The Relationship between Differential Parenting and Children’s Other-orientedness

by

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A thesis submitted in conformity with the requirements for the degree of Masters of Art
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Abstract

The current study examined whether there is a curvilinear association between differential parenting and children’s Theory of Mind (ToM) and two similar abilities we defined as “ToM-in-Action”. These were, use of perspective taking language and cognitive sensitivity (providing tailored verbal or non-verbal guidance) while completing a challenging task with a younger sibling. A community sample of 372 children (52% were males, average age=5.6), their younger siblings (average age=3.14) and their mothers were observed in their homes. Acknowledgments (if any) Findings showed a linear association rather than a curvilinear effect, where favored older siblings had significantly poorer cognitive sensitivity and perspective taking when interacting with their younger sibling in a challenging task. This relationship remained significant when other variables such as age and SES were controlled. The relationship between differential parenting and ToM was non-significant. Results demonstrate the specific and complex impact of differential parenting on children’s social cognition.
Acknowledgements

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# Table of Contents

Acknowledgements ........................................................................................................ iii  
List of Tables ................................................................................................................ vi  
1 Introduction ................................................................................................................. 1  
1.1. Differential Parenting and its impact on children and their sibling relationship quality .................................................................................................................. 1  
1.2. Differential Parenting and Social Cognition .............................................................. 4  
1.3 Theory of Mind .......................................................................................................... 5  
1.4 Perspective Taking ..................................................................................................... 7  
1.5 Cognitive Sensitivity .................................................................................................. 8  
1.6 Covariates .................................................................................................................. 8  
1.7 The Current Study .................................................................................................... 9  
2 Methods ....................................................................................................................... 9  
2.1 Participants ............................................................................................................... 9  
2.2 The Current Study .................................................................................................... 10  
2.3 Measures .................................................................................................................. 10  
2.3.1 Independent Control Variables ............................................................................ 15  
2.4 Data Analysis .......................................................................................................... 15  
2.5 Missing Data ............................................................................................................ 16  
3 Results ......................................................................................................................... 16  
3.1 Preliminary Analysis ............................................................................................... 16  
3.2 Main Analyses ......................................................................................................... 18  
3.2.1 Model 1: Theory of Mind .................................................................................... 18  
3.2.2 Model 2: Perspective Taking .............................................................................. 18  
3.2.3 Model 3: Cognitive Sensitivity .......................................................................... 21  
4 Discussion .................................................................................................................... 21
5 Limitations .........................................................................................................................26
6 References ..........................................................................................................................28
## List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1</td>
<td>Bivariate Pearson/point biserial correlations, Means and Standard Deviations</td>
<td>17</td>
</tr>
<tr>
<td>Table 2</td>
<td>Summary of hierarchical regression analysis examining the role of differential sensitivity in predicting Theory-of-Mind</td>
<td>19</td>
</tr>
<tr>
<td>Table 3</td>
<td>Summary of hierarchical logistic regression analysis examining the role of differential sensitivity in predicting sibling perspective taking</td>
<td>21</td>
</tr>
<tr>
<td>Table 4</td>
<td>Summary of hierarchical regression analysis examining the role of differential sensitivity in predicting sibling cognitive sensitivity</td>
<td>23</td>
</tr>
</tbody>
</table>
1 Introduction

1.1. Differential Parenting and its impact on children and their sibling relationship quality

Differential Parenting has been researched extensively since the seminal work of Plomin and Daniels in 1987. These authors argued that children in the same family are different than one another due to experiences in their nonshared environment. One aspect of the nonshared environment refers to the different ways each parent treats each of his or her children (i.e., differential parenting). Differential parenting refers to the degree to which parents display unequal treatment toward their children in terms of the amounts of negativity, control, sensitivity and warmth they direct to each child. Moderate amounts of differentiation may reflect sensitive parenting, as the parent adjusts his or her treatment of each child based on the child’s distinctive needs (Brody, Stoneman, & McCoy, 1992; Meunier, Bisceglia, & Jenkins, 2012). However, greater amounts of differential parenting and harsh parenting predict children’s propensity for behavioral problems (Tamrouti-Makkink, Dubas, Gerris, & van Aken, 2004). Research suggests that differential treatment may be driven both by differences between siblings and stress on parents. Child effects on differential parenting may include gender, age, and temperament (Jenkins, Rabash, & O’Connor, 2003). Parental effects may include social disadvantage (Jenkins, Rabash, & O’connor, 2003) and parental personality traits (Browne, Meunier, O’connor, & Jenkins., 2012). Overall, differential parenting was found to increase children’s risk of later behavior problems (Caspi et al., 2004; Burt, McGue, Iacono, & Krueger, 2006).
Studies have consistently shown that children who receive less favorable treatment than their siblings, present with more externalizing and internalizing behavior, as well as with lower self-esteem and self-worth (Dunn, Stocker, & Plomin, 1990; McHale, Updegraff, Jackson-Newson, Tucker, & Crouter, 2000; Singer & Weinstein, 2000; Scholte et al., 2007). Social Comparison Theory (Festinger, 1954) has been used in understanding these findings. This theory asserts that individuals have an intrinsic drive to evaluate their own opinions and abilities through self-comparison with others, particularly to those who are perceived as similar. Considering that siblings share their environment and family background, they are likely to engage in self-comparison (Whiteman, McHale, & Soli, 2011). Disfavored siblings who engage in social comparisons with their favored siblings are likely to experience negative self-evaluation, which may lead to suboptimal functioning and compromised sibling relationships (Shanahan et al., 2008). Findings of positive outcomes for favored siblings are limited. In a large twin and step families study, Reiss, Hetherington, Plomin and Howe (1995) found that in families where one child received greater amounts of negativity, the sibling presented with less antisocial behavior. Likewise, in families where greater amounts of warmth were directed to one child, the sibling presented with more depressive symptoms. These authors named this phenomenon the “sibling barricade”. In contrast, other studies have suggested that differential parenting may result in negative outcomes for all siblings in the family (Boyle et al., 2004) and that at least for some outcomes excessive amounts of differentiation are likely to have deleterious effects on a child regardless of whether he or she is being favored or disfavored (Suitor et al., 2008; Meunier, Bisceglia, & Jenkins, 2012; Meunier et al., 2013). For example, Rauer and Volling (2007) found that although siblings who received
more parental affection reported decreased sibling jealousy and higher self-esteem (compared to disfavored siblings), they also experienced high rates of romantic relationship distress. Furthermore, favored siblings were more likely than disfavored siblings to classify their attachment style as insecure (i.e., dismissive or fearful). These findings are consistent with Zervas and Sherman’s (1994) conclusion that individuals who are treated equally within a family present better outcomes than those who are being either favored or disfavored.

Deutsch (1985) developed the idea of distributive justice and argued that individuals experience a negative emotional reaction when an inequality that is perceived as unjust occurs. Thus, both favored and disfavored children in a family should perceive differential parenting as violating the principles of distributive justice. Kowal and colleagues (2002) used distributive justice theory to explain the findings that differential parenting is harmful to all children within the family. However, it should be noted that differential parenting does not appear to impact all children in a family equally. That is, for the outcomes that have been studied to date, disfavored children tend to be impacted more negatively by differentiation than their favored siblings (Burt, McGue, Iacono, & Krueger, 2006; Meunier et al., 2013).

Finally, Social Learning Theory (Bandura, 1977), has been used in explaining the erosion of the sibling relationship as a result of differential parenting, rather than each child’s outcomes. According to this theory, an individual acquires new behaviors and cognitive attitudes through observation and reinforcement of others’ behavior. Parents and older siblings are most likely to be imitated if they are perceived as powerful and competent (Bandura, 1977). Consistent with this theory, perhaps part of the erosion of the sibling relationship quality that is associated with differential parenting reflects
children imitating maladaptive interactions that their parents model. A child, who consistently witnesses his or her parent directing high levels of control and aggression toward his or her sibling, might replicate this harsh behavior pattern when interacting with that sibling. Supporting this notion, Perlman and Ross (1997) suggested that children model parental control strategies during sibling conflicts.

1.2. Differential Parenting and Social Cognition

Advanced social cognitive skills such as understanding others’ emotions and perspective taking (Fenning, Baker, & Juvonen, 2011) predict children’s later adaptive outcomes (Denham et al., 2003), whereas deficits in social cognition have been found to be correlated with externalizing behavior (Denham et al., 2002) and peer rejection (Dekovic’ & Gerris, 1994). One hypothesis regarding the development of social cognition asserts that it is constructed through accumulated experiences, specifically through parent-child interactions. Dyadic communication is perceived as essential to the development of social cognition (Dodge, 2006). Furthermore, Vygotsky (1931;1997) claimed that social understanding is rooted in interpersonal exchanges which are then internalized by the individual (Fernyhough, 2008).

While there is a large body of research examining the influence of differential parenting on children’s behavioral and adjustment outcomes, little if any work has been done on differential parenting and social cognition. We focus on a specific aspect of social cognition: other-orientedness - a child’s ability to understand his or her sibling’s perspective, thoughts, beliefs, and to cooperate with him or her. In order to measure children’s other-orientedness, we administered ToM tasks in addition to measures of perspective taking and cognitive sensitivity. These are described below.
1.3 Theory of Mind

ToM is a complex skill of understanding and predicting another’s psychological state (e.g., feelings, beliefs, and desires; Premack and Woodruff, 1978). Advanced ToM capacity in children has been linked to social competence (Astington & Jenkins, 1995), whereas deficits in ToM are associated with behavioral abnormalities, such as autism and schizophrenia (Baron-Cohen, Leslie, & Frith, 1985). Thus, ToM acquisition is central in the development of social competence. Numerous studies have examined ToM in order to understand this mechanism. Particular attention has been given to variables that predict ToM. Early research suggested ToM to be a maturational process that is not influenced by environmental factors (Leslie, 1994). However, children are highly variable in ToM acquisition, which may in part be explained by early social experiences (see Carpendale & Lewis, 2004; 2006); cross-cultural influences (Vinden, 1999; Wellman et al., 2001) and genetic effects (Hughes & Cutting, 1999). However, according to a more recent twin-study, with a large sample size, conducted by Hughes, Jaffee, Happé, Taylor, Caspi, and Moffitt (2005), no genetic effects were found for ToM. Further, research findings indicated that 44% of the variance in ToM among twins was explained by non-shared experiences, and differential parenting in particular. Thus, differential parenting may accelerate ToM understanding. Since Leslie’s work in 1994, a line of studies has looked into the impact of familial experiences on ToM acquisition. Perner and colleagues (1994) were the first to show that children who had siblings scored higher on measures of ToM than children without siblings in a family. Astington and Jenkins (1996) replicated these results with the exception that children with stronger language skills were not affected by having a sibling. The number of siblings in a family has also been linked to better ToM (false-belief) ability (Lewis et al., 1996).
However, perhaps the *quality* of the relationship, rather than the mere presence or absence of a sibling, is the factor that plays a role in accelerating ToM ability (Hughes, Deater-Deckard, & Cutting, 1999; Hughes & Ensor, 2005). Another line of research has shown that early experiences such as a secure attachment style (Fonagy et al. 1991; Meins 1997; Meins, Russell, & Clarck-Carter, 1998; Symons & Clark 2000), maternal discourse, with an emphasis on mental state talk (see Symons, 2004 for a review), and maternal mind mindedness (i.e., the tendency of a mother to treat her infant as an individual with a mind and ability of intentional behavior; Meins et al., 2002) were associated with ToM.

While understanding another’s mental state involves a larger range of social cognitive skills, the majority of the aforementioned studies used only false-belief tasks (i.e., the ability to judge information provided to an individual when interpreting and predicting the individual’s action; even if the information is not compatible with one’s own) to measure children’s ToM. False-belief tasks do not include any social interaction, but rather are solely directed toward evaluating a child’s cognitive ability. Consistent with the growing recognition that ToM research should encompass a fuller spectrum of mental states (Hughes & Leekam, 2004), we added two measures of social cognition: (1) perspective taking (i.e., the extent to which a child recognizes that his or her interaction partner has their own point of view. This recognition is reflected in the kind of language and reasoning a child directs towards their partner), and (2) cognitive sensitivity (i.e., the ability to provide tailored and sensitive guidance in teaching a novel task). We defined these two skills as “ToM-in-Action” because they capture children’s abilities to understand others within the context of social interaction rather than within a purely cognitive task. Perspective taking and cognitive sensitivity were evaluated
through observations of a child interacting with a younger sibling, and provided us with rich evidence on the subjects’ other-orientedness skills.

### 1.4 Perspective Taking

Perspective taking was defined by Hoffman (1984) as a cognitive process that allows one to understand another’s mental state and includes the explicit ability of taking another’s perspective. This skill promotes prosocial behavior, compassion, and empathy (Hoffman, 1984). According to Premack and Woodruff (1978) ToM is a form of perspective taking.

Perspective taking has been operationalized differently across various studies. For instance, emotional/affective perspective taking is described as the ability to explicitly interpret others’ emotions or feelings (Hughes & Dunn, 1998; Harwood & Farrar, 2006). Visual perspective taking refers to the ability to appreciate how the world looks from another’s perspective (Bigelow & Dugas, 2009). In the current study, perspective taking included a combination of two skills: reasoning and internal state talk because both reflected children’s understanding that they must explain, justify and elaborate their responses to their interaction partner. Such perspective taking can occur during a play interaction, for example, when a child’s request for blocks from their siblings is accompanied by reasoning: “I need this block because without it my castle will collapse”. Internal state talk was also utilized in this sentence as the child expressed a desire (i.e., I need) and a statement of ownership (i.e., my castle). In the literature, affective perspective taking was found to be significantly related to but not overlapping with ToM (Denham, 1986; Harwood & Farrar, 2006), suggesting that the two skills are different representations of cognitive empathy (Farrant et al., 2011).
1.5 Cognitive Sensitivity

Cognitive sensitivity captures an individual’s ability to correctly assess the knowledge and state of mind of their partner while cooperating to reach a shared goal (Prime et al., in press). It is comprised of three processes: building mutuality, mind-reading, and communicative clarity.

In the current study, we examined pre-school aged children’s cognitive sensitivity skills while they interacted with their younger siblings. Cognitive sensitivity was operationalized as the ability of a child to provide tailored guidance in teaching a challenging and novel task to a younger sibling. This measure required the child to be sensitive, cooperative and to perceive his or her younger sibling’s mental state, point of view, and knowledge capacity in order to provide the sibling with the appropriate and comprehensible directions. As ToM understanding requires an individual’s representation of another’s mental states, ToM should be linked to cognitive sensitivity ability. Findings of associations between ToM and children’s teaching skills (Strauss et al., 2002; Davis-Unger & Carlson, 2008; Prime et al., in press) support this notion.

1.6 Covariates

Past research has suggested that variables such as: gender differences in false-belief (Charman, Ruffman, & Clements, 2002; Happe´, 1995), age (Wellman, Cross, & Watson, 2001; Onishi & Baillargeon, 2005), language (e.g., Astington & Jenkins, 1999; Hughes & Dunn, 1998; Jenkins & Astington, 1996), mother’s educational attainment (Cutting & Dunn, 1999; Meins & Fernyhough, 1999), and social economic status (Cole & Mitchell, 1998; 2000; Cutting & Dunn, 1999; Holmes, Black & Miller, 1996) are all
correlated with ToM ability. Therefore, in the current study these variables were controlled in the data analysis.

1.7 The Current Study
The present study expands on the differential parenting literature by examining whether differential parenting is associated with pre-school children’s social cognitive ability. Specifically, is differential parenting related to children’s other-orientedness skills (ToM, perspective taking, and cognitive sensitivity). Thus, our goal in the current study was to explore whether differential parenting cross-sectionally predicted other-orientedness skills above and beyond covariates (described below). Specifically, in contrast with social comparison theory (Festinger, 1954), and consistent with growing evidence that suggest that differential parenting negatively affects all children in a family (Boyle et al., 2004; Meunier, Bisceglia, & Jenkins, 2011; Meunier et al., 2013), as well as with distributive justice theory (Deutch, 1985), a curvilinear association was hypothesized between differential sensitivity and ToM, such that, in families with higher rates of differentiation, children were expected to present lower other-orientedness abilities. As both perspective taking and cognitive sensitivity measures were captured through sibling interactions, we expected them to be influenced by various family dynamics (e.g., differential parenting).

2 Methods

2.1 Participants
The current study is embedded within a larger longitudinal birth-cohort study. The goals of the larger study were to examine genetic and environmental influences on children’s socio-emotional development using a sibling design. Participants were
recruited through a program called *Healthy Babies Healthy Children*, run by Toronto and Hamilton Public Health, which contacts the parents of all newborn babies within several days of the newborn’s birth. To be eligible families had to have a newborn child (called Sibling 1) with birth-weight being over 1500 grams, a sibling who was less than 4 years old (called Sibling 2), and an English speaking mother. Five-hundred and one families make-up the sample data collection. Using 2006 Canada Census Data, the sample was similar to the general population in terms of number of persons in the household and personal income, but had a lower proportion of non-intact families, fewer immigrants and more educated mothers (Meunier, Bisceglia, & Jenkins, 2012).

### 2.2 The Current Study

Data from the third wave of data collection when younger children were 3 and older siblings were on average 5.5 years-old was used in the present study. Data was gathered through questionnaires for mothers and videotaped siblings’ interactions and an interaction of mother with each of her children. The ages of the older siblings represent a sensitive developmental period in theory of mind development, whereas the younger siblings are at an age where false-belief understanding is unlikely to be evident (Austingon, Harris, & Olson, 1988; Gopnik & Wellman, 1994; Perner, 1991; Wellman, 1990; for a review, see Wellman, Cross, & Watson, 2001). As such, the older siblings were the focus of our exploration into individual differences. (N=372, males=192, $M$ age=5.57, $SD=0.77$, range 4-7.67).

### 2.3 Measures

**Theory of Mind.** The Wellman & Liu (2004) scale was used to capture ToM. The scale includes different tasks presented in a sequential order which target children’s
development of theory of Mind understanding. Higher scores reflect a more complex Theory of Mind understanding. In addition to the Wellman and Liu scale, we included a second order belief question (Astington, Pelletier, & Homer, 2002) to promote the variability in children’s performance. The testing session was ended once children failed two consecutive tasks on the scale. All theory-of-mind tasks were presented through stories which were enacted for children with the use of puppets and props (or pictures, i.e. 2nd order false belief). For each of the tasks, the child is given a score of 0 (fail) or 1 (pass). A mean was taken across tasks and the internal consistency of the scale was $\alpha = .81$.

**Cognitive Sensitivity.** Sibling pairs were filmed engaging in a cooperative building task (Aguilar et al., 2001). Dyads were instructed to sit on a yoga mat and use Duplo building blocks to build a picture of a design in 5 minutes. They were each only allowed to touch two of the four colours of Duplo blocks used in the model to ensure collaboration for completion. Interviewers were present in the room with the dyads during the task but did not provide instructions beyond protocol. If children finished the design before the end of five minutes, they were given a second model to build. All children were stopped after five minutes, regardless of completion. The majority of dyads were engaged with the task for 80% or more of the five minutes.

Videotapes of sibling interactions were coded using a measure of cognitive sensitivity (Prime et al., 2013). The measure addresses three linked capacities of mind-reading, mutuality, and communicative clarity. Coders watched the 5-minute film clip in its entirety and then rated the older sibling on a 5-point likert scale, ranging from ‘Not at all true’ (1) to ‘Very true’ (5) on each of the eleven cognitive sensitivity statements.
Items started with ‘This person is…’ and examples include: sensitive to what his/her partner knows and/or understands; good at rephrasing what his/her partner does not understand; gives positive feedback to reinforce his/her partner; clear in his/her requests for help. This approach provides comparable reliability and validity to a more time intensive observational coding method while requiring fewer resources (Prime et al., 2013). The mean was taken across items and internal consistency of the composite was high, $\alpha = .89$. Coders included a mix of undergraduate and graduate students who were trained by an expert coder. Inter-rater reliability was tested by double-coding ten percent of the interactions and reliability checks were carried out throughout the coding period to minimize drift. Disagreements were resolved by taking a mean of the coders’ judgments. Inter-rater reliability on the composite score was acceptable, $\alpha = .72$. All coders were blind to the hypotheses of the study.

**Perspective Taking.** Sibling dyads were video recorded completing the aforementioned Duplo building blocks task. Family interaction was coded using interval coding similar to work done by Volling, McElwain, and Miller (2002), Howes and Matheson (1992), and Perlman & Fletcher (2012), who used it to capture interactions in other contexts. Coders code the interaction based on fifteen 20 seconds intervals. In each one of the 15 snapshots observers coded internal state talk (i.e., desire, emotion, belief, and statement of ownership) and reasoning (e.g., justification, explanations) expressed by each sibling. If a reasoning or internal state talk were observed, the child received a score of 1 for that code for that snapshot. A final perspective taking score was computed by summing up all the snapshots in which reasoning and internal state talk were observed for each child. As the distribution was zero inflated, the final perspective taking score was dichotomized. Subjects who had a final score greater than
zero were assigned the value of 1. Subjects who had a final score of zero, kept that score. As the distributions of each of the variables that make up the perspective taking construct (i.e., reasoning and internal state talk: desire, belief, emotion, statement of ownership) were zero inflated as well, they were all dichotomized, using a similar procedure to the one described above. In order to measure the construct’s internal consistency value, a polychoric factor analysis was conducted in Stata (SE 12.0 version), due to the binary nature of all variables included in the perspective taking construct. Initial eigenvalues showed that the first factor explained 82% of the variance. All five variables that make up the perspective-taking construct showed factor loadings ranging between 0.37-0.7. Inter-rater reliability Kappa values were 0.86 for each of the siblings.

**Mother-child Interaction.** Mother was video recorded interacting with each child across a 5-minute building task and a 5-minute free play period. The building task was similar to the siblings’ Duplo building blocks task described above. During free play, mother and child were instructed to play for five minutes with no toys (Aguilar et al., 2001). Mother and child were instructed to sit in front of the camera on a “magic carpet” (yoga mat) while the camera was set to capture their full body. The two interactions were coded using a scale integrating the Coding of Attachment-Related Parenting (CARP; Matias, 2006) measure, and the Parchisy (PAR; Deater-Deckard et al., 1997) assessing three domains of responsivity (i.e., sensitivity, mutuality, and positive control). Mother’s sensitivity code (CARP) evaluated the extent to which she promoted her child’s autonomy, showed warmth, provided the child with appropriate verbal and non-verbal feedback, and was able to take her child’s perspective. The mutuality code (CARP) targeted the mother-child dyad and is consistent with the concept of “goal-
corrected partnership” (Bowlby, 1982). It assessed the reciprocity in the dyad dialogue, affect sharing, joint engagement in task, and open body posture. The positive control code (PARCHISY) was indexed by the mother’s ability to direct her child through the task using praise, open-ended questions and clarifications. Each of these codes was rated on a 7-point-likert scale, with a higher score indicating higher levels of the targeted behavior. Reliability was assessed through double-coding of 10-25% of total interactions (composite $\alpha=.903$). A final maternal sensitivity score was computed by calculating the mean for all three measures (composite internal consistency $\alpha=.79$).

**Differential Sensitivity.** A differential sensitivity score was computed using a multilevel modeling approach in order to partial out the effect of child age. Differential parenting is highly associated with age of children, specifically with regards to differential positivity (Jenkins, Rasbash, & O’Connor, 2003). According to Jenkins and colleagues, age was found to be a very strong predictor of differential parenting, where older children received more positive treatment than younger children, and middle children were treated less positively than younger children. In order to partial out the effect of age on differential sensitivity, a multilevel regression was performed using a 2-level model in Stata (SE 12.0 version) with maternal sensitivity (raw score) as the dependent variable and with children’s age as the predictor. Regression residuals were then saved and represented the amount of maternal sensitivity directed to each child after accounting for the effects of age. Next, younger siblings residual values were subtracted from those of the older siblings to produce a result of older siblings’ differential sensitivity score, after accounting for the fixed and random effects of age. Higher scores on this measure represent being favored.
Curvilinear Effect- Differential Sensitivity Quadratic Term. A quadratic term for differential parenting was computed. In order to reduce multicollinearity between the linear and the quadratic differential sensitivity terms (Aiken & West, 1991), the quadratic term was computed using centered differential sensitivity values.

2.3.1 Independent Control Variables

Demographics. Child gender (with boys as the reference category), age (was measured in years), socioeconomic status and mother's education level were included as covariates. Socioeconomic status variable was comprised of income and assets. To assess assets the following questions were used: “how many rooms do you have in your house”; “Do you own or co-own this home/apartment/unit, even if still making payments”; “Do you own or co-own a car, even if still making payments”. Annual income was also reported ($M= \$65,000 - \$74,999$). Assets and income items were standardized and a mean was computed, with higher scores indicating higher SES ($\alpha = .79$). Mothers’ education level was measured through their reports on the number of years of education they completed, including secondary and post-secondary education. The mean education level was 15.53 years ($SD=2.47$, range 10-22).

2.4 Data Analysis

Two hierarchical linear regressions and one hierarchical logistic regression were conducted in order to examine the relationship between differential parenting and ToM, sibling cognitive sensitivity and perspective taking. At step 1 the following variables were entered in the model: age, gender, socio-economic status, language, and maternal sensitivity toward target child. At step 2 we added differential sensitivity as a predictor. Finally, at step 3, the quadratic term for differential sensitivity was entered in the model.
2.5 Missing Data

Missing data on mothers’ reports, observational and child testing measures ranged from 0 to 17%. These missing cases if dropped from the analysis can result in reduction of the statistical power and bias the estimates of parameters (Allison, 2003). Multiple imputation analysis was conducted to avoid loss of participants (Rubin, 2003). Multiple imputation analysis was performed using SPSS (version 21) and generated 5 complete datasets that included the covariates, predictors and outcome variables. Each regression analysis was run across all 5 datasets and produced pooled estimates for all coefficients.

3 Results

3.1 Preliminary Analysis

Variable means, standard deviations, bivariate pearson and point biserial coefficients are presented in Table 1. Pearson and point biserial coefficient values present weak to moderate correlations ($-0.17 < r < 0.55$). Preliminary bivariate associations for cognitive sensitivity showed that it was significantly positively associated with children’s age, language skills socioeconomic status, perspective taking, ToM understanding, and with maternal sensitivity. Additionally, cognitive sensitivity was found to be significantly negatively associated with children’s gender and with differential sensitivity. That is, disfavored older girls and children with advanced language, perspective taking skills and Theory of Mind understanding, and children who came from higher socioeconomic status households, were more likely to present with higher cognitive sensitivity. With regards to perspective taking, preliminary bivariate associations showed that this skill was significantly positively associated with children’s
Moreover, perspective taking was significantly negatively associated with children's gender and with differential sensitivity. Specifically, disfavored older girls, children with higher language skills and children with advanced cognitive sensitivity and Theory of Mind abilities, were more likely to use perspective taking language when completing a challenging task with their younger sibling.

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<td>2.48</td>
</tr>
<tr>
<td></td>
<td>0.03</td>
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</tr>
<tr>
<td>5. SES (assets, income)</td>
<td>-0.07</td>
<td>0.15</td>
<td>0.4**</td>
<td>0.88**</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>0.03</td>
<td>0.71</td>
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<td></td>
</tr>
<tr>
<td>6. Mother Sensitivity</td>
<td>-</td>
<td>0.06</td>
<td>0.38**</td>
<td>0.33**</td>
<td>0.41**</td>
<td></td>
<td></td>
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<td></td>
<td>4.25</td>
<td>0.85</td>
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<tr>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>7. Differential Sensitivity</td>
<td>-</td>
<td>0.12</td>
<td>0.06</td>
<td>0.02</td>
<td>0.06</td>
<td>0.55**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.07</td>
<td>0.43</td>
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<td></td>
<td>0.13</td>
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</tr>
<tr>
<td>8. Cognitive Sensitivity</td>
<td>0.28**</td>
<td>-0.1†</td>
<td>0.15**</td>
<td>0.18**</td>
<td>0.21**</td>
<td>0.12†</td>
<td>-1.7**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.58</td>
<td>0.71</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>9. Sibling Perspective Taking</td>
<td>0.16**</td>
<td>-</td>
<td>0.17**</td>
<td>0.06</td>
<td>0.09</td>
<td>0.08</td>
<td>-0.11†</td>
<td>0.40**</td>
<td></td>
<td></td>
<td></td>
<td>0.86</td>
<td>.35</td>
</tr>
<tr>
<td></td>
<td>0.04</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>10. Theory of Mind</td>
<td>0.47**</td>
<td>0.01</td>
<td>0.32**</td>
<td>0.14†</td>
<td>0.20**</td>
<td>0.15**</td>
<td>-0.04</td>
<td>0.32**</td>
<td>0.23**</td>
<td></td>
<td></td>
<td>4.54</td>
<td>2.09</td>
</tr>
<tr>
<td>11. Differential Sensitivity-Quadratic Term</td>
<td>-0.06</td>
<td>0.11†</td>
<td>0.01</td>
<td>0.05</td>
<td>0.04</td>
<td>-0.00</td>
<td>-0.06</td>
<td>-0.03</td>
<td>-0.02</td>
<td></td>
<td></td>
<td>0.76</td>
<td>1.04</td>
</tr>
</tbody>
</table>

Note: †p < .05, ‡p < .01

Table 1. Bivariate Pearson/point biserial correlations, Means and Standard Deviations
3.2 Main Analyses

Three separate hierarchical regression models were conducted to assess the relationship between the predictor, differential sensitivity and each of the dependent variables, sibling perspective taking and sibling cognitive sensitivity (i.e., ToM-in-Action variables), and Theory-of-Mind. Hierarchical regression was selected because it allowed us to evaluate the unique contribution of the predictor to the model, above and beyond covariates.

3.2.1 Model 1: Theory of Mind

Results for hierarchical regression examining the relationship between differential sensitivity and ToM can be found in Table 2. At the first step, the covariates accounted for a significant amount of the variance in the model, $R^2=.28, F(6,365)=24.15, p<.001$. Target child’s age and language skills were found to be significant predictors of ToM understanding. That is, being older and having stronger language skills were associated with higher scores on ToM understanding scale. At step 2, differential sensitivity was included in the model, but it did not explain any more variance in the model, $R^2 change=.003, F(7, 364)=1.6, p=.3$. Thus, differential sensitivity was not significantly associated with ToM ability. Similarly, at step 3, the differential sensitivity quadratic term did not explain any additional variance in the model, $R^2 change<.001, F(8, 363)=.08, p=.8$. These results suggest that differential sensitivity has no curvilinear effect on ToM understanding scores.

3.2.2 Model 2: Perspective Taking

Results for hierarchical logistic regression examining the relationship between differential sensitivity and sibling perspective taking can be found in Table 3. In step 1,
Table 2. Summary of hierarchical regression analysis examining the role of differential sensitivity in predicting Theory-of-Mind.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>SE_B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Covariates</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child gender</td>
<td>-0.031</td>
<td>0.024</td>
<td>-0.06</td>
</tr>
<tr>
<td>Child age</td>
<td>0.150</td>
<td>0.016</td>
<td>0.444***</td>
</tr>
<tr>
<td>Mother education</td>
<td>-0.006</td>
<td>0.075</td>
<td>-0.056</td>
</tr>
<tr>
<td>Socioeconomic status</td>
<td>0.035</td>
<td>0.079</td>
<td>0.091</td>
</tr>
<tr>
<td>Child language skills</td>
<td>0.005</td>
<td>0.051</td>
<td>0.232***</td>
</tr>
<tr>
<td>Maternal sensitivity</td>
<td>0.033</td>
<td>0.068</td>
<td>0.106</td>
</tr>
<tr>
<td><strong>Predictor</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differential sensitivity</td>
<td>-0.019</td>
<td>0.063</td>
<td>-0.063</td>
</tr>
<tr>
<td><strong>Curvilinear effect</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differential sensitivity-Quadratic term</td>
<td>0.001</td>
<td>0.047</td>
<td>0.003</td>
</tr>
</tbody>
</table>

Note: ***p < .001, adjusted \( R^2 = 0.27 \)

the covariates accounted for a small but statistically significant amount of the sibling perspective taking variability (Nagelkerke \( R^2 = .06 \), \( \chi^2(6, 365) = 17.7, p = .01 \). Child age and language skills were found to be significant predictors of sibling perspective taking, where each additional point increase on language skills test increases the odds of using perspective taking language by 2.4%. In addition, with each year increase in a child’s age, he or she were about 47% more likely to use perspective taking language. At step 2, inclusion of differential sensitivity, explained additional 2.2% of variance in the model, Nagelkerke \( R^2 = .082 \), \( \chi^2(7, 364) = 6.44, p = 0.02 \). Differential sensitivity was found to be a
significant predictor of sibling perspective taking, such that, each additional unit increase in mother’s differential sensitivity toward a target child (being favoured), decreases the likelihood of that child using perspective taking language towards his/her younger sibling by about 40%. Lastly, at step 3, differential sensitivity quadratic term did not significantly explain any additional variance in the model (only explained additional .001% of the variance) \( \text{Nagelkerke } R^2 = 0.083, \chi^2(8,363) = 24, p = .65 \). These results suggest that there is no curvilinear effect of differential sensitivity on children’s perspective taking ability.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>SE</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covariates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child gender</td>
<td>-0.031</td>
<td>0.253</td>
<td>0.969</td>
</tr>
<tr>
<td>Child age</td>
<td>0.370</td>
<td>0.147</td>
<td>1.448</td>
</tr>
<tr>
<td>Mother education</td>
<td>0.016</td>
<td>0.101</td>
<td>1.016</td>
</tr>
<tr>
<td>Socioeconomic status</td>
<td>-0.145</td>
<td>0.359</td>
<td>0.865</td>
</tr>
<tr>
<td>Child language skills</td>
<td>0.021</td>
<td>0.010</td>
<td>1.021</td>
</tr>
<tr>
<td>Maternal sensitivity</td>
<td>0.298</td>
<td>0.193</td>
<td>1.347</td>
</tr>
<tr>
<td>Predictor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differential sensitivity</td>
<td>-0.382</td>
<td>0.184</td>
<td>0.683</td>
</tr>
<tr>
<td>Curvilinear effect</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differential sensitivity-Quadratic term</td>
<td>-0.042</td>
<td>0.115</td>
<td>0.959</td>
</tr>
</tbody>
</table>

*Note: *p < .05, *"p < .01, *""p < .001, Nagelkerke \( R^2 = 0.08 \)

Table 3. Summary of hierarchical logistic regression analysis examining the role of differential sensitivity in predicting sibling perspective taking.
3.2.3 Model 3: Cognitive Sensitivity

Finally, a hierarchical regression was conducted to examine the relationship between differential sensitivity and sibling cognitive sensitivity (Table 4). At step 1, the covariates accounted for a significant amount of the variance in sibling cognitive sensitivity, $R^2 = .12$, $F(6, 365)=9.23$, $p<0.001$. Child gender and age were found to be significant predictors of sibling cognitive sensitivity skills. That is, being older was associated with better cognitive sensitivity directed toward younger sibling. Additionally, female participants were more likely to use cognitive sensitivity when interacting with their younger sibling. At step 2, entering differential sensitivity explained additional 3.8% variance in the model, $R^2 change = .038$, $F(7, 364)=17.02$, $p<.001$. Results showed that directing more sensitivity toward an older child (i.e., being favoured) was a significant predictor of his or her cognitive sensitivity skills, such that, the more he or she was being favored, the poorer their cognitive sensitivity towards their younger siblings. In addition, the inclusion of differential sensitivity in the model contributed to the change in maternal sensitivity covariate to become statistically significant as well. That is, children who receive more maternal sensitivity are more likely to present better cognitive sensitivity skills. Lastly, at step 3, differential sensitivity quadratic term was included in the model. The quadratic term did not explain any additional significant variance in the model, $R^2 change = 0.002$, $F(8, 363)=1.07$, $p=.32$. Thus, these results indicate the absence of a curvilinear effect in differential sensitivity on cognitive sensitivity ability.

4 Discussion

The goal of the present study was to explore the relationship between children’s other-orientedness and differential parenting. To date, no other research in the
differential parenting literature has addressed this question. The current study contributes to this field, firstly by attempting to fill this gap using a representative sample of Canadian children ages 4-7. Secondly, the present study introduces a novel measure, ToM-in-Action. ToM-in-Action includes two different observational measures that were coded using two different coding techniques (i.e., global coding of cognitive sensitivity and interval coding of perspective taking). Thus, one of the strengths of this study is that it employed a multiple-measure approach in evaluating other-orientedness ability on a large sample of families. Further, the present study measured differential parenting using observations of mother-child interactions.

<table>
<thead>
<tr>
<th>Cognitive Sensitivity</th>
<th>B</th>
<th>SE_B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covariates</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Child gender</td>
<td>-0.199</td>
<td>0.051</td>
<td>-0.141***</td>
</tr>
<tr>
<td>Child age</td>
<td>0.246</td>
<td>0.051</td>
<td>0.269***</td>
</tr>
<tr>
<td>Mother education</td>
<td>-0.007</td>
<td>0.083</td>
<td>-0.023</td>
</tr>
<tr>
<td>Socioeconomic status</td>
<td>0.144</td>
<td>0.095</td>
<td>0.141</td>
</tr>
<tr>
<td>Child language skills</td>
<td>0.002</td>
<td>0.057</td>
<td>0.04</td>
</tr>
<tr>
<td>Maternal sensitivity</td>
<td>0.151</td>
<td>0.073</td>
<td>0.182*</td>
</tr>
<tr>
<td>Predictor</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Differential sensitivity</td>
<td>-0.193</td>
<td>0.064</td>
<td>-0.242***</td>
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<td>Curvilinear effect</td>
<td></td>
<td></td>
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<tr>
<td>Differential sensitivity-Quadratic term</td>
<td>-0.033</td>
<td>0.05</td>
<td>-0.049</td>
</tr>
</tbody>
</table>

Note: **p < .01, ***p < .001, adjusted $R^2$=0.15

Table 4. Summary of hierarchical regression analysis examining the role of differential sensitivity in predicting sibling cognitive sensitivity.
The novel ToM-in-Action variables, cognitive sensitivity and perspective taking provided us with richer understanding of ToM as it is applied by young children during a challenging sibling interaction. Even though the two skills were coded in two different coding techniques by different sets of coders, the pattern of results using both bivariate correlations and regression coefficients were similar. This indicates that the two measures are capturing similar abilities in different ways. Our initial aim of using ToM-in-Action variables was to examine ToM understanding in the context of an interaction where the setting is more naturalistic for the child to use this skill compared with a false-belief task. Our findings support this and would allow future studies to operationalize ToM in a wider array of contexts.

Consistent with Distributive Justice Theory (Deutsch, 1985), we expected that higher rates of differential parenting would be detrimental for both children in terms of their ToM and ToM-in-Action skills. Our results confirmed this for favored children. Interestingly, this was not the case for disfavored children who directed higher rates of ToM-in-Action towards their younger siblings. Why might this be? Several different theories may explain our pattern of results.

Firstly, the current study findings can be explained through the lens of Social Learning Theory (Bandura, 1977). As described earlier, an individual may replicate behavior patterns he or she observes occurring in the family. Perhaps, favored children who witness their mother consistently directing more negativity toward their disfavored sibling may replicate this dynamic when they interact with that sibling. Similarly, disfavored children who observe their mother directing much sensitivity and positivity toward their favored sibling, may imitate this relationship dynamic when interacting with that sibling.
Secondly, our findings may suggest the presence of a *partner effect* within family dynamics (i.e., siblings and mother-child interactions). A partner effect as used in Social Relations Models, (SRM; Kenny & La Voie, 1984), refers to the degree to which an individual elicits certain behaviours from a variety of people he or she interacts with. SRM allows researchers to examine the family system at the family, dyad, and individual levels to provide information on factors that impact family functioning. Thus, disfavoured children may elicit less sensitive behaviour from their mothers and less cognitive sensitivity and perspective taking language from their siblings. In contrast, favoured children may pull more sensitive responding from their mother and more cognitive sensitivity and perspective taking from their disfavored siblings. As was discussed earlier, differential parenting can be child driven, specifically, children who present more negative affectivity, aggressiveness and irritability, are more likely to receive more negative treatment (Pike et al., 1996; Jenkins, Rasbash, & O’Connor, 2003). For example, perhaps favored *younger* siblings who pull more cognitive sensitivity and perspective taking from their older disfavored siblings are in fact, less skilled and in need of more assistance when completing a challenging task. Their low levels of ability require greater responsivity when interacting with their mothers as well. To very briefly explore this possible explanation, bivariate correlations were conducted to assess whether younger siblings’ aggression, externalizing behavior, and emotional problems may be related to levels of differentiation (for a detailed explanation of the methods of data collection and the scales used see Meunier, Bisceglia, & Jenkins, 2012). These measures were not found to be significantly correlated with differential sensitivity. Perhaps other child characteristics that have not been looked at may influence this relationship.
Future research should consider examining a wider array of both children’s characteristics in order to further explore potential “partner effects” in explaining this pattern of results.

Lastly, the current investigation results are consistent with Hughes and colleagues (2005) hypothesis that in families where differentiation exists, children, who are particularly sensitive to minor inequalities within the family, are likely to engage in conflicts and discussions with parents regarding preferred treatment. In turn, these discussions may enhance children’s ability to differentiate between different people’s perspectives. This hypothesis relied on findings that showed that in families where conflicts were frequently discussed, children presented with accelerated ToM ability (Dunn & Slomkowski, 1992). Even though current investigation findings did not indicate that disfavoured siblings present with better ToM, they indeed suggest that disfavoured siblings present with more advanced ToM-in-Action skills compared with their favoured siblings.

The relationship between children’s ToM-in-Action performance, as part of a sibling interaction, and differential parenting may be mediated by other familial processes as suggested in the aforementioned theories of Social Learning and Social Relations Model. Therefore, these findings may be limited to the sibling dyad and cannot be generalized to relationships and interactions outside the family unit. This can also explain why the relationship between differential sensitivity and ToM was not statistically significant in this study. ToM is a cognitive construct that is measured independently from any family dynamic and thus, is less likely to be impacted by familial interactions.
Our findings highlight the link between maternal sensitivity and children’s cognitive sensitivity. This is consistent with findings that show the relationship between mother’s mind-mindedness and children’s social cognition (e.g., Meins et al., 2002). For ToM understanding, our results showed that its strongest predictor was age, which accounted for 22% of the variance. This is consistent with results obtained by other researchers (e.g., Wellman et al., 2001). Age was found to be a significant predictor of cognitive sensitivity as well, and may be indicative of the complexity of cognitive sensitivity skills, which require the child to exhibit an integration of several prosocial skills. Further, child language skills were shown to be significant predictors of ToM and of perspective taking. Language has previously been shown to play a central role in the development of ToM (Astington & Jenkins, 1999). Additionally, both ToM false-belief tasks and perspective taking measure are highly language loaded tasks (i.e., to score well requires adequate language skills). Interestingly, language was not found to be a significant predictor of cognitive sensitivity. Perhaps, children who could compensate for their low language skills by effectively using non-verbal gestures in providing both instructions and feedback, and who presented much sensitivity and warmth, could have received a high score on cognitive sensitivity. Finally, child gender was found to be a significant predictor only of cognitive sensitivity, with girls showing higher skills in this domain than boys.

5 Limitations

The cross-sectional design of the present study does not allow us to draw conclusions regarding directionality of the relationship between differential parenting and ToM-in-Action variables. Moreover, due to age constraints, younger siblings' ToM
and ToM-in-Action skills were not investigated. Thus, we cannot speak to the role of birth order or dyad gender constellation in the relationship between differential parenting with ToM and ToM-in-Action.

Finally, we did not have enough resources to observe all children within each family, nor the fathers’ interactions with each of their children. This can result in misrepresentations of family dynamics in larger families (>2 children). Particularly, as larger households were found to promote ToM skills (false-belief understanding; Jenkins & Astington, 1996). Future research should go beyond a non-trivial sample of 372 children, and include additional family members and use longitudinal methods if at all possible.

In conclusion, future research should focus on examining potential mediators such as sibling relationships and partner effect, preferably within a multi-level, longitudinal study design which will allow investigating causality and within-family dynamics more thoroughly. It should be noted however, that while the current study should be replicated and expanded, financial and human resources demands of such a study would be substantial.

Despite these limitations, the current study provides useful insights about the role of differential parenting in ToM and ToM-in-Action. Interestingly, for these outcomes differential parenting seems detrimental for children who are favored by their parents. This contributes yet another piece to the puzzle of the role of differential parenting in children’s outcomes.
6 References


Matias, C., Scott, S., & O’Connor, T. G. (2006). *Coding of Attachment-Related Parenting (CARP).*


