 1976). The rare assumption of data Completely Missing at Random (MCAR), also called uniform non-response, depends on a pattern of missing values which do not depend on the data values (Little 1988). In simple terms, this means that the analysis of only those cases with complete data can give valid inference. The results of the Separate Variance *t*-test on prosocial behaviour with respect to other variables in the dataset show that the null hypothesis of MCAR is rejected (χ^2 (28) = 65.792, p = 0.001); and therefore the data was not MCAR as expected (Table 2).

Table 2. Separate Variance *t* Tests

	Income	SES
Prosocial behaviour age 4-5		
t test	1.4	*2.1
Mean (present)	55285	0.025
Mean (missing)	50834	-0.069
Prosocial behaviour age 6-7		
t test	*2.1	*2.1
Mean (present)	55285	0.027
Mean (missing)	50834	-0.052
Prosocial behaviour age 8-9		
t test	*4.2	*4.1
Mean (present)	55285	0.037
Mean (missing)	50834	-0.116
Prosocial behaviour age 10-11		
t test	*2.4	*4.4
Mean (present)	55285	0.045
Mean (missing)	50834	-0.085
EM means		
χ^2 *(28)* = 65.792		
p value = .0001		

Note * = significant at 0.05

The analysis of mean differences shows that prosocial behaviour mean when children are 10-11 is not statistically different of when prosocial behaviour values at younger age are missing (not shown). However, the analysis of mean differences in income and SES, when missing values of prosocial behaviour are not part of the sample, shows that differences are significant (Table 2). As a result, this suggests missing values are a special case of MAR, called uniform non-response within classes. Because case deletion or mean imputation are impractical within the context of an empirical growth curve model, and especially in the case where latency and variances are modeled explicitly, missing values are dealt with using Full Information Maximum Likelihood (FIML) to avoid statistical bias when estimating the model in AMOS 18.

In the study sample, prosocial behaviour scores are 11.97, 13.99, 14.20 and 14.51 on average at age 4-5, 6-7, 8-9 and 10-11 respectively, which are an indication of systematic increasing trend (Table 3). In addition, prosocial behaviour scores are normally distributed and show good distributional symmetry and concentration; and the measures of skewness and kurtosis range respectively from -0.13 to -0.52 and -0.41 to -0.27 across cycles. Moreover, measures of sample variability and dispersion in prosocial behaviour scores, defined by variance and standard deviation, are fairly high, which is an indication of high level of inter-individual variability across children.

Overall, parenting practices display features of normally distributed sample and systematic time-varying properties across cycles. The positive parenting scale displays an average decreasing trend from 14.26 to 12.04 between the age of 4-5 and 10-11, which indicates that on average, parents are less positive in their interaction with their school-

Table 3. Study Sample Characteristics*

	Mean	Standard Deviation	Variance	Skewness	Kurtosis
Prosocial Behaviour					
Age 4 to 5	11.97	4.08	16.64	-0.13	-0.41
Age 6 to 7	13.99	3.71	13.76	-0.48	-0.16
Age 8 to 9	14.20	3.68	13.51	-0.41	-0.32
Age 10 to 11	14.51	3.76	14.15	-0.52	-0.27
Parenting-Positive Interaction					
Age 4 to 5	14.26	2.66	7.06	-0.40	0.08
Age 6 to 7	13.27	2.53	6.38	-0.29	0.51
Age 8 to 9	12.60	2.57	6.61	0.02	-0.19
Age 10 to 11	12.04	2.63	6.89	0.02	-0.16
Parenting-Consistency					
Age 4 to 5	14.78	3.24	10.52	-0.71	0.86
Age 6 to 7	15.23	3.16	9.98	-0.71	0.29
Age 8 to 9	15.50	3.02	9.10	-0.82	0.90
Age 10 to 11	15.58	3.07	9.42	-0.78	0.46
Parenting-Effectiveness					
Age 4 to 5	16.96	3.58	12.80	0.57	0.68
Age 6 to 7	17.24	3.68	13.56	0.74	0.86
Age 8 to 9	17.33	3.57	12.75	0.66	0.98
Age 10 to 11	17.62	3.79	14.37	0.66	0.62
Parenting-Rationality					
Age 4 to 5	15.26	1.94	3.77	0.13	0.15
Age 6 to 7	15.56	2.00	3.99	0.16	-0.08
Age 8 to 9	18.64	1.93	3.73	0.17	0.07
Age 10 to 11	18.82	1.87	3.48	0.18	0.09
Family Dysfunction					
Age 4 to 5	8.17	4.97	24.69	0.17	-0.12
Age 6 to 7	8.37	5.09	25.88	0.14	-0.03
Age 8 to 9	8.07	4.94	24.44	0.16	-0.02
Age 10 to 11	7.73	5.13	26.27	0.19	0.01
Parental Depression					
Age 4 to 5	4.75	5.26	27.62	2.00	5.09
Age 6 to 7	4.03	5.11	26.10	2.18	5.88
Age 8 to 9	4.21	5.24	27.46	2.16	5.56
Age 10 to 11	3.74	5.11	26.12	2.48	7.38

*All statistics were weighted with rescaled longitudinal weights

age children as they grow older. The parenting consistency scale displays similar patterns but in reverse, and shows a slight average increase of approximately one unit between the age of 4-5 and 10-11. The parenting effectiveness scale also shows increasing patterns from cycle 3 through cycle 6, as well as fairly high variability, which indicates significant differences in how parents assess their parenting effectiveness in relation to their child. The parenting rationality scale displays significant average increase over time, from 10.26 when children are 4-5 years old to 15.01 when they are 10-11 years old. However, parenting rationality shows less sample variability than other parenting practices.

Family dysfunction and mother's depression do not show systematic time-varying properties, and therefore remain fairly stable from cycle 3 through cycle 6 with average scores around 8 and 4 respectively. Nonetheless, both measures show very high sample variance, which indicates high inter-individual variability in parents' assessment of family functioning and parental depression in the study sample.

A correlation analysis of the variables reveals a high cross-correlation between prosocial behaviour at all ages, and positive, effective, consistent, and rational parenting practices (not shown). In addition, the results of longitudinally weighted cross-correlation statistics between prosocial behaviour, family SES, family dysfunction, parental depression, and parental practices are reported in Table 4. As expected, results show no significant association between measures of family SES when the child was aged 4-5 and prosocial trajectories over time. The cross-correlation analysis of prosocial behaviour and total household income measured at every cycle yields the same results (not shown).

Table 4. Correlation Between Prosocial Behaviour and Selected Variables

	Prosocial behaviour (4-5 YRS)	Prosocial behaviour (6-7 YRS)	Prosocial behaviour (8-9 YRS)	Prosocial behaviour (10-11 YRS)
Socioeconomic Status (SES)				
1998-1999	0.003	-0.028	-0.024	0.014
Family dysfunction				
1998-1999	**-0.119	**-0.079	**-0.075	**-0.088
2000-2001	**-0.074	**-0.103	**-0.107	**-0.122
2002-2003	**-0.106	**-0.092	**-0.142	**-0.120
2004-2005	**-0.104	**-0.071	**-0.132	**-0.151
Parental depression				
1998-1999	**-0.061	*-0.036	**-0.055	*-0.034
2000-2001	-0.002	-0.018	-0.024	-0.028
2002-2003	-0.022	**-0.053	**-0.095	**-0.058
2004-2005	-0.013	**-0.042	**-0.080	**-0.091
Positive parenting				
1998-1999	**0.194	**0.111	**0.168	**0.148
2000-2001	**0.107	**0.180	**0.139	**0.129
2002-2003	**0.117	**0.175	**0.219	**0.191
2004-2005	**0.131	**0.141	**0.194	**0.251
Effective parenting				
1998-1999	**0.091	**0.059	**0.109	**0.085
2000-2001	**0.078	**0.146	**0.144	**0.137
2002-2003	**0.074	**0.106	**0.172	**0.131
2004-2005	**0.043	**0.115	**0.144	**0.187
Consistent parenting				
1998-1999	**0.051	0.022	**0.050	0.025
2000-2001	*0.040	**0.111	**0.091	**0.053
2002-2003	*0.033	*0.035	**0.053	*0.039
2004-2005	0.022	**0.042	**0.056	**0.104
Rational parenting				
1998-1999	**0.165	**0.107	**0.143	**0.116
2000-2001	**0.122	**0.130	**0.114	**0.120
2002-2003	**0.123	**0.090	**0.151	**0.109
2004-2005	**0.115	**0.109	**0.155	**0.197

Note: Kendall's Tau *b* correlation ** = significant at 0.01, * = significant at 0.05, all statistics were weighted with rescaled longitudinal weights

The analysis of cross-correlation between measures of positive, effective, and rational parenting practices, and prosocial behaviour trajectories, suggests significance at a 0.01 level. Moreover, the analysis of correlation between the initial level of parenting practices in year 1998-1999, and measures of prosocial behaviour, also shows significance at a 0.01 level for positive interaction, effectiveness, and rationality. On the other hand, the analysis of contemporary cross-correlation, which assesses how parenting practices and prosocial behaviour, show strong and significant correlation at each time point over the period 1998-1999 to 2004-2005, as well as expected signs. However, correlation is lower between consistent parenting and prosocial trajectories, although contemporary correlation between both measures is strong and significant.

The analysis of cross-correlation between parental depression and prosocial behaviour suggests a weak association. The cross-correlation analysis of family dysfunction and prosocial trajectories shows a significant, strong, inverse, association. Overall results of cross-correlation between family dysfunction, family SES, parental depression, and parenting practices are reported in Table 5. Findings suggest family SES in year 1998-1999 and family dysfunction are significantly and inversely correlated at a 0.01 level. As a result, higher family SES in 1998-1999 is statistically associated with lower family dysfunction at each time point. However, correlations between family SES and parenting practices are not significant beyond the time-period 1998-1999 (not shown). On the other hand, parental depression shows strong positive correlation with family dysfunction, both contemporarily and across time, with higher correlations in the base year 1998-1999. In addition, family dysfunction is also correlated with the four parenting domains (pr 0.01).

Table 5. Correlation Between Family Dysfunction and Selected Variables

	Family dysfunction 1998-1999	Family dysfunction 2000-2001	Family dysfunction 2002-2003	Family dysfunction 2004-2005
Socioeconomic Status (SES)				
1998-1999	**-0.106	**-0.092	**-0.061	**-0.091
Parental depression				
1998-1999	**0.223	**0.097	**0.132	**0.096
2000-2001	**0.180	**0.196	**0.171	**0.145
2002-2003	**0.096	**0.108	**0.204	**0.136
2004-2005	**0.137	**0.086	**0.162	**0.199
Positive parenting				
1998-1999	**-0.182	**-0.107	**-0.084	**-0.114
2000-2001	**-0.117	**-0.104	**-0.102	**-0.063
2002-2003	**-0.096	**-0.097	**-0.137	**-0.130
2004-2005	**-0.101	**-0.094	**-0.107	**-0.139
Effective parenting				
1998-1999	**-0.128	**-0.126	**-0.075	**-0.085
2000-2001	**-0.052	**-0.113	**-0.052	**-0.088
2002-2003	**-0.077	**-0.079	**-0.101	**-0.136
2004-2005	**-0.050	**-0.070	**-0.081	**-0.118
Consistent parenting				
1998-1999	**-0.066	**-0.068	**-0.092	**-0.082
2000-2001	**-0.111	**-0.107	**-0.054	**-0.079
2002-2003	**-0.065	**-0.090	**-0.090	**-0.073
2004-2005	**-0.097	**-0.065	**-0.051	**-0.116
Rational parenting				
1998-1999	**-0.106	**-0.115	**-0.085	**-0.122
2000-2001	**-0.111	**-0.155	**-0.098	**-0.128
2002-2003	**-0.067	**-0.119	**-0.142	**-0.129
2004-2005	**-0.049	**-0.086	**-0.085	**-0.156

Note: Kendall's Tau *b* correlation ** = significant at 0.01, * = significant at 0.05

Overall, the descriptive analysis of our study sample demonstrates that prosocial behaviour and parenting practices change systematically across NLSCY cycles. Results are generally consistent with the literature on the study of change, which postulates an age-based developmental process, and a transactional relationship between the parent and the child reflected in the way parenting practices seem to adapt over time and circumstances. On the other hand, both family dysfunction and parental depression show non-systematic changes over time. Nonetheless, results demonstrate that family dysfunction is correlated with prosocial trajectories, while parental depression's correlation with prosociality remains weak. Interestingly, family SES, measured when children are 4-5 years old in the study sample, are uncorrelated with prosocial behaviour, but are associated with family dysfunction and parental depression. As a result, the study sample is, at a descriptive level, in accordance with some of the theoretical and empirical findings described in the review of literature.

Analytical Methods

The choice of an empirical methodology usually depends on the nature of the empirical phenomenon under analysis, how it is measured, and ultimately how well it responds to the research question (Preacher et al. 2008). The study of change in prosocial behaviour requires a study design that can handle repeated longitudinal measures and heterogeneity in growth trajectories; and statistical methods capable of analyzing both inter-individual and intra-individual change as well as population sub-group differences.

The literature review shows few studies investigated children's prosocial behaviour longitudinally, and fewer using NLSCY sample data. For instance, empirical

growth curve studies by Tremblay et al. (2001), Romano et al. (2005), and Edwards and Bromfield (2009) rely on a nested HLM methodology to analyze individual, family and neighbourhood effects on prosocial behaviour in a cross-section of children. The same nested approach is used by Parilla et al. (2002) to study prosocial behaviour development longitudinally in a sample of children from the NLSCY. This approach is used by Edwards and Bromfield (2009) as well to study prosocial development in Australian children. On the other hand, Letourneau et al. (2006) and Moraes (2009) use a HLM methodology to analyze the impacts of a number of time-invariant predictors on both the level and growth of prosocial behaviour in children.

Moreover, the literature review shows that empirical studies on prosocial behaviour using SEM or LGM methodologies in order to unveil mediating and moderating pathways are especially infrequent. For instance, King et al. (2005) and Verhoeven et al. (2007) analyze neighbourhood and family mediating pathways to prosocial behaviour, but the SEM method is applied in a cross-section of children. Caprara et al. (2000), Kerr and Michalski (2004), and Aunola and Nurmi (2005) use a LGM methodology, but applied to the study of other children's outcomes such as hyperactivity, externalizing behaviours, or peer relations. Carlo et al. (2007) is the only known study which attempts to apply a LGM methodology for the analysis of children's prosocial behaviour trajectories. In addition, Cote et al. (2002) and Kokko et al. (2006) are the only two studies using latent class analysis to endogenously determine children's prosocial behaviour trajectories.

Although both HLM and LGM framework have similar advantages and features when estimating a simple growth curve, the LGM framework has more flexibility when

analyzing mediating pathways. The LGM framework has enhanced capability to support the simultaneous analysis of the determinants of prosocial behaviour in children in both initial status and growth trajectory (Duncan and Duncan 2009). LGMs are appropriate for the analysis of both mean and variance structures in longitudinal datasets, and the estimation provides meaningful statistics representing intra- and inter-individual change (Raudenbush and Bryk 2002; Kline 2005).

Most importantly, the LGM approach can support the analysis of multiple predictors, or correlates of individual differences in prosocial behaviour, and therefore can test for the significance and magnitude of direct and indirect effects on the level and rate of prosocial development (Willett and Sayer 1994; Park and Schutz 2005). Thus, the LGM framework allows for modeling the effects of moderators, for example gender, directly and simultaneously on all the mediating relationships analyzed. In order to push the academic envelope, and more importantly to answer the research questions laid out previously, a series of LGMs are estimated in AMOS 18 (Arbuckle 2009).

Unconditional Latent Growth Model (LGM)

In the context of this study, unconditional LGMs are used to answer research questions #1 and #2. Therefore, a basic unconditional LGM is assessed prior to the introduction of chosen mediators and moderators in what is called a conditional LGM. In order to study the shape of individual prosocial trajectories, the empirical implementation of a LGM requires a dataset that is time-structured (interval) for a same unit of measurement (construct), and where each variable is repeated on at least three occasions (Kline 2005; Duncan and Duncan 2009). Thus, four repeated measures of children's

prosocial behaviour between the age of 4-5 and 10-11 are used in the study, and allow for testing both linear and non-linear trajectories hypothesis by including polynomials.

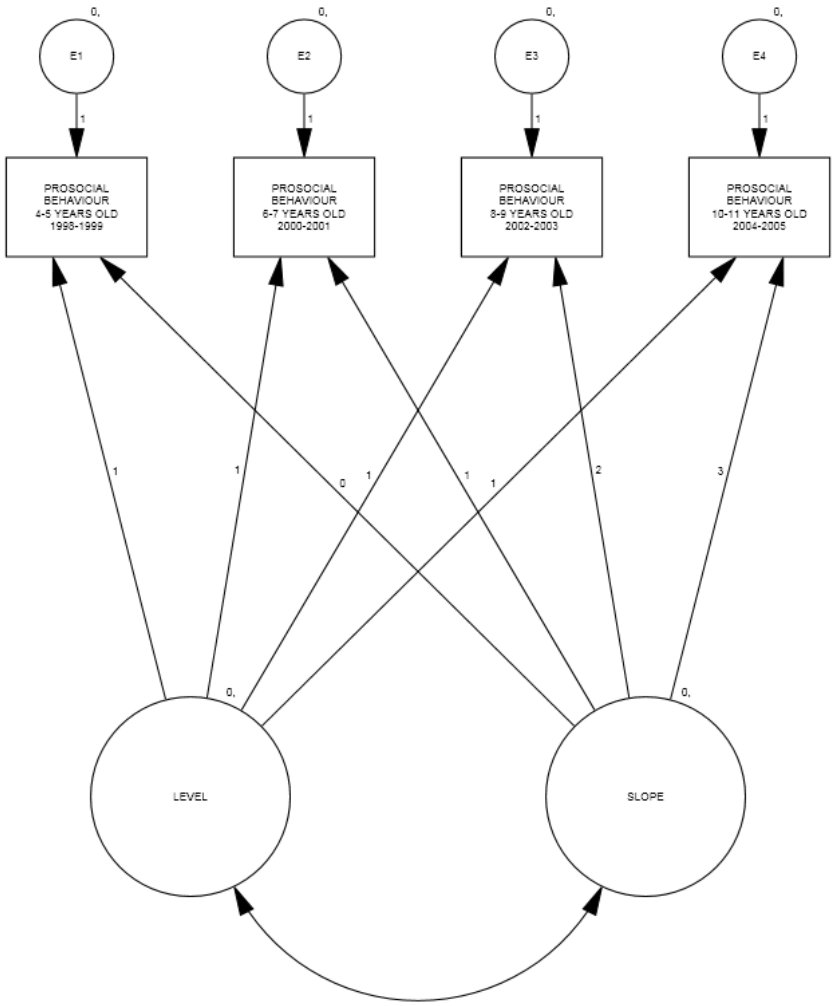
LGMs are estimated using a Full Information Maximum Likelihood (FIML) method. FIML estimation allows for generating efficient estimates from a sample containing missing data without actually imputing data per se. According to Preacher et al. (2008), FIML is more efficient and less biased than other estimation methods involving imputation or deletion of partial data and produces unbiased estimates when data are MCAR or MAR. According to Chambers and Skinner (2003), sampling does not induce bias in the un-weighted estimators if the specified model is correct. Moreover, the FIML empirical method used for dealing with missing values in AMOS 18 prevent entirely the use of weights to avoid model solvability problems involved with reaching an estimated global maximum. As Moraes (2009) points out, sample weights are also not considered critical in theory testing where inference about the broad population is less important. For instance, the studies by Tremblay (2001), Cote et al. (2002), Kokko et al. (2005), Letourneau et al. (2006), Carlo et al. (2007), and Moraes (2009) did not use weights in their estimations. For all these reasons, no weights are applied in our study and no broad generalization of the results to Canadian population is attempted.

The empirical LGM specification for the unconditional model used in this study includes four repeated assessments of prosocial behaviour measured when children are aged 4-5, 6-7, 8-9 and 10-11. Figure 2 below depicts this model, where one dependent prosocial behaviour variable is measured at four time intervals, and two independent variables, intercept and slope, explains these four observed outcome variables. Each child in the sample has his or her own intercept and slope, and inter-individual variation is

assumed in the LEVEL and SLOPE. Following the methodology developed by Duncan and Duncan (2009), the LEVEL and SLOPE loadings are parameterized to model the growth curve in prosocial behaviour. As Park and Schutz (2005) point out, because of the fixed factor loadings, the latent variables have specific meanings in the context of a LGM. Therefore, the factor loadings are set to a fixed value of 1 for the LEVEL, and 0, 1, 2, and 3 for the SLOPE, in order to represent the strength and linearity of the time metric relationship between observed and latent variables over time. In addition, factor loadings, also called pattern coefficients, also represent the causal effects of the underlying factors on the observed score in the model (Kline 2005).

In the empirical model, the LEVEL and SLOPE present information about the mean and variance of all children's prosocial behaviour initial status and rate of change. Consequently, LEVEL and SLOPE factors describe the true inter-individual means and variances in intra-individual growth in prosocial behaviour. In addition, the magnitude and direction of the relationship between the score level at the initial time and the rate of change is represented by the covariance between LEVEL and SLOPE. The covariance explains the degree to which initial levels in prosocial behaviour predicts the rates of change in prosocial behaviour over time. Therefore, the covariance represents the shared variance, or more simply the degree to which LEVEL and SLOPE change together (Tabachnik and Fiddell 2001). Error terms, labelled E1, E2, E3 and E4, are also allowed to correct the measured variances for random errors. As pointed out by Kline (2005), error variances represent the combined effect of all other sources of influence on the observed scores besides that of the factor the indicator is supposed to measure.

Figure 2. Unconditional Latent Growth Model (LGM)



Following Kline (2005), the empirical model's mean structure in Figure 2 is fully identified with the introduction of a "means and intercepts" specification in the LGM, and these structural equations are described algebraically as follow:

$$V1 = \alpha 1 + (1)\,LEVEL + (0)\,SLOPE + (1)\,E1 \quad (1)$$

$$V2 = \alpha 2 + (1)\,LEVEL + (1)\,SLOPE + (1)\,E2 \quad (2)$$

$$V3 = \alpha 3 + (1)\,LEVEL + (2)\,SLOPE + (1)\,E3 \quad (3)$$

$$V4 = \alpha 4 + (1)\,LEVEL + (3)\,SLOPE + (1)\,E4 \quad (4)$$

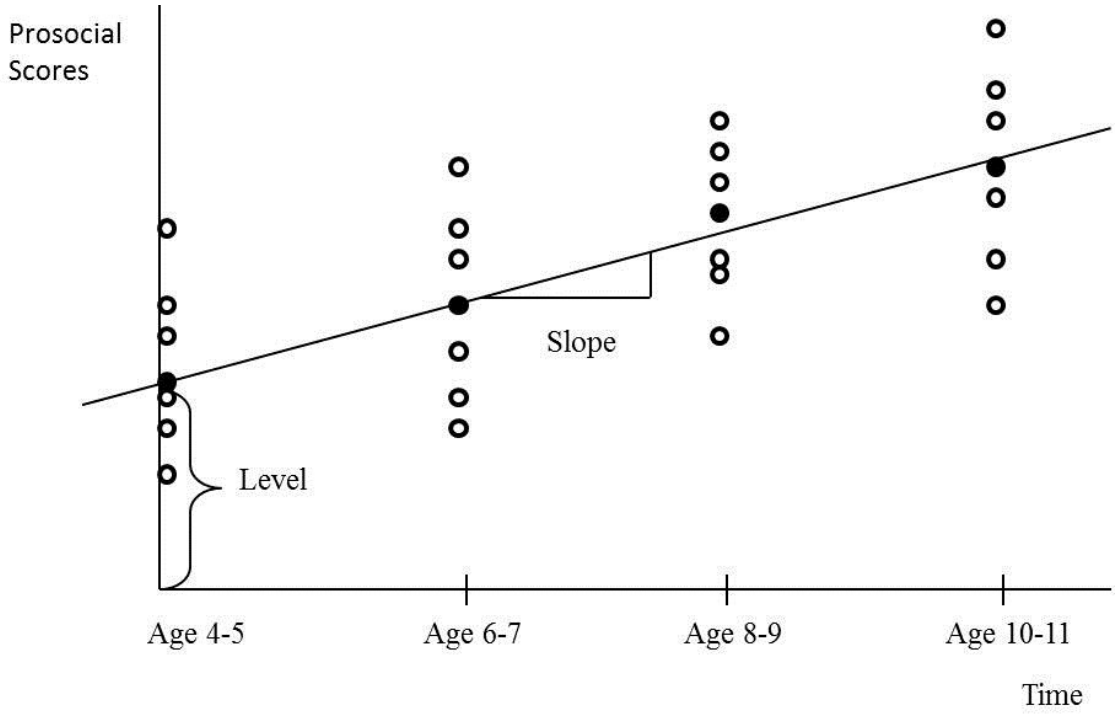
Where V1, V2, V3 and V4 represent observed endogenous prosocial behaviour scores when children are age 4-5, 6-7, 8-9 and 10-11. LEVEL and SLOPE latent factors represent respectively the initial status in children's prosocial behaviour at age 4-5, and the prosocial linear growth through the age 6-7, 8-9 and 10-11. The parameterization of the error terms labelled E1, E2, E3, and E4, in relationships to prosocial behaviour measures at each time period, are represented by the constant numbers in bracket. Because the factor loadings represent an increasing trend, the difference between V1, V2, V3 and V4 is equal to the magnitude of the SLOPE factor apart from error terms, which are unique at each time point (Park and Schutz 2005; Duncan and Duncan 2004).

Using this model specification, the means of LEVEL, SLOPE and error terms E1, E2, E3, and E4 are fixed at zero; and the constants α1, α2, α3 and α4 are introduced in each equation. Eleven parameters are estimated, LEVEL and SLOPE variances, one covariance, four error variances, and four intercept means. The intercept means captured by α1, α2, α3 and α4 are derived from the fact that, when a predictor is regressed on a constant, the unstandardized coefficient becomes the mean of the predictor (Kline 2005). Therefore, these eleven parameters are estimated, using a FIML estimation method, from fourteen sample moments (six covariances, four variances, and four means in observed variables), with accordingly three degrees of freedom.

Based on this empirical framework, the longitudinal data being modeled using is displayed graphically in Figure 3. This LGM represents linear change for a hypothetical sample of prosocial scores observed individually when children are 4-5, 6-7, 8-9, and 10-11 years old. This basic linear model captures longitudinal changes in mean prosocial scores over time for all children. From estimation results, an aggregated growth function

is constructed, which includes an initial level and a slope. The level and slope, as previously conceptualized, represent the true inter-individual mean and variance in intra-individual prosocial growth. This simple framework is then used to analyze differences across population sub-groups, for example boys and girls; as well as for carrying out more complex analysis of prosocial determinants.

Figure 3. Modeled Longitudinal Prosocial Behaviour Data



One main issue related to the use of NLSCY data is sample heterogeneity of either prosocial behaviour or its determinants, or both. According to Duncan and Duncan (2009), the assumption of a homogeneous random sample from a single population is not always realistic, and it is sometimes necessary to test and model multiple populations that

can have multiple developmental pathways across condition rather than an assumed single underlying trajectory for all. The LGM framework has potent capability to accommodate and test for heterogeneous samples (Bryk and Raudenbush 1992; Muthen and Satorri 1995; Kaplan and Elliott 1997; Henry and Muthen 2010).

Research question #2 is specifically assessed using the same specification for an unconditional LGM, but with a simultaneous estimation of multiple population sub-groups using the multi-group estimation method in AMOS 18 (Arbuckle 2009). This estimation method allows for the analysis of statistical differences in children's prosocial trajectories between population sub-groups, which are determined based on child's gender, family structure, social support, neighbourhood cohesion, and place of residence. First, two sets of structural equations are estimated simultaneously to analyze growth patterns in prosocial behaviour across groups. Second, tests of difference in factor means (of intercept and slope) are performed to assess statistical difference in prosocial behaviour trajectories between groups, for example boys and girls. This procedure specifically requires that one of the group factor means is set to zero, and therefore calculates differences in prosocial initial level and growth and test for their statistical significance.

Unconditional Group Mixture Model (GMM)

Population sub-groups with heterogeneous prosocial trajectories are also taken into account using Latent Class Analysis (LCA), also called Growth Mixture Modeling (GMM) (Nagin 1999; Muthen 2001; Duncan and Duncan 2009). LCA combines categorical and conventional continuous latent variables, and is therefore designed to

analyze repeated dichotomous measures related to sub-population groups. LCA usually assumes that a given population comprises an unknown number of latent classes, or sub-populations, which group membership is influenced by selected predictors (Duncan *et al.* 2006). The basic LCA specification assumes and assigns predetermined group membership representing clusters of growth trajectories within the population. However, the reality of the data may suggest otherwise that there is uncertainty in group membership, or that the clusters of growth trajectories are based on some unknown characteristics. Nagin (1999) proposes an alternative group-based approach to identify those clusters of unknown trajectories within the data. This approach characterizes individuals with respect to aggregated clusters, and calibrates the probability of individual membership in those groups. This methodology is applied to the study of social behaviours by identifying the number of groups or clusters that best fit the data, as well as the shape of the growth trajectories for each group (Tremblay *et al.* 1987; Moffit 1993; Nagin and Tremblay 2001; Muthen and Asparouhov 2009).

Therefore, this specific approach is used to investigate research question #3, in order to identify the main clusters of children's developmental trajectories, and to calculate individual posterior probabilities of membership to these clusters. In order to do so, an unconditional LGM is first estimated using the Bayesian estimation procedure in AMOS 18 (Arbuckle 2009). This allows for the discovery of unknown prosocial growth trajectory clusters that are present in the data. Second, the predictive posterior probabilities of membership to these clusters are calculated for each child, and a descriptive analysis of selected child, family, and neighbourhood characteristics in relation to these clusters is performed.

Conditional Latent Growth Model (LGM)

Duncan and Duncan (2009) argue that one key advantage of LGM over traditional methodologies is the ability to use variables simultaneously as independent and dependent variables in the same model, which allows for complex representations of growth and correlates of change. They point out that the parameters for an individual's growth curve can support the analysis of the predictors of individual differences and rates of development; and therefore explain how development influences subsequent behaviours. Multivariate conditional LGM accommodates this type of longitudinal analysis by providing a more dynamic viewpoint of the correlates of change, and most importantly how their development is interrelated (Duncan et al. 2006). The introduction of those correlates of change within a growth curve framework tends to be cumbersome, and models need to be specified carefully in both HLM and LGM formats.

Most of the studies reviewed previously use model specifications that allows for the analysis of a limited number of time-invariant predictors on prosocial behaviour level and growth (Tremblay et al. 2001; Romano et al. 2005; Letourneau et al. 2006; Moraes 2009). Moreover, those studies usually focus on a core time-varying mechanism related to prosocial behaviour, for example depression or parenting practices (Letourneau 2006; Moraes 2009). In addition, other time-invariant determinants are also included in the growth curve model. Usually, the reviewed studies attempt to model the impacts on prosocial behaviour of time-invariant determinants, for instance family SES, only in base year. Other SEM-based methodologies analyze mediating pathways to prosocial behaviour without attempting to model time-varying relationships (King et al. 2005; Verhoeven et al. 2007).

A conditional LGM is developed to include parental depression and family dysfunction as time-invariant mediators of the relationship between family SES, parenting practices, and children's prosocial behaviour. Willms (2003) defines a mediator as a variable that explain why there is a relationship between two variables. For example, parental depression is hypothesized to be a mediator, or explaining factor, in the relationship between family SES and positive interaction in parenting. In turn, parenting practices can be viewed as hypothesized mediators of the relationship between family dysfunction and children's prosocial development. In this case, parental depression, family dysfunction, and parenting practices are hypothesized to be mediators because they are correlated with both family SES and prosocial behaviour.

Because of the critical importance of socialisation processes involving parenting practices and child prosocial behaviour demonstrated in the literature and supported by the descriptive analysis, parenting practices are introduced as time-varying covariates in a parallel process framework in the model. This specific approach is used in a HLM framework by Moraes (2009) to analyze potential mediating and moderating factors influencing the relationship between parenting practices and prosocial behaviour. However, the testing of longitudinal mediation and moderation processes in the LGM framework is very recent (Li et al. 2000; Cheong et al. 2003; McKinnon et al. 2007; and Selig and Preacher 2009). Nonetheless, Muthen and Curran (1997), Singer and Willet (2003), Cheong et al. (2003), and Selig and Preacher (2009) propose a methodology to analyze mediated relationships using LGMs that is focused on modeling two latent time-varying growth processes in parallel and integrating mediators as time-invariant measures. Carlo et al (2007) use this approach to analyze a dual process between peer

relationships and prosocial behaviour, where the initial level and growth in peer interaction have an influence on prosocial initial level and growth.

The empirical LGM specification for the conditional model used in this study includes, as for the unconditional model, four repeated assessments of prosocial behaviour measured when children are aged 4-5, 6-7, 8-9 and 10-11. Figure 4 depicts the conditional model for generic parenting practices, where mother's depression and family dysfunction are time-invariant mediators of the relationship between family SES and four parenting practices. Following the proposed approach, parenting practices and prosocial behaviour are modeled in a time-varying dual-process, and four different models are estimated to analyze the impacts of the mediators on positive parenting, parenting effectiveness, parenting consistency and parenting rationality.

The empirical model is also fully identified with the introduction of a "means and intercepts" specification proposed by in the conditional LGM, and the fourteen equations are described algebraically as followed:

Prosocial latent growth curve:

$$V1 = \alpha 1 + (1)\ LEVELPSB + (0)\ SLOPEPSB + (1)\ E1 \quad (1)$$

$$V2 = \alpha 2 + (1)\ LEVELPSB + (1)\ SLOPEPSB + (1)\ E2 \quad (2)$$

$$V3 = \alpha 3 + (1)\ LEVELPSB + (2)\ SLOPEPSB + (1)\ E3 \quad (3)$$

$$V4 = \alpha 4 + (1)\ LEVELPSB + (3)\ SLOPEPSB + (1)\ E4 \quad (4)$$

Parenting practices latent growth curve:

$$V5 = \alpha 5 + (1)\ LEVELPAR + (0)\ SLOPEPAR + (1)\ E5 \quad (5)$$

$$V6 = \alpha 6 + (1)\ LEVELPAR + (1)\ SLOPEPAR + (1)\ E6 \quad (6)$$

$$V7 = \alpha 7 + (1)\ LEVELPAR + (2)\ SLOPEPAR + (1)\ E7 \quad (7)$$

$$V8 = \alpha 8 + (1)\ LEVELPAR + (3)\ SLOPEPAR + (1)\ E8 \quad (8)$$

Structural relations between prosocial development and parenting practices:

$$LEVELPSB = \alpha 9 + \beta 1\ DYS + \beta 2\ SES + (1)\ E9 \quad (9)$$

$$SLOPEPSB = \alpha 10 + \beta 3\ DYS + \beta 4\ SES + \beta 5\ LEVELPAR + \beta 6\ SLOPEPAR + (1)\ E10 \quad (10)$$

$$LEVELPAR = \alpha 11 + \beta 7\ DYS + \beta 8\ SES + \beta 9\ DEP + (1)\ E11 \quad (11)$$

$$SLOPEPAR = \alpha 12 + \beta 10\ DYS + \beta 11\ SES + \beta 12\ DEP + (1)\ E12 \quad (12)$$

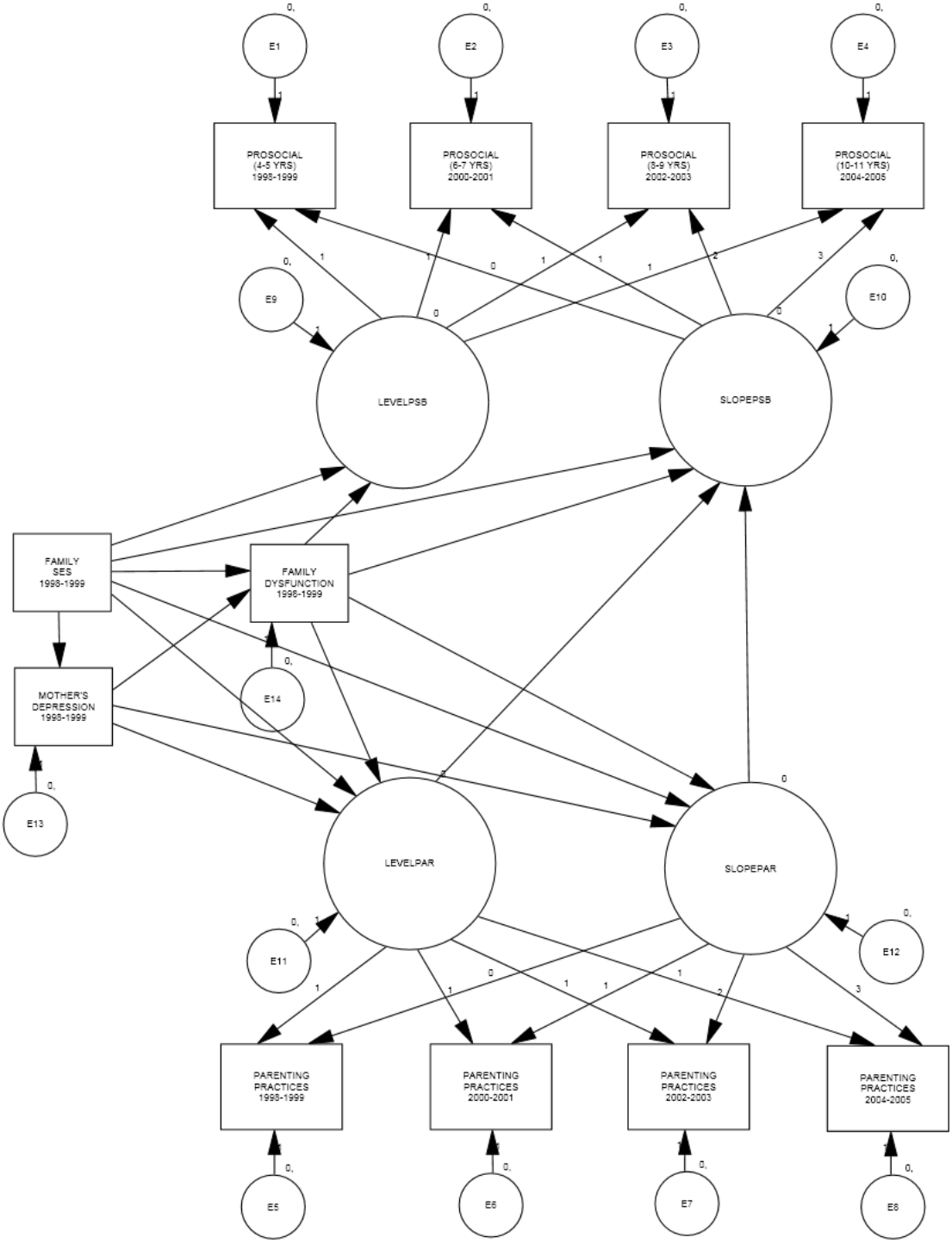
Endogenous mediators:

$$DEP = \alpha 13 + \beta 13\ SES + (1)\ E13 \quad (13)$$

$$DYS = \alpha 14 + \beta 14\ SES + \beta 15\ DEP + (1)\ E14 \quad (14)$$

Where V1, V2, V3 and V4 represent observed endogenous prosocial behaviour scores in children aged 4-5, 6-7, 8-9 and 10-11; and V5, V6, V7 and V8 represent observed endogenous parenting practices scores in children aged 4-5, 6-7, 8-9 and 10-11. LEVELPSB and SLOPEPSB latent factors represent respectively the initial status in children's prosocial behaviour at age 4-5, and the prosocial growth through the age 6-7, 8-9 and 10-11. On the other hand, LEVELPAR and SLOPEPAR latent factors represent the initial status in children's parenting practices at age 4-5, and the change in parenting practices through the age 6-7, 8-9 and 10-11.

Figure 4. Conditional Latent Growth Model (LGM)



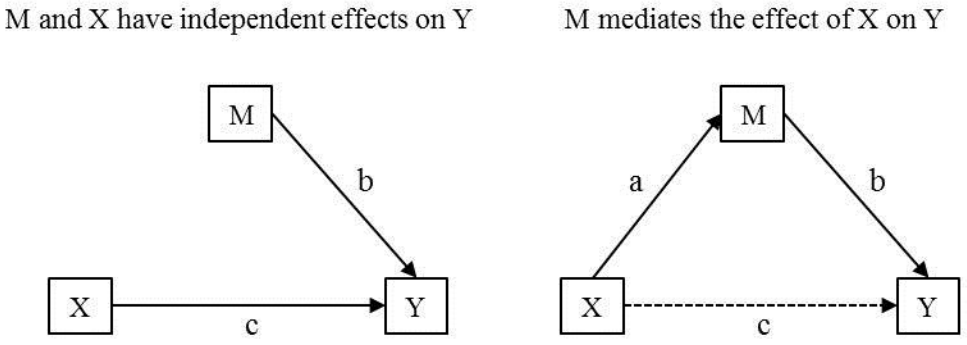
Four different models are estimated for positive parenting, effectiveness, consistency, and rationality. The parameterization of the time metric and the error terms relationships to prosocial behaviour measures, and parenting practices at each time period are represented by numbers in bracket. The means of LEVELPSB, SLOPEPSB, LEVELPAR, SLOPEPAR, DEP and DYS, and error terms E1, E2, E3, E4, E5, E6, E7, E8 E9, E10, E11, E12, E13, and E14 are fixed at zero; and constants α1, α2, α3, α4, α5, α6, α7, α8, α9, α10, α11, α12, α13, and α14 are introduced in each equation. The structural mediation is modeled with equations 9, 10, 11 and 12. However, equations 9 and 11 model the relations between family SES, family dysfunction, and the mediation process at the initial levels of the latent factors.

On the other hand, equations 10 and 12 model the relations between family SES, family dysfunction, and the rate of growth in parenting practices; and the relations among the latent factors of those two parallel processes. More specifically, equation 10 models how the rate of growth in prosocial behaviour is potentially mediated by both parenting practices levels and growth. Forty one parameters are estimated using FIML: fifteen regression weights, fifteen error variances, ten intercept means, and one exogenous variable mean. These parameters are estimated from seventy seven distinct sample moments (covariances, variances and means in observed variables), with thirty six degrees of freedom.

A clear conceptualization of mediation and moderation processes is necessary to the implementation of this conditional LGM. In its basic form, the mediation model explains the mechanism or pathway that underlies an observed relationship between an independent variable and a dependent variable, by including a third intervening

explanatory variable, called a mediator. According to Baron and Kenny (1986), a mediator variable explains how or why another variable may affect an outcome. The mediation model hypothesizes that the independent variable causes the mediator variable, which in turn causes the dependent variable (MacKinnon et al. 2007). Consequently, the intermediate factor is a variable that occurs specifically in a causal pathway from an independent to a dependent variable (Kraemer et al. 2001). The mediation is graphically displayed in Figure 5. In this example, the influence of independent variable X on dependent variable Y, is fully mediated by variable M, when pathways a and b are significant, while pathway c is not as indicted by the dotted line.

Figure 5. The Mediation Model



Source: Kraemer et al. (2001) and McKinnon et al. (2007)

Direct and indirect effects can be estimated for all mediating pathways in the model. In figure5, the total mediated effects of variable X on variable Y is calculated by taking the product of coefficients a and b. Similarly, in the empirical conditional LGM previously discussed, the point estimate of the mediated effects of family SES on

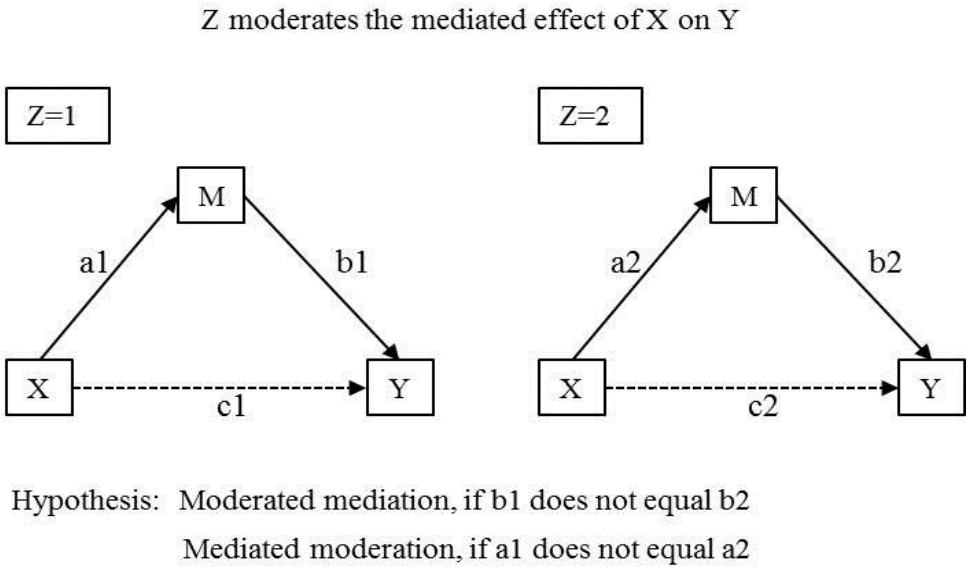
parenting practices by family dysfunction is obtained by taking the product of coefficients β7 and β14. In addition, indirect mediated effects of family dysfunction on prosocial behaviours through parenting practices are obtained by adding the product of coefficients β5 and β7, and β6 and β10. The analysis of these causal relationships, using this methodology, allows for a better understanding of the strength of influence between underlying determinants and children's prosocial behaviour.

Kraemer et al. (2001) define a moderator as an effect modifier, which refers to variation in the magnitude of an effect that occurs across levels of another variable. According to McKinnon et al. (2007), two types of moderating effects can influence any mediating path: first, a moderated mediation effect; and second, a mediated moderation effect. Moderated mediation refers to the moderating impacts of a given variable, on the mediator of a relationship between an independent variable and a dependent variable (McKinnon et al. 2007). On the other hand, mediated moderation occurs when the sequence of causality from a moderating effect to a dependent variable is inter-mediated by a mediator (Baron and Kenny 1986). In simple terms, mediated moderation happens when a moderator, for example social support, is transmitted through the mediator, for example mother's depression. According to McKinnon et al. (2007) mediated moderation determines the mediating variable that explains the moderating effect.

This framework is depicted below in Figure 6, where coefficients along mediated pathways are compared statistically across the two categorical groups. In this example, it is of interest to test whether the mediated effect a1*b1 is different than a2*b2. Testing for the equality of coefficients a, is considered a test of mediated moderation, while testing for the equality of coefficients b, informs about moderated mediation (MacKinnon et al.

2007). If the pairwise comparison of b1 and b2 is statistically significant, there is evidence of moderated mediation. Alternatively, if the pairwise comparison of a1 and a2 is significant, this suggests mediated moderation. Thus, this framework allows locating where moderating effects may be along the mediating pathways.

Figure 6. The Mediation Model across Moderators



Source: McKinnon et al. (2007)

The hypothesized moderating effects of selected characteristics on mediating pathways can be tested by using simultaneous group estimation in AMOS 18. Testing empirically for moderated mediation and mediated moderation is conducted using critical ratio differences (CRD) estimates. The conditional LGM is estimated simultaneously for two groups, for example boys and girls. Then, a CRD matrix is obtained for all cross-coefficients along the same mediating paths, and relevant statistical tests are analyzed.

Chapter IV: Results

The results to the five research questions are presented in this chapter. An unconditional LGM is estimated to answer research questions #1 "How do children's prosocial behaviour trajectories vary in levels and rates of growth across individuals?"; and research question #2 "How do child, family and neighbourhood group characteristics contribute to differences in children's prosocial behaviour trajectories?". A GMM is estimated to answer research question #3 "What are the latent classes (clusters) of prosocial behaviour trajectories present in the data, and what are the child, family and neighbourhood characteristics of those classes (clusters)?". Finally a conditional LGM is estimated to answer research question #4 "How do parental depression, family dysfunction, and parenting practices (positivity, effectiveness, consistency, and rationality) contribute to mediate the relationship between family SES and children's prosocial behaviour trajectories?"; and research question #5 "How do child, family, and neighbourhood characteristics contribute to moderate the relationship between family SES, parental depression, family dysfunction, parenting practices (positivity, effectiveness, consistency, and rationality), and children's prosocial behaviour?".

Research Question #1

An unconditional linear LGM is estimated using FIML to assess prosocial behaviour developmental trajectories for a NLSCY sample of 3,202 children, in order to address the following research question #1: How do children's prosocial behaviour trajectories vary across individuals? Significant inter-individual differences in intra-individual prosocial trajectories across children are hypothesized.

Because prosocial behaviour scores appear to be slightly curvilinear, a non-linear unconditional LGM specification is first fitted to the data. However, the overall non-linear model fit is poor (χ^2 (2) = 2.987, p = 0.15 and Root Mean Square Error of Approximation (*RMSEA*) = 0.287) and the estimates for the slope (p = 0.405) and the quadratic (p = 0.075) terms are not significant. This indicates that a linear trajectory may be a more appropriate representation of children's prosocial development between the age of 4-5 and 10-11.

As expected, the linear growth model fits the four repeated measures of prosocial behaviour very well: χ^2 *(3)* = 17.334, p = 0.001, *RMSEA* = 0.039, Normed Fit Index (*NFI*) = 0.993, Tucker-Lewis Index (*TLI*) = 0.982 and Comparative Fit Index (*CFI*) = 0.995. The mean prosocial behaviour scores at age 4-5, 6-7, 8-9 and 10-11 are found significant (p < 0.001) and are respectively estimated at 12.119, 14.013, 14.325 and 14.579 (Table 6). Significant inter-individual variability in prosocial behaviour is found for both LEVEL (σ^2 = 7.041, S.E. = 0.38, p < 0.001) and SLOPE (σ^2 = 0.35, S.E. = 0.071, p < 0.001). Results show that children's prosocial scores vary 3.025 units below and above the mean at age 4-5, and that their rate of growth varies 0.175 units below and above their mean growth. The covariance between the initial level and the growth in prosocial behaviour is negative and significant at -0.388 (S.E. = 0.137 and p < 0.005). Therefore, children who start with higher prosocial levels increased at a lower rate on average, while those who start lower increased at a higher rate over the analyzed period.

In order to display an estimated trajectory, a second unconditional LGM is also fitted to the data but with assumptions of constrained intercepts ($\alpha1=\alpha2=\alpha3=\alpha4$) and equal error variances. The constrained model fits the four repeated measures of prosocial

behaviour adequately with an Akaike's Information Criterion (AIC) of 40,410. Graphical results from the unconstrained unconditional LGM (Model 1) and the constrained unconditional LGM (Model 2) are shown in Figure 7. The fitted Model 2 shows the average initial level in children's prosocial behaviour at age 4-5 in our sample is 12.578 units, and that the average linear rate of growth between the age of 4-5 and 10-11 is 0.793. Thus, an average child is expected to realize an increase of 0.793 units in prosocial behaviour every two years over a period of six years.

Table 6. Results of Unconditional LGM

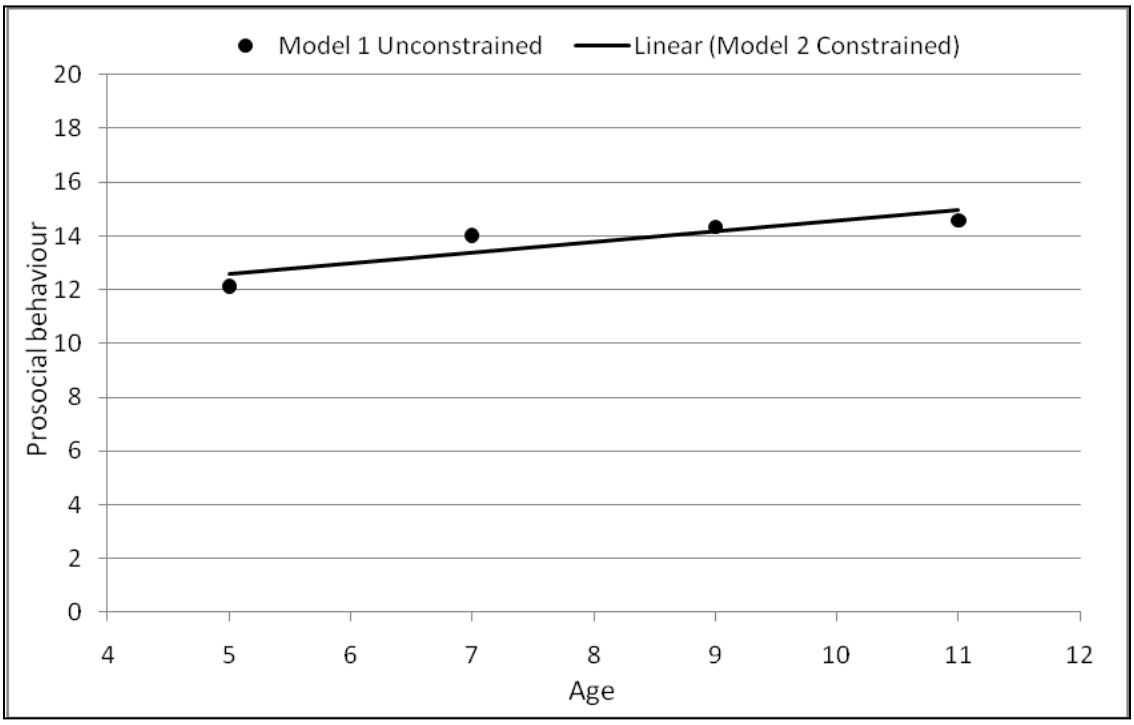
	Estimate	S.E	C.R.	*p* value
Intercepts				
α1	12.119	0.072	167.986	***
α2	14.013	0.068	205.721	***
α3	14.325	0.065	218.865	***
α4	14.579	0.071	204.243	***
Covariance				
SLOPE <=> LEVEL	-0.388	0.137	-2.824	**
Variances				
LEVEL	7.041	0.380	18.514	***
SLOPE	0.350	0.071	4.899	***
E1	8.445	0.374	22.606	***
E2	6.830	0.241	28.338	***
E3	5.510	0.208	26.503	***
E4	5.799	0.316	18.349	***

Note: *** = *p* value < 0.001 and ** = *p* value < 0.005

The results support the hypothesis #1a of significant inter-individual differences in intra-individual prosocial trajectories across children. Results show children's prosocial behaviour follows an increasing linear trend over the analyzed period. There is significant inter-individual variability across children, both in initial level of prosocial behaviour and growth between the age of 4-5 and 10-11. Children who display higher

initial levels of prosocial behaviour when they are 4-5 years old, increase on average at a lower rate of growth.

Figure 7. Results of Constrained and Unconstrained Unconditional LGMs



Research Question #2

An unconditional linear LGM is estimated to address research question #2, which is stated as: How do child, family and neighbourhood group characteristics contribute to differences in children's prosocial behaviour trajectories? Significant differences are hypothesized across population groups defined by gender, family structure, social support, neighbourhood cohesion and place of residence. In order to answer that research question, two sets of structural equations are estimated simultaneously using FIML in AMOS 18, and prosocial linear trajectories across groups and statistical differences in

LEVEL and SLOPE factor means are analyzed. Tests of equivalence in LEVEL and SLOPE factor means across groups are performed by constraining one group's mean to zero, and re-estimating the two sets of structural equations with their intercepts constrained across groups. The null hypothesis, referring to the equivalence of factor means, is then assessed using a *t*-test to make inference about gender differences in prosocial trajectories.

Simultaneous unconstrained unconditional LGMs describing children's prosocial trajectories for male and female are estimated and tests of equivalence in factor means are performed (Table 7). Results show male and female display different prosocial behaviour: mean prosocial scores at age 4-5, 6-7, 8-9, and 10-11 are found significantly different ($p < 0.001$) in both groups; those scores are respectively estimated at 11.506, 13.319, 13.664, and 13.796 for male, and 12.749, 14.719, 14.998, and 15.363 for female. Inter-individual variability in prosocial behaviour is found to be higher for male than female for both LEVEL ($\sigma^2 = 7.396$ versus $\sigma^2 = 5.927$) and SLOPE ($\sigma^2 = 0.501$ versus $\sigma^2 = 0.216$). Sample variance in SLOPE is not significant in the female group, which indicates more homogeneity and parallel stability in female growth trajectories.

The covariance between LEVEL and SLOPE is negative and significant only for male, and is estimated at -0.529 (S.E. = 0.206 and $p < 0.01$). A test of equivalence in factor means show there is significant differences in prosocial behaviour across gender, and female are estimated to be 1.248 units (S.E. = 0.128, $p < 0.001$) above male's initial levels at age 4-5. However, difference in rate of growth between male and female, estimated at 0.089 units, is not significant (S.E. = 0.052, $p < 0.083$). Thus, results adequately support the hypothesis #2a that children's prosocial trajectories are

significantly different across gender. Results demonstrate that female (model 2) display higher prosocial behaviour levels than male (model 1) from age 4-5 through 10-11, although linear prosocial trajectories do not differ significantly across gender (Figure 8). Nevertheless, results demonstrate the male group display more individual heterogeneity in both prosocial level and growth than the female group.

Table 7. Results of Unconditional LGMs by Gender

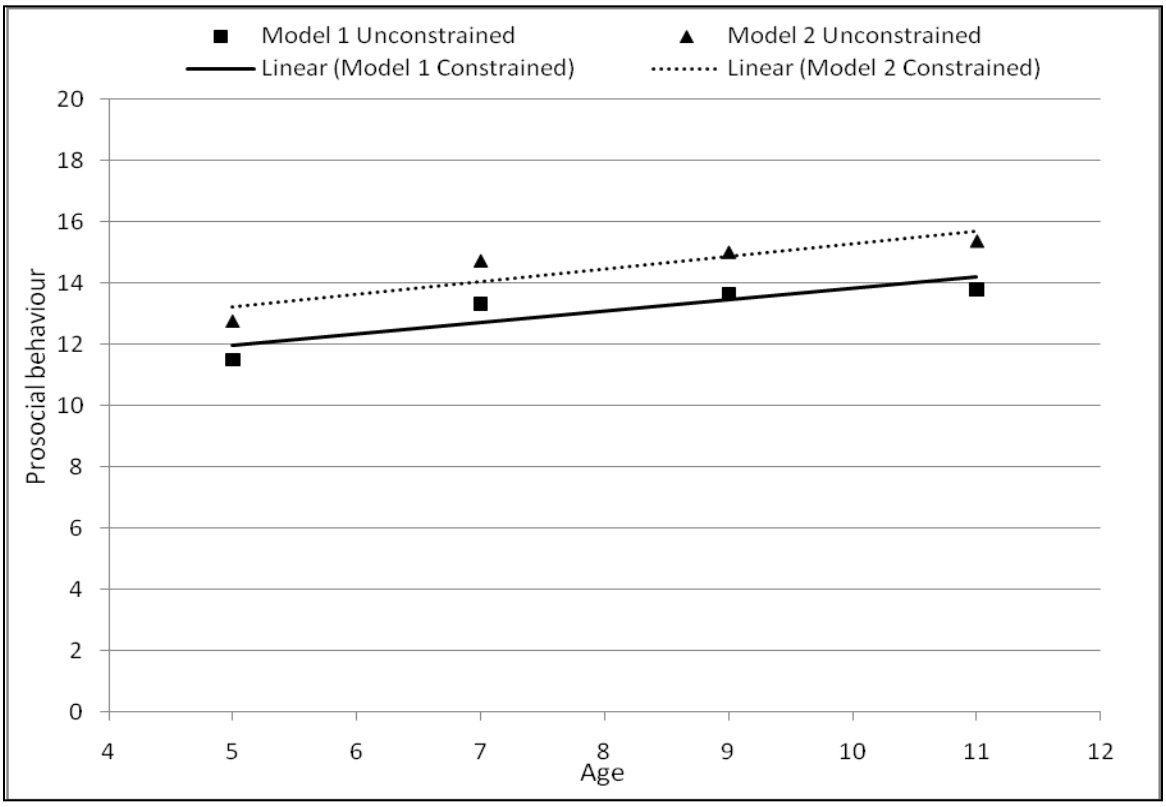
	Male (n = 1621)		Female (n = 1581)	
	Estimate	*p* value	Estimate	*p* value
Intercepts				
α1 (α5 for female)	11.506	***	12.749	***
α2 (α6 for female)	13.319	***	14.719	***
α3 (α7 for female)	13.664	***	14.998	***
α4 (α8 for female)	13.796	***	15.363	***
Covariance				
SLOPE <=> LEVEL	-0.529	0.010	-0.324	0.07
Variances				
LEVEL	7.396	***	5.927	***
SLOPE	0.501	***	0.216	0.021
E1 (E5 for female)	8.324	***	8.471	***
E2 (E6 for female)	7.235	***	6.421	***
E3 (E7 for female)	5.374	***	5.706	***
E4 (E8 for female)	5.959	***	5.544	***
Test of equivalence (Male factor means=0, equal intercepts across groups)				
LEVEL			1.248	***
SLOPE			0.052	0.083

Note: *** = *p* value < 0.001

Various tests of factor means equivalence are performed to analyze differences children's prosocial trajectories across family structure (Table 8). First, equivalence in prosocial factor means, LEVEL and SLOPE, is tested between children who have one parent and those who have two parents when they are 4-5 years old. Results show that

there are no significant differences between initial levels of prosocial behaviour (S.E. = 0.179, $p = 0.702$) and rates of growth (S.E. = 0.073, $p = 0.318$) across family structure. Second, the equivalence of factor means in four different family situations is also assessed by running a simultaneous estimation in AMOS 18. In order to do so, the latent factor means for a reference group of children that have two parents when they were aged 4-5, and still have two parents when they are aged 10-11 are set to zero and the intercepts are constrained across groups.

Figure 8. Results of Constrained and Unconstrained Unconditional LGMs by Gender



Results show no significant differences in prosocial levels for children who have one parent at age 4-5 and 10-11 (S.E. = 0.275, $p = 0.582$), those who have one parent at

age 4-5 and two parents at age 10-11 (S.E. = 0.277, p = 0.409), and those who have two parents at age 4-5 and only one parent at age 10-11 (S.E. = 0.229, p = 0.306). Similarly, results show no significant differences in rate of growth across children of single parents aged 4-5 who still live with one parent at age 10-11 (S.E. = 0.102, p = 0.807) or live with two parents at age 10-11 (S.E. = 0.107, p = 0.027). Children who live with two parents at age 4-5 but live with only one parent at age 10-11, also do not differ significantly in their prosocial growth (S.E. = 0.095, p = 0.026). Thus, similarly to the descriptive analysis of correlation, tests of equivalence of factor means show children do not statistically differ in their prosocial level and growth according to their family structure, and the hypothesis #2b is therefore not supported empirically.

Table 8. Tests of Equivalence in Factor Means by Family Structure

	Estimate	S.E	C.R.	*p* value
Family structure at age 4-5:				
(One parent at age 4-5 factor means = 0, equal intercepts across groups)				
LEVEL	0.068	0.179	0.382	0.702
SLOPE	-0.073	0.073	-0.998	0.318
Family structure at age 4-5 and 10-11:				
(Two parents at age 4-5 and 10-11 factor means = 0, equal intercepts across groups)				
One parent at age 4-5 and 10-11 (n = 146)				
LEVEL	-0.152	0.275	-0.551	0.582
SLOPE	0.025	0.102	0.244	0.807
One parent at age 4-5 and two parents at age 10-11 (n = 131)				
LEVEL	0.228	0.277	0.825	0.409
SLOPE	-0.237	0.107	-2.214	0.027
Two parents at age 4-5 and one parent at age 10-11 (n = 235)				
LEVEL	0.234	0.229	1.023	0.306
SLOPE	-0.211	0.095	-2.231	0.026

Note: *** = p value < 0.001

In order to assess differences in prosocial trajectories across neighbourhood characteristics, a series of unconditional LGMs are estimated, and test of equivalence in factor means are performed (Table 9). First, a test of equivalence in prosocial latent factor means across rural and urban place of residence is performed. Results show there are no significant differences, both for in terms of initial levels and rate of growth in prosocial behaviour, between children who live in a rural area (S.E. = 0.159, $p = 0.555$) and those who live in an urban area (S.E. = 0.063, $p = 0.712$) at the age of 4-5. Therefore, results do not support the hypothesis #2d about significant differences in children's prosocial trajectories across types of communities.

Table 9. Tests of Equivalence in Factor Means by Neighbourhood

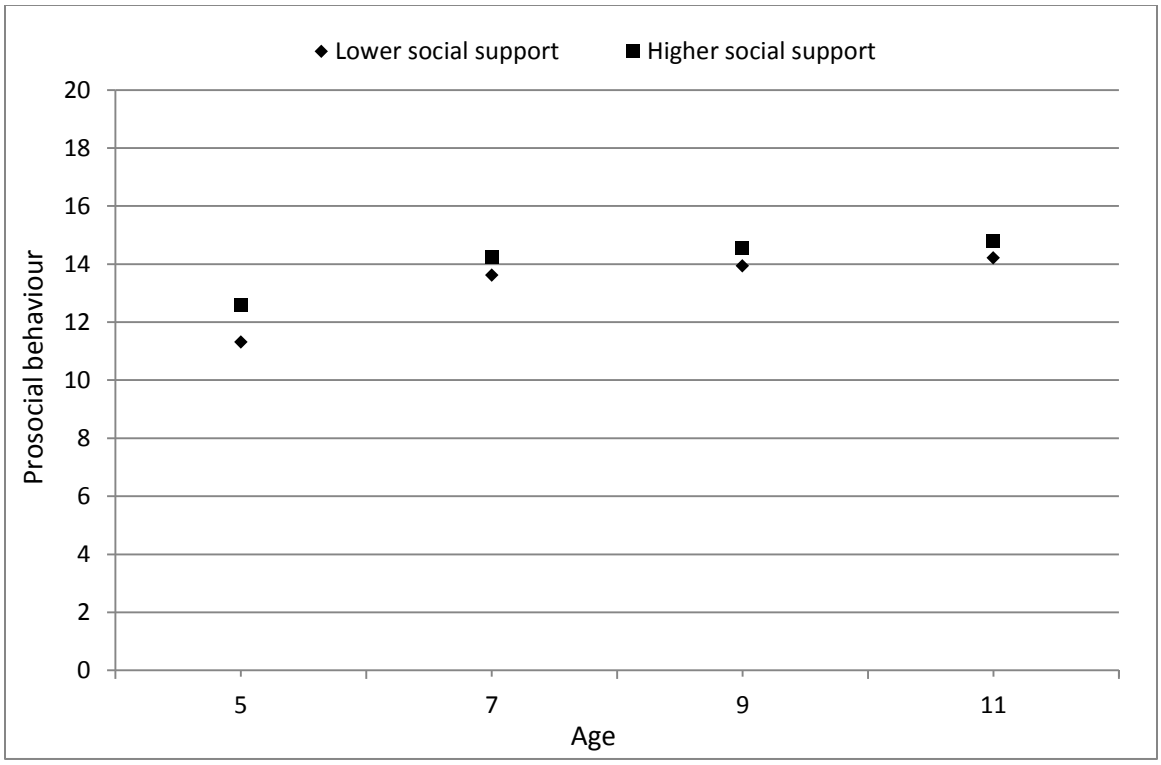
	Estimate	S.E	C.R.	*p* value
Social support (Lower support factor means = 0, equal intercepts across groups)				
LEVEL	1.061	0.138	7.694	***
SLOPE	-0.199	0.056	-3.579	***
Social cohesion (Lower cohesion factor means = 0, equal intercepts across groups)				
LEVEL	0.746	0.138	5.416	***
SLOPE	-0.088	0.055	-1.588	0.112
Place of residence (Rural factor means = 0, equal intercepts across groups)				
LEVEL	0.094	0.159	0.590	0.555
SLOPE	-0.023	0.063	-0.369	0.712

Note: *** = p value < 0.001

Second, differences in prosocial trajectories according to parents' perception of neighbourhood social support and social cohesion are tested using the same methodology. Results show there are significant differences in prosocial levels at age 4-5 for children whose parents perceptions of social support (S.E. = 0.138, $p < 0.001$) and social cohesion (S.E. = 0.138, $p < 0.001$) are higher. The prosocial scores by lower and higher social support are depicted below in Figure 9. Children aged 4-5 who live with parents who

have more positive perceptions of social support and social cohesion, show higher level in prosocial behaviour by 1.061 units and 0.746 units respectively above their lower support and lower cohesion counterparts.

Figure 9. Results of Unconstrained LGMs by Social Support



However, results demonstrate there are no significant differences between the rates of growth of children based on parents perceptions of neighbourhood cohesiveness (S.E. = 0.055, $p = 0.112$). Alternatively, children aged 4-5 whose parents perceptions of neighbourhood social support is higher experience a significant lower rate of growth than their lower social support counterparts (S.E. = 0.056, $p < 0.001$). Thus, on average these children experience lower growth in prosocial behaviour by 0.199 units between the age of 4-5 and 10-11 than their lower social support counterparts. This result is consistent

with earlier results of significant covariance relationships between LEVEL and SLOPE within the growth curve. Nonetheless, the hypothesis #2c of significant differences in children's prosocial trajectories across levels of neighbourhood social support and social cohesion is supported.

Research Question #3

In order to identify classes (clusters) of children's developmental prosocial behaviour trajectories, and identify child, family, and neighbourhood characteristics attached to those classes (clusters), an unconditional GMM is estimated using the Bayesian estimation procedure in AMOS 18 (Arbuckle 2009). This methodology is used to identify heterogeneous clusters of unknown prosocial trajectories within the NLSCY data, and to calculate individual probability of membership to those clusters. The GMM estimation perfectly converges with a Convergence Statistics (C.S.) of 1.001 for a sample of 3,202 children. The C.S. compares the variability within sub-sets of the analysis sample to the variability across those sub-sets, and a value of 1.000 represents perfect convergence (Arbuckle 2009). A three-class model and a five-class model are also estimated without ever reaching convergence, which supports the existence of four types of prosocial trajectories within the data.

Posterior probabilities are used to determine the most likely distribution of children within each cluster. Results support the discovery of four previously unknown prosocial developmental trajectory clusters: first, a low prosocial trajectory; second, a high prosocial trajectory; third, a medium increasing and decreasing trajectory; and finally, a high increase prosocial trajectory (Table 10).

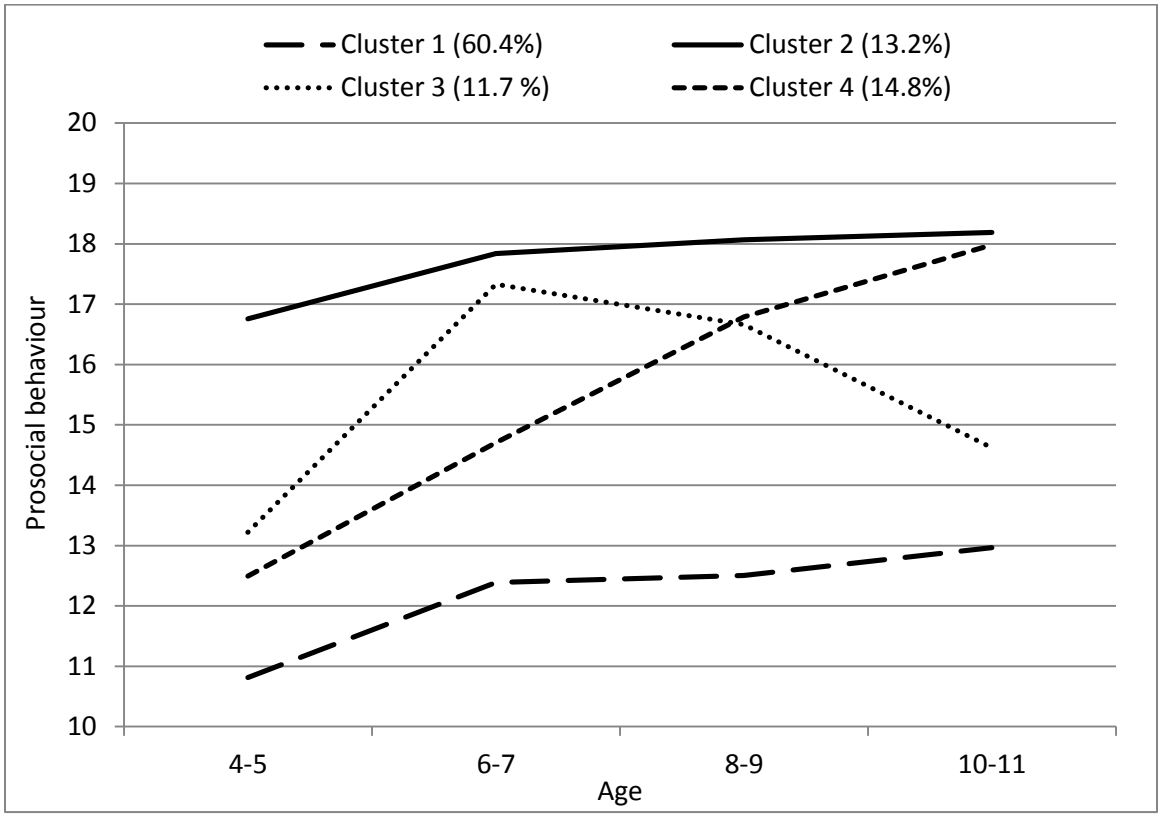
Table 10. Results of Unconditional GMM*

	Cluster 1	Cluster 2	Cluster 3	Cluster 4
Intercepts				
α1	10.815	16.759	13.219	12.495
α2	12.386	17.838	17.332	14.707
α3	12.505	18.066	16.662	16.791
α4	12.964	18.188	14.619	17.981
Covariance				
SLOPE <=> LEVEL	-0.440	0.020	-0.147	0.860
Variances				
LEVEL	4.403	0.563	0.687	-2.025
SLOPE	0.243	0.022	0.124	-0.277
E1	8.226	3.717	11.483	13.257
E2	7.585	1.368	2.189	9.362
E3	6.424	1.475	3.799	3.399
E4	7.129	1.004	9.376	0.978
Clusters				
Proportion (%)	0.604	0.132	0.117	0.148

Note: * All estimates converged to C.S. < 1.001

A low prosocial trajectory, Cluster 1, comprises 60.4% of the children who display low initial prosocial behaviour at age 4-5, and remain low throughout age 6-7, 8-9, and 10-11. In that low prosocial cluster, children show an average prosocial score of 10.815 at age 4-5 and 12.964 at age 10-11. Cluster 2, a high prosocial trajectory, includes 13.2% of children who start very high at age 4-5 with 16.759 units in prosocial score, and increase even higher to attain 18.188 units by age 10-11. A third cluster of children display an above average initial level of 13.219 in prosocial behaviour at age 4-5, which increase radically to 17.332 at age 6-7, to decrease to 14.619 units by age 10-11. A fourth cluster of children prosocial trajectories start around the sample mean at age 4-5, and increased to high prosocial throughout age 6-7, and 8-9, and reach 17.981 units by age 10-11. These prosocial trajectory clusters are depicted in Figure 10.

Figure 10. Results of GMM Prosocial Trajectory Clusters



A descriptive analysis of child, family, and neighbourhood characteristics is performed in relation to those prosocial trajectory clusters. In order to do so, predictive posterior probabilities are calculated for every child and they are assigned to their most likely trajectory cluster according to their highest membership likelihood. Results show male children are overrepresented in the lower prosocial behaviour trajectory cluster, and underrepresented in the higher prosocial trajectory cluster in support of hypothesis #3a (Table 11).

Study results show 71.3% of boys belongs to Cluster 1 and display low initial prosocial behaviour at age 4-5, and remains low throughout age 6-7, 8-9 and 10-11. On the other hand, only 54.4% of girls belong to Cluster 1. Of all clusters, the low prosocial

trajectory is the most populated for both boys and girls. The situation is inversed in relation to high prosocial trajectory membership as 20.6% of females belong in Cluster 2, while only 11.9% of boys do so. Membership to the third cluster includes those children who increase in prosocial behaviour at age 6-7, and progressively decrease through age 8-9 and 10-11. Membership to this cluster is similar for both male and female with 5% and 7.3% belonging respectively. However, the female group also belong at 16.6% to the fourth cluster, which displays a tremendous increase in prosocial behaviour score between the age of 4-5 and 10-11. On the other hand, approximately 11% of males belong to this high increase prosocial cluster.

Table 11. Proportion of Children in Prosocial Clusters by Gender*

	Male		Female	
	Count	%	Count	%
Cluster 1	1155	71.3	860	54.4
Cluster 2	193	11.9	326	20.6
Cluster 3	81	5.0	116	7.3
Cluster 4	181	11.2	263	16.6

Note: * Proportions are based on predictive posterior individual probabilities

Results do not support hypothesis #3b concerning higher average probability of belonging to lower prosocial trajectories clusters for children living with only one parent as opposed to two parents (Table 12). Therefore, children are distributed similarly in the four prosocial clusters independently of their family situation. Results are also similar whether children live with one parent at age 4-5 and 10-11, one parent at age 4-5 and two parents at age 10-11, or two parents at age 4-5 and one parent at age 10-11. These results support mixed research findings about the lack of significance of family structure in determining prosocial behaviour in children.

Table 12. Proportion of Children in Prosocial Clusters by Family Structure*

	Two parents		One parents	
	Count	%	Count	%
Cluster 1	1674	62.8	334	63.4
Cluster 2	433	16.2	86	16.4
Cluster 3	169	6.3	28	5.3
Cluster 4	368	13.8	74	14.0

Note: * Proportions are based on predictive posterior individual probabilities

Differences in membership to four prosocial trajectory clusters are assessed across parents' perception of neighbourhood social support and social cohesion (Table 13). Results support research hypothesis #3c about how children whose parents perceive low levels of neighbourhood social support and social cohesion have higher average probability of belonging to lower prosocial trajectories clusters. Results show children aged 4-5, whose parent perceive low levels of social support and social cohesion, are overrepresented in the low prosocial trajectory Cluster 1; their proportion are respectively 67.3% and 66.4% in that cluster, as opposed to 60.5% and 58.7% of children whose parent have more positive perceptions of their neighbourhood. On the other hand, children belonging to high prosocial Cluster 2 are also underrepresented when their parent have lower neighbourhood perceptions; respectively 12.9% and 13.9% for social support and social cohesion; when compared with their counterparts who have more favourable perceptions of their neighbourhood. Therefore, respectively 17.9% and 19% of children whose parents have favourable perceptions of social support and cohesion belong to Cluster 2.

Table 13. Proportion of Children in Prosocial Clusters by Perceived Social Support and Neighbourhood Cohesion*

	Lower		Higher	
	Count	%	Count	%
Social Support				
Cluster 1	744	67.3	1234	60.5
Cluster 2	143	12.9	366	17.9
Cluster 3	57	5.2	138	6.8
Cluster 4	153	13.8	285	14.0
Social Cohesion				
Cluster 1	1091	66.4	712	58.7
Cluster 2	229	13.9	230	19.0
Cluster 3	100	6.1	79	6.5
Cluster 4	208	12.7	182	15.0

Note: * Proportions are based on predictive posterior individual probabilities

Research Question #4

A series of four conditional LGMs are estimated to address research question #4, which is stated as: How do parental depression, family dysfunction, and parenting practices (positivity, effectiveness, consistency, and rationality) contribute to mediate the relationship between family SES and children's prosocial behaviour trajectories? A conditional LGM is developed to test the relevance of the parental socialisation hypothesis, or family stress model, on children's prosocial trajectories. The model includes measures of family SES, mother's depression, and family dysfunction as time-invariant mediators of the relationship between parenting practices and children's prosocial behaviour. A causal path is identified from the literature review and descriptive data analysis, and family SES is therefore hypothesized to impact mother's depression, family dysfunction, and parenting practices. As a result, mother's depression and family dysfunction are hypothesized as mediators of the relationship between family SES and parenting practices. Mother's depression, family dysfunction, and parenting practices are

identified as mediators because of their correlation with both family SES and prosocial behaviour outcome.

Because of the importance of systematic socialisation processes occurring between parenting practices and child prosocial behaviour over time, parenting practices are introduced in the model as time-varying covariates using a parallel process framework (Cheong et al. 2003; Selig and Preacher 2009). Parenting practices, more specifically positivity, effectiveness, consistency, and rationality, are modeled as main mediators of the relationship between family SES, family dysfunction and prosocial behaviour. The empirical LGM used in the study is identified with the introduction of a "means and intercepts" model specification, and includes four repeated assessments of prosocial behaviour measured when children are aged 4-5, 6-7, 8-9, and 10-11. Four models are estimated separately by analyzing the influence of four different types of parenting practices on prosocial behaviour. This approach allows, in a second step in research question #5, for a multi-group analysis of the hypothesized moderating effects of child, family, and neighbourhood characteristics on the mediation paths.

Results of the conditional LGM for positive parenting show a good fit (χ^2 *(37)* = 424.945, $p = 0.000$, *RMSEA* = 0.057, *NFI* = 0.928, *TLI* = 0.882 and *CFI* = 0.934) (Table 14 below and Table A1 in Appendix). Mean prosocial behaviour scores and positive parenting scores at age 4-5, 6-7, 8-9, and 10-11 are found significant ($p < 0.001$), and are respectively estimated at 13.125, 14.922, 15.136, and 15.293, and 15.173, 14.070, 13.239, and 12.659 (Table A1). Therefore, both prosocial behaviour and positive parent-child interaction demonstrate systematic change in the model: prosocial behaviour

increases while positive interaction decreases as the child aged. Moreover, all variances in the model are significant at $p < 0.001$.

Table 14. Results for Positive Parenting Conditional LGM

	Estimate	S.E	C.R.	*p* value
Unstandardized Regression Weights				
SES => DEP	-1.320	0.139	-9.525	***
SES => DYS	-0.837	0.126	-6.654	***
DEP => DYS	0.277	0.016	17.299	***
SES => LEVELPOS	0.004	0.063	0.068	0.946
SES => SLOPEPOS	0.026	0.027	0.947	0.344
DYS => LEVELPOS	-0.082	0.009	-9.270	***
DYS => SLOPEPOS	0.014	0.004	3.583	***
DEP => LEVELPOS	-0.015	0.008	-1.986	0.047
DEP => SLOPEPOS	-0.002	0.003	-0.674	0.500
SES => LEVELPSB	-0.216	0.094	-2.294	0.022
SES => SLOPEPSB	0.046	0.046	0.998	0.318
DYS => LEVELPSB	-0.120	0.013	-9.266	***
DYS => SLOPEPSB	0.005	0.007	0.706	0.480
LEVELPOS => SLOPEPSB	0.111	0.018	6.136	***
SLOPEPOS => SLOPEPSB	1.280	0.183	6.984	***
Model Fit Measures				
χ^2 *(37)* = 424.945				
p value = .000				
RMSEA = 0.057				
NFI = 0.928				
TLI = 0.882				
CFI = 0.934				

Note: *** = *p* value < 0.001 and ** = *p* value < 0.005

Results also show some empirical support for hypothesis #4a regarding parental depression and family dysfunction mediating the relationship between family SES and parenting practices. Family SES, when the child is 4-5 is not a significant predictor of positive parenting initial level (SES => LEVELPOS $p = 0.946$) or rate of growth (SES => SLOPEPOS $p = 0.344$). However, no statistical significance is found either in paths

between mother's depression when the child is 4-5 and positive parenting initial level (DEP => LEVELPOS $p = 0.047$) or rate of growth (DEP => SLOPEPOS $p = 0.5$). Nonetheless, the path between mother's depression and family dysfunction is significant at $p < 0.001$; so when depression increases by one unit, family dysfunction increases by 0.227 units. The effects of family dysfunction on positive parenting level when the child was 4-5, and the rate of growth throughout age 10-11, are both statistically significant at $p < 0.001$. As a result, it can conclude that the hypothesized relationship between family SES and positive parenting is fully mediated by family dysfunction. Therefore, when family dysfunction increases by one unit, the level of positive parenting decreases by 0.082 units, and the rate of growth in positive parenting increases by 0.014 units.

In a dual process model, results also support hypothesis #4b that parenting practices mediate the relationship between family SES, family dysfunction, and children's prosocial behaviour. First, results show that family dysfunction mediate the relationship between family SES and prosocial behaviour at the age of 4-5. Family SES does not have significant effect on both prosocial level (SES => LEVELPSB $p = 0.022$) and growth (SES => LEVELPSB $p = 0.318$), while family dysfunction effects are significant at $p < 0.001$ on the initial level of prosociality. On the other hand, the initial level of positive parenting, when the child is 4-5 has a significant effect on the rate of growth in prosocial behaviour (LEVELPOS => SLOPEPSB $p < 0.001$). The rate of growth in positive parenting has also a significant effect on the rate of prosocial growth (SLOPEPOS => SLOPEPSB $p < 0.001$). More importantly, results demonstrate that the effects of family dysfunction on the rate of in prosocial behaviour are fully mediated by positive parenting. So when both the level and rate of growth in positive parenting

increase by one unit, the effects on the rate of growth in prosocial behaviour are 0.111 and 1.280 units respectively.

Results of the conditional LGM for effective parenting are reported in Table 15 below, and Table A2 in Appendix. Overall, the model has a very good fit (χ^2 *(37)* = 266.392, $p = 0.000$, *RMSEA* = 0.044, *NFI* = 0.963, *TLI* = 0.942 and *CFI* = 0.967). As expected, mean prosocial behaviour scores are consistent with previous estimations, while effective parenting scores at age 4-5, 6-7, 8-9, and 10-11 increase slightly and are also significant ($p < 0.001$) with respective scores of 18.103, 18.392, 18.425, and 18.655 (Table A2). Both prosocial behaviour and effectiveness in parenting show systematic positive change over time. All error variances in the model are significant at $p < 0.001$.

In support of hypothesis #4a, the relationship between family SES and effective parenting is fully mediated by mother's depression and family dysfunction. In this model, mother's depression has a significant influence on the level of effectiveness in parenting when the child is age 4-5 (DEP => LEVELEFF $p < 0.001$). So when depression increases by one unit, the level of parenting effectiveness decreases by 0.115 units, and therefore parenting hostility towards the child increases. As in the first model of positive parenting, the path between mother's depression and family dysfunction is significant at $p < 0.001$; and an increase of one unit of depression is associated with an increase of 0.278 units in family dysfunction. Moreover, family SES, when the child is 4-5 is not a significant predictor of effective parenting initial level (SES => LEVELEFF $p = 0.151$) or rate of growth (SES => SLOPEEFF $p = 0.986$). Nonetheless, the influence of family dysfunction on the level of effective parenting, when the child is 4-5, is statistically significant at $p <$

0.001. Therefore, in the model, an increase of one unit in family dysfunction is associated with a decrease in parenting effectiveness level of 0.071 units.

Table 15. Results for Effective Parenting Conditional LGM

	Estimate	S.E	C.R.	*p* value
Unstandardized Regression Weights				
SES => DEP	-1.314	0.139	-9.486	***
SES => DYS	-0.832	0.126	-6.615	***
DEP => DYS	0.278	0.016	17.364	***
SES => LEVELEFF	-0.122	0.085	-1.434	0.151
SES => SLOPEEFF	0.001	0.034	0.018	0.986
DYS => LEVELEFF	-0.071	0.012	-5.870	***
DYS => SLOPEEFF	0.006	0.005	1.328	0.184
DEP => LEVELEFF	-0.115	0.011	-10.682	***
DEP => SLOPEEFF	0.002	0.004	0.631	0.528
SES => LEVELPSB	-0.215	0.095	-2.275	0.023
SES => SLOPEPSB	0.084	0.043	1.928	0.054
DYS => LEVELPSB	-0.120	0.013	-9.275	***
DYS => SLOPEPSB	0.014	0.006	2.211	0.027
LEVELEFF => SLOPEPSB	0.071	0.011	6.578	***
SLOPEEFF => SLOPEPSB	0.874	0.108	8.062	***
Model Fit Measures				
χ^2 *(37)* = 266.392				
p value = .000				
RMSEA = 0.044				
NFI = 0.963				
TLI = 0.942				
CFI = 0.967				

Note: *** = *p* value < 0.001 and ** = *p* value < 0.005

As theorized in hypothesis #4b, the analysis of the time-varying relationship between parenting effectiveness and prosocial behaviour suggest that effectiveness mediate the relationship between family SES, family dysfunction, and children's prosocial behaviour trajectories. As expected, based on the first model results, family SES does not have significant effect on both prosocial level and growth. Both the level

(LEVELEFF => SLOPEPSB $p < 0.001$), and rate of growth (SLOPEEFF => SLOPEPSB $p < 0.001$) in effectiveness, have significant and positive impacts on the rate of growth in children's prosociality. As a result, a one-unit increase in parenting effectiveness, when the child is 4-5, increases prosocial level and growth by 0.071 and 0.874 units respectively. Results demonstrate however, that the growth in parenting effectiveness is not predicted by any of the variables in the model, and therefore may have a unique effect on the growth of prosocial behaviour.

Results of the conditional LGM for consistent parenting show an excellent fit (χ^2 *(37)* = 172.330, $p = 0.000$, *RMSEA* = 0.034, *NFI* = 0.975, *TLI* = 0.964 and *CFI* = 0.980) (Table 16 below and Table A3 in Appendix). Prosocial behaviour and consistent parenting show systematic change in the parallel process model: mean prosocial behaviour scores, and consistent parenting scores at age 4-5, 6-7, 8-9, and 10-11, are significant ($p < 0.001$); and are estimated respectively at 13.127, 14.916, 15.127, and 15.276, and 15.626, 16.113, 16.285, and 16.481 (Table A3). As expected, error variances for all endogenous variables are significant at $p < 0.001$ or $p < 0.005$.

The hypothesis #4a concerning a mediating role for parental depression and family dysfunction in the relationship between family SES and consistent parenting is only partially supported. Family SES, measured when the child is 4-5 years old, has a significant direct effect on both the level (SES => LEVELCONS $p < 0.001$) and the growth (SES => SLOPECONS $p < 0.001$) in consistent parenting. This is in addition to other significant mediating paths related to mother's depression and family dysfunction. An increase of one unit in the level of family SES has a positive effect of 0.921 units, and a negative effect of 0.143 units, on parenting consistency level and growth. However,

mother's depression and family dysfunction at initial status have significant and negative effects on the initial prosocial level. Therefore, an increase of one unit in depression and dysfunction decreases consistency by approximately 0.05 units in both cases.

Table 16. Results for Consistent Parenting Conditional LGM

	Estimate	S.E	C.R.	*p* value
Unstandardized Regression Weights				
SES => DEP	-1.344	0.138	-9.727	***
SES => DYS	-0.841	0.126	-6.695	***
DEP => DYS	0.278	0.016	17.309	***
SES => LEVELCONS	0.921	0.078	11.834	***
SES => SLOPECONS	-0.143	0.030	-4.838	***
DYS => LEVELCONS	-0.059	0.011	-5.372	***
DYS => SLOPECONS	0.000	0.004	-0.078	0.937
DEP => LEVELCONS	-0.052	0.009	-5.565	***
DEP => SLOPECONS	0.000	0.002	-0.168	0.867
SES => LEVELPSB	-0.202	0.095	-2.123	0.034
SES => SLOPEPSB	0.290	0.077	3.779	***
DYS => LEVELPSB	-0.120	0.013	-9.193	***
DYS => SLOPEPSB	0.015	0.008	1.821	0.069
LEVELCONS => SLOPEPSB	0.022	0.012	1.778	0.075
SLOPECONS => SLOPEPSB	1.635	0.355	4.608	***
Model Fit Measures				
χ^2 *(37)* = 172.330				
p value = .000				
RMSEA = 0.034				
NFI = 0.975				
TLI = 0.964				
CFI = 0.980				

Note: *** = *p* value < 0.001 and ** = *p* value < 0.005

As in previous models, results support hypothesis #4b that family dysfunction mediate the relationship between family SES and prosocial behaviour level; and there is no significance in the direct path from family SES to prosocial behaviour (SES => LEVELPSB *p* = 0.034). Family dysfunction does not mediate the relationship between

family SES and prosocial behaviour growth (DYS => SLOPECONS $p = 0.069$). However, family SES has both significant direct (SES => SLOPEPSB $p < 0.001$) and indirect effects on prosocial growth (SES => SLOPECONS $p < 0.001$, SLOPECONS => SLOPEPSB $p < 0.001$). An increase in family SES level is associated respectively with increased level of consistency and decreased growth in consistency; while an increase in family SES is associated with higher prosocial growth. The growth in parenting consistency is associated with higher growth in prosocial behaviour; and when the rate of growth in parenting consistency increased by one unit, the rate of growth in prosocial behaviour increased by 1.635 units.

Results of the conditional LGM for rational parenting are reported in Table 17 below, and Table A4 in Appendix. The model has a good fit overall (χ^2 *(37)* = 464.762, $p = 0.000$, *RMSEA* = 0.06, *NFI* = 0.907, *TLI* = 0.845 and *CFI* = 0.913). As expected, mean prosocial behaviour scores are significant and consistent with previous estimations. Rational parenting scores at age 4-5, 6-7, 8-9, and 10-11 show a systematic increase over time, with respective values of 15.848, 16.025, 19.240, and 19.244, and are significant at $p < 0.001$ (Table 21). Consistent with previous model estimations, all error variances are also significant at $p < 0.001$ or $p < 0.005$.

Results show the relationship between family SES and rational parenting is fully mediated by mother's depression and family dysfunction, in support of hypothesis #4a. Family SES has no significant direct effect on either the level of rational parenting (SES => LEVELRAT $p = 0.025$) or growth (SES => LEVELRAT $p = 0.612$). Family dysfunction level, when the child was 4-5 years old, is significantly associated with a decrease in the level of rationality (DYS => LEVELRAT $p < 0.001$), and an increase in

the rate of growth of rationality (DYS => SLOPERAT $p < 0.001$). An increase of one unit in family dysfunction is associated with a decrease in parenting rationality level of 0.056 units, and an increase in growth of 0.01. Mother's depression, also has significant effects on both rational parenting level (DEP => LEVELRAT $p < 0.001$) and growth (DEP => SLOPERAT $p < 0.001$). Therefore, an increase in mother's depression level by one unit is associated with a decrease of 0.043 units, and an increase of 0.014 units respectively in the level and growth of rationality. Nonetheless, as in the other models, the path between mother's depression and family dysfunction is significant at $p < 0.001$.

The analysis of the parallel relationship between parenting rationality and prosocial behaviour suggest that rational parenting does not fully mediate the relationship between family dysfunction and children's prosocial behaviour trajectories, as it is theorized in hypothesis #4b. As expected, family SES does not have significant direct effects on either prosocial behaviour level (SES => LEVELPSB $p = 0.028$) and growth (SES => SLOPEPSB $p = 0.288$). However, results show family dysfunction fully mediates the relationship between family SES and prosocial growth. Family dysfunction has both direct effects (DYS => SLOPEPSB $p < 0.001$), and indirect effects (DYS => LEVELRAT $p < 0.001$, LEVELRAT => SLOPERAT $p < 0.001$), on prosocial growth. An increase of one unit in family dysfunction is associated with a 0.12 unit decrease in prosocial level, as well as a 0.025 unit decrease in prosocial growth. An increase of one unit in rational parenting, when the child was 4-5, is associated with an increase of 0.12 units in prosocial growth over time.

Table 17. Results for Rational Parenting Conditional LGM

	Estimate	S.E	C.R.	*p* value
Unstandardized Regression Weights				
SES => DEP	-1.314	0.139	-9.483	***
SES => DYS	-0.833	0.126	-6.621	***
DEP => DYS	0.279	0.016	17.388	***
SES => LEVELRAT	0.100	0.044	2.242	0.025
SES => SLOPERAT	0.010	0.019	0.507	0.612
DYS => LEVELRAT	-0.056	0.006	-8.789	***
DYS => SLOPERAT	0.010	0.003	3.688	***
DEP => LEVELRAT	-0.043	0.006	-7.301	***
DEP => SLOPERAT	0.014	0.003	5.407	***
SES => LEVELPSB	-0.208	0.095	-2.197	0.028
SES => SLOPEPSB	0.041	0.039	1.063	0.288
DYS => LEVELPSB	-0.120	0.013	-9.229	***
DYS => SLOPEPSB	0.025	0.007	3.587	***
LEVELRAT => SLOPEPSB	0.273	0.029	9.380	***
SLOPERAT => SLOPEPSB	0.450	0.317	1.420	0.155
Model Fit Measures				
χ^2 *(37)* = 464.762				
p value = .000				
RMSEA = 0.06				
NFI = 0.907				
TLI = 0.845				
CFI = 0.913				

Note: *** = *p* value < 0.001 and ** = *p* value < 0.005

Results of standardized effect sizes for all parenting models, measuring the strength of the relationships between various determinants of prosocial behaviour, are reported in Table 18, Table 19 and Table 20. These standardized effect sizes complement the analysis of inferential statistics performed above by estimating influence magnitude of the family stress model on prosocial development outcomes in children. Using standardized effect sizes, combining direct and indirect (mediated) effects, ensures that results are comparable across variables based on different rating scales. Therefore,

standardized total effects represent the average overall amount of change in the dependent variable for a one unit (standard deviation) change in the predictor variable.

Overall, study findings demonstrate the important direct influence of all parenting practices on the growth of prosocial behavior in children. Results show an increase of one standard deviation in the initial level of positive and effective parenting when the child is 4-5 years old, induces a positive change in prosocial growth of approximately 0.37 standard deviations (Table 18). The direct effect of the level of rationality in parenting when the child is 4-5 years old has the strongest effect on prosocial growth of all parenting practices. Results also show effect sizes on prosocial growth in relation to growth in parenting practices are greater for positivity, effectiveness and consistency. This suggests that, when positive, effective and consistent parenting practices change by one standard deviation over the analyzed period, the average change in children's prosocial behaviour is also about one standard deviation.

Table 18. Direct Effects of Parenting Practices on Prosocial Behaviour*

	Positivity	Effectiveness	Consistency	Rationality
LEVELPAR => SLOPEPSB	0.379	0.367	0.117	0.618
SLOPEPAR => SLOPEPSB	0.933	0.924	1.047	0.099

Note: *All effects are standardized

Direct, indirect and total effects of family SES, family dysfunction and parental depression on parenting practices are reported below in Table 19. In accordance with the previous analysis of causal pathways, results show the direct effects of family SES on all parenting practices but consistent parenting is somewhat negligible. For instance, a change of one standard deviation in family SES induces on average a direct effect of only 0.05 standard deviations on positive, effective and rational parenting practices.

Table 19. Direct, Indirect, and Total Effects on Parenting Practices*

	Direct	Indirect	Total
Positivity			
SES => LEVELPOS	0.002	0.051	0.053
SES => SLOPEPOS	0.051	-0.028	0.023
DYS => LEVELPOS	-0.252	0	-0.252
DYS => SLOPEPOS	0.196	0	0.196
DEP => LEVELPOS	-0.050	-0.075	-0.125
DEP => SLOPEPOS	-0.029	0.058	0.030
Effectiveness			
SES => LEVELEFF	-0.034	0.066	0.032
SES => SLOPEEFF	0.001	-0.015	-0.014
DYS => LEVELEFF	-0.143	0	-0.143
DYS => SLOPEEFF	0.063	0	0.063
DEP => LEVELEFF	-0.249	-0.042	-0.291
DEP => SLOPEEFF	0.025	0.019	0.044
Consistency			
SES => LEVELCONS	0.279	0.043	0.322
SES => SLOPECONS	-0.356	0.002	-0.354
DYS => LEVELCONS	-0.129	0	-0.129
DYS => SLOPECONS	-0.006	0	-0.006
DEP => LEVELCONS	-0.120	-0.038	-0.159
DEP => SLOPECONS	-0.007	-0.002	-0.009
Rationality			
SES => LEVELRAT	0.067	0.083	0.150
SES => SLOPERAT	0.067	-0.209	-0.142
DYS => LEVELRAT	-0.268	0	-0.268
DYS => SLOPERAT	0.501	0	0.501
DEP => LEVELRAT	-0.223	-0.080	-0.303
DEP => SLOPERAT	0.734	0.149	0.883

Note: *All effects are standardized

These results emphasize the magnitude of the indirect (mediated) effects related to parental depression and family dysfunction in their influence on parenting practices. Results show family dysfunction has the greatest effect on positive parenting: when family dysfunction changes by one standard deviation, positivity decreases by 0.252 standard deviations on average. Similar results are seen with the effects of family

dysfunction on rational parenting, and to smaller extent on effective and consistent parenting practices. In addition, the magnitude of parental depression effects on all initial levels of parenting practices is important, and more specifically in terms of effectiveness and rationality. Thus, when parental depression changes by one standard deviation, effective and rational parenting decrease by about 0.3 standard deviations on average.

Study results on total effects of the family stress model on prosocial behaviour are reported below in Table 20. These results emphasize how parenting practices, which on average have positive effects on prosocial behaviour, are influenced negatively by family SES, family dysfunction and parental depression. Total effects of family SES on prosocial behaviour, which includes direct as well as indirect (mediated) effects, are greater on children's growth in prosocial behaviour than their initial level at age 4-5. When family SES changes by one standard deviation, prosocial behaviour growth changes by only 0.1 standard deviations. However, family dysfunction has the strongest total effects on the level of prosocial behaviour: when family dysfunction changes by one standard deviation when the child is 4-5 years old, prosocial behaviour changes negatively by approximately 0.24 standard deviations on average.

Table 20. Total Effects on Prosocial Behaviour by Parenting Practices*

	Positivity	Effectiveness	Consistency	Rationality
SES => LEVELPSB	-0.020	-0.020	-0.015	-0.018
SES => SLOPEPSB	0.101	0.097	0.102	0.096
DYS => LEVELPSB	-0.242	-0.240	-0.235	-0.240
DYS => SLOPEPSB	0.139	0.148	0.147	0.155
DEP => LEVELPSB	-0.072	-0.071	-0.070	-0.072
DEP => SLOPEPSB	-0.004	-0.024	0.022	-0.019

Note: *All effects are standardized

Overall, these results suggest that the magnitude of the direct effects of parenting practices on prosocial behaviour, which are non-negligible and positive, are to a large extent negatively affected by the variables defined in the family stress model. Family SES, family dysfunction and parental depression all have some sizeable detrimental effects on the level and growth in parenting practices, which would otherwise impact prosocial development positively. These results also support various tested hypotheses in this chapter about the significance of mediated causal relationships between the family stress model and prosocial development. Most of the total effects of family SES on prosocial development in children are caused by the indirect (mediated) effects of family dysfunction, parental depression and parenting practices. Consequently, the relevance of the family stress model in influencing the development of prosocial behaviour in children is confirmed both in the statistical significance and the magnitude of opposing effects.

Research Question #5

Research question #5 which is stated as: How do child, family, and neighbourhood characteristics contribute to moderate the relationship between family SES, parental depression, family dysfunction, parenting practices (positivity, effectiveness, consistency, and rationality), and children's prosocial behaviour? The significance of potential moderating effects (moderated mediation and mediated moderation) of selected characteristics such as child's gender, family structure, social support, neighbourhood cohesion, and place of residence, on identified mediating paths is tested using critical ratio differences (CRD) in a multi-group setting. First, critical ratios are obtained by dividing model estimates by their respective standard errors. Critical

ratios are then applied to a usual student *t* test to produce CRDs by dividing the differences between two group coefficients by the standard error of those two estimates.

This straightforward statistical procedure is applied to the analysis of categorical moderators in a conditional LGM using AMOS 18. In this case, the null hypothesis refers to the equality of pairwise coefficients across groups. A CRD above a value of 1.96 increases the likelihood that the difference between two regression weights, along the same structural path, but in two different groups, is due to more than just random variation (Arbuckle 2009). Alternatively, if a CRD for two coefficients is below 1.96 at a level of significance of 0.05, the null hypothesis that the two regression weights are not different in the sample cannot be rejected. If the null hypothesis is not rejected, no significant differences are present along a mediating path across two groups, and then moderation cannot be supported empirically. As a result, this suggests the hypothesized mediational model is in fact not different across moderator levels.

Results of CRD two-tailed tests for all parenting practices by gender are reported below in Table 18. For simplicity, only those significant CRDs associated with both significant coefficients along a path are analyzed. In the positive parenting model, the mediational path from family dysfunction to prosocial behaviour to the rate of growth in positive parent-child interaction is not significant for female, while in the male model the path from family SES to the rate of growth in prosocial behaviour was significant (Table A5 in Appendix). Consequently, results show evidence of moderated mediation by gender at a significance level of $p < 0.10$ between the initial level of positive parenting and rate of growth in prosocial behaviour. Both models for effective parenting by gender show similar results (Table A6 in Appendix). However, results show the path between

family SES and the initial prosocial level at age 4-5 is also significant for males. Results also show evidence of moderation at a significance level of $p < 0.10$ based on gender, for the direct path between mother's depression level and the level of effective parenting (Table 21). Most importantly, the relationship between family dysfunction and the rate of growth in prosocial behaviour, as mediated by parenting effectiveness, show moderated mediation by gender at a significance level of $p < 0.05$.

Table 21. Critical Ratios Differences for Parenting Practices by Gender

	Positivity	Effectiveness	Consistency	Rationality
SES => DEP	0.362	0.381	0.309	0.449
SES => DYS	-1.138	-1.142	-1.074	-1.110
DEP => DYS	-0.468	-0.193	-0.471	-1.170
SES => LEVELPAR	***2.124	1.683	0.125	1.697
SES => SLOPEPAR	-1.352	***-2.161	0.348	-0.970
DYS => LEVELPAR	1.570	-1.209	0.157	0.933
DYS => SLOPEPAR	**-1.668	1.404	-0.562	0.078
DEP => LEVELPAR	-0.681	**1.742	-0.042	-0.202
DEP => SLOPEPAR	-0.797	-1.602	-0.798	0.167
SES => LEVELPSB	***2.848	***2.837	***2.711	***2.848
SES => SLOPEPSB	-0.438	0.022	-1.788	-1.486
DYS => LEVELPSB	0.798	0.703	0.705	0.708
DYS => SLOPEPSB	**1.891	-0.890	0.756	0.216
LEVELPAR => SLOPEPSB	**1.883	***-2.188	1.263	-1.219
SLOPEPAR => SLOPEPSB	-1.323	-0.472	-1.036	-0.422

Note: *** = p value < 0.05 and ** = p value < 0.10 where pairwise coefficients apply; shaded area indicates significant paths in the original conditional LGM

Estimation results for male and female in the consistent parenting models are dissimilar, as the effect of family SES on rates of growth in both consistent parenting and prosocial behaviour are not significant (Table A7 in Appendix). The impact of the rate of growth in parenting consistency on the rate of growth in prosocial behaviour is also not significant in the female model. Therefore, no moderation effects are found in this model

between significant pairwise coefficients across male and female groups (Table 21). Both rational parenting models for boys and girls are similar, apart from the significance of a direct path between family SES and prosocial level in the boys model (Table A8 in Appendix). Nonetheless, no moderation effects by gender are found in the rational parenting model (Table 21). Overall, the hypothesis #5a concerning a moderating influence by gender is supported only for positive and effective parenting models; and both models show significant moderation on the relationship between family dysfunction and growth in prosocial behaviour as mediated by parenting practices.

A similar CRD analysis of potential moderating effects is performed for family structure (Table 22). Results for the positive parenting model show that the mediating paths are slightly different depending on family structure; and the relationships between family SES, and mother's depression and family dysfunction, are not significant for single-parents (Table A9 in Appendix). The relationship between the initial level of positive parenting and the rate of growth in prosocial behaviour also becomes not significant when the child live with only one parent at the age of 4-5. Nevertheless, when the mediating path from mother's depression to positive parent-child interaction is taken into account, results show a mediated moderation effect of family structure through family dysfunction at a significance level of $p < 0.05$ (Table 22). In simple terms, this means that single parenthood, as a moderating effect, is very likely transmitted through family dysfunction in its impacts on positive parenting.

The model for effective parenting displays almost exactly the same results for both one-parent versus two-parent families (Table A10 in Appendix). The path between the rate of growth in parenting effectiveness and the rate of growth in prosocial behaviour

is not significant in the one-parent model. However, results show family structure has significant moderating effects on the relationship between family dysfunction initial level, and the rate of growth in prosocial behaviour, when it is mediated by parenting effectiveness (Table 22). First, there is a significant mediating moderation effect on prosocial behaviour growth through parenting effectiveness at a level of p value < 0.05. Second, family structure has a moderated mediation effect in the path from effectiveness to prosocial growth. Results demonstrate that, in the effective parenting model, family structure completely moderate the mediated relationship between family dysfunction and prosocial behaviour development. On the other hand, the consistent parenting models results show differences in the coefficients significance between single and two parents' models (Table A11 in Appendix).

Table 22. Critical Ratios Differences for Parenting Practices by Family Structure

	Positivity	Effectiveness	Consistency	Rationality
SES => DEP	**-1.711	-1.642	-1.458	**-1.725
SES => DYS	-0.935	-0.859	-0.801	-0.919
DEP => DYS	***2.797	***2.490	***2.754	***2.101
SES => LEVELPAR	-1.081	-0.610	-0.543	-0.065
SES => SLOPEPAR	0.627	0.090	-0.480	0.682
DYS => LEVELPAR	1.625	***2.922	1.042	***2.729
DYS => SLOPEPAR	-1.451	-1.362	0.065	**-1.925
DEP => LEVELPAR	0.183	-1.362	1.604	-0.967
DEP => SLOPEPAR	0.379	-1.086	***-2.033	0.801
SES => LEVELPSB	-0.089	0.119	-0.165	-0.094
SES => SLOPEPSB	-1.183	-0.832	1.206	-1.030
DYS => LEVELPSB	0.200	0.269	0.183	0.226
DYS => SLOPEPSB	0.772	-0.230	-0.293	0.167
LEVELPAR => SLOPEPSB	**1.897	***-2.166	***-2.032	-0.777
SLOPEPAR => SLOPEPSB	1.597	***2.797	***2.244	***2.753

Note: *** = p value < 0.05 and ** = p value < 0.10 where pairwise coefficients apply; shaded indicates significant paths in the original conditional LGM

In the single parent model, the relationships between family SES and mother's depression, as well as family dysfunction and the level of consistency in parenting, show a lack of statistical significance. The significance of a moderated mediation effect on depression in all models suggests that the impact of depression on family dysfunction is greater in a two-parent family. Moreover, the path between the rate of growth in parenting consistency, and the rate of growth in prosocial behaviour is not significant. As a result, the only moderating effect of family structure in the consistent parenting model is related to the direct path between mother's depression and family dysfunction, which is significant at a level of p value < 0.05.

The rational parenting model show low significance when estimated for one parent (Table A12 in Appendix). Nonetheless, results show a mediated moderation effect of family structure through rational parenting at a significance level of $p < 0.05$. As a result, single parenthood, as moderating effect of the mediated relationship between family dysfunction and prosocial growth, is likely translated through rational parenting. Overall, results support hypothesis #5b of a moderating effect related to family structure. In addition, family structure has a mediated moderation effect that may be transmitted through family dysfunction in the positive parenting model; and through effective and rational parenting in their respective models.

Results on potential moderating effects related to social support are reported in Table 23. Results are similar for lower versus higher social support in the positive parenting models, although the paths between family dysfunction and prosocial levels, as well as the path between positivity and prosocial growth, are not significant in the lower social support model (Table A13 in Appendix). The relationship between family

dysfunction level and the rate of growth in prosocial behaviour, as it is mediated by the level of positive parent-child interaction, is moderated by social support at a significance level of *p* value < 0.05 (Table 23). The mediated impact of family SES on family dysfunction parental depression is also moderated by social support not only in the positive parenting model but in all models: higher perceptions of social support have mitigating effects on the negative influence of depression on family dysfunction.

In the effective parenting models, the relationship between family dysfunction and prosocial behavior, and effective parenting level, are not significant for lower social support (Table A14 in Appendix). Results show that social support has a moderating effect, at a significance level of *p* value < 0.05, on the direct path between the rate of growth in effective parenting and the rate of growth in prosocial behaviour.

Table 23. Critical Ratios Differences for Parenting Practices by Social Support

	Positivity	Effectiveness	Consistency	Rationality
SES => DEP	1.283	1.266	1.401	1.272
SES => DYS	0.202	0.218	0.215	0.239
DEP => DYS	***3.380	***3.013	***3.369	***3.616
SES => LEVELPAR	1.359	**1.736	-0.096	**1.753
SES => SLOPEPAR	-1.225	-0.192	0.438	***-2.074
DYS => LEVELPAR	0.812	-1.181	-0.900	-0.631
DYS => SLOPEPAR	-1.219	-0.332	0.234	-0.317
DEP => LEVELPAR	-1.086	0.128	0.892	1.234
DEP => SLOPEPAR	-0.018	-1.174	**-1.729	-0.121
SES => LEVELPSB	1.280	1.205	1.157	1.210
SES => SLOPEPSB	-0.776	-1.567	-0.091	-1.543
DYS => LEVELPSB	-0.120	-0.090	-0.112	-0.139
DYS => SLOPEPSB	0.203	0.283	-0.145	0.404
LEVELPAR => SLOPEPSB	***-2.349	0.274	-1.362	-0.072
SLOPEPAR => SLOPEPSB	-0.142	***3.382	1.611	***3.349

Note: *** = *p* value < 0.05 and ** = *p* value < 0.10; shaded indicates significant paths in the original conditional LGM

Many paths are not significant for lower social support in the consistent parenting model, notably the relationships between family SES, family dysfunction, and the level of consistent parenting (Table A15 in Appendix). Consequently, the only significant moderating effect of social support (p value < 0.05) in the consistent parenting model is for the relationship between family SES and family dysfunction, as it is mediated by mother's depression (Table 23).

In the rational parenting model, the paths between family dysfunction, mother's depression, and the level of rationality are not significant, while the direct path between family SES and the level of rational parenting becomes significant (Table A16 in Appendix). Therefore, in the lower social support model, the significant causal path goes from family SES to mother's depression, then to family dysfunction, and to prosocial growth. In the higher social support model, the relationship between family SES and the rate of growth in prosocial behaviour is fully mediated by the level of rational parenting. However, no significant moderating effects from social support are found in the rational parenting model. Overall, results support hypothesis #5c of a moderating effect of perceptions of social support, on the mediated relationship between family SES and family dysfunction in all parenting models. Results also show a significant moderating effect on the relationship between family dysfunction and prosocial growth, as it is mediated by positive parenting.

Results for all parenting models are fairly consistent across the lower and higher social cohesion moderator (Table A17 in Appendix, Table A18 in Appendix, Table A19 in Appendix, and Table A20 in Appendix). All parenting models display a lack of significance of regression weights related to family SES and family dysfunction in the

higher social cohesion model. Therefore, the relationship between family SES and family dysfunction is fully mediated by mother's depression in the higher cohesion models.

Estimation results are similar for lower versus higher social cohesion in the positive parenting model. However, the path between the level of positive parenting and the growth of prosocial behaviour in the higher social cohesion model show a lack of significance (Table A17 in Appendix). Nonetheless, in all parenting models, social cohesion is found to have a mediated moderation effects through mother's depression in the mediated relationship between family SES and family dysfunction at a significance level of $p < 0.05$ (Table 24). The effect of family SES on effective parenting is fully mediated by mother's depression in the lower social cohesion model (Table A18 in Appendix). Therefore, social cohesion show a moderated mediation effect on the relationship between family SES and effective parenting at a significance level of $p < 0.10$ (Table 24).

Results for the consistent parenting model are fairly similar for both lower and higher neighbourhood cohesion, although the effect of family dysfunction and mother's depression on the level of consistent parenting are not significant (Table A19 in Appendix). Family SES has no significant effect on the rate of growth in parenting consistency for higher cohesion neighbourhood.

Results are also similar for rational parenting across lower and higher social cohesion, to the exception of the lack of significance of the path between family dysfunction and the rate of growth in rational parenting (Table A20 in Appendix). The path between family dysfunction and the rate of growth prosocial behaviour is also not significant for both lower and higher social cohesion models. However, social cohesion

has a mediated moderation effect, at a significance level of $p < 0.05$, on the mediated relationship between family dysfunction and the rate of prosocial growth (Table 24). Therefore, hypothesis #5c is supported for all parenting models, with an emphasis on mediated moderation processes related to family SES.

Table 24. Critical Ratios Differences for Parenting Practices by Neighbourhood Cohesion

	Positivity	Effectiveness	Consistency	Rationality
SES => DEP	***2.082	***2.092	***2.177	***2.075
SES => DYS	**1.882	**1.885	**1.902	**1.896
DEP => DYS	0.342	0.724	0.371	0.180
SES => LEVELPAR	0.938	0.362	0.089	**1.947
SES => SLOPEPAR	0.435	0.354	0.820	-0.916
DYS => LEVELPAR	-1.005	-0.612	***-2.553	***-2.575
DYS => SLOPEPAR	0.479	-0.389	1.195	1.601
DEP => LEVELPAR	0.166	**-1.829	-0.001	-0.088
DEP => SLOPEPAR	0.223	1.629	0.876	1.169
SES => LEVELPSB	0.530	0.478	0.422	0.481
SES => SLOPEPSB	-0.795	-0.517	-0.344	-0.663
DYS => LEVELPSB	0.878	0.817	0.830	0.836
DYS => SLOPEPSB	-1.061	-0.642	-1.474	-0.537
LEVELPAR => SLOPEPSB	-1.414	-0.584	-0.084	-0.895
SLOPEPAR=> SLOPEPSB	-0.400	0.357	0.478	0.324

Note: *** = p value < 0.05 and ** = p value < 0.10; shaded indicates significant paths in the original conditional LGM

The potential moderating effects related to the place of residence are reported in Table 25. Results show the relationship between family SES and family dysfunction is not significant for children living in rural areas for all parenting models (Table A21 in Appendix, Table A22 in Appendix, Table A23 in Appendix, and Table A24 in Appendix). Results also show the path between family dysfunction and the rate of growth in positive parenting are not significant when both rural and urban models are estimated

simultaneously (Table A21 in Appendix). The relationship between levels of positive interaction, when the child is aged 4-5, and the rate of growth in prosocial behaviour is also not significant in the rural model. Therefore, no moderating effects are found for place of residence in the positive parenting model (Table 25).

Results for both rural and urban models are very similar when effective parenting is considered; and the main difference is the lack of significance in the relationship between family dysfunction and the level of effective parenting (Table A22 in Appendix). Consequently, in that model, mother's depression fully mediates the relationship between family SES and effective parenting level. As a result, the place of residence has a moderating effect, at a significance level of $p < 0.05$, on the path between mother's depression and the level of effective parenting (Table 25).

Table 25. Critical Ratios Differences for Parenting Practices by Place of Residence

	Positivity	Effectiveness	Consistency	Rationality
SES => DEP	-0.184	-0.156	-0.159	-0.174
SES => DYS	-0.734	-0.721	-0.761	-0.728
DEP => DYS	0.442	-0.001	0.424	-0.093
SES => LEVELPAR	0.653	0.917	-0.922	0.792
SES => SLOPEPAR	-0.247	-0.062	-0.277	-1.295
DYS => LEVELPAR	0.217	-1.173	0.857	0.336
DYS => SLOPEPAR	-1.048	0.214	1.017	-0.009
DEP => LEVELPAR	-1.204	-0.286	***-2.200	***-2.881
DEP => SLOPEPAR	1.062	0.526	1.089	***2.816
SES => LEVELPSB	-1.301	-1.272	-1.288	-1.297
SES => SLOPEPSB	-0.339	-0.755	-0.597	0.090
DYS => LEVELPSB	0.804	0.863	0.830	0.858
DYS => SLOPEPSB	0.649	-0.700	-1.165	0.087
LEVELPAR => SLOPEPSB	1.021	-0.550	1.496	-1.232
SLOPEPAR => SLOPEPSB	-0.594	0.435	-0.375	0.449

Note: *** = p value < 0.05 and ** = p value < 0.10; shaded indicates significant paths in the original conditional LGM

Rural and urban models, applied to consistent parenting, diverge in results (Table A23 in Appendix W). Both relationships between mother's depression, family dysfunction, and the level of consistency, are not significant in the rural model. Family SES is also not significant in its effect on the rate of growth in consistent parenting for children living in rural areas. Therefore, no moderating effects are found in the consistent parenting model (Table 25).

Results are very similar for rational parenting across place of residence, to the exception of the lack of significant relationship between mother's depression and the level and rate of growth of rational parenting in rural areas (Table A24 in Appendix). Place of residence has no moderating effects whatsoever in the rational parenting model (Table 25). Consequently, overall results do not support the hypothesis of a moderating effect by place of residence, as the only moderated structural path is the relationship between family SES and effective parenting level mediated by mother's depression.

Chapter V: Discussions

Discussions of the main research findings are presented in this chapter. The first section provides a brief discussion of study results significance and an overview of the main conclusions in light of the literature review. The second section provides a brief discussion of policy and program implications related to this study's research findings. The third and fourth sections emphasize the study's limitations, and provide recommendations for future research. The purpose of this study was to analyze the effects of family SES, parental depression, family functioning, and parenting practices on Canadian children's prosocial behaviour developmental trajectories; and to analyze the relative influences of family and neighbourhood characteristics on those trajectories. More specifically, the objectives were to analyze individual and group differences in children's prosocial behaviour trajectories; to assess the relevance of the family stress model in the relationship between family SES and children's prosocial behaviour trajectories; and finally to assess the influence of child, family, and neighbourhood characteristics.

Overview of Research Findings

The study findings show significant differences in prosocial behaviour trajectories between children, as well as across demographic and trajectory clusters. Findings suggest that the family stress model, applied to four parenting practices, is a significant mediator of the relationship between family SES and children's prosocial trajectories. As a result, findings show that family SES, apart from a direct influence on the level of consistency in parenting, has only indirect effects on either parenting practices or prosocial behaviour

in children. This study also emphasizes the relevance of analyzing parenting practices separately in four domains, as they are impacted differently by the core structural paths related to the family stress model. Those structural paths, which include mediating determinants such as family dysfunction and parental depression, influence at various degree the level, and in some case the growth, of parenting positivity, consistency, effectiveness, and rationality. Moreover, the methodological approach based on representing the relationship between parenting practices and prosocial behaviour as a systematic dual process in the model is sound and promising.

However, findings show the structural paths related to the family stress model to be moderated by child's gender and parents' perceptions of neighbourhood support and cohesion. Thus, these findings suggest the way parents perceive social support network in their neighbourhood, as well as the manner they assess the overall collective efficacy of their neighbourhood, has a significant moderating influence on family processes that are more proximal to the development of their child's prosocial behaviour. These findings have broad implications for policies and programs in Canada; not simply those pertaining specifically to child development, but also those initiatives that support families as a human development unit within the community.

Magnitude and Significance of Research Findings

Overall, the relevance of the family stress model in influencing the development of prosocial behaviour in children is confirmed both in its statistical significance as well as in the magnitude of the opposing standardized effects between prosocial determinants. In accordance with the analysis of causal pathways, findings also suggest the direct

effects of family SES on all parenting practices, but consistent parenting, are rather negligible in magnitude. Accordingly, findings suggest the magnitude of the indirect (mediated) effects related to parental depression and family dysfunction are more prominent in their influence on parenting practices than that of family SES.

Study findings demonstrate the direct effect sizes of all parenting practices on children's prosocial growth; the level of rationality in parenting having one of the strongest effects on prosocial growth. Nevertheless, study findings also suggest that the magnitude of the direct effects of parenting practices on prosocial behaviour, which are non-negligible and positive, are to a great extent negatively affected by the variables defined in the family stress model. Therefore, study findings demonstrate that family SES, family dysfunction and parental depression all have some sizeable detrimental effects on the level and growth in parenting practices, which would otherwise impact prosocial development rather positively.

Differences in Prosocial Behaviour Trajectories

The first research objective was to identify and assess individual and group differences in children's prosocial behaviour trajectories between the age of 4-5 and 10-11. Overall, this study's findings suggest children's prosocial behaviour follows an increasing linear trend over the analyzed period. Results also suggest there is significant inter-individual variability across children both in terms of the initial level and the rate of growth in prosocial behaviour. Those findings are consistent with other studies by Eisenberg et al. (1997), Fabes et al. (1999), and Eisenberg et al. (2006), who point to significant individual differences in children's prosocial behaviour trajectories. The

results suggest a broad range of prosocial trajectories in Canadian children, not only in terms of their actual levels of prosociality achieved at age 4-5, but more importantly in terms of the uniqueness of their developmental path through age 10-11. Nonetheless, it is observed that children, who display higher prosocial levels when they are 4-5 years old, increase their prosociality at a lower rate, than those who are lower at the same age. This is consistent with other empirical studies by Parilla et al. (2002), Letourneau et al. (2006), and Moraes (2009), who conclude that prosocial development in school-age children is best described by an increasing linear growth pattern; and where the level of prosociality attained in the early years influences the rate to which prososial behaviour develops in subsequent years. Although the non-linear specifications that were tested were not significant, model results nonetheless suggest a slight curvilinear prosocial trajectory.

Findings support the hypothesis that boys' and girls' prosocial behaviour trajectories are significantly different, in terms of the level attained at the end of the preschool years. Results show that girls display, on average, higher prosocial levels than boys when the child is 4-5 years old; an advantage that is maintained throughout the school years. For that reason, this study shows the rate of growth in prosocial behaviour does not differ much on a gender basis. Boys exhibit more individual heterogeneity in both their prosocial level attained at the age of 4-5, and their growth over time, than their female counterparts. These findings support previous studies in the literature, for instance Parilla et al. (2002), Romano et al. (2005), Letourneau et al. (2006), and Moraes (2009), who found there is a gender gap in prosocial behaviour that is present at very young age.

More interestingly, the findings on gender differences are also emphasized by the latent class analysis performed in this study. Four distinct children's prosocial trajectories

were identified: first, a low prosocial trajectory; second, a high prosocial trajectory; third, a medium increasing and decreasing trajectory; and finally, a high increase prosocial trajectory. Overall, results show boys are over-represented in lower prosocial trajectory clusters, as well as under-represented in higher prosocial trajectory clusters. These results are similar to other empirical studies by Cote et al. (2002) and Kokko et al. (2006), who found, using other datasets, distinct low prosocial trajectories for boys. Thus, in this study, girls are also overwhelmingly represented in higher level and higher growth prosocial clusters. Nonetheless, this study reveals a different number of prosocial trajectories, and those trajectories reflect different patterns of growth.

Findings do not support the hypothesis that children's prosocial trajectories differ according to their family structure. Results show no significant differences in rate of growth across children of single parents who still live with one parent at age 10-11; or children who live with two parents at age 4-5, and live with only one parent at age 10-11. However, results support previous studies by Letourneau et al. (2006), who found the effect of family structure is consistent with the estimated prosocial growth curve. In this case, children with higher initial status at age 4-5 experience lower subsequent growth. In this study's sample, prosocial behaviour is higher initially for those children who live with one parent, although their subsequent increase in prosocial behaviour is lower. In addition, findings do not support the hypothesis of higher membership to lower prosocial clusters for children who live with single parents, as the proportion of children in the four clusters are similarly distributed for both one and two-parent families.

One domain where children's prosocial trajectories have unique properties is in the level of neighbourhood social support and cohesion. Findings show significant

differences between the prosocial trajectories of children whose parents have more positive perceptions of social support in their neighbourhood, than those whose parents rate the level of social support lower. In this case, social support perceptions increase both the prosocial level at the age of 4-5, as well as the rate to which prosocial behaviour increases throughout the school years. Similarly, positive parents' perceptions of neighbourhood cohesion when the child is 4-5 years old are also associated with a higher initial level of prosocial behaviour. However, results suggest there are no differences in prosocial trajectories whether the child lives in a rural versus an urban neighbourhood. These findings suggest that neighbourhood social interactions, or more precisely the individual perceptions of the quality and quantity of social processes within the neighbourhood, exert some influences on the development of prosociality in children above and beyond the effects of neighbourhood physical characteristics and remoteness.

Family Environment and Prosocial Behaviour

The influence of the immediate family environment on prosocial development, captured by proximal variables such as family dysfunction, parental depression, and parenting practices, was tested empirically in this study. More specifically, the second research objective was to assess the mediating role of the family stress model on the relationship between family SES and children's prosocial behaviour development. The basic research hypothesis, as laid out in the literature review, concerns how lower family SES may increase the likelihood of exposure to negative life stressors, which, in turn, may negatively influence family functioning or affect patents' psychological health and,

as a result, decreasing parental capacity to meaningfully interact and socialize with their children.

Overall, this study's findings support the research hypothesis that family determinants have substantial influence, above and beyond that of family SES. Findings show that the effect of family SES on the level of prosocial behaviour is fully mediated by family dysfunction. This result supports to some extent few empirical studies, for instance Tremblay et al. (2001) and Romano et al. (2005), who show that better family functioning is associated with higher scores in children's prosocial behaviour. However, this study not only shows an inverse association between family dysfunction and prosocial behaviour, but a full mediating effect associated with family dysfunction in the relationship between family SES and prosocial behaviour which also holds for the four separate parenting practices models.

In addition, findings show the hypothesized relationship between family SES and parenting practices is fully mediated by family dysfunction and maternal depression in positive, effective, and rational parenting models. In those models, the level of family SES attained when the child is 4-5, is not a direct predictor of either the level of parenting when the child is 4-5, or the change in parenting practices throughout the school years.

However, the mediating role of parental depression and family dysfunction, in the relationship between family SES and consistent parenting is not fully supported. Thus, in the consistent parenting model, family SES retains a significant and direct influence on both the level and growth in consistency. Findings show families who display higher levels of SES, have higher levels of, as well as lower growth in, parenting consistency. Moreover, family SES also has a direct effect on the growth in children's prosocial

behaviour, and therefore the relationship is not mediated by family dysfunction. In all instances however, the structural path between maternal depression and family dysfunction is still significant in that model. As a result, in all models, higher levels of parental depression and family dysfunction are associated with lower levels of positive interaction, effectiveness, consistency, and rationality in parenting. Overall, findings for all four parenting models support the idea of a compound risk associated with parental depression, family functioning, and parenting practices, influencing the development of children‘s socio-emotional competence.

Research findings support, and to a large extent, the hypothesis from studies emphasized in the literature review, that parenting is the single most important socialization mechanism in a child's early years. Findings show both level and growth in positive and effective parenting practices significantly influence prosocial growth and development. More specifically, findings show the effect of family dysfunction on the rate of growth in prosocial behaviour is fully mediated by positive parenting practices. On the other hand, the level of parenting effectiveness when the child is 4-5, mediates the relationship between family dysfunction and parental depression, and children's prosocial behaviour trajectories.

Parental depression also has a direct influence on the level of effective, consistent and rational parenting practices, as well as a unique effect on the growth in parenting rationality. This is somewhat consistent with a review study by Dearing (2008), who suggests parents' mental health problems are detrimental and affect parents' hostility and reward practices towards their children, which in turn impacts their children's socio-emotional functioning. However, parental depression seems to compromise parenting

capacity in the parenting domains of rationality and consistency only, rather than in terms of positive parent-child interaction.

The analysis of moderating effects in the four parenting models show moderated mediation effect by gender. This effect is significant on the relationship between family dysfunction and the rate of prosocial growth, as it is mediated by positive and effective parenting practices. Findings also show evidence of moderation effect based on gender for the direct structural path between the level of parental depression and the level of effective parenting. This result may point to a more pronounced influence of parental symptoms of depression on the level of hostility towards boys. In the model, the variable effectiveness is measured in terms of parenting hostility; a more effective parent being less hostile towards his or her child. In this context, this means the influence of parental depression on the level of effectiveness in parenting is greater when the child is a boy than when it is a girl. These findings complement those of Foster et al. (2008), who show recurrent symptoms of maternal depression are negatively associated with some measures of family functioning; and gender moderate that relationship.

When the mediated path from parental depression to positive parent-child interaction is taken into account, findings show the moderating effects associated with single parenthood, are transmitted through family dysfunction in their impacts on positive parenting. This result complements other studies, which suggest the negative effects of childhood economic disadvantages on prosocial behaviour, can arise through the mediating role of parents' impaired emotionality usually associated with family structure breakdown. Moreover, findings also show family structure has significant moderating

influences on the relationship between family dysfunction level and the rate of growth in prosocial behaviour, as it is mediated by the level of parenting effectiveness.

Family structure also has a significant moderating effect on the direct path between parental depression and family dysfunction in the consistent parenting model. As a result, and because family structure does not have significant direct effect on prosocial behaviour in the first unconditional LGM, it can be concluded that children living with one parent are indirectly affected in their prosocial development in similar ways as those living with two parents. In complement to other related studies, this study shows that the indirect influence occurs through the underlying role of parental depression and family dysfunction on positive and consistent parenting practices.

On another note, the study findings show using a LGM framework for the analysis, where parenting practices are introduced as time-varying predictors of children's prosocial development, is beneficial to capturing change in children's prosocial behaviour. These results, along with the relative goodness of fit for all four parenting models, emphasize the relevance of using a latent growth methodology based on dual process for the analysis of the relationship between parenting practices and children prosocial behaviour.

Neighbourhood Environment and Prosocial Behaviour

This study analyzed the potential influences of neighbourhoods on children's prosocial behaviour along two nexuses: first, as it relates to a geographical place of residence; and second, in terms of perceptions of social processes within neighbourhoods.

Both types of effects were introduced in the analysis as potential moderators of the mediating relationships between proximal family determinants.

Findings do not support the hypothesis of a moderating effect by place of residence for all parenting models. The only structural path that is moderated by place of residence in the analysis is the relationship between family SES and the level of effective parenting, as it is mediated by parental depression. In addition, there is no association between family SES and family dysfunction in all parenting models when children living in rural areas are taken into account. These findings are consistent with previous results for the unconditional LGM reported in this study, indicating a lack of significance between rural and urban children's prosocial trajectories. These findings are consistent with studies by Tremblay et al. (2001) and Romano et al. (2005), which show no significance in the effect of place of residence or area size, on the level and growth in children's prosocial behaviour. As a result, it can be concluded that the geographical location where a family live, does not have much influence, either directly on prosocial development trajectories in children between the age of 4-5 and 10-11, or on the determinants of the family stress model.

Nonetheless, this study supports the hypothesis of significant differences in children's prosocial trajectories across levels of neighbourhood social support and social cohesion as perceived by parents. Results show children, at 4-5 years old, who live with parents who have positive perceptions of social support and cohesion, display higher levels of prosocial behaviour. Thus, these results support previous studies by Tremblay et al. (2001) and Xue et al. (2003), who found that children of parents with lower perceptions of social cohesion display lower levels of prosocial behaviour. These results

are also in line with the results reported in this study about over-representation of children, whose parents have lower perceptions of social support and cohesion, in lower children's prosocial trajectory clusters. Therefore, this study suggests children display different prosocial trajectories based on their parents' perceptions of neighbourhood dynamics; a more positive view of collective trust and community support leading to higher levels of prosocial behaviour.

Study findings concerning moderating neighbourhood effects generally support the underlying hypothesis associated with the socialisation model developed by Jencks and Mayer (1990) and Shonkoff and Phillipps (2000). More specifically, findings suggest perceptions of distal neighbourhood processes, which can potentially affect a family's ability to provide positive support for a child, as well as parents' interactions with their social environment, have the potential to influence the development of children's prosocial behaviour indirectly. More specifically in the lower social support model, findings suggest a significant causal pathway runs from family SES to parental depression and family dysfunction, and then to children's growth in prosocial behaviour. As a result, this study shows lower perceptions of social support have a moderating influence on the relationship between family SES and family dysfunction, as it is mediated by parental depression. In this context, the influence of parental depression on family dysfunction is greater when the parent has lower perceptions of social support. These findings are similar for both positive and consistent parenting models.

In addition, the study findings seem to support Belsky's (1984) hypothesis concerning the role of social support, in which the parent-child relationship is rooted, as shaping parenting practices in a significant manner. Results show the relationship

between family dysfunction level and the rate of prosocial growth, as it is mediated by the level of positive parent-child interaction, is moderated by parents' perceptions of social support in the neighbourhood. In this context, the influence of an increase in positive parent-child interaction on prosocial growth is greater when parents have higher perceptions of social support within the neighbourhood. Nonetheless, no moderation effects coming from parents' perceptions of social support are found in relation with rational parenting. These findings complement studies such as Letourneau et al (2006), who show the main effect of parental depression on prosocial trajectories tends to disappear when social support and positive parenting are introduced in the model. Therefore, it can be argued there is strong evidence that parents' perceptions of social support, along with their own personal experience of depression, may exert an influence on the manner with which they relate affectively with their child.

This study also analyzed the influence of social cohesion on the family stress model. Collective socialisation in the neighbourhood, called the social control model in the literature, hypothesizes adults act as enforcers of appropriate children behaviour through their positive and collective influences; therefore suggesting that successful childrearing is in part a community enterprise (Jencks and Mayer 1990). Collective socialisation is suggested to lead to collective efficacy, when individuals in a given neighbourhood trust each other and work cohesively for the common good; which in turn benefits children (Brooks-Gunn et al. 1993; Beauvais and Jenson 2003). In this framework, adults in a neighbourhood take upon their social ties by notifying authorities or dissuading children of adopting harmful behaviours.

In this study, social cohesion is found to have systematic mediated moderation effects through parental depression, in the mediated relationship between family SES and family dysfunction, and for all parenting models. This means the moderating influence of perceived higher collective efficacy may mitigate the negative effects of family SES on family dysfunction through the influence of lower parental depression. However, study findings demonstrate the relationship between family SES and family dysfunction for higher social cohesion is overall weaker. A similar effect is reported for the mediated relationship between family SES and some parenting practices. For instance, family SES exerts influences on the level of rationality in parenting through the effect of parental depression, which, in turn, is moderated by parents' perceptions of neighbourhood cohesion. In addition, social cohesion also has a mediated moderation effect on the relationship between family dysfunction and the rate of prosocial growth, when it is fully mediated by the level of rational parenting. These findings suggest parents' rationality, or lack of, explain at least part of the moderation effects due to lower neighbourhood collective efficacy.

Overall, these findings seem to support the hypothesis suggested in the literature that parents' neighbourhood perceptions may influence children's prosocial behaviour through family pathways. This suggests that neighbourhood perceptions may have indirect effects on children's development, by mitigating, or emphasizing, one or more family processes that are proximal to the child. However, this study provides more specific information about the types of moderation, and the focus of the moderating effects on the family stress model. Furthermore, this study discriminates the influences of two very different neighbourhood effects: social support and social cohesion. On the one

hand, findings show how perceptions of social support can affect family functioning through its influence on parental depression, as well as it moderates the influence of positive and effective parenting practices on prosocial behaviour. On the other hand, findings suggest perceptions of social cohesion have a greater moderating role on the structural relationships between family SES, parental depression, and family dysfunction. In addition, the influence of family dysfunction on consistent and rational parenting is moderated by social cohesion to a much greater extent than social support does.

Implications for Policy and Programs

In an increasingly complex world where social relationships define individuals, the development of prosocial behaviour and overall social competence has become a necessary element of life's success. Yet, differences between children's prosocial trajectories remain significant. The reasons for these discrepancies are numerous, and include social as well as economic determinants, which unfold within the family and the neighbourhood. This study identifies a number of determinants that can inform the assessment and design of preventive interventions related closely, or not, to prosocial development in children.

One of the key study findings support the underlying hypothesis of the family stress model in most parenting domains, which emphasizes that family determinants such as family dysfunction and parental depression have significant and important influences above and beyond that of family SES. This study shows clearly that determinants related to socialization processes between parents, and between parents and their child, exert a prominent influence on the development of prosocial behaviour in children. For instance,

dysfunctional relationships within the family negatively influence parenting practices, as well as prosocial behaviour directly. Parental depression also negatively influences how parents interact with their child, and exacerbates dysfunctional relationships between parents. This supports the idea of compound risk associated with family processes in their influence on children's prosocial behaviour. Consequently, study findings validate that family processes have sizeable detrimental effects on parenting practices which would otherwise influence prosocial development in a rather positive manner.

Conceptually, one can think of two main policy/programs approaches to responding to this study conclusions: first, a public intervention approach mainly focused of the "root cause", which is in the context of this study family SES; second, an approach focused on mediating family influences. Research findings suggest a focus on family SES alone, which may include measures of poverty reduction, may have a very marginal influence on children's prosocial development. In addition, public interventions aimed at increasing individual or family SES, or reducing disparities across individuals and families, require significant long-term resources and complicated sets of policies, all of which are beyond the scope of this study. A more appropriate approach may be to focus on developing preventive programs and interventions aimed specifically at reinforcing social relationships and parenting practices within the family unit.

The critical importance of parenting practices in influencing the development of prosocial behavior in children is well demonstrated in this study. From a public intervention standpoint, this suggests that prevention and outreach programs could be introduced aimed specifically at informing and supporting dysfunctional families in relation to their parenting practices. This may even be more relevant with respect to

enhancing specifically parenting effectiveness. As well, there is, perhaps, a need to address more specific questions around mother-boy relationships with respect to parenting practices, maybe through an allocation of public resources towards community-based information campaigns.

However, parenting practices should not be viewed as a monolithic block of parent-child relationships, but rather as a set of various attitudes and behaviours, which probably deserve separate interventions. For instance, findings show rational parenting practices respond quite differently to the set of family and neighbourhood determinants. This is notable, when one looks at how parental depression affects quite singularly parenting rationality in the study. This is especially relevant in the case of single parents with young children.

The study findings emphasize the critical role of perceived social relationships within neighbourhoods, and their important influence on more proximal family determinants of children's prosocial behaviour. Thus, findings also strongly suggest parents' perceptions of informal and immediate social support may deserve to be a prime focus of public interventions. For instance, in the study social support mitigates the influence of parental depression on family functioning when positive and consistent parenting practices are taken into account. Thus, there may be a need for public agencies to better understand the extent to which informal social support is perceived or actually available to families in their neighbourhood environments. As well, there may be benefits in directing public resources towards community-based pilot programs aimed at educating vulnerable parents at how and when to seek help and support with their parenting practices.

Parents' perceptions of neighbourhood social cohesion also suggest collective efficacy could play a significant role in the development of prosocial behaviour. For instance, lower collective efficacy in neighbourhoods may exacerbate symptoms of parental depression in relation to parenting rationality. Consequently, there may be a need for new neighbourhood and community initiatives to increase access and availability to psychological and socio-emotional support resources for vulnerable families.

Neighbourhoods' social relations, when viewed positively, can help alleviate some of the negative influences of family processes on prosocial development. Nonetheless, these findings suggest implicitly a certain level of individual and family social isolation, which may call for an extended role of public agencies in supporting initiatives aimed at increasing public awareness of social isolation within communities.

Overall, public agencies should dedicate resources to support the creation of neighbourhood and family social environments that are more favourable to the development of children's prosocial behaviour. As to whether these prevention initiatives should be led by government agencies, rather than by communities or more informal social groups, remains an open question. In the context of increased devolution of roles and mandates to lower levels of governance, it can be argued that some policy domains, which traditionally belonged to government, may be managed more efficiently by communities. Even though the complete disappearance of individual differences in prosocial trajectories cannot be an objective of public interventions; better prevention initiatives should be developed to avoid long-term detrimental effects on children.

Study Strengths and Limitations

This study has a number of limitations due to various methodological and data constraints. A first limitation concerns the lack of empirical generalization to the Canadian population due to the impossibility of weighting the sample using a LGM approach. Although this is usual in this type of study, as shown in the literature review, this restrains the inference that can be made about public policy and programs aimed at influencing children's prosocial development.

Another limitation is related to the use of time-invariant determinants in the structural component of the LGM. Although this approach is certainly justified, based on methodological and empirical considerations laid out earlier, the inclusion of structural time-varying components could have enhanced the analysis. In addition, the inclusion of time-varying child characteristics, such as hyperactivity for instance, could be appropriate to assess the transaction between parenting practices and prosocial behaviour more accurately. However, although the estimated models include structural mediating pathways, the analysis is in nature correlational, and therefore caution has to be applied in making causal inference between variables in the models.

The use of parent-rated survey statistics has both strengths and limitations in the way they could be interpreted as well, notably, in the way parents' emotional affect can influence survey results. In addition, although the scales used in this study show excellent reliability, some of the survey questions refer to different time dimensions. For instance, survey items for parental depression refer to how a parent felt about certain issues in the past weeks prior to the survey. Answers to this survey question could very well reflect conjectural events, and not necessarily reflect more persistent symptoms of parental

depression. Other scale survey items, such as parenting practices and prosocial behaviour, have more structural features, which then points to a more substantive assessment of social behaviours or social phenomena. Although the methodology used allows for the analysis of discriminating influences in the base year and over time, the implications of using NLSCY survey scales remain to be fully investigated empirically. Therefore, given these specific study limitations, the findings need to be contextualized so they can fully enlighten public policy, programs, and interventions.

Nonetheless, this study has a number of strengths, which are brought forward by new methodological novelties applied to the study of change. First, the analysis of specific mediating pathways within an LGM framework has been rarely applied, and more so for children's prosocial behaviour. In this context, this study brings a unique contribution to the literature. Moreover, the dual process methodology used in this study is successful in capturing the systematic relationship between parenting practices and prosocial behaviour and its dynamics over time. This flexible approach also allows for the introduction of structural mediating relationships related to the family stress model.

The study also emphasizes the efficiency of using simultaneous multi-group estimations in order to analyze moderating influences on causal pathways. This approach is applied more specifically for discriminating moderated mediation and mediated moderation effects, and in addition, contributes to the study of children's prosocial trajectories by using a latent class analysis framework. This new approach has been rarely used, and allows for the discovery of prosocial trajectory clusters using longitudinal data. These methodological features contributed in a distinctive manner to the current literature on the development of children's prosocial behaviour.

Recommendations for Future Research

This study underlines the need for more longitudinal studies on children's prosocial behaviour, designed specifically to capture time-varying changes in prosocial behaviour and its determinants. Therefore, there is an opportunity for developing new LGM methodologies to analyze mediating relationships so critical to understanding the development of children's socialisation over time. Areas of future research include better assessments of gaps between boys and girls, both in terms of prosocial outcomes and determining pathways. Another important area of research also includes the role of maternal depression within the context of family processes, and in relation to children's prosocial development.

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Appendix: Additional Tables

Table A1. Estimates for Positive Parenting Conditional LGM

	Estimate	S.E	C.R.	*p* value
Intercepts				
α1	13.125	0.129	101.106	***
α2	14.922	0.112	133.100	***
α3	15.136	0.113	134.167	***
α4	15.293	0.135	113.267	***
α5	15.173	0.086	177.020	***
α6	14.070	0.077	182.417	***
α7	13.239	0.080	166.284	***
α8	12.659	0.096	131.748	***
α13	4.692	0.093	50.531	***
α14	7.068	0.112	63.116	***
Variances				
E1	9.263	0.300	30.869	***
E2	7.031	0.241	29.201	***
E3	5.447	0.204	26.640	***
E4	6.172	0.274	22.537	***
E5	3.943	0.130	30.368	***
E6	4.023	0.129	31.104	***
E7	3.410	0.118	28.906	***
E8	3.699	0.160	23.155	***
E9	5.569	0.211	29.201	***
E10	0.234	0.045	5.200	***
E11	2.377	0.098	24.176	***
E12	0.113	0.019	5.822	***
E13	27.002	0.683	39.938	***
E14	21.535	0.545	39.518	***

Note: *** = p value < 0.001 and ** = p value < 0.005

Appendix: Additional Tables (continued)

Table A2. Estimates for Effective Parenting Conditional LGM

	Estimate	S.E	C.R.	*p* value
Intercepts				
α1	13.126	0.129	101.527	***
α2	14.926	0.113	132.172	***
α3	15.145	0.114	133.257	***
α4	15.309	0.136	112.711	***
α5	18.103	0.116	257.833	***
α6	18.392	0.107	302.221	***
α7	18.425	0.111	386.442	***
α8	18.655	0.132	321.711	***
α13	4.688	0.093	50.503	***
α14	7.063	0.112	63.108	***
Variances				
E1	9.037	0.294	30.726	***
E2	7.019	0.241	29.181	***
E3	5.374	0.203	26.518	***
E4	6.211	0.268	23.180	***
E5	5.946	0.208	28.571	***
E6	5.788	0.129	29.726	***
E7	5.135	0.195	27.808	***
E8	5.508	0.185	21.665	***
E9	5.696	0.254	29.201	***
E10	0.365	0.067	5.448	***
E11	5.353	0.195	27.523	***
E12	0.248	0.034	7.202	***
E13	27.009	0.683	39.529	***
E14	21.534	0.545	39.518	***

Note: *** = p value < 0.001 and ** = p value < 0.005

Appendix: Additional Tables (continued)

Table A3. Estimates for Consistent Parenting Conditional LGM

	Estimate	S.E	C.R.	*p* value
Intercepts				
α1	13.127	0.130	100.757	***
α2	14.916	0.114	130.869	***
α3	15.127	0.115	132.073	***
α4	15.276	0.136	112.342	***
α5	15.626	0.107	146.120	***
α6	16.113	0.096	167.406	***
α7	16.285	0.098	166.675	***
α8	16.481	0.111	148.305	***
α13	4.691	0.093	50.555	***
α14	7.068	0.112	63.109	***
Variances				
E1	8.998	0.297	30.295	***
E2	6.982	0.241	29.015	***
E3	5.453	0.206	26.456	***
E4	6.213	0.292	21.302	***
E5	5.407	0.178	30.396	***
E6	4.685	0.160	29.207	***
E7	4.460	0.157	28.415	***
E8	4.135	0.182	22.674	***
E9	5.971	0.225	26.484	***
E10	0.387	0.077	5.026	***
E11	4.390	0.155	28.311	***
E12	0.066	0.021	3.156	**
E13	26.972	0.682	39.528	***
E14	21.528	0.545	39.518	***

Note: *** = p value < 0.001 and ** = p value < 0.005

Appendix: Additional Tables (continued)

Table A4. Estimates for Rational Parenting Conditional LGM

	Estimate	S.E	C.R.	*p* value
Intercepts				
α1	13.122	0.130	101.319	***
α2	14.920	0.113	132.294	***
α3	15.139	0.114	133.200	***
α4	15.302	0.136	112.477	***
α5	15.848	0.061	257.833	***
α6	16.025	0.053	302.221	***
α7	19.240	0.050	386.442	***
α8	19.244	0.050	321.711	***
α13	4.694	0.093	50.555	***
α14	7.064	0.112	63.068	***
Variances				
E1	9.185	0.300	30.869	***
E2	7.022	0.241	29.201	***
E3	5.437	0.204	26.640	***
E4	6.238	0.274	22.537	***
E5	2.480	0.130	30.368	***
E6	2.594	0.129	31.104	***
E7	0.997	0.118	28.906	***
E8	0.971	0.160	23.155	***
E9	5.696	0.211	29.201	***
E10	0.133	0.042	3.208	**
E11	0.862	0.038	22.805	***
E12	0.119	0.023	5.174	***
E13	27.009	0.683	39.529	***
E14	21.534	0.545	39.518	***

Note: *** = p value < 0.001 and ** = p value < 0.005

Appendix: Additional Tables (continued)

Table A5. Results for Positive Parenting Conditional LGM by Gender

	Male		Female	
	Estimate	*p* value	Estimate	*p* value
Unstandardized Regression Weights				
SES => DEP	-1.368	***	-1.267	***
SES => DYS	-0.708	***	-0.995	***
DEP => DYS	0.285	***	0.270	***
SES => LEVELPOS	-0.120	0.159	0.146	0.112
SES => SLOPEPOS	0.060	0.106	-0.013	0.740
DYS => LEVELPOS	-0.095	***	-0.067	***
DYS => SLOPEPOS	0.020	***	0.007	0.206
DEP => LEVELPOS	0.000	0.899	-0.004	0.348
DEP => SLOPEPOS	-0.010	0.336	-0.021	0.067
SES => LEVELPSB	-0.453	***	0.073	0.577
SES => SLOPEPSB	0.055	0.431	0.015	0.803
DYS => LEVELPSB	-0.128	***	-0.108	***
DYS => SLOPEPSB	-0.008	0.453	0.018	0.033
LEVELPOS => SLOPEPSB	0.092	***	0.160	***
SLOPEPOS => SLOPEPSB	1.449	***	0.964	***

Note: *** = p value < 0.001 and ** = p value < 0.005

Appendix: Additional Tables (continued)

Table A6. Results for Effective Parenting Conditional LGM by Gender

	Male		Female	
	Estimate	*p* value	Estimate	*p* value
Unstandardized Regression Weights				
SES => DEP	-1.363	***	-1.257	***
SES => DYS	-0.701	***	-0.989	***
DEP => DYS	0.286	***	0.271	***
SES => LEVELEFF	-0.251	0.031	0.035	0.778
SES => SLOPEEFF	0.071	0.140	-0.078	0.114
DYS => LEVELEFF	-0.056	***	-0.085	***
DYS => SLOPEEFF	0.000	0.961	0.013	0.052
DEP => LEVELEFF	-0.133	***	-0.096	***
DEP => SLOPEEFF	0.008	0.134	-0.004	0.462
SES => LEVELPSB	-0.452	***	0.075	0.569
SES => SLOPEPSB	0.085	0.166	0.087	0.171
DYS => LEVELPSB	-0.127	***	-0.110	***
DYS => SLOPEPSB	0.018	0.037	0.007	0.426
LEVELEFF => SLOPEPSB	0.089	***	0.042	**
SLOPEEFF => SLOPEPSB	0.881	***	0.839	***

Note: *** = p value < 0.001 and ** = p value < 0.005

Appendix: Additional Tables (continued)

Table A7. Results for Consistent Parenting Conditional LGM by Gender

	Male		Female	
	Estimate	*p* value	Estimate	*p* value
Unstandardized Regression Weights				
SES => DEP	-1.381	***	-1.295	***
SES => DYS	-0.718	***	-0.988	***
DEP => DYS	0.285	***	0.270	***
SES => LEVELCONS	0.910	***	0.930	***
SES => SLOPECONS	-0.153	***	-0.132	0.003
DYS => LEVELCONS	-0.061	***	-0.057	***
DYS => SLOPECONS	0.002	0.745	-0.003	0.643
DEP => LEVELCONS	-0.051	***	-0.052	***
DEP => SLOPECONS	0.002	0.588	-0.002	0.555
SES => LEVELPSB	-0.430	0.001	0.076	0.568
SES => SLOPEPSB	0.394	***	0.134	0.170
DYS => LEVELPSB	-0.127	***	-0.109	***
DYS => SLOPEPSB	0.008	0.514	0.020	0.041
LEVELCONS => SLOPEPSB	0.013	0.493	0.044	0.006
SLOPECONS => SLOPEPSB	1.830	***	1.134	0.027

Note: *** = *p* value < 0.001 and ** = *p* value < 0.005

Appendix: Additional Tables (continued)

Table A8. Results for Rational Parenting Conditional LGM by Gender

	Male		Female	
	Estimate	*p* value	Estimate	*p* value
Unstandardized Regression Weights				
SES => DEP	-1.347	***	-1.242	***
SES => DYS	-0.706	***	-0.985	***
DEP => DYS	0.285	***	0.272	***
SES => LEVELRAT	0.032	0.603	0.183	0.005
SES => SLOPERAT	0.027	0.307	-0.010	0.714
DYS => LEVELRAT	-0.061	***	-0.049	***
DYS => SLOPERAT	0.010	0.010	0.010	0.008
DEP => LEVELRAT	-0.042	***	-0.044	***
DEP => SLOPERAT	0.013	***	0.014	***
SES => LEVELPSB	-0.447	***	0.083	0.534
SES => SLOPEPSB	0.093	0.095	-0.023	0.672
DYS => LEVELPSB	-0.127	***	-0.109	***
DYS => SLOPEPSB	0.022	0.028	0.025	0.006
LEVELRAT => SLOPEPSB	0.299	***	0.229	***
SLOPERAT => SLOPEPSB	0.815	0.094	0.071	0.862

Note: *** = *p* value < 0.001 and ** = *p* value < 0.005

Appendix: Additional Tables (continued)

Table A9. Results for Positive Parenting Conditional LGM by Family Structure

	One parent		Two parents	
	Estimate	*p* value	Estimate	*p* value
Unstandardized Regression Weights				
SES => DEP	-0.191	0.709	-1.096	***
SES => DYS	-0.441	0.210	-0.794	***
DEP => DYS	0.195	***	0.296	***
SES => LEVELPOS	0.203	0.272	-0.010	0.885
SES => SLOPEPOS	-0.021	0.812	0.038	0.193
DYS => LEVELPOS	-0.117	***	-0.076	***
DYS => SLOPEPOS	0.028	0.013	0.011	0.009
DEP => LEVELPOS	-0.019	0.221	-0.015	0.098
DEP => SLOPEPOS	-0.005	0.470	-0.002	0.508
SES => LEVELPSB	-0.135	0.623	-0.161	0.120
SES => SLOPEPSB	0.166	0.204	-0.001	0.989
DYS => LEVELPSB	-0.129	***	-0.121	***
DYS => SLOPEPSB	-0.007	0.699	0.009	0.270
LEVELPOS => SLOPEPSB	0.011	0.847	0.125	***
SLOPEPOS => SLOPEPSB	0.885	***	1.428	***

Note: *** = *p* value < 0.001 and ** = *p* value < 0.005

Appendix: Additional Tables (continued)

Table A10. Results for Effective Parenting Conditional LGM by Family Structure

	One parent		Two parents	
	Estimate	*p* value	Estimate	*p* value
Unstandardized Regression Weights				
SES => DEP	-0.218	0.669	-1.086	***
SES => DYS	-0.464	0.187	-0.789	***
DEP => DYS	0.196	***	0.297	***
SES => LEVELEFF	0.043	0.869	-0.126	0.171
SES => SLOPEEFF	-0.020	0.860	-0.010	0.795
DYS => LEVELEFF	-0.158	***	-0.055	***
DYS => SLOPEEFF	0.025	0.085	0.004	0.437
DEP => LEVELEFF	-0.093	***	-0.128	***
DEP => SLOPEEFF	0.011	0.230	0.000	0.986
SES => LEVELPSB	-0.192	0.479	-0.157	0.131
SES => SLOPEPSB	0.175	0.170	0.062	0.200
DYS => LEVELPSB	-0.131	***	-0.121	***
DYS => SLOPEPSB	0.019	0.305	0.014	0.030
LEVELEFF => SLOPEPSB	0.125	***	0.060	***
SLOPEEFF => SLOPEPSB	0.764	0.003	0.904	***

Note: *** = *p* value < 0.001 and ** = *p* value < 0.005

Appendix: Additional Tables (continued)

Table A11. Results for Consistent Parenting Conditional LGM by Family Structure

	One parent		Two parents	
	Estimate	*p* value	Estimate	*p* value
Unstandardized Regression Weights				
SES => DEP	-0.326	0.519	-1.089	***
SES => DYS	-0.489	0.160	-0.789	***
DEP => DYS	0.197	***	0.296	***
SES => LEVELCONS	1.045	***	0.905	***
SES => SLOPECONS	-0.094	0.336	-0.144	***
DYS => LEVELCONS	-0.088	0.005	-0.053	***
DYS => SLOPECONS	-0.002	0.870	-0.001	0.786
DEP => LEVELCONS	-0.084	***	-0.045	***
DEP => SLOPECONS	0.016	0.073	-0.003	0.284
SES => LEVELPSB	-0.107	0.697	-0.156	0.137
SES => SLOPEPSB	0.094	0.459	0.273	***
DYS => LEVELPSB	-0.128	***	-0.122	***
DYS => SLOPEPSB	0.022	0.132	0.017	0.052
LEVELCONS => SLOPEPSB	0.071	0.007	0.010	0.457
SLOPECONS => SLOPEPSB	0.316	0.519	1.635	***

Note: *** = *p* value < 0.001 and ** = *p* value < 0.005

Appendix: Additional Tables (continued)

Table A12. Results for Rational Parenting Conditional LGM by Family Structure

	One parent		Two parents	
	Estimate	*p* value	Estimate	*p* value
Unstandardized Regression Weights				
SES => DEP	-0.182	0.721	-1.095	***
SES => DYS	-0.442	0.209	-0.790	***
DEP => DYS	0.198	***	0.297	***
SES => LEVELRAT	0.155	0.246	0.146	0.003
SES => SLOPERAT	-0.043	0.477	0.001	0.976
DYS => LEVELRAT	-0.099	***	-0.050	***
DYS => SLOPERAT	0.024	0.002	0.008	0.004
DEP => LEVELRAT	-0.039	0.001	-0.052	***
DEP => SLOPERAT	0.012	0.026	0.017	***
SES => LEVELPSB	-0.130	0.637	-0.158	0.128
SES => SLOPEPSB	0.139	0.261	0.004	0.920
DYS => LEVELPSB	-0.129	***	-0.121	***
DYS => SLOPEPSB	0.021	0.409	0.026	***
LEVELRAT => SLOPEPSB	0.331	***	0.265	***
SLOPERAT => SLOPEPSB	1.089	0.159	0.337	0.285

Note: *** = *p* value < 0.001 and ** = *p* value < 0.005

Appendix: Additional Tables (continued)

Table A13. Results for Positive Parenting Conditional LGM by Social Support

	Lower		Higher	
	Estimate	*p* value	Estimate	*p* value
Unstandardized Regression Weights				
SES => DEP	-1.441	***	-1.037	***
SES => DYS	-0.404	0.012	-0.358	0.022
DEP => DYS	0.287	***	0.180	***
SES => LEVELPOS	-0.129	0.273	0.061	0.418
SES => SLOPEPOS	0.067	0.176	-0.006	0.859
DYS => LEVELPOS	-0.098	***	-0.078	***
DYS => SLOPEPOS	0.026	0.006	0.013	0.006
DEP => LEVELPOS	-0.006	0.619	-0.024	0.015
DEP => SLOPEPOS	-0.002	0.637	-0.002	0.548
SES => LEVELPSB	-0.424	0.012	-0.162	0.163
SES => SLOPEPSB	0.127	0.147	0.046	0.412
DYS => LEVELPSB	-0.086	0.005	-0.090	***
DYS => SLOPEPSB	-0.009	0.614	-0.005	0.534
LEVELPOS => SLOPEPSB	0.166	***	0.078	***
SLOPEPOS => SLOPEPSB	1.310	0.001	1.246	***

Note: *** = *p* value < 0.001 and ** = *p* value < 0.005

Appendix: Additional Tables (continued)

Table A14. Results for Effective Parenting Conditional LGM by Social Support

	Lower		Higher	
	Estimate	*p* value	Estimate	*p* value
Unstandardized Regression Weights				
SES => DEP	-1.436	***	-1.037	***
SES => DYS	-0.403	0.012	-0.354	0.023
DEP => DYS	0.287	***	0.181	***
SES => LEVELEFF	-0.262	0.079	0.055	0.601
SES => SLOPEEFF	0.007	0.910	-0.007	0.859
DYS => LEVELEFF	-0.073	0.010	-0.111	***
DYS => SLOPEEFF	0.013	0.273	0.009	0.140
DEP => LEVELEFF	-0.117	***	-0.114	***
DEP => SLOPEEFF	0.008	0.229	-0.002	0.734
SES => LEVELPSB	-0.414	0.014	-0.167	0.152
SES => SLOPEPSB	0.192	0.011	0.046	0.413
DYS => LEVELPSB	-0.088	0.005	-0.091	***
DYS => SLOPEPSB	0.002	0.916	0.006	0.448
LEVELEFF => SLOPEPSB	0.068	***	0.074	***
SLOPEEFF => SLOPEPSB	0.759	***	0.978	***

Note: *** = *p* value < 0.001 and ** = *p* value < 0.005

Appendix: Additional Tables (continued)

Table A15. Results for Consistent Parenting Conditional LGM by Social Support

	Lower		Higher	
	Estimate	*p* value	Estimate	*p* value
Unstandardized Regression Weights				
SES => DEP	-1.488	***	-1.048	***
SES => DYS	-0.407	0.011	-0.359	0.021
DEP => DYS	0.287	***	0.180	***
SES => LEVELCONS	0.928	***	0.911	***
SES => SLOPECONS	-0.159	0.004	-0.131	***
DYS => LEVELCONS	-0.034	0.196	-0.060	***
DYS => SLOPECONS	-0.002	0.868	0.001	0.844
DEP => LEVELCONS	-0.068	***	-0.050	***
DEP => SLOPECONS	0.009	0.133	-0.003	0.392
SES => LEVELPSB	-0.399	0.020	-0.158	0.177
SES => SLOPEPSB	0.260	0.016	0.248	0.005
DYS => LEVELPSB	-0.087	0.006	-0.091	***
DYS => SLOPEPSB	0.007	0.634	0.004	0.677
LEVELCONS => SLOPEPSB	0.051	0.028	0.013	0.370
SLOPECONS => SLOPEPSB	0.752	0.065	1.666	***

Note: *** = *p* value < 0.001 and ** = *p* value < 0.005

Appendix: Additional Tables (continued)

Table A16. Results for Rational Parenting Conditional LGM by Social Support

	Lower		Higher	
	Estimate	*p* value	Estimate	*p* value
Unstandardized Regression Weights				
SES => DEP	-1.432	***	-1.031	***
SES => DYS	-0.406	0.011	-0.353	0.024
DEP => DYS	0.288	***	0.181	***
SES => LEVELRAT	0.028	0.726	0.196	***
SES => SLOPERAT	0.051	0.140	-0.036	0.127
DYS => LEVELRAT	-0.062	***	-0.072	***
DYS => SLOPERAT	0.016	0.014	0.014	***
DEP => LEVELRAT	-0.049	***	-0.034	***
DEP => SLOPERAT	0.013	0.002	0.012	***
SES => LEVELPSB	-0.408	0.016	-0.159	0.172
SES => SLOPEPSB	0.134	0.068	-0.005	0.925
DYS => LEVELPSB	-0.086	0.005	-0.091	***
DYS => SLOPEPSB	0.014	0.439	0.022	0.037
LEVELRAT => SLOPEPSB	0.284	***	0.279	***
SLOPERAT => SLOPEPSB	0.723	0.200	0.270	0.567

Note: *** = *p* value < 0.001 and ** = *p* value < 0.005

Appendix: Additional Tables (continued)

Table A17. Results for Positive Parenting Conditional LGM by Neighbourhood Cohesion

	Lower		Higher	
	Estimate	*p* value	Estimate	*p* value
Unstandardized Regression Weights				
SES => DEP	-1.448	***	-0.849	***
SES => DYS	-0.816	***	-0.326	0.103
DEP => DYS	0.250	***	0.261	***
SES => LEVELPOS	-0.083	0.368	0.042	0.661
SES => SLOPEPOS	0.017	0.659	0.042	0.318
DYS => LEVELPOS	-0.062	***	-0.081	***
DYS => SLOPEPOS	0.011	0.063	0.015	0.016
DEP => LEVELPOS	-0.018	0.081	-0.016	0.240
DEP => SLOPEPOS	-0.003	0.344	-0.002	0.684
SES => LEVELPSB	-0.313	0.020	-0.206	0.171
SES => SLOPEPSB	0.096	0.163	0.017	0.820
DYS => LEVELPSB	-0.118	***	-0.093	***
DYS => SLOPEPSB	0.012	0.244	-0.004	0.720
LEVELPOS => SLOPEPSB	0.137	***	0.081	0.009
SLOPEPOS => SLOPEPSB	1.394	***	1.231	***

Note: *** = *p* value < 0.001 and ** = *p* value < 0.005

Appendix: Additional Tables (continued)

Table A18. Results for Effective Parenting Conditional LGM by Neighbourhood Cohesion

	Lower		Higher	
	Estimate	*p* value	Estimate	*p* value
Unstandardized Regression Weights				
SES => DEP	-1.448	***	-0.846	***
SES => DYS	-0.813	***	-0.322	0.106
DEP => DYS	0.250	***	0.263	***
SES => LEVELEFF	-0.131	0.290	-0.065	0.625
SES => SLOPEEFF	-0.010	0.845	0.016	0.760
DYS => LEVELEFF	-0.055	0.003	-0.072	***
DYS => SLOPEEFF	0.009	0.229	0.005	0.493
DEP => LEVELEFF	-0.101	***	-0.145	***
DEP => SLOPEEFF	-0.005	0.357	0.009	0.176
SES => LEVELPSB	-0.306	0.023	-0.210	0.164
SES => SLOPEPSB	0.114	0.065	0.066	0.340
DYS => LEVELPSB	-0.117	***	-0.094	***
DYS => SLOPEPSB	0.017	0.066	0.008	0.422
LEVELEFF => SLOPEPSB	0.077	***	0.064	***
SLOPEEFF => SLOPEPSB	0.802	***	0.963	***

Note: *** = *p* value < 0.001 and ** = *p* value < 0.005

Appendix: Additional Tables (continued)

Table A19. Results for Consistent Parenting Conditional LGM by Neighbourhood Cohesion

	Lower		Higher	
	Estimate	*p* value	Estimate	*p* value
Unstandardized Regression Weights				
SES => DEP	-1.480	***	-0.854	***
SES => DYS	-0.820	***	-0.326	0.103
DEP => DYS	0.249	***	0.262	***
SES => LEVELCONS	0.895	***	0.910	***
SES => SLOPECONS	-0.158	***	-0.106	0.022
DYS => LEVELCONS	-0.027	0.106	-0.089	***
DYS => SLOPECONS	-0.004	0.531	0.007	0.292
DEP => LEVELCONS	-0.050	***	-0.050	0.002
DEP => SLOPECONS	-0.003	0.277	0.001	0.861
SES => LEVELPSB	-0.288	0.034	-0.202	0.184
SES => SLOPEPSB	0.338	0.004	0.276	0.044
DYS => LEVELPSB	-0.117	***	-0.093	***
DYS => SLOPEPSB	0.025	0.042	-0.005	0.761
LEVELCONS => SLOPEPSB	0.025	0.154	0.023	0.269
SLOPECONS => SLOPEPSB	1.652	0.001	2.108	0.008

Note: *** = *p* value < 0.001 and ** = *p* value < 0.005

Appendix: Additional Tables (continued)

Table A20. Results for Rational Parenting Conditional LGM by Neighbourhood Cohesion

	Lower		Higher	
	Estimate	*p* value	Estimate	*p* value
Unstandardized Regression Weights				
SES => DEP	-1.442	***	-0.844	***
SES => DYS	-0.815	***	-0.321	0.108
DEP => DYS	0.251	***	0.262	***
SES => LEVELRAT	0.034	0.598	0.219	0.002
SES => SLOPERAT	0.011	0.689	-0.026	0.381
DYS => LEVELRAT	-0.036	***	-0.072	***
DYS => SLOPERAT	0.006	0.146	0.016	***
DEP => LEVELRAT	-0.045	***	-0.046	***
DEP => SLOPERAT	0.012	***	0.018	***
SES => LEVELPSB	-0.301	0.026	-0.204	0.178
SES => SLOPEPSB	0.081	0.144	0.025	0.697
DYS => LEVELPSB	-0.117	***	-0.093	***
DYS => SLOPEPSB	0.028	0.002	0.020	0.092
LEVELRAT => SLOPEPSB	0.312	***	0.256	***
SLOPERAT => SLOPEPSB	0.339	0.495	0.456	0.283

Note: *** = *p* value < 0.001 and ** = *p* value < 0.005

Appendix: Additional Tables (continued)

Table A21. Results for Positive Parenting Conditional LGM by Place of Residence

	Rural		Urban	
	Estimate	*p* value	Estimate	*p* value
Unstandardized Regression Weights				
SES => DEP	-1.313	***	-1.383	***
SES => DYS	-0.661	0.025	-0.902	***
DEP => DYS	0.261	***	0.278	***
SES => LEVELPOS	-0.092	0.539	0.016	0.821
SES => SLOPEPOS	0.047	0.482	0.029	0.341
DYS => LEVELPOS	-0.085	***	-0.081	***
DYS => SLOPEPOS	0.022	0.014	0.011	0.007
DEP => LEVELPOS	0.001	0.938	-0.021	0.018
DEP => SLOPEPOS	-0.007	0.207	0.000	0.942
SES => LEVELPSB	0.040	0.860	-0.284	0.007
SES => SLOPEPSB	0.078	0.506	0.035	0.495
DYS => LEVELPSB	-0.140	***	-0.114	***
DYS => SLOPEPSB	-0.004	0.825	0.008	0.282
LEVELPOS => SLOPEPSB	0.079	0.056	0.127	***
SLOPEPOS => SLOPEPSB	1.451	***	1.210	***

Note: *** = *p* value < 0.001 and ** = *p* value < 0.005

Appendix: Additional Tables (continued)

Table A22. Results for Effective Parenting Conditional LGM by Place of Residence

	Rural		Urban	
	Estimate	*p* value	Estimate	*p* value
Unstandardized Regression Weights				
SES => DEP	-1.314	***	-1.372	***
SES => DYS	-0.660	0.025	-0.896	***
DEP => DYS	0.262	***	0.279	***
SES => LEVELEFF	-0.272	0.181	-0.066	0.489
SES => SLOPEEFF	0.010	0.896	0.005	0.903
DYS => LEVELEFF	-0.039	0.155	-0.074	***
DYS => SLOPEEFF	0.003	0.746	0.006	0.285
DEP => LEVELEFF	-0.109	***	-0.117	***
DEP => SLOPEEFF	-0.001	0.858	0.003	0.443
SES => LEVELPSB	0.041	0.858	-0.279	0.009
SES => SLOPEPSB	0.150	0.130	0.067	0.177
DYS => LEVELPSB	-0.142	***	-0.114	***
DYS => SLOPEPSB	0.023	0.079	0.013	0.073
LEVELEFF => SLOPEPSB	0.083	***	0.068	***
SLOPEEFF => SLOPEPSB	0.871	***	0.871	***

Note: *** = *p* value < 0.001 and ** = *p* value < 0.005

Appendix: Additional Tables (continued)

Table A23. Results for Consistent Parenting Conditional LGM by Place of Residence

	Rural		Urban	
	Estimate	*p* value	Estimate	*p* value
Unstandardized Regression Weights				
SES => DEP	-1.342	***	-1.401	***
SES => DYS	-0.658	0.026	-0.907	***
DEP => DYS	0.262	***	0.278	***
SES => LEVELCONS	1.066	***	0.875	***
SES => SLOPECONS	-0.117	0.096	-0.138	***
DYS => LEVELCONS	-0.078	0.002	-0.054	***
DYS => SLOPECONS	-0.010	0.297	0.001	0.848
DEP => LEVELCONS	-0.013	0.521	-0.062	***
DEP => SLOPECONS	-0.005	0.303	0.001	0.693
SES => LEVELPSB	0.054	0.811	-0.269	0.012
SES => SLOPEPSB	0.359	0.027	0.250	0.002
DYS => LEVELPSB	-0.141	***	-0.114	***
DYS => SLOPEPSB	0.038	0.069	0.011	0.183
LEVELCONS => SLOPEPSB	-0.016	0.570	0.032	0.024
SLOPECONS => SLOPEPSB	1.785	0.004	1.509	***

Note: *** = *p* value < 0.001 and ** = *p* value < 0.005

Appendix: Additional Tables (continued)

Table A24. Results for Rational Parenting Conditional LGM by Place of Residence

	Rural		Urban	
	Estimate	*p* value	Estimate	*p* value
Unstandardized Regression Weights				
SES => DEP	-1.311	***	-1.376	***
SES => DYS	-0.660	0.025	-0.898	***
DEP => DYS	0.262	***	0.279	***
SES => LEVELRAT	0.017	0.880	0.112	0.023
SES => SLOPERAT	0.067	0.151	0.001	0.978
DYS => LEVELRAT	-0.059	***	-0.054	***
DYS => SLOPERAT	0.010	0.122	0.010	0.001
DEP => LEVELRAT	-0.010	0.456	-0.052	***
DEP => SLOPERAT	-0.001	0.925	0.017	***
SES => LEVELPSB	0.048	0.831	-0.275	0.010
SES => SLOPEPSB	-1.518	0.930	0.038	0.382
DYS => LEVELPSB	-0.142	***	-0.114	***
DYS => SLOPEPSB	-0.192	0.937	0.020	0.007
LEVELRAT => SLOPEPSB	0.344	***	0.255	***
SLOPERAT => SLOPEPSB	0.284	0.924	0.616	0.038

Note: *** = *p* value < 0.001 and ** = *p* value < 0.005

Appendix: Additional Tables (continued)

Table A25. Key Empirical Studies on Children's Prosocial Behaviour

Authors	Title	Methodology	Data	Dependant variables	Explanatory variables	Main results
Fabes and Eisenberg (1999)	Meta-Analyses of Age and Sex Differences in Children's and Adolescents' Prosocial Behavior	Systematic review of studies on prosocial behaviour from 1974-1994. Statistical analysis across and within age groups.	A sample of 155 cross-sectional and longitudinal studies of prosocial behaviour in children and adolescents.	Prosocial behaviour as measured in experimental or correlational designs.	Study parameters such as reporting method, type of prosocial behaviour, and type of study design.	Overall evidence of age increasing process in prosocial behaviour were found, but the effects varied as a function of studies characteristics.
Cote et al. (2002)	The Development of Impulsivity, Fearfulness, and Helpfulness during Childhood: Patterns of Consistency and Change in the Trajectories of Boys and Girls	Estimation of child behaviour trajectories and group membership probabilities using semi-parametric Group Mixture Model (GMM).	A longitudinal survey sample of 1,865 children between the age of 6 and 12 in Quebec schools. Annual survey questionnaire was completed by teachers.	Measures of helpfulness, fearfulness and impulsivity.	None as paper focused on determining population heterogeneity in behavioural trajectories	Three distinct trajectories in children's helpfulness were shown (low, moderate and high). Broad patterns of development were similar across gender but not within trajectories.
Kokko et al. (2006)	Trajectories of Prosocial Behavior and Physical Aggression in Middle Childhood: Links to Adolescent School Dropout and Physical Violence	Estimation of child behaviour trajectories and group membership probabilities using semi-parametric Group Mixture Model (GMM). Correlation analysis between child outcomes.	A longitudinal survey sample of 1,161 low SES boys between the age of 6 and 12 in 53 schools from the Montreal Longitudinal and Experimental Study. Survey questionnaire was completed by teachers.	Measures of aggression, prosocial behaviour, and physical violence.	Measures of aggression and prosocial behaviour trajectories between age 6-12 in relation to outcomes of physical violence at age 17.	Two trajectories of low and moderate decline in prosociality were found. Study has shown low negative correlation between prosociality and aggression. Prosociality had no association with violence.

Moraes (2009)	Examining the Impact of Child Characteristics and Microsystem Variables on Developmental Trajectories of Prosocial Behaviour in Canadian Children: A Longitudinal Study Using the NLSCY	Estimation of prosocial growth curves using Hierarchical Linear Model (HLM).	A longitudinal two-cohort survey sample of 8,605 Canadian children between the age of 4 and 11 from the NLSCY. Survey questionnaire was completed by the person most knowledgeable (PMK) about the child.	Measure of prosocial behaviour.	Measures of family SES, gender, parenting practices, temperament, child care arrangements,	Prosocial trajectories were shown to be linear. Temperament was found to be moderating the relationship between positive parenting and prosociality. Low SES children who received non-parental care were more prosocial. The rate of prosocial change was not influenced by any of the predictors.
Aber et al. (2003)	Developmental Trajectories toward Violence in Middle Childhood: Course, Demographic Differences, and Response to School-based Intervention	Estimation of child outcome growth curves using Hierarchical Linear Model (HLM).	A longitudinal survey sample of 11,160 1th to 6th grade children from New York low income urban neighbourhoods. Survey questionnaire was completed by teachers.	Measures of prosocial behaviour, hostility/ aggression, conduct problems, and depressive symptoms.	Measures of family economic resources, gender, race, classroom instruction, teacher coaching, and intervention programs.	Study has shown potential non-linearity in prosocial (increasing rate of growth), although girls displayed a greater linear increase than boys. Conflict resolution intervention had some influence on socio-emotional development.
Letourneau et al. (2006)	Longitudinal Study of Postpartum Depression, Maternal-child Relationships, and Children's Behavior to 8 Years of Age	Estimation of child outcome growth curves using Hierarchical Linear Model (HLM).	A longitudinal survey sample of 3,533 Canadian children between the age of 2 and 8 from the NLSCY. Survey questionnaire was completed by the person most knowledgeable (PMK) about the child.	Measures of anxiety, hyperactivity, aggression, and prosocial behaviour.	Measures of family SES, family structure, parenting practices, social support, gender, and maternal depression.	Study has shown that prosocial growth was linear and differed across gender. Children of depressed mothers displayed higher levels of hyperactivity, anxiety, and aggression but not prosocial behaviour. Depression was associated with family SES although SES by itself was not a significant predictor of prosocial behaviour.

Carlo et al. (2007)	A Latent Growth Curve Analysis of Prosocial Behavior Among Rural Adolescents	Estimation of prosocial growth trajectories using Latent Growth Model (LGM).	A longitudinal survey sample of 500 children in 7th, 8th and 9th grade cohorts from low SES rural communities in Eastern US. Ratings were done on a yearly basis on four consecutive occasions.	Measure of prosocial behaviour.	Measures of gender, peer relationship, and parent-child relationship.	Study has shown an overall decline in prosocial until grade 11, and more so for boys, after which prosocial rebounded slightly.
Tremblay et al. (2001)	Multi-level Effects on Behaviour Outcomes in Canadian Children	Estimation of child outcomes using a nested Hierarchical Linear Model (HLM).	A cross-sectional survey sample of 2,745 Canadian children between the age of 2 to 11 from the NLSCY. Survey questionnaire was completed by the person most knowledgeable (PMK) about the child.	Measures of anxiety, hyperactivity, aggression, and prosocial behaviour.	Measures of area size, neighbourhood poverty, social cohesion, social support, family SES, family functioning, child's gender and age, and mother's depression.	Study has shown that individual and family variables accounted for a larger share of the variance in prosocial behaviour than neighbourhood variables. Children from less dysfunctional families and with positive and consistent parent-child relationships were more prosocial.
Parilla et al. (2002)	Development of Prosocial Skills	Estimation of prosocial behaviour using a nested Hierarchical Linear Model (HLM).	A longitudinal survey sample of 841 Canadian children between the age of 7 and 11 from the NLSCY. Survey questionnaire responses from both parent and teacher were analyzed over three consecutive cycles.	Measure of prosocial behaviour.	Measures of gender, peer relationships, emotional regulation, recreational activities, family SES and ratio to LICO, family structure, siblings, school changes and moves, social support, family functioning, parenting practices, neighbourhood safety and cohesion, school climate, mother's depression.	Study has shown that boys and girls differ significantly in their prosocial development. Family variables accounted for a higher share of the variance in children's prosocial behaviour, while higher levels of maternal depression and lower positive parent-child interaction were associated with lower prosociality.

Romano et al. (2005)	Multilevel Correlates of Childhood Physical Aggression and Prosocial Behaviour	Estimation of prosocial behaviour and physical aggression using a nested Hierarchical Linear Model (HLM).	A cross-sectional survey sample of 2,745 Canadian children between the age of 2 to 11 from the NLSCY. Survey questionnaire was completed by the person most knowledgeable (PMK) about the child.	Measure of prosocial behaviour and physical aggression.	Measures of gender, family SES, parenting practices, mother's depression, mother age, family dysfunction, family structure, social support, area size, neighbourhood poverty, neighbourhood cohesion,	Study has shown that a larger share of the variance in children's prosocial behaviour was shown to be between individuals. Children with depressed mothers experienced lower prosociality and more punitive parenting practices than their high prosocial counterparts. Neighbourhood SES and cohesion were not associated with prosocial behaviour.
King et al. (2005)	Pathways to Children‘s Academic Performance and Prosocial Behaviour of Physical Health Status, Environmental, Family, and Child Factors	Estimation of prosocial behaviour and academic performance using a Structural Equation Model (SEM).	A cross-sectional survey sample of 9,714 Canadian children between the age of 6 and 11 from the NLSCY. Survey questionnaire was completed by the person most knowledgeable (PMK) about the child.	Measures of academic performance and prosocial behaviour.	Measures of chronic health problems, health status, family functioning, social support, neighbourhood cohesion, recreational activities, family SES, physical aggression, anxiety, and conduct problems.	Study has shown that there was a mediating pathway from social support and neighbourhood cohesion to family functioning which influenced children's behavioural functioning and thereby prosocial behaviour.
Verhoeven et al. (2007)	Parenting During Toddlerhood: Contributions of Parental, Contextual, and Child Characteristics	Confirmatory factor analysis using Structural Equation Model (SEM) and correlation analysis of parenting determinants.	A cross-sectional survey sample of 111 two-parent families with 17-month-old boys in the Netherlands. Both mothers and fathers completed the survey questionnaire.	Measures of parenting support (responsiveness and positive interaction), lack of structure, positive discipline, psychological control, physical punishment.	Measures of parental personality, parental self-control, marital satisfaction, family SES, family size, child's temperament, language development.	Study has shown that the use of positive or punitive parenting practices is influenced by contextual factors such as family size and SES. However, no differences between mothers and fathers in the way they are influenced by contextual and child characteristics were shown.

Allusen et al. (2005)	Duration and Developmental Timing of Poverty and Children's Cognitive and Social Development from Birth through Third Grade	Estimation of child outcome growth curves and poverty group patterns using Hierarchical Linear Model (HLM).	As longitudinal survey sample of 1,364 children between the age of 0 and 9 in ten US locations. Mothers completed the survey questionnaire (with teachers ratings later on).	Measures of cognitive and social development, behaviour problems.	Measures of gender, age, ethnicity, family median income to needs ratio, mother's education, mother's depression, maternal sensitivity, home environment assessment, child care characteristics,	Study has shown that poverty measures were associated to child outcomes through the mediating role of positive parenting. There was no indication of different patterns of child behaviours with respect to poverty groups. Duration was shown to be more important than timing in influencing development.
Edwards and Bromfield (2009)	Neighbourhood Influences on Young Children‘s Conduct Problems and Prosocial Behavior: Evidence from an Australian National Sample	Estimation of child outcomes using a nested Hierarchical Linear Model (HLM).	A cross-sectional survey sample of 4,983 Australian children aged 4-5. Parents completed the survey questionnaire.	Measures of prosocial behaviour and conduct problems.	Measures of parental perceptions of neighbourhood facilities, belonging, safety, and cleanliness, remoteness of the neighbourhood, neighbourhood SES, family income, mother's education, single-parenthood, child's gender and age.	Study has shown that prosocial behaviour was not influenced by neighbourhood SES, while neighbourhood belonging had a direct effect on prosocial behaviour levels. Geographic remoteness was not associated with either prosociality or conduct problems.
Aunola and Nurmi (2005)	The Roles of Parenting Styles in Children's Problem Behavior	Estimation of child behaviour growth curves using a Latent Growth Model (LGM). Multigroup analysis of parenting styles.	A longitudinal survey sample (structured interview) of 196 children between the age of 5-6 and 8-9 in Finland. Both parents completed the survey questionnaire.	Measures of internalizing and externalizing behaviours.	Measures of parenting styles such as affection, behavioural control, and psychological control.	Study has shown that mother's behavioural control decreased children's externalizing behaviour problems when combined with low psychological control, and thus supported previous findings suggesting that behavioural control was an important factor fostering prosocial behaviour.

Kerr and Michalski (2004)	Family Structures and Children's Behavioral Problems: A Latent Growth Curve Analysis	Estimation of child's hyperactivity growth curve using a Latent Growth Model (LGM).	A longitudinal survey sample of 1,902 Canadian children aged 4-5 to 10-11 from the NLSCY. Survey questionnaire was completed by the person most knowledgeable (PMK) about the child.	Measures of hyperactivity and inattention problems.	Measures of ratio to LICO, family functioning, family structure, parents' education, child's gender.	Study has shown the relatively modest influence of divorce and separation on hyperactivity trends. Children whose parents divorced over the analyzed period were not significantly worse-off behaviourally than those whose parents remained together.
Caprara et al. (2000)	Prosocial Foundations of Children's Academic Achievement	Estimation of structural paths using Structural Equation Model (SEM).	A longitudinal survey sample of 294 Italian children between the age of 7 and 13 in four cohorts. Survey questionnaire was completed by self, peers, and teachers.	Measures of academic achievement and peer social relationships.	Measures prosocial behaviour and aggression.	Study has shown that early prosocial behaviour predicted subsequent levels of academic achievement.