Mothers' and fathers' sensitivity with their two children: A longitudinal study from infancy to early childhood.

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Abstract

To examine the effects of child age and birth order on sensitive parenting, 364 families with two children were visited when the second-born children were 12, 24, and 36 months old, and their older siblings were on average two years older. Mothers showed higher levels of sensitivity than fathers at all assessments. Parental sensitivity increased from infancy to toddlerhood, and then decreased into early childhood. The changes in parental sensitivity with child age were similar for mothers and fathers, and mothers' and fathers' sensitivity levels were related over time. However, the changes in parental sensitivity towards the firstborn and second-born child were not related to each other, suggesting that parents' experiences with the firstborn child do not have implications for their sensitivity towards their second-born child. Instead, the child's own unique characteristics and developmental stage seem to play a more important role. These findings highlight the importance of considering developmental child characteristics in the study of parenting, and suggest that individual differences in attaining developmental milestones may affect parental sensitivity.

Keywords: sensitivity, fathers, mothers, birth order, child age

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In the literature on early childhood caregiving, parental sensitivity is a central dimension of parenting (Mesman & Emmen, 2013). It concerns the parent's ability to notice child signals, to interpret these signals correctly, and to respond to these signals in a prompt and adequate manner (Ainsworth, Bell, & Stayton, 1974). Central to this definition is the parents' appropriate adjustment of their responses to the specific needs and interests of the child. During infancy and toddlerhood parents are challenged to adapt their responses according to the rapidly changing developmental levels of their children, and research suggests that parents are able to do so, resulting in consistent or even increasing levels of sensitive parenting across time (e.g., Bergmann, Wendt, Von Klitzing, & Klein, 2013; Bornstein, Tamis-LeMonda, Hahn, & Haynes, 2008; Kemppinen, Kumpulainen, Raita-Hasu, Moilanen, & Ebeling, 2006; Kochanska & Askan, 2004). In addition to changes driven by developmental processes within the child, family dynamics also change when a second child is born (which happens in 60% of families in the Netherlands; Aalders, 2003). Parents are then no longer responsible for only one child but have to divide their attention and affection between two children (Furman & Lanthier, 2002), and their experiences with their firstborn child may have important consequences for the way parents approach childrearing with later-born children (Whiteman & Buchanan, 2002). As a result, changes in parental sensitivity towards a later-born child over time do not necessarily follow the same trajectory as changes in parental sensitivity towards the firstborn child. In the current study we longitudinally examine changes in mothers' and fathers' sensitivity towards firstborn and second-born children within the context of the larger family system across infancy and early childhood.

The developmental achievements associated with infancy and early childhood may challenge parents to adjust their responses to the changing developmental levels of their child.

There are different hypotheses with respect to whether and how parents modify their responses to these changes: Across time, levels of parental sensitivity (1) are stable, (2) increase, or (3) decrease. Several studies confirm hypothesis (1), as parents adequately adapt their responses to the changing developmental levels of their children (Bornstein et al., 2008; Howes & Obregon, 2009; Lovas, 2005; Stack et al., 2012; Kochanska & Askan, 2004). Certain types of responding are more appropriate during specific developmental stages of the child and less in others, and parents appear able to flexibly use different types of responsiveness depending on the age of the children. For example, as the child matures, mothers generally respond with fewer descriptions and exploratory prompts, but at the same time increasingly respond with imitations and expansions, questions, and play prompts (Bornstein et al., 2008).

There is also empirical support for hypothesis (2) that parental sensitivity increases during infancy and early childhood (Biringen et al., 1999; Braungart-Rieker, Hill-Soderlund, & Karras, 2010; Kemppinen et al., 2006). During the first years of life, infants start to speak their first words and are increasingly able to communicate with their environment (e.g., Iverson, 2010). As a result, young children become more active social partners in interaction with their parents and have more skills to communicate their needs and wishes, which might make it easier for parents to understand their children's needs and respond more sensitively. In addition, parents develop more effective childrearing strategies through practice (Whiteman, McHale, & Crouter, 2003), and might also show increases in sensitivity because they become more familiar with children's unique characteristics and needs.

Finally, hypothesis (3) points towards decreases in parental sensitivity over time. One study reported a small but significant decrease in maternal sensitivity from five to 20 months of child age (Bornstein et al., 2010). During infancy and toddlerhood, the achievement of the ability to crawl and walk increases the opportunities for the child to explore his or her environment. This transition to locomotion may be associated with more challenges for the parent (i.e., potential for safety and norm violations) and evoke more discipline-related parenting behaviors (Bornstein et al., 2010). For example, parents are found to show increased attempts to influence their child's behavior as the child becomes older (Kochanska & Askan, 2004), which might hamper sensitive responses. Although parental sensitivity and gentle discipline can certainly go together, a strong focus on child obedience and limit-setting may go at the expense of the child's needs and may thus result in less harmonious parent-child relationships.

As children become older, so do their siblings, whose developmental progressions exert their own influence on family dynamics. Further, there is evidence that parents interact differently with firstborn and later-born children in the family (e.g., Hallers-Haalboom et al., 2014; Van IJzendoorn et al., 2000; Volling, Blandon, & Gorvine, 2006), suggesting that the development of parental sensitivity towards one child over time does not necessarily follow the same trajectory as parental sensitivity towards a sibling. Shanahan, McHale, Osgood, and Crouter (2007a) propose two ways to conceptualize parental differential treatment.

Concurrent parental differential treatment refers to parents' differential treatment of their children at the same time point, when the two children differ in age and may thus elicit different caregiving patterns, as has been shown in some studies (Hallers-Haalboom et al., 2014; Volling et al., 2006). Age-graded parental differential treatment, on the other hand, refers to parents' differential treatment of their children when they had the same age. Only longitudinal designs allow for such comparisons and, to our knowledge, no more than two observational studies compared parental treatment of firstborn and second-born children within the family when they had the same age. Dunn, Plomin, and Nettles (1985) observed that mothers behaved very similarly towards their two siblings when each child was 12 months old. In contrast to these findings, Van IJzendoorn and colleagues (2000) showed that mothers were less sensitive in their interactions with their later-born child than with their firstborn child when they were observed at 12-14 months.

Two hypotheses address how experiences with the firstborn child can affect parents' relationships with later-born children (Shanahan, McHale, Crouter & Osgood, 2007b, Shanahan et al., 2007a). The learning-from-experience hypothesis proposes that parents use their experiences with their firstborn child when faced with similar situations with their later-born child (Whiteman et al., 2003). As a result, parents are more experienced and may feel more competent in the interaction with later-born children, which in turn could lead to an improvement of parent-child interactions with later-born children. Indeed, parents report less conflict with their second-born than their firstborn children and have greater knowledge of their second-born children's daily activities than of their firstborn children's activities during early adolescence (Whiteman et al., 2003). Further, second-born children tend to experience fewer conflicts with their parents during the transition into adolescence than firstborns, whereas firstborn children report an elevation of parent-offspring conflict frequency during this transition (Shanahan et al., 2007b).

In contrast to the learning-from-experience hypothesis, the spillover hypothesis (Larson & Almeida, 1999; Shanahan et al., 2007b) implies that responses to the challenges of the firstborn's developmental stage might have negative implications for parents' relationships with other children within the family. For example, Shanahan and colleagues (2007b) found that siblings experienced elevated levels of conflict with parents between middle childhood and middle adolescence: firstborn children as they approached middle adolescence and second-born children in the later part of middle childhood. This pattern suggests that whereas increases in firstborn's reports of conflict frequency with parents were timed to their own transition to adolescence, second-born children's experiences of elevated conflict with parents were associated with their older siblings' transition instead of their own (Shanahan et al., 2007b).

No studies addressing within-family similarities and differences between parents' interactions with their firstborn and later-born children have included fathers, although family system theory (Cox & Paley, 1997; Minuchin, 1985) highlights the importance of studying parent-child pairs in the context of the larger family system that includes both parents. There is ample evidence that paternal sensitivity contributes to positive child development (e.g., Cabrera, Shannon, & Tamis-LeMonda, 2007; Lucassen et al., 2011; Tamis-LeMonda et al., 2004, Webster et al., 2013), but less agreement exists about the differences and similarities between mothers' and fathers' parenting behavior. To date, most studies indicate that mothers are generally more sensitive towards their children than fathers (e.g., Barnett et al., 2008; Hallers-Haalboom et al., 2014; Lovas, 2005; Schoppe-Sullivan et al., 2006; Volling, McElwain, Notaro, & Herrera, 2002). These differences between mothers and fathers occurred across various contexts, suggesting that differences between mothers and fathers in parenting do not depend on the situation in which the parent interacts with the child (Volling et al., 2002). In contrast, several other studies concluded that fathers are just as sensitive as mothers towards their young children (e.g., Braungart-Rieker, Garwood, Powers, & Wang, 2001; John, Haliburton, & Humphrey, 2012; Lucassen et al., 2015; Tamis-LeMonda et al., 2004). Interestingly, there are no evident differences between the studies that do and do not find mother-father differences with respect to sample characteristics, procedures or instruments. These inconsistent findings indicate that parent gender is still an important factor to consider in research on parenting behavior.

In addition, the effects of child age and birth order might be different for mothers and fathers. For example, one cross-sectional study with young children showed that fathers with older children were more sensitive in their interactions than fathers with younger children, whereas mothers provided similar levels of sensitivity regardless of child age (Bergmann et al., 2013). This finding may reflect the fact that the time fathers spend on caregiving increases when the child grows older (Yeung, Sandberg, Davis-Kean, & Hofferth, 2001). On the other hand, mothers and fathers might also become more similar over time because they observe each other or discuss the interaction with their children and, as a result, may learn from each other and adopt similar parenting styles (Braungart-Rieker, Garwood, Notaro, & Powers, 1998). However, Bergmann and colleagues (2013) observed parenting behavior towards children of different ages cross-sectionally and not longitudinally. As a result, firm conclusions about the role of child age on mothers' and fathers' sensitivity could not be drawn. Further, a longitudinal study showed that declines in fathers' warmth (but not mothers' warmth) during the transition to adolescence were less pronounced for second-born children than for firstborn children, which is consistent with the learning-from-experience hypothesis (Shanahan et al., 2007a). Thus, both child age and birth order may relate to different developmental patterns of sensitivity in fathers than in mothers, but this constellation of family dynamics has never been tested longitudinally across infancy and early childhood.

Current study

The current study extends previous work by longitudinally examining the effect of child age and birth order on mothers' and fathers' sensitivity within the context of the family system. The first goal was to examine changes in parents' sensitivity towards their children from infancy to early childhood. The following three competing hypotheses were tested: across time, levels of parental sensitivity (a) remain stable (e.g., Lovas, 2005; Stack et al., 2012), (b) increase (e.g., Braungart-Rieker et al., 2010; Kemppinen et al., 2006), or (c) decrease (Bornstein et al., 2010). Related to this issue, we tested the hypothesis that differences in parental sensitivity between mothers and fathers become smaller over time (Bergmann et al., 2013). Our second goal was to examine whether changes in parental sensitivity in a single parent-child pair were related to changes in parental sensitivity in other parent-child pairs within the family. Based on a family system perspective (Cox & Paley, 1997; McHale, Crouter, & Whiteman, 2003; Minuchin, 1985), we expected that experiences with the firstborn child affect the parent's relationship with the later-born child. Further, we tested whether or not our data supported the learning-from-experience hypothesis (Whiteman et al., 2003) or the spillover hypothesis (Larson & Almeida, 1999; Shanahan et al., 2007b).

Method

Sample

This study is part of the longitudinal study [BLINDED FOR REVIEW] examining the influence of mothers' and fathers' gender-differentiated socialization on the socio-emotional development in boys and girls in the first years of life. The current paper reports on data from the first three waves of the study.

Families with two children were selected from municipality records in the Western region of the Netherlands. Families were included if the second-born child was around 12 months of age and the firstborn child was approximately two years older. Exclusion criteria were single-parenthood, severe physical or intellectual handicaps of parent or child, and being born outside the Netherlands and/or not speaking the Dutch language. Between April 2010 and May 2011, eligible families were invited by mail to participate in a study on the unique role of mothers and fathers on socio-emotional development with two home visits each year over a period of three years. All families received a letter, a brochure with the details of the study, and an answering card to respond to the invitation. Of the 1,249 eligible families 31% were willing to participate (n = 390). The participating families did not differ from the non-participating families in age of mothers (p = .83) or fathers (p = .13), educational level of mothers (p = .27) or fathers (p = .10), or the degree of urbanization of residence (p = .77). At the end of the third wave, 18 families no longer participated because of problems in the family (*n* = 3), moving abroad (*n* = 5), considering the home visits too demanding (*n* = 7), or because they could not be reached by phone or mail (*n* = 3).

For the current study, families were excluded if observations of parental sensitivity for one or more waves were missing (*n* = 8), resulting in a final sample of 364 families. The current sample consisted of families with the following sibling gender constellations: 99 boy-boy (27%), 86 girl-girl (24%), 90 boy-girl (25%), and 89 girl-boy (24%). At the time of the first home visit at Wave 1 the age of the firstborn children ranged from 2.5 to 3.6 years (*M* = 3.0, *SD* = 0.3) and the second-born children were 12.0 months old (*SD* = 0.2). The families were visited again when the second-born children were 24.0 (*SD* = 0.3) and 36.0 months (*SD* = 0.7) old. At wave 1, mothers were aged between 25.1 and 45.6 years (*M* = 34.0, *SD* = 3.8) and fathers were between 25.8 and 53.3 years of age (*M* = 36.7, *SD* = 4.8). With regard to educational level, most mothers finished academic or higher vocational schooling (79%) and the same was true for fathers (77%). The percentage of highly educated parents in our study is larger than in the general Dutch population (Sociaal Cultureel Planbureau [SCP], 2012). Mothers worked on average 25.8 hours per week (*SD* = 8.8, range 0-60) and fathers worked 37.3 hours per week (*SD* = 7.2, range 0-80), which is comparable to the average working hours of mothers and fathers in the general Dutch population (SCP, 2012). At Wave 1, most parents were married (79%), 14% of the couples had a cohabitation agreement or registered partnership, and 7% lived together without any kind of registered agreement. During the study, parents of 8 families got divorced, and in 15% of the families a third child was born (*n* = 53). Analyses with and without these families yielded similar results, so these families were retained in the current data set.

Procedure

At every wave each family was visited twice; once with the mother and the children and once with the father and the children, separated by a period of about two weeks. The order in which mothers and fathers were visited and interacted with the firstborn and second-born child was counterbalanced between families and waves. Before the first home visit, both parents were asked to individually complete a set of questionnaires. During the home visits, parent-child interactions and sibling interactions were filmed. At the first two waves the firstborn child and both parents completed computer tests, from the third wave the second-born child also completed computer tasks. In case of a third child in the family, this child was not present during the observations. All home visits were conducted by pairs of trained (under)graduate students. Families received a payment of 30 Euros and small presents for the children. Informed consent was obtained from all participating families. Ethical approval for this study was provided by the Commission Research Ethics Code of the [BLINDED FOR REVIEW].

Measures

Parental sensitivity. The fourth edition of the Emotional Availability Scales (EAS; Biringen, 2008) was used to measure parents' sensitivity towards their children during free play. Each parent-child pair received a bag of toys and was invited to play for eight minutes. Sensitivity refers to the parent's ability to show warmth and be appropriately responsive to the child. Important aspects are the expression and appropriateness of positive affect, and clarity in perception of the child's signals and the ability and willingness to respond appropriately to such signals. The construct is divided into seven subscales; the first two subscales are coded on 7-point Likert scales and the other subscales are coded using 3-point Likert scales (potential score range 7-29). For every subscale a global rating was given for the entire free play session.

The second author, who is an experienced coder of parent-child interactions, completed the online training provided by Zeneyp Biringen and then trained a team of coders. During the team training, some subscales led to persistent interpretation problems and some alterations were made to improve intercoder agreement (for more information see [AUTHOR]). Three groups of in total 13 coders rated the videotapes on the EAS dimensions. All groups completed a reliability set (n = 60), with at least 42% overlap between two different reliability sets. Intercoder reliability was adequate, with intraclass correlation coefficients (single measure, absolute agreement) ranging from .71 to .92. For every wave, all parent-child pairs within the same family were coded by different coders to guarantee independency among ratings. No coder rated a parent twice. During the coding process, the first 100 videotapes of every coder were coded independently by separate coders and regular meetings were organized to prevent coder drift.

Data analysis

All variables were inspected for outliers, defined as values more than 3.29 *SD* above or below the mean (Tabachnick & Fidell, 2012). Outliers were found for sensitivity at all three waves (n = 16). The outlying scores were winsorized by giving them a marginally higher value than the most extreme non-outlying value (Tabachnick & Fidell, 2012). Analyses performed with the non-winsorized and winsorized data did not show different results. Therefore the results of the non-winsorized data are presented. All variables were normally distributed.

As a first step in the analyses, univariate linear growth curve models of parental sensitivity were estimated for each parent-child pair (mother-firstborn, mother-second-born, father-firstborn, father-second-born, see Appendix A) with EQS 6.2 for Windows (Bentler, 2001). The χ^2 likelihood ratio statistic, comparative fit index (CFI), and root mean square error of approximation (RMSEA) were taken as indicators for the evaluation of the overall goodness of fit of the model. The χ^2-value provides a test of the overall fit of the model to the data, but is sensitive to sample size (Bentler & Bonett, 1980). Therefore, the fit was judged to be acceptable with a CFI value greater than .95 and an RMSEA of less than .08 (Byrne, 2006).

Prior to testing the linked trajectories of mothers' and fathers' sensitivity towards firstborn children and second-born children, we tested whether or not the four parent-child pairs were empirically distinguishable in terms of their levels of parental sensitivity by using the procedures described by Kashy, Donnelan, Burt, and McGue (2008) and Kenny, Kashy, and Cook (2006). Four models were tested (Table 1). The χ^2-values for the test of distinguishability were all significant (*ps* < .01), suggesting distinguishability between the four parent-child pairs. Although the other fit indices did not show a consistent pattern (see Appendix B), the LM-test indicated that the means for all models should not be constrained (*ps* < .02). In sum, we conclude that there was not enough evidence for indistinguishability between the four parent-child pairs.

Dyadic growth curve models were specified for the distinguishable case as described by Kashy and Donnelan (2008). Four dyadic growth curve models were tested (Table 1), examining linked trajectories of mothers' and fathers' sensitivity (separately for firstborn children and second-born children) and parental sensitivity towards firstborn children and second-born children (separately for mothers and fathers). Figure 1 presents the dyadic growth curve model that was tested. In the process of model fitting, we retained significant covariances and covariances that were necessary for the model to converge. The overall fit of the dyadic growth curve models was judged to be acceptable with a CFI value greater than .95 and an RMSEA of less than .08 (Byrne, 2006).

Results

Preliminary analysis

Descriptive statistics and correlations between mothers' and fathers' sensitivity towards their firstborn and second-born child are presented in Table 2. Close inspection shows that parental sensitivity towards the firstborn child decreased over time. Parental sensitivity towards the second-born child increased from the first to the second wave, but remained relatively stable from the second to the third wave (see also Figure 2). Paired *t*-tests indicated that at all three waves mothers were more sensitive towards their children than fathers ($ps < .01$).

To further examine differences in parental treatment of firstborn and second-born children, parental sensitivity towards the two children was compared when both children were three years old (firstborn child during the first wave and second-born child during the third wave). Analyses were conducted using GLM Repeated Measures analyses, controlling for the age difference between the firstborn child and second-born child[1] and the effect of having a third child in the family. With respect to differences between mothers and fathers, a significant main effect was found, *Pillai's F* (1, 358) = 37.33, $p < .01$, $\eta_p^2 = .09$. Consistent with the patterns shown in Table 2, mothers were more sensitive towards their children than fathers. No significant main effect was found for birth order, *Pillai's F* (1, 358) = 1.30, $p = .26$, $\eta_p^2 < .01$. When both children were three years old, parents showed similar levels of sensitive behavior towards their firstborn child and second-born child. Further, no significant interaction between parent gender and child birth order was found ($p > .89$) and none of the two-way interactions between the within-subjects factors (parent gender, child birth order) and the between-subjects variable (sibling gender constellation) were significant ($ps > .11$).

Longitudinal changes in parental sensitivity

Fit indices and parameter estimates for each model are presented in Table 3. All four univariate growth models demonstrated acceptable to excellent fit. Quadratic slopes were also fitted, but there was no evidence of curvilinear trajectories for parental sensitivity towards the firstborn child. Further, adding quadratic slopes did not significantly improve the growth models for parental sensitivity towards the second-born child (ΔCFI < .01). All of the

[1] Because the age difference between firstborn children (measured at the first wave) and second-born children (measured at the third wave) ranged from -12 to 7 months, this variable was included as a covariate in the analyses.

univariate growth curve models had significant variances in the intercept (*ps* $< .01$), indicating individual variation in sensitivity scores at the first wave for all parent-child pairs. Further, the model for paternal sensitivity towards the second-born child showed significant variance in the linear slope ($p < .01$), suggesting that there was detectable variation in the growth of paternal sensitivity. Within the univariate growth curve model for paternal sensitivity towards the second-born child, the intercept and slope were also significantly associated ($r = -.81$, $p < .01$). Fathers with higher levels of sensitivity at the first wave showed less increase in parental sensitivity over time. As reported in Table 2, average levels of maternal and paternal sensitivity towards the firstborn child decreased from Wave 1 to Wave 3 and parental sensitivity towards the second-born child increased from Wave 1 to Wave 3.

Multiple group analyses were conducted to examine whether the univariate growth curve models differed for boys and girls. In the models for parental sensitivity towards the firstborn child where all parameters were restricted to be equal between boys and girls, the LM tests did not give reason to release parameters (mothers: *ps* $> .07$, fathers: *ps* $> .07$). Although the LM test revealed one parameter (intercept) in the model for maternal sensitivity towards the second-born child that did not operate equivalently across the two groups ($p = .02$), releasing this constraint did not lead to substantial improvement in model fit compared to the fully constrained model (ΔCFI $< .01$) indicating that the growth curve model for maternal sensitivity towards the second-born child was not substantially different for boys and girls. However, the model for paternal sensitivity towards the second-born child in which three parameters (intercept, slope, and variance in slope) were freely estimated differed significantly from the fully constrained model (ΔCFI=.03). Fathers were less sensitive towards boys ($M = 22.35$, $SE = .24$) than towards girls ($M = 23.29$, $SE = .25$) at the first wave, but paternal sensitivity towards boys (unstandardized $\beta = .85$, $p < .01$) increased more rapidly over time than paternal sensitivity towards girls (unstandardized $\beta = .35$, $p < .01$).

Linking trajectories of parental sensitivity towards firstborn and second-born children

Since there were detectable differences between sensitivity of mothers and fathers and parental sensitivity towards firstborn children and second-born children (see Analyses section), dyadic growth curve models for the distinguishable case were specified. All models demonstrated acceptable to excellent fit (see also Appendix C).

Associations between trajectories of mothers' and fathers' sensitivity. With respect to the model testing the linked trajectories of mothers' and fathers' sensitivity towards their firstborn child (Model 1: χ^2 (15) = 22.69, p = .09, CFI = .97, RMSEA = .04), the model yielded a significant correlation between the intercepts for mothers and fathers (r = .36, p < .01), indicating that when one parent showed relatively high sensitivity, the other parent also tended to be high in sensitivity at the first wave. Further, there was a significant covariance between the residuals (r = .15, p < .05). After controlling for the other parameters in the model (i.e., controlling for the effects of time) mothers' and fathers' levels of parental sensitivity were still positively associated.

With regard to parental sensitivity towards the second-born child (Model 2: χ^2 (12) = 48.85, p < .01, CFI = .99, RMSEA = .02), significant correlations were found between intercepts for mothers and fathers (r = .42, p < .01) and between slopes for mothers and fathers (r = .68, p < .05). These positive correlations suggest that mothers and fathers follow similar patterns of parental sensitivity towards their second-born child in terms of their initial status and increase in sensitivity over time. Further, the model showed that if mothers were more sensitive at the first wave, fathers tended to show a smaller increase in sensitivity over time (r = -.60, p < .01). A similar pattern was found within fathers; fathers with higher levels of sensitivity at the first wave showed less change in parental sensitivity over time (r = -.80, p < .01).

Associations between trajectories of parental sensitivity towards firstborn and second-born children. The model testing the linked trajectories of maternal sensitivity towards their firstborn child and second-born child (Model 3: χ^2 (15) = 30.44, p = .01, CFI = 1.00, RMSEA = .00) only yielded a significant correlation between the intercepts for maternal sensitivity towards the firstborn child and second-born child (r = .84, p < .01). This positive correlation indicated that mothers showed similar levels of parental sensitivity towards their firstborn child and second-born child at the first wave. No significant associations were found between the slopes, suggesting that the decrease in maternal sensitivity towards the firstborn child was not related to the increase in maternal sensitivity towards the second-born child.

With respect to paternal sensitivity towards their firstborn child and second-born child (Model 4: χ^2 (14) = 40.57, p < .01, CFI = .98, RMSEA = .04), the model also indicated that fathers showed similar levels of parental sensitivity towards their firstborn child and second-born child at the first wave (r = .85, p < .01). In addition, the model showed that if fathers were more sensitive at the first wave (either towards their firstborn child, r = -.46, p < .05, or second-born child, r = -.81, p < .01) they tended to show a smaller increase in sensitivity towards their second-born child over time. Similar to the model testing the linked trajectories of maternal sensitivity towards both children, the decrease in paternal sensitivity towards the firstborn child was not related to the increase in paternal sensitivity towards the second-born child.

Discussion

In our longitudinal study of parental sensitivity with two children from infancy to early childhood, parental sensitivity was found to change with child age. Parental sensitivity towards the firstborn child decreased over time, but parental sensitivity towards the second-born child increased from infancy to toddlerhood. The change of parental sensitivity with child age was similar for mothers and fathers, mothers' and fathers' sensitivity levels were found to be related over time, and at all three waves mothers showed higher levels of sensitive behavior than fathers. Further, our results indicate that changes in parental sensitivity towards the firstborn and second-born child were not related over time. More specifically, the decrease in parental sensitivity towards the firstborn child was not related to the simultaneous increase in parental sensitivity towards the second-born child.

Changes in parental sensitivity from infancy to early childhood

Child age. In line with previous work (Biringen et al., 1999; Braungart-Rieker et al., 2010; Kemppinen et al., 2006), we found that parental sensitivity towards the second-born child increased from infancy to toddlerhood and remained stable between 24 and 36 months. The strong increase in children’s verbal skills to communicate their needs and whishes during the second year of life (e.g., Iverson, 2010) may help parents to modify their parenting behavior in a way that fits their child’s needs. Both parents’ sensitivity decreased between ages three and five years of the firstborn child. This decrease may be explained by the onset of school attendance at age four years (normative in the Netherlands), which may mark a phase transition that leads to a reorganization of the parent-child relationship (Granic, Hollenstein, Dishion, & Patterson, 2003). Phase transitions are characterized by an increase in the variability of dyadic patterns, which in turn may temporarily interfere with optimal parenting practices.

Birth order. To disentangle the effect of birth order and child age on parental behavior during infancy and early childhood, we also tested for differences in parental sensitivity towards firstborn and second-born children when they had the same age. Our results indicate that mothers and fathers showed similar levels of sensitive behavior towards their firstborn child at age three years and their second-born child at the same age, which is in line with an early study by Dunn and colleagues (1985). This suggests that differences in parental sensitivity towards siblings could not be explained by birth order but seem to be primarily related to the developmental status of both siblings (reflected by child age).

Differences between mothers and fathers

Mothers were more sensitive towards their children during infancy and early childhood than fathers. These findings are in line with previous studies (e.g., Barnett et al., 2008; Hallers-Haalboom et al., 2014; Lovas, 2005; Schoppe-Sullivan et al., 2006) and extend the literature by showing that the differences between mothers and fathers are persistent over time during the first years of the child's life. These differences in parenting behavior may be due to the fact that mothers on average spend two to three times as much time with their children than fathers do (Huerta et al., 2013; SCP, 2011). As a result, mothers might have more knowledge of their children's needs and interests, which makes it easier for them to adjust their responses accordingly. Because father involvement in childcare generally increases after infancy (Furman & Lanthier, 2002; Yeung et al., 2001), we expected the gap between mothers' and fathers' sensitivity to decrease over time, but this was not the case. It may be that such a catch-up effect does not occur until children reach middle childhood, when the division of childcare becomes more equal (Yeung et al., 2001).

An often heard critique of gender role theories is that they are no longer applicable to Western societies because of the shift towards more egalitarian gender roles. Over the last few decades such a shift in gender role patterns has indeed occurred in the Western societies: Mothers' participation in the labor market increased substantially and fathers have taken more active roles in their children's socialization (Cabrera, Tamis-LeMonda, Bradley, Hoffert, & Lamb, 2000; Lamb, 2010). However, although the division of gender roles became less strict, there is evidence that maternal involvement still remains substantially higher and that in Europe as a whole and in the Netherlands specifically, mothers spend on average two to three times as much time in direct one-on-one interaction with their children compared to fathers

(Huearta et al., 2013; SCP, 2011). This implies that mothers are still the primary caregivers of young children in most families. So even though some aspects of traditional gender roles have become less salient over time, gendered task division in families is still very relevant to current-day societies (Endendijk, Groeneveld, & Mesman, 2014), and may therefore provide one of several possible explanations for our results regarding differences between mothers and fathers in sensitivity.

Alternatively, mothers may maintain an advantage in sensitivity throughout child development, because females are more competent in decoding social and emotional nonverbal information than males (Hall & Matsumoto, 2004), especially in decoding subtle emotional expressions (Hoffmann, Kessler, Eppel, Rukavina, & Troue, 2010). Further, fathers have been found to use more directive speech, informing speech, and questions and requests than mothers when interacting with their children, suggesting that fathers are more goal-oriented than mothers (Leaper, Andersons, & Sanders, 1998; Tenenbaum & Leaper, 2003). It may be that fathers' use of instrumental speech interferes with their child's activities in a somewhat intrusive and insensitive way.

Trajectories of parental sensitivity to firstborn and second-born children

The second goal of our study was to examine whether changes in parental sensitivity in a single parent-child pair were related to changes in parental sensitivity in other parent-child pairs within the family. We found no significant association between the firstborns' and second-born children's trajectories of sensitivity by either mothers or fathers. This suggests that, in contrast to the spillover hypothesis (Larson & Almeida, 1999; Shanahan et al., 2007b), parents' experiences with their firstborn child did not have negative implications for their sensitivity towards their second-born child. From a family system perspective (Cox & Paley, 1997; Minuchin, 1985), this finding may be rather surprising and unexpected. However, since parents have to attune their parenting behavior to the specific needs and interests of their child in order to react sensitively (Biringen, 2008), it is likely that the second-born child's own unique characteristics and developmental stage play a more important role in this process than the experiences that the parent had with the other child. This driving force of children's development is also illustrated by the fact that decreases or increases in maternal sensitivity over time were associated with corresponding decreases or increases in paternal sensitivity over time. Nevertheless, we can not fully reject the spillover hypothesis based on our results. For example, we did find that the initial levels of paternal sensitivity towards the firstborn child (intercept) affected the rate of paternal sensitivity towards the second-born child (slope). This illustrates that family dynamics are rather complex and warrant more extensive longitudinal research, also in other domains of parenting.

Limitations

Our study extends previous work on parenting by longitudinally examining the effect of child age and birth order on mothers' and fathers' sensitivity within the context of the larger family system, but several limitations of the current study should be mentioned. First, our sample consisted of predominantly highly educated Caucasian parents. Since parenting practices might be different in families with lower socio-economic status or different ethnic backgrounds, our findings cannot be generalized to populations with other backgrounds. Second, child characteristics other than child age and birth order may influence parenting, and such potential covariates need to be examined in future research in this area. Third, we did not control for quantity of maternal and paternal involvement in child caregiving. Because the time mothers and fathers spend with their children may be an important mechanism underlying our results, this would be an important factor to take into account for future research. Fourth, the two children were observed separately. This might not represent daily family life situations in which parents have to deal with the behavior of both children at the same time. Observing parenting in situations with two children at the same time might reveal associations between the firstborns' and second-born children's trajectories of parental sensitivity that could not be detected in dyadic parent-child interactions.

Conclusion

To our knowledge, this is the first study to examine changes in mothers' and fathers' sensitivity towards firstborn and second-born children longitudinally across infancy and early childhood. Our results showed that the developmental stage of the child (reflected by child age) affected mothers' and fathers' parenting practices in similar ways. This underscores the importance of considering children's developmental characteristics in the study of parenting quality, and suggests that individual differences in attaining developmental milestones may affect parental sensitivity. For example, there is evidence that parents of children with language impairments use less optimal parenting strategies (Carson, Carson, Klee, & Jackman-Brown, 2007; Hammer, Tomblin, Zhang, & Weiss, 2001), and that parenting children with developmental disabilities and developmental delays is characterized by more intrusive and negative behavior than parenting typically developing children (Brown, McIntryre, Crnic, Baker, & Blacher, 2011; Floyd, Harter, & Costigan, 2004). The study of individual variations in sensitivity would therefore benefit from not only focusing on parental characteristics (such as educational level and psychological health) but also on individual differences in children's developmental trajectories in multiple domains of functioning.

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Table 1.

Overview of the dyadic models examining associations between two parent-child pairs.

Model	Parent-child pair A	Parent-child pair B
	Parent gender	
Model 1	Mother-firstborn	Father-firstborn
Model 2	Mother-second-born	Father-second-born
	Child birth order	
Model 3	Mother-firstborn	Mother-second-born
Model 4	Father-firstborn	Father-second-born

Table 2.

Correlations for sensitivity and nonintrusiveness of mothers and fathers towards their firstborn and second-born child over three waves (N = 364).

	1	2	3	4	5	6	7	8	9	10	11	*M*	*SD*
1. W1 mother-firstborn	-											24.98[a]	2.67
2. W1 mother-second-born	.28**	-										24.03[b]	3.08
3. W1 father-firstborn	.23**	.07	-									24.04[a]	3.03
4. W1 father-second-born	.17**	.22**	.39**	-								22.59[b]	3.58
5. W2 mother-firstborn	.26**	.21**	.11*	.13*	-							24.63[a]	2.73
6. W2 mother-second-born	.19**	.28**	.08	.21**	.25**	-						25.05[b]	2.74
7. W2 father-firstborn	.15**	.18**	.32**	.30**	.00	.03	-					23.85	2.94
8. W2 father-second-born	.18**	.11*	.38**	.39**	.03	.15**	.24**	-				23.85	2.94
9. W3 mother-firstborn	.23**	.26**	.08	.09	.22**	.28**	.04	.12*	-			24.04[a]	2.67
10. W3 mother-second-born	.30**	.25**	.20**	.15**	.25**	.25**	.07	.13*	.33**	-		24.69[b]	2.64
11. W3 father-firstborn	.15**	.12*	.38**	.35**	.09	.15**	.23**	.31**	.17**	.13*	-	23.10[a]	2.85
12. W3 father-second-born	.09	.00	.31**	.25**	.02	.03	.19**	.34**	.05	.12*	.29**	23.80[b]	2.77

Note. W1 = wave 1, W2 = wave 2, W3 = wave 3. Different superscripts indicate significant differences between parental sensitivity towards firstborn and second-born children within waves and separately for mothers and fathers.

* $p < .05$ ** $p < .01$

Table 3.

Fit indices and parameter estimates for the univariate growth curve models.

	Fit indices					Parameter estimates			
Dependent variable	χ^2	df	*p*	CFI	RMSEA	Intercept	Variance	Linear slope[a]	Variance
Mother-firstborn	1.12	3	.77	1.00	.00	25.05**	1.81**	-0.47**	0.00
Father-firstborn	7.60	3	.06	.98	.06	24.14**	3.41**	-0.47**	0.00
Mother-second-born	21.79	3	< .01	.99	.03	24.26**	3.21**	0.33**	0.15
Father-second-born	23.40	3	< .01	.97	.07	22.80**	6.54**	0.61**	1.01**

[a] Unstandardized β.

* $p < .05$ ** $p < .01$

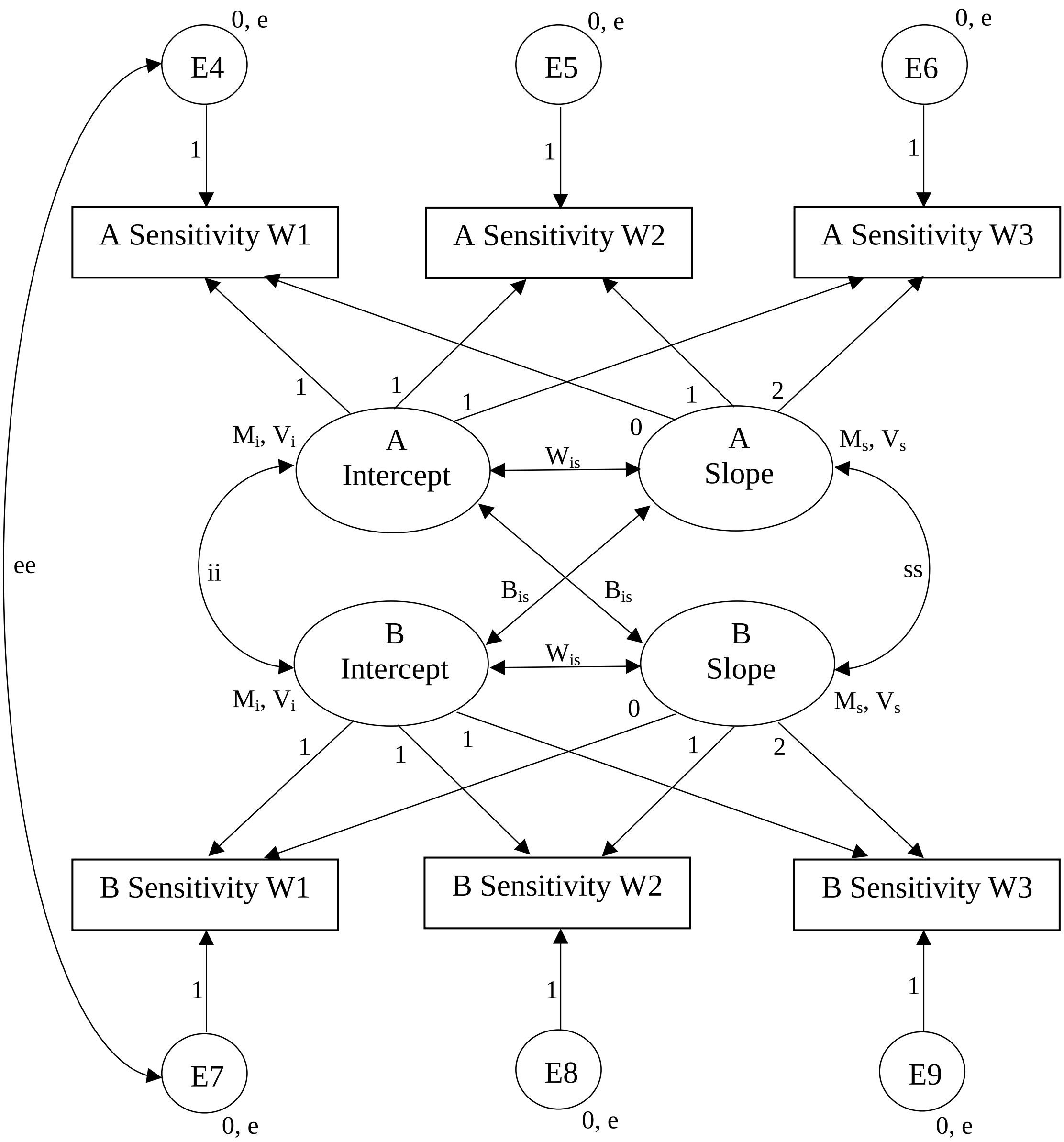


Figure 1. Basic dyadic growth curve model for distinguishable dyads.

A = parent-child pair A (e.g. mother-firstborn child); B = parent-child pair B (e.g. father-firstborn child); W1 = wave 1; W2 = wave 2; W3 = wave 3; M_i = mean intercept value, M_s = mean slope; V_i = intercept variance, V_s = slope variance; W_{is} = within-person covariance between the intercept and slope; B_{is} = between-persons covariance; ii = intercept-intercept covariance; ss = slope-slope covariance; E = residual component for the ratings; e = variance of the residuals, ee = covariance of the residuals across the two parent-child pairs.

Note. Within each parent-child pair the variances for the residuals were constrained to the same value (i.e., variances for the residuals at Wave 2 and Wave 3 were set equal to the variance for the residual at Wave 1).

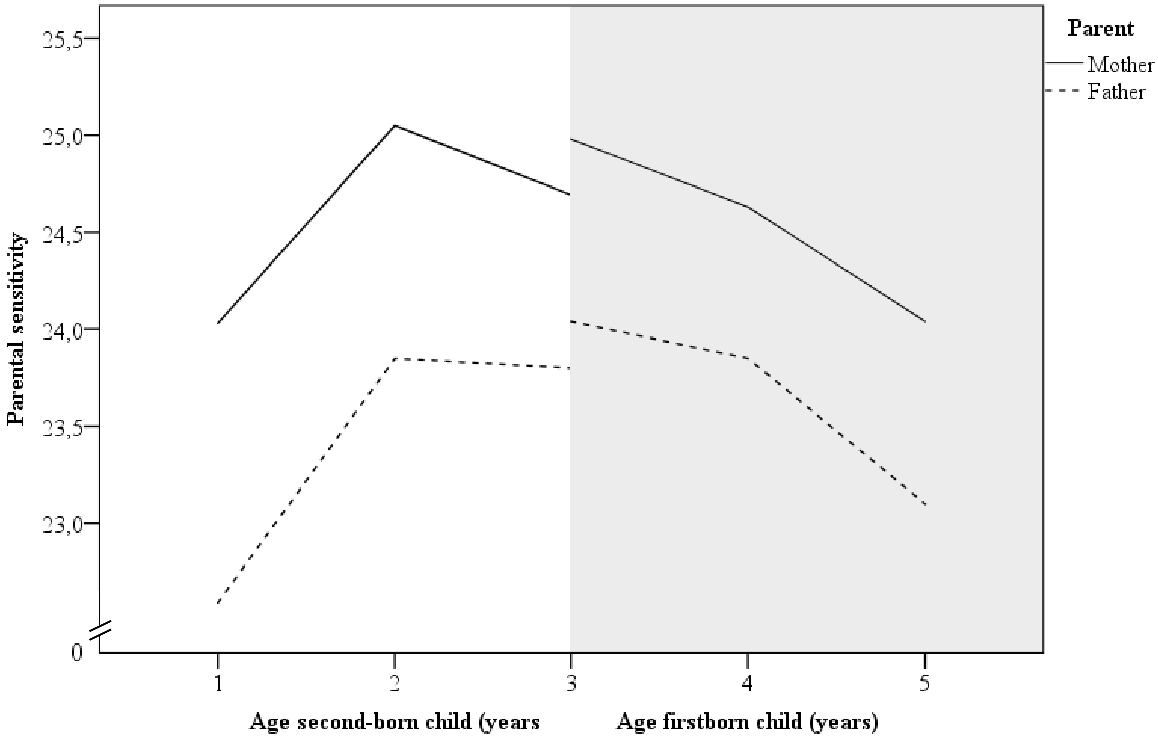
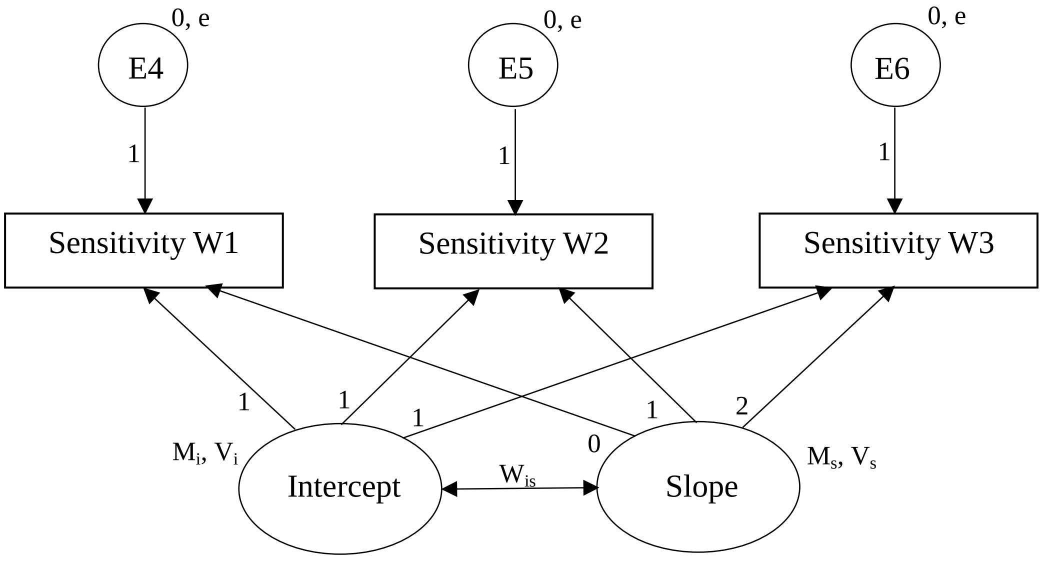


Figure 2. Growth patterns for parental sensitivity of mothers and fathers towards their firstborn and second-born children over time.

Appendix A



Univariate linear growth curve models of parental sensitivity.

W1 = wave 1; W2 = wave 2; W3 = wave 3; M_i = mean intercept value, M_s = mean slope; V_i = intercept variance, V_s = slope variance; W_{is} = within-person covariance between the intercept and slope; E = residual component for the ratings; e = variance of the residuals.

Note. The variances for the residuals were constrained to the same value (i.e., variances for the residuals at Wave 2 and Wave 3 were set equal to the variance for the residual at Wave 1).

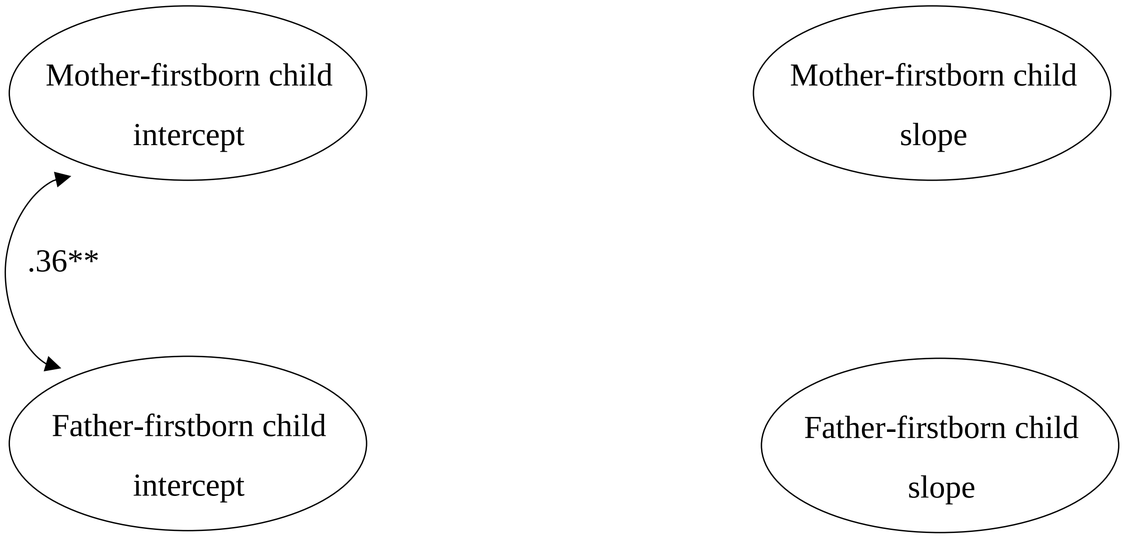
Appendix B

Fit indices for the tests of distinguishability between parent-child pairs.

Model	Fit indices				
	χ^2	df	p	CFI	RMSEA
Model 1	55.29	12	< .01	.98	.04
Model 2	86.06	12	< .01	.94	.07
Model 3	56.97	12	< .01	.99	.03
Model 4	89.85	12	< .01	.95	.08

Appendix C

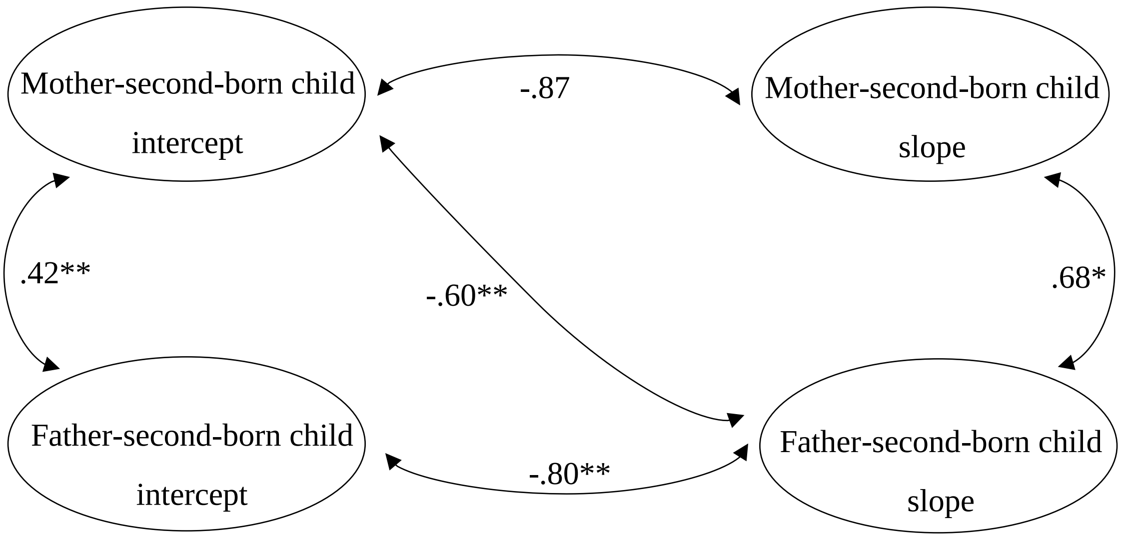
Graphic presentation of the four dyadic growth models, including the fit indices and relevant



correlations.

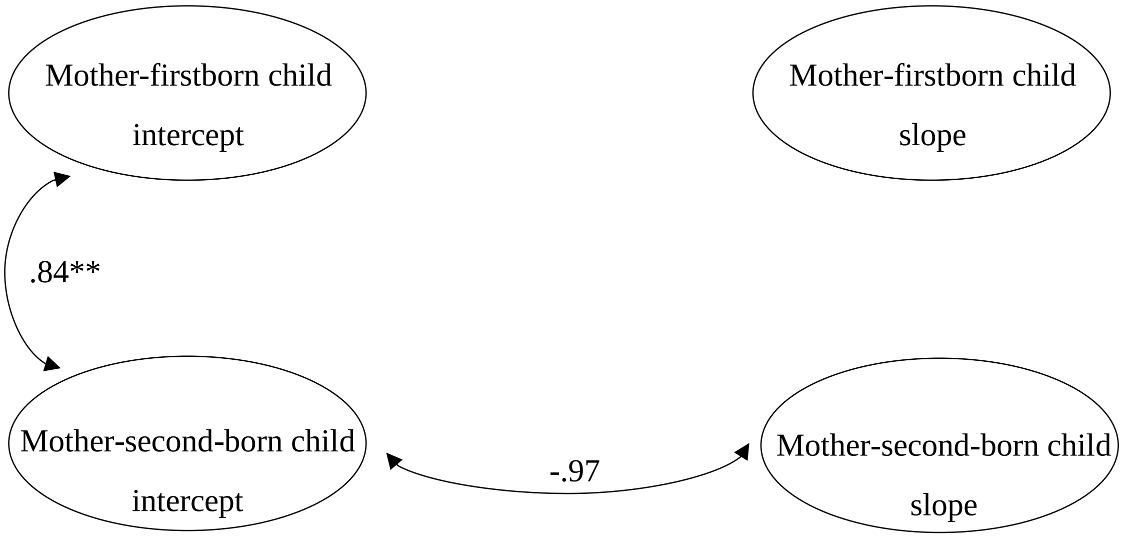
Model 1, χ^2 (15) = 22.69, *p* = .09, CFI = .97, RMSEA = .04.

** *p* < .01



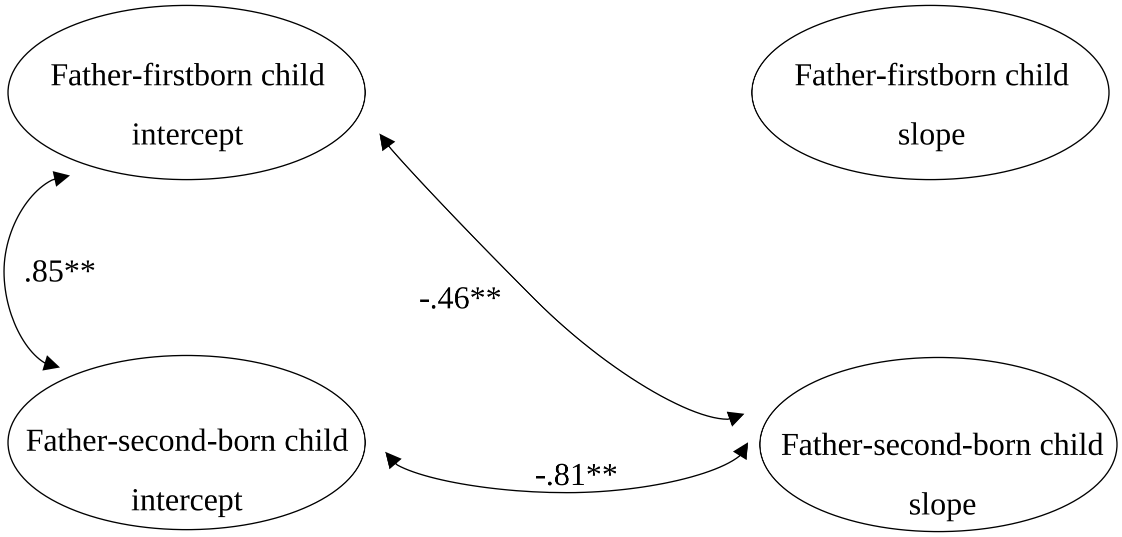
Model 2, χ^2 (12) = 48.85, *p* < .01, CFI = .99, RMSEA = .02.

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



Model 3, χ^2 (15) = 30.44, p = .01, CFI = 1.00, RMSEA = .00.

** p < .01



Model 4, χ^2 (14) = 40.57, p < .01, CFI = .98, RMSEA = .04.

** p < .01