

## ORIGINAL ARTICLE

# Continuity, stability, and concordance of socioemotional functioning in mothers and their sibling children

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## Funding information

Intramural program of the NIH, NICHD. Award Number: N/A; European Research Council; Horizon 2020, Grant/Award Number: 695300--HKADeC-ERC-2015-AdG

## Abstract

This within-family longitudinal study accomplishes a novel multivariate assessment of socioemotional parenting cognitions and practices in mothers and their sibling children's socioemotional behaviors. Mothers participated with their 20-month-old firstborns and again, an average of 3 years later, with their 20-month-old secondborns (55 families, 165 participants). Continuity and stability in maternal cognitions and practices between the two times, and similarities, differences, and correspondences in siblings' behaviors, are assessed and compared. Maternal socioemotional parenting cognitions were continuous in mean level and stable in individual differences across siblings; maternal socioemotional practices were continuous in mean level but unstable in individual differences. Firstborns were more sociable and emotionally available to mothers than secondborns; first- and secondborns' socioemotional behaviors were largely unrelated. This study contributes to understanding socioemotional domains of parenting and child development, birth order effects, and the shared and non-shared contexts of siblings' environments within the family.

## KEYWORDS

differential treatment, parenting, siblings, socioemotional development

## 1 | INTRODUCTION

Approximately 80% of mothers in the United States have more than one child (U.S. Census Bureau, 2010). Family structure, including parity and birth order, has been thought to influence the psychologies of parents and children at least since Alfred Adler (1931). Yet, a substantial proportion of developmental science has historically centered, and continues to be constructed, on mother-firstborn relationships. The overall purpose of the present study was to examine in close detail a variety of socioemotional parenting cognitions and practices of mothers with their first- and secondborn toddlers alongside socioemotional characteristics of the siblings themselves. Socioemotional behaviors (here defined broadly to include any behaviors that have an interactive, social, or emotional component) are important to study in the same family because the contexts of development may differ for firstborns and secondborns. Firstborns may have the full attention of their parents but may lack regular interaction with other children, especially in toddlerhood. Secondborns have divided attention from parents (shared with the firstborn), and a natural and ever-present older sibling who may serve as an additional important socializer. Because socioemotional functions in mothers and children are numerous and diverse and unlikely to follow identical paths of development, we examined a wide variety of cognitions and practices in mothers and characteristics in children within the broad socioemotional domain. The literatures on parity and birth-order effects are thin and plagued by methodological shortcomings, which we attempted to overcome by using a combination between- and within-family, age-held-constant, longitudinal design. We addressed two specific goals.

### 1.1 | Continuity and Stability in Maternal Socioemotional Parenting Cognitions and Practices

Our first goal was to assess continuity and stability of socioemotional parenting cognitions and practices in mothers with their two children when each child was the same age. Developmental science is centrally concerned with assessing average performance as well as variation around the average across time (Bornstein, Putnick, & Esposito, 2017). To differentiate these two approaches, we distinguish *continuity* (consistency in group mean level through time) from *stability* (consistency in the relative position of individuals in the group through time). Continuity assesses whether there are systematic mean differences in how mothers think and behave with their firstborn and secondborn children *across families*, and whether firstborn and secondborn children *across families* behave differently from one another on average. Stability assesses whether mothers think and behave similarly with the firstborn and secondborn children *within family* and whether firstborns and secondborns *within family* behave similarly relative to the group. Continuity in a group and stability in individuals are conceptually and statistically independent. Thus, 'continuous-and-stable' describes the developmental situation where the mean level of a socioemotional parenting construct in a group of mothers remains the same with their first and second children and mothers in the group retain their same relative positions in the group vis-à-vis their two children. Of course, mean levels of parenting by mothers in a group could remain the same with their two children and individual mothers in the group change their relative positions: 'continuous-and-unstable'. Similarly, patterns for mothers could be 'discontinuous-and-stable' or 'discontinuous-and-unstable'.

Historically, the predominant view has characterized parenting as largely static and unchanging; once a 'parenting style' was assessed or classified, it was assumed that the parent would continue to behave that same way in the future (Baumrind, 1967; Holden, 2012). Attachment theory too suggests that parental attachment representations and interactive styles likely remain stable across time due to enduring influences of the parent's own 'working model' of attachment (Main, Kaplan, & Cassidy, 1985). Considerable empirical evidence has accumulated that parents think and behave in some similar ways over time and across contexts as well as toward their different children (Dallaire & Weinraub, 2005; Else-Quest, Clark, & Owen, 2011; Haltigan, Roisman, & Fraley, 2013; Holden & Miller, 1999; Klahr & Burt, 2014). If, therefore, on the one hand, parenting is consistent, trait-like, and family systems tend to stabilize, we would expect socioemotional functioning in parents to be continuous and stable over

time. Thus, a second child, when reaching a given age, may be reared much the same as her/his older sibling was reared at that age (even though the older sibling may now be the recipient of similar or different age-appropriate parenting).

However, when a second child is born family systems and dynamics can change dramatically. Suddenly, parents no longer have one child to care for, but have to divide their time and resources, attention and affection, often unevenly, between two children with differing needs and demands (Feinberg, McHale, & Whiteman, 2019). Most studies interpret differences in two children within the same family as indicative of non-shared environmental influences (Dunn, Plomin, & Daniels, 1986); that is, parents rear their two children differently or children interpret or receive parenting differently (Sutor et al., 2009). If, therefore, on the other hand, socioemotional functioning in mother-child dyads is responsive to changing expectations or experiences in childrearing or to siblings' individual differences, we might expect that dimensions of socioemotional relationships would be discontinuous across families and unstable in the same parent and between siblings.

Unfortunately, research into which dimensions of socioemotional parenting are continuous or discontinuous, and which stable or unstable, within families is scant and unsystematic. In terms of mean level, mothers have been reported to favor firstborns (Dunn & Plomin, 1986; Hallers-Haalboom et al., 2014) or favor secondborns (Moore, Cohn, & Campbell, 1997; Ward, Vaughn, & Robb, 1988) or treat first- and secondborns equitably (Bornstein, Putnick, & Suwalsky, 2016; Dunn & Plomin, 1986) depending on the caregiving domain. Individual-difference order research is also equivocal, with some studies reporting stability in mothers toward their two children (Dunn & Plomin, 1986; Lawson & Mace, 2009; Moore et al., 1997; Ward et al., 1988), but others reporting instability (Bornstein et al., 2016; Hallers-Haalboom et al., 2014).

Holden and Miller (1999) meta-analyzed the consistency of beliefs and behaviors of parents (mostly mothers) in mean level and relative standing across children. They found small mean differences ( $d = 0.23$ ) but larger childrearing stability ( $r = 0.50$ ). Of course, a 'strong' correlation of .50 still leaves 75% of common variance unaccounted for. In a later meta-analysis, Klahr and Burt (2014) estimated that children's shared environments explained 27–39% of the variance in parenting, similar percentages to those for children's genetic and non-shared environmental influences (see also Avinun & Knafo, 2014). These summary findings support a dynamic view of parenting in which parents are expected (and able) to alter their beliefs and behaviors (within limits bounded by individual parents' characteristics) as they interact with their two different children (Bornstein et al., 2016).

## 1.2 | Sibling Similarities, Differences, and Correspondence

Our second main goal was to examine and compare similarities and differences in socioemotional behaviors of siblings as well as relative covariation between siblings in socioemotional characteristics. Siblings share genetics as well as some major aspects of their environments (e.g., parents, homes, schools, neighborhoods, socioeconomics), which contribute to similarities between them. Still, siblings differ from one another on a range of biological and experiential factors. Naturally occurring variation in age, gender, temperament, personality, or cognitive level and style all contribute to making siblings distinctive individuals (Pluess & Belsky, 2013). Each child engenders as well as interprets interactions with parents individually and, thus, may react differently to them (Lerner, Hershberg, Hilliard, & Johnson, 2015).

Some studies report no mean level differences between first- and secondborns, for example, in responsiveness to mothers (Bornstein et al., 2016); others, however, note some systematic mean-level differences between first- and secondborn siblings in socioemotional domains such as sociability, attachment, and positive affect (Belsky, Gilstrap, & Rovine, 1984; Dunn & Plomin, 1986; Marleau, Saucier, & Allaire, 2006; Moore et al., 1997; Ward et al., 1988). With respect to individual-differences correspondence between siblings, Moore et al. (1997) reported that infant affect was uncorrelated between siblings, but Saudino, Wertz, Gagne, and Chawla (2004) observed medium to large positive correlations in siblings' temperaments. Few studies have systematically explored sibling similarities, differences, and correspondences within the same family.

### 1.3 | Methodological Problems in Sibling Research

The majority of birth-order research has compared firstborns and laterborns between families or in siblings at different ages, research designs that necessarily confound birth order with family or child developmental differences and so suffer significant limitations (see Bornstein et al., 2016; Michalski & Shackelford, 2001; Price & Hare, 1969). This literature is also methodologically compromised by variation in the ages of sibling pairs, laterborns of different ordinal positions aggregated into a single group, mothers and firstborns studied alone but mothers and secondborns studied with firstborns present, reliance on brief (e.g., 5-min) observations, the same (non-blind) observers or raters used for both siblings, and recruited samples varying in medical or social risk (biological and adopted children in the same sample, mothers suffering from depression with one sibling but remitted with the other). Not unexpectedly, given the potential effects of these moderators, the extant literature is unsettled (as reviewed above).

### 1.4 | Overview of this Study

Our longitudinal research design employed first- and secondborn children at the same age and in the same family to overcome some of the most egregious methodological shortcomings in parity and birth-order studies. We tested children over a narrow age range, only assessed first- versus secondborns, and used multiple measures and sources of information focused broadly on socioemotional functioning. The sample was balanced with respect to child gender and sibling gender combinations across families so that interactions between child gender and birth order could be examined. Finally, to localize effects to parity and birth order per se, we examined several possible sociodemographic covariates, and we controlled for significant partner variables. We expected that maternal socioemotional parenting cognitions and practices would be moderately continuous and stable between their two children, with cognitions more consistent than practices (Abelson, 1986; Holden & Miller, 1999). Continuity and stability in parenting point to a strong component of similarity in family life (shared environments) and in relation to sibling birth order. Based on the shared genetic inheritance of siblings who also share some major aspects of their parenting and environments, we expected to find few mean level differences in socioemotional functioning, and at least moderately sized correlations, between siblings when observed at the same age.

## 2 | METHOD

### 2.1 | Participants

A total of 165 individuals provided data, including 55 European American monolingual English-speaking mothers and their 55 first- and 55 secondborn children. Families with firstborn children were invited to participate in a longitudinal study of child development. Later, these families were invited to participate in the same protocol after the birth of their second child. Sample demographics are presented in Table 1. Mother-child dyads were observed when the family's firstborn child was 20 months of age and again an average of 2.88 years later ( $SD = 0.98$ , range = 1.33–5.75) when the family's secondborn child was 20 months of age. Secondborn children were 4 days older on average than firstborn children at the time of their respective observations (Table 1). Consequently, siblings' ages and the age difference between the two children were evaluated as potential covariates. Sibling pairs did not differ statistically in gender composition: 49.09% were same gender ( $n = 12$  females and  $n = 15$  males), and 50.91% were different genders ( $n = 14$  female older siblings and  $n = 14$  male older siblings). Mothers were older, better educated, and of higher family SES at the secondborn visit (Table 1); these variables were therefore also

included as potential covariates (with the exception of family SES; we used education because maternal education was highly correlated with family SES,  $r(55) = 0.79$ ,  $p < 0.001$ , and is a more proximal covariate).

Because some aspects of parenting and child development vary with ethnicity (Bornstein, 2015; Murry, Hill, Witherspoon, Berkel, & Bartz, 2015), we recruited an ethnically homogenous sample as a first step in understanding parity and birth order in socioemotional functioning before embarking on more complex studies and analyses with ethnically diverse samples (Bornstein, Jager, & Putnick, 2013; Jager, Putnick, & Bornstein, 2017).

## 2.2 | Procedures

Children and their mothers were videorecorded in the home during a 2-hr visit by one female researcher. Mothers made alternative care arrangements for their firstborn child during visits with secondborns; when this was not possible, a second researcher cared for the firstborn away from the mother and secondborn child. During the visit, the following procedures were conducted: A 10-min child solitary play session followed by a 10-min collaborative play session with mother; an assessment of maternal verbal intelligence; and an inventory of sociodemographic information about the family. At the end of the visit, the researcher left a set of questionnaires for the mother to complete and return by mail. To reduce the length of the visit, approximately one week later, mothers were interviewed by telephone about their child's adaptive behaviors. The reliability and validity of each measure reviewed below appear in the Supporting Information.

As a check against threats to validity, at the conclusion of the visit the mother and the researcher independently evaluated the observation session by marking a series of 8-point (range = 0–7) graphic rating scales, randomly ordered with respect to valence but recoded in ascending order. Mothers rated their own behavior with their first- and secondborns as typical ( $M = 5.52$ ,  $SD = 1.50$ , and  $M = 5.79$ ,  $SD = 1.03$ ),  $t(47) = -1.33$ ,  $p = 0.190$ , and their first- and secondborn children as having engaged in typical play ( $M = 5.54$ ,  $SD = 1.22$ , and  $M = 5.69$ ,  $SD = 1.01$ ),  $t(47) = -0.72$ ,  $p = 0.474$ . The researcher also rated the first- and secondborn children as being relaxed ( $M = 5.37$ ,  $SD = 1.56$ , and  $M = 5.33$ ,  $SD = 2.09$ ),  $t(51) = 0.11$ ,  $p = 0.911$ , and alert ( $M = 6.04$ ,  $SD = 0.82$ , and  $M = 6.53$ ,  $SD = 0.58$ ),  $t(50) = -3.35$ ,  $p = 0.002$ , during the session. Because secondborn children were rated as significantly more alert, child alertness was included as a potential covariate in analyses including variables derived from the child solitary and collaborative play sessions.

**TABLE 1** Demographic statistics for siblings and families at the firstborn and secondborn visits

	Firstborn visit		Secondborn visit		t (54)
	M	SD	M	SD	
Child					
Age (m)	20.04	0.27	20.17	0.20	2.82** <sup>a</sup>
Gender <sup>b</sup>	47.27%		47.27%		0.03 <sup>f</sup>
Mother					
Age (y)	31.36	4.25	34.25	4.37	21.82***
Education <sup>c</sup>	5.87	1.12	5.98	1.05	2.57*
Employment status <sup>d</sup>	65.45%		58.18%		8.44** <sup>f</sup>
Hours of employment <sup>e</sup>	36.42	9.04	32.48	12.95	-1.46
Family SES	53.88	11.26	55.11	10.81	2.65**

<sup>a</sup>Degrees of freedom for this test = 108. <sup>b</sup>Percent female. <sup>c</sup>Hollingshead 7-point education scale. <sup>d</sup>Percent employed.

<sup>e</sup>Based on employed mothers. <sup>f</sup>Chi-square test.

\* $p \leq 0.05$ . \*\* $p \leq 0.01$ . \*\*\* $p \leq 0.001$ .

## 2.3 | Maternal Socioemotional Parenting Cognitions

### 2.3.1 | Self-perceptions of parenting

Maternal competence, satisfaction, investment, and role balance in parenting were evaluated with the 22-item Self-Perceptions of the Parental Role (SPPR; MacPhee, Benson, & Bullock, 1986). Items have a pair of statements, such as 'Some parents do a lot of reading about how to be a good parent'. BUT 'Other parents don't spend much time reading about parenting'. The respondent chooses the statement that describes her best, and then checks *Sort of true for me* or *Really true for me*. The four scales consisted of the average of their 5 or 6 items with four response options, weighted 1, 2, 4, and 5 to account for the absence of a response indicating that the item was equally like and unlike the respondent.

### 2.3.2 | Self-reports of parenting style

The Parental Style Questionnaire (PSQ; Bornstein et al., 1996; Senese, Bornstein, Haynes, Rossi, & Venuti, 2012) was constructed to index differences in domains of parenting practices (Bornstein, 2015). The Social Exchange Scale (sensitivity, expressions of affection, and positive responsiveness to the child; e.g., 'I am aware of what my child wants and/or is feeling') was computed as the mean of 5 items. Each item was rated on a 5-point scale (*hardly at all, on occasion, sometimes, frequently, all the time*).

### 2.3.3 | Parenting knowledge

The Knowledge of Infant Development Inventory (KIDI; MacPhee, 1981) uses 75 items to assess mothers' knowledge of parental practices, developmental processes and norms, and health and safety guidelines. Items are all close-ended, and the response format varies by question (e.g., *agree-disagree*, multiple choice, and all items include an option for *not sure*, but no credit is given for these responses). For example, 'The two-year-old's sense of time is different from an adult's' (*agree-disagree*).

### 2.3.4 | Locus of control in parenting

The Parent Attributions Questionnaire (PAQ; MacPhee, Seybold, & Fritz, nd; Sirignano & Lachman, 1985) contains five causal attributions to explain failures in seven parenting tasks. For example, one item asks: 'When I am unable to get my child to take a bath, it is because: (a) I am not good at this, (b) This is hard to do, (c) My child makes this hard to do, (d) I haven't tried hard enough, and (e) I'm in a bad mood'. Each of the five causes was rated on a scale from 1 (*Not at all a reason*) to 5 (*Very much a reason*). Mothers' attribution of parenting failures to internal causes was computed as the sum of three subscale scores: attributions for failure to maternal ability, effort, and mood.

## 2.4 | Maternal Socioemotional Parenting Practices

Maternal parenting practices were recorded from dyadic mother-child play during the home visit. The mother was asked to play with her child as she typically would and to disregard the presence of the researcher. A set of standard, age-appropriate, gender-varied toys was provided; the child's own toys were excluded.

### 2.4.1 | Demonstrations and solicitations of socioemotional play

Frequency and duration of mothers' socioemotional play were coded sec-by-sec in accordance with a play category system derived from previous research on the progressive nature of play during the first and second years

of life (Bornstein, 2007). Demonstrations were defined as a mother's play (e.g., modeling) excluding all verbal solicitations. Solicitations were defined as verbal questions or statements that encouraged the child to engage in a specific play activity (e.g., 'Can you feed the baby?'). Demonstrations of socioemotional play were calculated as the mean of four standardized ( $M = 0$ ,  $SD = 1$ ) indices of mother play: the count of play bouts, the proportion of play bouts, the total duration of play, and the proportion of play duration. These four variables shared variance ( $r_s = 0.35$ – $0.79$ ,  $p_s < 0.001$ ), but each provided a slightly different perspective on maternal demonstrations of socioemotional play. Solicitations of socioemotional play were calculated as the mean of the standard scores ( $M = 0$ ,  $SD = 1$ ) for two measures: frequency and proportion frequency ( $r = 0.50$ ,  $p < 0.001$ ).

## 2.4.2 | Expressions of affection

Mothers' interactions with their children were coded from the videorecords for social play, praise/endearaments, and physical affection. Social play was the frequency of verbal and/or physical behaviors directed toward the child to amuse the child. Praise/endearaments were the frequency of verbal expressions of warmth and approval. Affectionate physical gestures were the frequency of tactile behaviors manifestly intended to convey warmth and sensitivity. Because approximately one-half of mothers did not display these behaviors in the play session, all frequency counts were dichotomized to reflect mothers who expressed affection (1) or who did not (0).

## 2.4.3 | Emotional availability

The Emotional Availability Scales (EAS 3rd ed.; Biringen, Robinson, & Emde, 1998) were used to assess observed maternal sensitivity (expressions of warmth and emotional connectedness with the child). Maternal sensitivity is globally coded on a scale from 1 to 9.

## 2.5 | Sibling Socioemotional Behaviors

### 2.5.1 | Solitary socioemotional play

To assess the child's socioemotional play skills without maternal intervention, each child was videorecorded for 10 min, as the mother and the researcher sat nearby but did not interact with the child. The same set of toys used in the mother-child play session was provided, and play was coded in real time from videorecords by noting the behaviors and onset and offset times to 1 sec in accordance with the same play category system used with mothers. Child solitary play was the mean of the standard scores ( $M = 0$ ,  $SD = 1$ ) for four measures: frequency, total duration, proportion of play frequency, and proportion of play duration ( $r_s = 0.59$ – $0.82$ ,  $p_s < 0.001$ ). Three short firstborn play sessions (range = 567–580 sec) and three short secondborn play sessions (range = 512–590 sec) were prorated up to 600 sec.

### 2.5.2 | Child socioemotional play with mother

The dyadic mother-child play session described above was coded independently a second time for the child's socioemotional play behavior when interacting with the mother. Child-initiated child play and mother-initiated child play were coded sec-by-sec from the videorecords in real time. Socioemotional play was child-initiated if the child started the play bout. If child play occurred directly after it was demonstrated or solicited by the mother, the play bout was coded as mother-initiated. Both child-initiated and mother-initiated play were calculated as the mean of the standard scores ( $M = 0$ ,  $SD = 1$ ) of four measures: frequency, duration, proportion frequency, and proportion duration ( $r_s = 0.58$ – $0.86$ ,  $p_s < 0.001$ , for child-initiated, and  $r_s = 0.42$ – $0.82$ ,  $p_s < 0.001$ , for mother-initiated).

### 2.5.3 | Sociability

An index of sociability was adapted from a behavioral coding system developed by Mullen, Snidman, and Kagan (1993). Three behaviors indicative of the child's sociability were coded sec-by-sec in real time from video-records when the child played alone but in the presence of the researcher and mother: verbalizations directed to researcher, positive verbalizations with no specific object, and amount of time the child spent close to the researcher. An aggregate index was computed by standardizing ( $M = 0$ ,  $SD = 1$ ) and averaging the three measures ( $r_s = 0.26$ – $0.63$ ,  $p_s < 0.001$ ).

### 2.5.4 | Emotional availability

The EAS were also used to assess child responsiveness (willingness to respond to the mother's suggestions and display of enjoyment in the interaction). Responsiveness is globally coded on a scale from 1 to 7.

### 2.5.5 | Adaptive behavior

The Vineland Adaptive Behavior Scales – Interview Edition, Survey Form (VABS; Sparrow, Balla, & Cicchetti, 1984) were used to assess mothers' estimates of their children's daily living and socialization skills. The VABS Daily Living Skills Domain taps the child's performance in three subdomains, two of which are socioemotional and age-appropriate: personal care and domestic tasks. The VABS Socialization Domain consists of three subdomains, two of which are socioemotional and age-appropriate: interpersonal relationships and play skills.

## 2.6 | Potential Covariates

Demographic variables that were evaluated as potential covariates included child age, gender, alertness, and the age spacing between siblings as well as maternal age, education, and hours of employment per week outside the home, all of which were obtained from a family description questionnaire. In addition, the following measures were evaluated.

### 2.6.1 | Maternal personality

Following the model of Paunonen and Jackson (1996), which confirmed the Five-Factor Model of personality using the Jackson Personality Inventory (JPI; Jackson, 1976), Openness, Neuroticism, Extraversion, Conscientiousness, and Trustworthiness were computed as principal components of JPI subscales (see Supporting Information).

### 2.6.2 | Maternal verbal intelligence

Mothers were administered the Peabody Picture Vocabulary Test-Revised (PPVT-R Form L; Dunn & Dunn, 1981). Up to 175 vocabulary words were presented verbally by a trained researcher, and for each word presented the mother chose one of four pictures to indicate the meaning of the word. Standard scores with a possible range of 40–160 ( $M = 100$ ,  $SD = 15$ ) were obtained based on the mother's age.

### 2.6.3 | Maternal social desirability

The Social Desirability Scale (SDS; Crowne & Marlowe, 1960) uses 33 items to assess adults' tendency to respond to questions in a socially desirable fashion. Questions like 'I have never intensely disliked anyone' are rated as *true* or *false*. The SDS was used as a control on maternal reports.



## 2.7 | Analytic Plan

All analyses were conducted in SPSS 24.0. First, preliminary analyses were conducted to impute missing data, evaluate the distributions of variables, and remove shared variance with social desirability bias. To examine continuity of maternal cognitions (7 variables) and practices (6 variables) and mean differences between siblings (7 variables), we computed general linear mixed models (GLMMs) for each variable. Sibling birth order was treated as a repeated effect within families, and the covariance structure was modeled as heterogeneous compound symmetry, accounting for the likelihood that a mother's cognitions and practices with her two children, and the behavior of firstborns and secondborns within families, would be correlated but variances could vary. The variance parameters were always significant (estimates = 0.002(0.0004)–813,225(175,384.82),  $p < 0.001$ ), and the rhos between firstborn and secondborn visits were significant for all maternal cognitions ( $p = 0.41$ – $0.62$ ,  $p \leq 0.001$ ) and maternal sensitivity ( $p = 0.28$ ,  $p = 0.023$ ), but non-significant for all other maternal practices ( $p = -0.03$ – $0.02$ ,  $p = 0.804$ – $0.862$ ) and sibling behaviors ( $p = -0.09$ – $0.22$ ,  $p = 0.515$ – $0.100$ ). Other covariance structures were tested (e.g., unstructured, compound symmetry, diagonal), and the results were nearly identical. Birth order, child gender, and the interaction of Birth order and Gender were explored as fixed effects. Because this study focused on parity and birth order, child gender was included only as a control and potential moderator. Hence, main effects of child gender are not reported, but significant interactions between Birth order/Parity and Child gender are reported.

When a significant main effect of birth order/parity or interaction between Birth order/Parity and Child gender was found, significant sociodemographic covariates were entered into the model as fixed effects to determine whether the main effects or interaction remained significant. Potential covariates were controlled if they were significantly correlated with a target variable. If the effects remained significant controlling for sociodemographic covariates, significant corresponding partner variables (i.e., child behaviors when maternal variables were the focus of the analysis, and maternal variables when child behaviors were the focus of the analysis) were then added to the model as fixed effect covariates to determine whether the effects remained significant.

Stability of maternal cognitions and practices across time (and across two children), and correspondence between first- and second-born child behaviors, were examined with zero-order correlations. Partial correlations were then computed that controlled significant zero-order effects for significant sociodemographic covariates and corresponding partner variables. In describing effect sizes of correlations, we use Cohen's (1988, pp. 79–80) terminology; small effect size  $r = 0.10$ , medium effect size  $r = 0.30$ , large effect size  $r = 0.50$ .

## 3 | RESULTS

### 3.1 | Preliminary Analyses

In the total sample of 55 mothers and their 55 first- and 55 secondborn children, not all participants provided complete data. Eleven of the 55 mothers did not return any of the questionnaires at one or both time points and were therefore omitted from analyses of cognitions. Mothers who completed the cognitions questionnaires did not differ from mothers who failed to complete them in age, intelligence, or socioeconomic status. In the remaining sample of 44 mothers' cognitions, 11 data points (2.78% of the total data points) were missing completely at random (Little's MCAR test:  $\chi^2(6) = 4.09$ ,  $p = 0.66$ ) from the first time-point, and 12 data points (2.53% of the total data points) were missing completely at random (Little's MCAR test:  $\chi^2(12) = 11.70$ ,  $p = 0.47$ ) from the second time-point and were imputed.

The full sample of 55 mothers was retained in the maternal practices data set. Five maternal data points (0.57% of the total data points) were missing completely at random (Little's MCAR test:  $\chi^2(23) = 28.13$ ,  $p = 0.21$ ) from the first data collection time-point, and 3 data points (0.34% of the total data points) were missing completely at random (Little's MCAR test:  $\chi^2(11) = 13.03$ ,  $p = 0.29$ ) from the second data collection time-point and were imputed.

For child behaviors, 3 of the 55 sibling pairs did not complete one of the visits, leaving 52 sibling pairs. Eighteen data points (1.57% of the total data points) were missing completely at random (Little's MCAR test:  $\chi^2(53) = 48.13$ ,  $p = 0.66$ ) from firstborns' behaviors, and 17 data points (1.49% of the total data points) were missing completely at random (Little's MCAR test:  $\chi^2(35) = 27.51$ ,  $p = 0.81$ ) from secondborns' behaviors. Missing data points for maternal cognitions, maternal practices, and child behaviors were imputed using the Expectation-Maximization (EM) algorithm (Dempster, Laird, & Rubin, 1977), which has been found to be unbiased and efficient when data are MCAR (Dong & Peng, 2013).

A post hoc power analysis was computed prior to data analysis to determine whether the sample size provided sufficient power to detect a medium-sized effect in a  $2 \times 2$  (Birth order/Parity by Child gender) GLMM design. With an effect size  $f = 0.25$  (Faul, Erdfelder, Lang, & Buchner, 2007),  $\alpha = 0.05$ , and  $Ns = 88$ –110 mother–child dyads, the power estimates ranged from .90 to .95 for birth-order/parity main effects and interactions, indicating adequate power to detect medium to large effects. Power to detect a correlation of .30 ranged from .64 to .73, and power to detect a correlation of 0.50 ranged from 0.97 to 0.99 for  $\alpha = 0.05$  and  $Ns = 44$ –55, indicating tests of medium-sized correlations were underpowered but tests of large correlations had strong power.

Univariate and multivariate distributions of the dependent variables and potential covariates were examined for normality, homogeneity of variance, outliers, and influential cases, and transformations (ranging from 2nd power to 5th power, listed in Table 2) were applied to resolve problems of non-normality (Tabachnick & Fidell, 2012). SPSS competence and satisfaction and trustworthiness were also adjusted to remove the effect of the mother's social desirability bias by saving unstandardized residuals from regression analyses. Analyses were conducted on the transformed data; for clarity, descriptive statistics (see Table 2) are presented as untransformed variables. Some of the seven maternal cognitions were correlated,  $|r|s = 0.00$ –0.51,  $ps = 0.494$ –<0.001, as were the six maternal practices,  $|r|s = 0.01$ –0.56,  $ps = 0.461$ –<0.001, and seven child behaviors,  $|r|s = 0.01$ –0.49,  $ps = 0.452$ –<0.001, but none so highly that they could not be explored independently.

## 3.2 | Continuity in Maternal Socioemotional Parenting Cognitions and Practices across Parity

### 3.2.1 | Cognitions

Parenting competence, satisfaction, investment, role balance, and social exchange did not differ for mothers with firstborns and with secondborns, and no interactions were significant. Mothers were more knowledgeable and attributed parenting failures more to internal causes when with their secondborns than with their firstborns (Table 2). However, the main effect of parity for internal attributions of failure attenuated to non-significance when controlling for children's ages when observed,  $est. = .96(.61)$ , 95%CI =  $-2.18$ –.26,  $t(43.65) = -1.58$ ,  $p = 0.121$ .

### 3.2.2 | Practices

In separate linear mixed models, no main effects of parity or interactions were significant for maternal demonstrations or solicitations of play or maternal sensitivity. Mothers' social play, praise, and physical affection (evaluated using McNemar's test for paired variables) did not systematically increase or decrease between children ( $ps = 0.152$ –0.832).

## 3.3 | Stability of Maternal Socioemotional Parenting Cognitions and Practices across Time

Zero-order correlations of maternal cognitions and practices with their first- and secondborns are also presented in Table 2. Mothers' self-perceptions, social exchange, knowledge, and attributions exhibited medium to large

**TABLE 2** Untransformed descriptive statistics, univariate *F*-tests of mothers' cognitions and practices across parity and of firstborn and secondborn children's behaviors, and stability correlations across parity/birth order

	Mother- Firstborn		Mother- Secondborn		Linear Mixed Model Parameters for Birth Order						
	M	SD	M	SD	Estimate	SE	df	t	95% CI	r	
Maternal cognitions											
SPPR competence	4.11	0.60	4.12	0.59	0.11	0.59	42.14	0.19	-1.08-1.30	0.58***	
SPPR satisfaction (5th power)	4.74	0.51	4.67	0.52	185.05	140.91	42.76	1.31	-99.18-469.27	0.41**	
SPPR investment	3.15	0.80	2.98	0.74	0.18	0.10	42.41	1.77	-0.03-0.39	0.62***	
SPPR role balance	3.77	0.76	3.66	0.74	0.12	0.10	42.53	1.31	-0.07-0.33	0.61***	
PSQ social exchange	4.45	0.40	4.46	0.33	0.001	0.05	42.60	0.02	-0.10-0.10	0.58***	
Parenting knowledge	0.82	0.05	0.84	0.06	-0.02	0.01	42.66	-2.80**	-0.04--0.01	0.51***	
Attributions	16.16	3.77	17.50	3.78	-1.36	0.58	42.39	-2.33*	-2.54--0.18	0.49***	
Maternal practices											
Socioemotional demonstrations <sup>a</sup>	0.01	0.90	-0.01	0.75	0.01	0.16	51.71	0.07	-0.31-0.33	0.02	
Socioemotional solicitations <sup>a</sup>	0.02	0.85	-0.02	0.89	0.05	0.17	53.38	0.28	-0.29-0.39	0.03	
Social play <sup>b</sup>	45%		60%				1	0.15		0.15	
Praise <sup>b</sup>	56%		60%				1	2.33		0.18	
Physical affection <sup>b</sup>	47%		58%				1	1.31		0.01	
EA sensitivity (3rd power)	7.62	0.98	7.84	0.87	-36.81	23.31	53.56	-1.58	-83.54 - 9.93	0.28*/0.06 <sup>c</sup>	
Child behaviors											
Child solitary socioemotional play <sup>a</sup>	-0.01	0.89	0.01	0.88	-0.02	0.17	50.71	-0.09	-0.36-0.33	0.05	
Child initiated socioemotional play <sup>a</sup>	-0.14	0.80	0.14	0.90	-0.26	0.16	50.27	-1.68	-0.58-0.05	0.05	
Mother initiated socioemotional play <sup>a</sup>	-0.06	0.86	0.06	0.82	-0.10	0.17	50.84	-0.59	-0.45-0.24	-0.09	
Sociability <sup>a</sup> (4th power)	0.20	0.85	-0.20	0.64	78.82	22.46	50.70	3.51***	33.72-123.93	0.22	
EA responsiveness (3rd power)	6.24	0.78	5.89	0.95	38.06	13.95	50.70	2.73**	10.06-66.05	0.19	
VABS daily living skills	93.95	6.82	92.47	9.24	1.66	1.43	50.68	1.16	-1.21-4.53	0.10	
VABS socialization	105.98	8.41	100.11	8.33	6.01	1.43	50.69	4.20***	3.14-8.89	0.20	

Note. SPPR = Self-Perceptions of the Parental Role. PSQ = Parental Style Questionnaire. EA = Emotional Availability. VABS = Vineland Adaptive Behavior Scales.

<sup>a</sup>Mean *z* score. <sup>b</sup>Percent who engaged in the activity. Test of difference by birth order is reported as McNemar's chi-square test for paired samples, and correlation is a phi coefficient. <sup>c</sup>Correlation attenuated to non-significance when controlling siblings' EA responsiveness.

\* $p \leq 0.05$ . \*\* $p \leq 0.01$ . \*\*\* $p \leq 0.001$ .

stabilities across an average of nearly 3 years. All correlations remained significant when controlling for covariates and partner variables. By contrast, maternal practices exhibited very small to only medium stabilities across time. Only sensitivity was significantly correlated between time 1 and time 2, and this correlation attenuated when controlling for sibling responsiveness.

### 3.4 | Similarities and Differences in Sibling Socioemotional Behaviors

The interaction between Birth order and Gender was significant for child solitary play,  $est. = 0.79(0.34)$ ,  $95\%CI = 0.11\text{--}1.46$ ,  $t(99.48) = 2.31$ ,  $p = 0.023$ . Firstborn girls engaged in more solitary play than firstborn boys,  $est. = 0.54(0.24)$ ,  $95\%CI = 0.07\text{--}1.02$ ,  $t(50) = 2.29$ ,  $p = 0.023$ , but secondborn girls and boys did not differ,  $est. = -0.24(0.25)$ ,  $95\%CI = -0.73\text{--}0.26$ ,  $t(50) = -0.96$ ,  $p = 0.342$ . Among girls, there was no difference between firstborns' and secondborns' solitary play,  $est. = 0.41(0.26)$ ,  $95\%CI = -0.13\text{--}0.95$ ,  $t(27.70) = 1.56$ ,  $p = 0.413$ . Among boys, secondborns engaged in marginally more solitary play than firstborns,  $est. = -0.37(0.20)$ ,  $95\%CI = -0.77\text{--}0.027$ ,  $t(28.12) = 1.91$ ,  $p = 0.065$ . No sociodemographic variables or corresponding partner variables were associated with child solitary play. Child-initiated and mother-initiated play did not differ between first- and secondborns, nor were there any interactions between birth order and gender. Firstborns were more sociable than secondborns, and this effect held when controlling for child age at the observation,  $est. = 67.71(23.54)$ ,  $95\%CI = 20.45\text{--}114.97$ ,  $t(51.08) = 2.88$ ,  $p = 0.006$ . Firstborns were also rated as more emotionally responsive than secondborns, and when controlling for maternal sensitivity birth order remained significant,  $est. = 58.62(11.54)$ ,  $95\%CI = 35.44\text{--}81.80$ ,  $t(50.21) = 5.08$ ,  $p < 0.001$ . For adaptive socialization, firstborns scored higher than secondborns, and this effect maintained significance when controlling for maternal verbal intelligence and openness,  $est. = 6.25(1.44)$ ,  $95\%CI = 3.36\text{--}9.15$ ,  $t(49.71) = 4.34$ ,  $p < 0.001$ , as well as maternal investment in parenting,  $est. = 7.00(1.55)$ ,  $95\%CI = 3.87\text{--}10.12$ ,  $t(42.94) = 4.52$ ,  $p < 0.001$ . Adaptive daily living skills did not differ by birth order.

### 3.5 | Correspondence of Sibling Socioemotional Behaviors

Relations between first- and secondborn siblings' behaviors are presented in Table 2. Surprisingly little concordance in sibling behaviors emerged, even though the two were observed with the same mother and when the same age.

## 4 | DISCUSSION

Developmental research on family process has traditionally focused on one parent and one target child in the family (e.g., Yu, Cheah, Hart, & Yang, 2018), usually the firstborn; however, family systems theory advocates more realistic frameworks of theory and research that involve more members of the family (e.g., Bornstein & Sawyer, 2006; Kerig, 2019). In that context, the current study of maternal socioemotional parenting cognitions and practices and child socioemotional functioning addressed two specific goals: continuity and stability in mothers with firstborns and secondborns and sibling similarities, differences, and correspondences. To meet these goals, we twice investigated the same families, first when firstborns in the family were 20 months old and about 3 years later when secondborns in the same family were 20 months old.

Despite being with different children and the structural changes that occurred in the family on account of the addition of a child and the passage of time, six of seven maternal socioemotional cognitions were consistent in their mean level (only parenting knowledge increased when sociodemographics were controlled) and all seven maternal socioemotional cognitions were stable. That is, a range of mothers' socioemotional parenting cognitions remained relatively unchanged vis-à-vis their two different children. Consequently, we can characterize the parenting climate created in the family by maternal socioemotional cognitions as 'continuous-and-stable' between siblings, a decidedly shared socioemotional rearing environment. Similarly, group mean levels of all six socioemotional

caregiving practices remained the same in mothers between their first- and secondborn children; however, the stability of maternal socioemotional practices across time and their two different children was uniformly low. In contrast to their cognitions, maternal socioemotional practices can be thought of as 'continuous-and-unstable' between siblings. In summary, once mothers are thinking and acting in a certain way, they tend to maintain their beliefs and behaviors in group terms and their beliefs in individual terms with (at least) their first two children.

The implications for parenting and childrearing in the family are that maternal socioemotional cognitions and (to a degree) practices are fairly consistent across siblings. Because siblings behaved differently in some respects (see below), mothers may tailor their behaviors to the needs of their individual children. Supporting this contention, Avinun and Knafo (2014) reported that 23% of the variance in parenting might be attributable to the child's genetics, suggesting that parents modify their parenting in part to accord with their two children's genetically distinct behaviors and capabilities, such as temperament. Maternal consistency in parenting cognitions may derive from a consistent environment, from fixed inheritance, characteristic traits, internal working models, or from perceived or actual similarities in sibling offspring (Bornstein, 2016). We suspect that in these largely intact, well-functioning, middle-class families, childrearing environments are relatively stable. When child behavior was controlled, the only stable parenting practice (sensitivity) attenuated, suggesting that similar sibling behaviors may contribute to consistency in mothers.

About half of siblings' socioemotional behaviors we studied were similar in terms of their group mean level, but firstborns were more sociable, emotionally responsive, and socioemotionally mature than were secondborns at the same age. No child socioemotional behaviors were concordant across siblings. Whereas mothers may be consistent in their socioemotional cognitions about parenting, their children appear to vary in socioemotional functioning as mothers did in their actions toward their two children. Our findings suggest that, despite some shared genetics and environments, first- and secondborn 20-month-old children are beginning to individuate socioemotionally.

Overall, the results of this study underscore the significance of both shared and non-shared environments for understanding the dynamics of relationships within families. Among the more dramatic changes in family life is the one that takes place when a second baby is born (e.g., Feinberg et al., 2019). In a system's perspective, the births of later children alter the roles of each family member and presumably affect the ways in which each interacts with all others. Parents with a secondborn child are in many respects, therefore, not the same parents as they were with their firstborn. Although parenting practices were uncorrelated between firstborns and secondborns, mothers as a group did not consistently favor their first or second child, as indicated by continuous means across parity, and parenting cognitions remained largely stable. We conclude that parenting is modular and how parenting changes depends on the 'specificity' of what is measured and how it is measured (see Bornstein, 2015). As Maccoby (2000) observed, the shared environment of parenting may not actually translate into shared effects for siblings because different children who receive the same parental treatment still may not interpret or respond to it similarly.

#### 4.1 | Limitations and Strengths

Our participating families consisted of mothers and children who were ethnically homogenous; thus, the findings might have limited generalizability to other ethnic groups, fathers, et al. In addition, child and mother behaviors were drawn from relatively short (10-min) play sessions which provide only a small sample of the myriad interactions between mothers and children. Perhaps, too, parenting cognitions that are more specific or more general, and more macro or micro parenting practices, would have resulted in other patterns of results. However, we employed several tactics to ensure that our sample was representative of typical mother-child interaction, we studied a range of common and prominent socioemotional cognitions and practices of mothers and children, we encouraged mothers to behave as they would typically (which we confirmed), and we used standard, age-appropriate materials in standardized procedures. Although the sample size of families was small, the within-family design boosted power and we had adequate power to detect medium effects in tests of continuity, but adequate

power only to detect large effects for correlations. Using a single imputation, the standard errors may also be underestimated which overvalues the power of the tests (Graham, 2009). Still our missing data were missing completely at random, which lowers bias in the parameter estimates compared to other forms of missing data, and we were judicious by only imputing cases where the dyad participated at both timepoints so as not to greatly overestimate the power of the tests.

The design in this study—the use of identical observational procedures and measurements for two siblings seen at the same age with the same mother—contributes useful data to the study of parenting, sibling development, and family life. In particular, because mothers were observed when alone with each child, there were similar constraints on mothers' attention in the two observations; that is, mothers were able to devote full attention to each child because the distraction, competition, and responsibility of another child were removed. Additionally, this study used both group mean level consistency (continuity) and individual standing consistency (stability) analyses, thereby lending greater clarity to understanding functioning in firstborn and secondborn dyads than is usually found in the literature.

## 4.2 | Conclusions

Some investigators contend that shared environment effects are negligible. In the sense that by the age of 20 months children in the same family are behaving differently in some domains, and mothers treat them differently (although not systematically differently—as in a birth-order preference), our study supports this contention. Only mothers' parenting cognitions were continuous and stable across siblings. Despite sharing some genetics, major environments (e.g., home, childcare, neighborhood), and key socialization figures, siblings' socioemotional functioning is apparently diverging early in toddlerhood.

## ACKNOWLEDGMENTS

This research was supported by the Intramural Research Program of the NIH/NICHD, USA, and an International Research Fellowship in collaboration with the Centre for the Evaluation of Development Policies (EDePO) at the Institute for Fiscal Studies (IFS), London, UK, funded by the European Research Council (ERC) under the Horizon 2020 research and innovation program (grant agreement No 695300-HKADeC-ERC-2015-AdG)

## SUPPORTING INFORMATION

Additional Supporting Information may be found online in the supporting information tab for this article.

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**How to cite this article:** Bornstein MH, Putnick DL, Suwalsky JTD. Continuity, stability, and concordance of socioemotional functioning in mothers and their sibling children. *Social Development*. 2019;28:90–105. <https://doi.org/10.1111/sode.12319>