

Mother–Child Mutually Responsive Orientation and Conscience Development: From Toddler to Early School Age

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We examined whether positive implications of mother–child mutually responsive orientation, demonstrated earlier at toddler and preschool age, extend longitudinally into early school age. The focus of the present study was on the long-term consequences of mutually responsive orientation for the development of conscience. Mutually responsive orientation encompassed shared cooperation and shared positive affect between mother and child. It was measured as a composite of those qualities observed in dyadic naturalistic interactions and reported by mothers, at toddler and preschool age. Children’s conscience was assessed at early school age ($N = 83$) using multiple measures, including observations of moral behavior, alone and in the peer context, and moral cognition. Mother–child mutually responsive orientation at toddler and preschool ages predicted children’s future conscience, even after controlling for the developmental continuity of conscience. Model-fitting analyses revealed that mutually responsive orientation at toddler age had a direct effect on future conscience, not mediated by such orientation at preschool age. The findings extend those of earlier work that revealed the importance of mother–child mutually responsive orientation for socialization, and they confirm the value of the relationship approach to social development, including long-term outcomes.

INTRODUCTION

As more complex bidirectional models of socialization continue to replace earlier, parent-centered unidirectional views, the relationship approach to social-emotional development has increasingly gained prominence (Belsky, 1984; Bugental & Goodnow, 1998; Collins & Laursen, 1999; Hartup, 1986; Hinde & Stevenson-Hinde, 1988; Maccoby, 1992, 1999; Radke-Yarrow, Richters, & Wilson, 1988; Sroufe & Fleeson, 1986). In particular, the quality of the mother–child relationship, mutually cocreated over the shared history of interactions, has been seen as central in social development, initially by attachment theory, and gradually extending to other models of socialization (Maccoby, 1992; Thompson, 1998).

Recently, research on relationships in social and developmental psychology has interfaced in a compelling manner. In particular, the concept of communal relationships (Clark, 1984) emerged as highly applicable to the context of the parent–child dyad. Its relevance is especially salient in view of Maccoby’s depiction of parent–child socialization as a process of inducting the child into a system of reciprocity—a binding, reciprocal, and mutually responsive relationship (Maccoby, 1983, 1992; Maccoby & Martin, 1983). The latter bears a strong resemblance to a communal relationship, characterized by mutual strong emotional ties between the partners, by shared feelings of commitment and the investment in the relationship, by feeling mutually compelled to respond to each other’s needs and be receptive to each other’s in-

fluence, and by mutual empathy and trust (Maccoby, 1999).

In this spirit, in our earlier work (Kochanska, 1997), we introduced a construct of *mother–child mutually responsive orientation* that integrated elements of the concept of a communal relationship and that of a system of positive reciprocity between the mother and child (Maccoby, 1983). We further proposed that such orientation encompasses two major components: the mother’s and the child’s cooperation with, or responsiveness to each other, and shared dyadic positive affect (Kochanska, 1997). We also proposed that such orientation established early in development becomes the foundation for a host of positive socialization outcomes. As a result of the history of having experienced maternal responsiveness and mutually rewarding interactions, the child, in turn, comes to feel receptive and responsive to maternal socialization influence, including internally felt obligation and eagerness to embrace maternal values and rules, or willingness to be socialized (Maccoby & Martin, 1983).

This proposal drew from several literatures. Attachment and compliance researchers have shown that maternal responsiveness contributes to the child’s willingness to be, in turn, responsive to the mother (Londerville & Main, 1981; Lytton, 1977; Martin, 1981; Matas, Arend, & Sroufe, 1978; Parpal & Maccoby,

1985; Rocissano, Slade, & Lynch, 1987; Stayton, Hogan, & Ainsworth, 1971; Westerman, 1990). Others have linked positive affect with mutual coordination, affection, and the formation of a reciprocal bond within the dyad (Ainsworth, Blehar, Waters, & Wall, 1978; Dix, 1991; Emde, Biringen, Clyman, & Oppenheim, 1991; Kochanska & Aksan, 1995; Lay, Waters, & Park, 1989; Maccoby, 1983; Radke-Yarrow et al., 1988).

Our earlier paper (Kochanska, 1997) presented the first empirical test of this model, based on a large, short-term longitudinal study. Both components of mother-child mutually responsive orientation were targeted, using multiple assessment methods that included observations of interactions as well as maternal reports. Shared cooperation within the dyad was conceptualized as willing responsiveness to each other's signals or bids. Shared positive affect was measured as the periods of interaction that were infused with mutually experienced positive emotions. To capture the enduring qualities of the dyad, the observations were sampled across multiple naturalistic contexts. Child internalization of maternal rules, or conscience, was also assessed, using observations and mothers' reports. All data were collected at toddler and preschool age. As predicted in that study, the mutual or reciprocal orientation was linked quite strongly to children's conscience development, or increased eagerness and readiness to embrace and internalize maternal goals and values. Those effects were both contemporaneous and longitudinal over the considered age span.

Because in the original study the measures of mother-child mutually responsive orientation and the socialization outcomes were collected relatively close in time (at ages 1½ and 4 years), the direction of causality was somewhat open to interpretation. Conceivably, at least the contemporaneous findings could be explained, in part, in terms of child effects: children who were more internalized could have been treated more responsively and shared more positive affect with their mothers. In view of the short-term longitudinal effects also found in that study such interpretation was unlikely; nevertheless, a much more powerful test of that new model would be to examine longer-term socialization effects. To that end, we need to examine whether positive implications of the early established mother-child mutually responsive orientation indeed continue as the child moves into early school age, and as he or she becomes part of a broader ecology of development, including extended peer contexts. To provide such a test was one objective of the current study.

Another goal nested in this broader objective was to address the questions that were asked, but not an-

swered, in the original work regarding the developmental mechanism of the impact of mutually responsive orientation. Does the orientation laid down early, in the second year, exert its influence on future socialization outcomes directly, or does it set the stage for the later orientation at preschool age, and thus, is its impact indirect or mediated through the later quality of the relationship? In the previous paper (Kochanska, 1997, p. 109), these questions were set forth as a direction for future research that would require a more sophisticated statistical approach than the one we used in the previous study. In the current article we address this issue using structural equation modeling.

We expected that mother-child highly mutually responsive orientation, established in the first few years of life, would continue to predict broadly viewed conscience development, assessed as late as early school age. Positive results would confirm its significant role in socialization. An additional focus was to examine the type of those effects—direct versus indirect paths of influence.

Toward that goal, the same children were studied again approximately 3½ to 4 years after the original assessment, at early school age. The focus was again on their conscience development, measured using multiple behavioral paradigms, some of which were comparable to those used at earlier ages. Given that the children were now older, however, the measures of conscience were expanded to encompass the developmentally shifting ecology of socialization and children's growing cognitive and verbal skills. Specifically, new to this study was extending conscience assessment in two new directions. First, we included behavior in a peer context, to represent an ecological sphere increasingly important at that age. Second, we obtained indices of moral cognition and moral reasoning.

Two methodological guidelines were followed. First, to assure robust measurement, the data were considerably aggregated (Rushton, Brainerd, & Pressley, 1983). Second, to obtain conservative estimates of the unique contributions of mother-child early mutually responsive orientation to children's conscience measured at early school age, above and beyond the developmental continuity of conscience across childhood, this continuity was controlled in the analyses, as argued by Maccoby and Martin in their discussion of the self-component (Maccoby & Martin, 1983).

METHOD

Sample

The characteristics of the sample at two previous assessments were described in detail in Kochanska

(1997). Briefly, 103 mothers and normally developing children were seen at toddler age (51 girls, 52 boys; M age = 32.86 months, SD = 4.09); 99 dyads returned at preschool age (49 girls, 50 boys; M age = 46.01 months, SD = 2.62). The families, who came from several counties in eastern Iowa, represented a relatively broad range in terms of parental education, employment, and income, and were predominantly Caucasian. For the current assessment at early school age, 83 families returned (39 girls, 44 boys; M age = 65.89 months, SD = 5.35). Families had originally made a commitment to two assessments, at toddler and preschool age, and only 4 participating dyads did not return for the preschool assessment. By the time of the early school age follow-up introduced in this article, many participants had moved away.

Overview of Design

Mothers and children were seen during home and laboratory sessions (each 2–2½ hours long) at toddler age, during a laboratory session (3–3½ hours long) at preschool age, and during a laboratory session (2½–3 hours long) at early school age. The sessions encompassed multiple naturalistic yet carefully scripted contexts of mother–child interaction and diverse conscience paradigms. Additionally, within a couple of months of the latter session children were seen in same-sex peer groups of three in another laboratory session (45 min long).¹ All peers were participants in the study; they did not know each other, and were matched on gender only. All sessions were conducted by young women (“experimenters”) and videotaped for later coding by many teams of coders.

Mother–child mutually responsive orientation measures, the predictors in this article, were obtained at toddler and preschool ages in the earlier study (Kochanska, 1997). Earlier measures of children’s conscience were also gathered at those two times, and, although not of central interest in this paper, they are considered in the analyses that control for the stability of conscience. As those measures were described in detail in the earlier report, the account here is brief. The current long-term conscience outcome measures were collected at early school age, during the mother–child and peer sessions.

¹Due to scheduling difficulties, there were 6 children who were seen with peers but not at the mother–child session, and 6 who were seen at the mother–child session but not with peers. Therefore, although the n for each session at early school age was 83, the overlap was not perfect.

Observed Measures of the Mutually Responsive Mother–Child Orientation

In our original article (Kochanska, 1997), two components of the mother–child mutually responsive orientation were proposed: *shared cooperation with each other* and *shared mother–child positive affect*. Each represented a result of the multistep aggregation of observational measures, described in detail in that article. Shared cooperation with each other encompassed the mother’s eager responsiveness to the child and the child’s eager responsiveness to the mother; shared positive affect reflected interactions infused with positive emotion on the part of both members of the dyad across a broad range of interactions. Both components of mutually responsive orientation were created in an analogous manner at toddler and preschool age. The extensive details of all coding systems and reliability can be found in the original article.

Shared Cooperation Between Mother and Child

The ultimate composite score of shared cooperation included (1) maternal responsiveness to the child captured by a “microscopic” coding system, (2) maternal responsiveness to the child based on a “macroscopic” coding system, and (3) child responsiveness to the mother, or enthusiastic, eager compliance (“committed compliance”). Both maternal responsiveness coding systems were applied to diverse naturalistic mother–child interaction contexts (e.g., play, snack, free time, kitchen chores; 40 min at toddler age and 20 min at preschool age); child responsiveness was coded in discipline contexts (80 min at toddler age and 65 min at preschool age).

Maternal responsiveness to child: Microscopic coding. Coders examined each 60-s segment of the interaction and, for each one, identified all “child-related events”: child distress/negative affect, bid for attention, influence attempt, and need for help/assistance. In the segments where there were no such events, one of the global codes was used (mother and child engaged in separate activities, child not addressing/needling mother but mother addressing child, mother and child engaged in an activity led by and mostly guided by mother, and uncodable). These segments were not considered further.

For each child-related event, the coders evaluated maternal response using one of the four codes: poor (mother ignores, avoids, reprimands child), fair (mother responds to child in a perfunctory, half-hearted way), good (mother responds adequately, “well enough” to child), and exceptional (mother responds in a prompt, contingent, warm, supportive, genuinely interested,

empathic manner). The conventions specified clearly the meaning of each code given the preceding child event (see Kochanska, 1997). *Reliability*, average κ , across multiple checks was .74 for identifying the child-related events, .71 for specifying their categories, and .73 for maternal response.

For each mother, the number of each type of response (poor, fair, good, exceptional) was tallied separately for each category of child-related events and divided by the number of events in each category to control for the varied numbers of events across dyads (e.g., percentage of child distress signals to which mother responded poorly, fairly, well, or exceptionally). To capture specifically maternal high responsiveness, we averaged all the relative scores reflecting exceptional responsiveness, across all four types of child-related events, thus creating the *microscopic responsiveness scores*, one for toddler age and one for preschool age.

Maternal responsiveness to child: Macroscopic coding. The same contexts were also coded using the classic 9-point rating scales of maternal sensitivity–insensitivity, acceptance–rejection, and cooperation–interference, typically viewed as components of responsiveness (Ainsworth, Bell, & Stayton, 1971). To increase robustness, we gave a rating on each scale for each 5-min segment of the observed interaction rather than one global rating for the dyad. *Reliability*, α s (generalizability; Bakeman & Gottman, 1986) were .99 for sensitivity, .98 for acceptance, and .99 for cooperation.

For each mother, the ratings were averaged across the 5-min segments and across observed contexts, and, given the high intercorrelations among the scales ($\alpha = .93$ at toddler age and .92 at preschool age), across the scales. The aggregation was done at toddler and at preschool age, producing one *macroscopic responsiveness score* at each age.

Child responsiveness to mother. The child's eager, enthusiastic, "committed" compliance with the mother was observed in naturalistic discipline contexts, toy cleanups and prohibition contexts revolving around preventing the child from touching attractive toys displayed on a low shelf. Child responses to maternal directives were coded for each interval (20 to 60 s, depending on the context; for details, see Kochanska, 1997; Kochanska, Aksan, & Koenig, 1995). Eager, committed compliance was coded when the child wholeheartedly endorsed or embraced the mother's directive, and compliance appeared self-regulated and not contingent on maternal sustained control (spontaneously cleaned up one pile of toys after another, looked closely at the prohibited objects without touching and commented about their fragility). *Reliability* κ s were .63–.77 for cleanups and .78–.80 for prohibited object contexts. Data aggregation involved

the tallying of all the occurrences and dividing by the number of coded intervals.

Shared Mother–Child Positive Affect

At toddler and preschool age, lengthy contexts of mother–child interaction were coded for the mother's and child's affect (at toddler age, 145 min, at preschool age, 75 min). They encompassed the discipline situations, free time, play, snack, and so on. Two different coding systems were used for different contexts. One system was applied to the discipline situations, and included neutral-positive, positive, neutral-negative, and negative affect codes. The second system was applied to daily routines other than discipline, and included seven codes (affectionate, joyful, neutral-positive, neutral-negative, sad, anxious, and angry). Both systems were essentially similar in that both utilized short intervals (20–60 s, depending on the system), and both were equivalent in that the mother's and the child's affect were coded as either positive (neutral-positive mood or a discrete positive affect code) or negative (neutral-negative mood or a discrete negative affect code). *Reliability* κ s ranged from .76 to .81 for the mother, and from .77 to .84 for the child.

We tallied across both affect coding systems all intervals in which *both* mother and child displayed positive affect (or mood) and *neither* displayed negative affect (or mood). Finally, those tallied shared scores were divided by the total number of coded segments and averaged across both affect coding systems, resulting in the *mother–child shared positive affect scores* for toddler and preschool age assessments.

Observed Mother–Child Mutually Responsive Orientation

Mother–child *shared cooperation with each other* score was created by averaging (standardized) maternal micro- and macroscopic responsiveness to child, and the child's committed compliance to the mother. That score was then aggregated with the *shared mother–child positive affect* score, resulting in the *overall mutually responsive orientation score* (one at toddler and one at preschool age). Those two components were related; at toddler age, $r(103) = .51, p .001$, and at preschool age, $r(99) = .22, p .05$, and the overall orientation scores were longitudinally stable, $r(99) = .43, p < .001$.

Mother-Reported Measures of the Mutually Responsive Mother–Child Orientation

At toddler and preschool age, mothers completed the Parenting Dimensions Inventory (PDI; Power,

1991), from which two scales most relevant for responsiveness were selected: Nurturance (six items) and Responsiveness to Child Input (four items). Both scales employ a 6-point format (1 = not at all descriptive of me, 6 = highly descriptive of me), and describe mother responsiveness to child distress, as well as shared "good times" and enjoyment of mother-child interaction, and thus parallel loosely the components of the observational construct. All items were averaged (α was .77 at each time). The scores were longitudinally stable, $r(99) = .54, p < .001$.

Measures of Children's Conscience at Early School Age

Internalization of Maternal Request: Child Alone

Following a joint craft project, mother asked the child to put all the craft materials back into a large, multicompartment box. After a period of interactive cleanup, the mother left the room, asking the child to complete the chore alone (5 min). Typically, much remained to be cleaned up.

Child behavior was coded for every 10-s interval, until all craft materials were put away or up to 30 intervals ($M = 28.41, SD = 4.66$). Internalization of maternal request (internalized cleanup) was coded when child was engaged in sustained cleaning up and no play was present; all occurrences were tallied and divided by the number of coded segments. Reliability κ was .88.

Internalization of the Experimenter's Rules: Child Alone

The experimenter introduced a "Throwing Game." She affixed a velcro dart board to the wall, and explained that the child would win "a really special prize" for hitting its center with a nerf ball, "an OK prize" for hitting the area immediately around the center, and no prize for any other hit or missing the target (the wrapped prizes were clearly displayed in plastic bins).

The child had one practice trial at a close distance, and the experimenter then explained the rules that made the game extremely difficult. The child was to remain within a narrow area marked on the floor across the room from the target; to face the opposite wall while throwing, and thus, to throw backward; to use the nondominant hand; and to throw each of five balls only once (without retrieving balls after having thrown them).

The experimenter reviewed the rules with the child and remarked that breaking them would be cheating, and further defined "cheating" (in a friendly but serious manner). She then left for 3 minutes, to "discover,"

upon her return, that she "had set up the game wrong." She let the child play the game again, this time with much easier rules. Each child won a prize.

Child behavior was coded for each of sixty 3-s segments while the child was alone. We coded (and tallied) rule violations (stepping away from the designated area, using the dominant hand, facing the target, sticking a ball manually on the target), as well as the number of balls retrieved and those stuck manually on the target. We also coded the latencies to the first instances of those violations. Rule-compatible behaviors were also coded. Reliability κ for the discrete behaviors (segment-by-segment), was .91. The latencies were coded within 1 s in 92% of cases, within 6 s in 3%, and within more than 7 s in 3% of cases.

Rule violations were tallied, standardized, and aggregated ($\alpha = .78$), as were the latencies ($\alpha = .68$). The aggregates for (reversed) violations, latencies, and rule-compatible behavior (standardized) were aggregated into one *internalization score* ($\alpha = .78$).

Internalization of the Experimenter's Rules: Child With Peers

The experimenter introduced a "Ring Toss Game" to the three children. Like the "Throwing Game," it was to be played in the absence of adult supervision (3 min). The experimenter affixed a wooden dowel to a base (target) and gave each child one plastic ring. She explained and reviewed the rules. Standing within a designated area on the floor far away from the target, children were to toss the rings onto the dowel. They were allowed to toss only once, without ever retrieving the ring. After explaining, the experimenter left, to "discover," upon return that "she had used the wrong rings," and she let the children throw again until each of them won a prize.

We coded each child's behavior for every 3-s segment, including rule violations (throwing the ring from outside of the designated area, throwing more than once, and retrieving the ring), the latencies to their first instances, and rule-compatible behaviors. Each child also received a score of readiness to cheat (1 = never cheated, $n = 30$; 2 = third, or last, child to cheat, $n = 12$; 3 = second child to cheat, $n = 19$; 4 = first child in the session to cheat, $n = 22$). Reliability κ for the discrete behaviors was .82. For 10 cases, the latencies to throw from outside the designated area were within 1 s difference in all cases; to throw more than once within 1 s for 9 cases, within 14 s for 1 case; to retrieve the ring within 1 s for 8 cases, and within 7 s for 2 cases. Kappa for readiness to cheat was 1.00.

For each child, we tallied all instances of each rule-violating behavior. Because the length of the para-

digm varied somewhat across the triads, each score was divided by the number of the coded segments. (The experimenter occasionally needed to return earlier, for example when conflict arose among children; thus, the length of the time when children were alone varied somewhat.) The scores were standardized and aggregated ($\alpha = .90$), as were the latencies ($\alpha = .79$). The composites of (reversed) transgressions, latencies, and rule-compatible behavior were aggregated into an *internalization score* ($\alpha = .82$). The *readiness-to-cheat* score was kept separate.²

Moral Cognition

Two sets of stories (four hypothetical stories per set) were used, one by Eisenberg-Berg and Hand (1979) and one by Nunner-Winkler (1993). The Eisenberg stories depict the protagonist faced with dilemmas pitting self-interest against the welfare of others (e.g., ignore an injured child to attend a birthday party versus help the child and miss the party). The Nunner-Winkler stories similarly portray the protagonist faced with conflicts between self-interest and others' welfare or a moral norm (e.g., whether to steal another's candy). After each story, the child was asked what course of action the protagonist should take. In the Eisenberg stories, the experimenter also challenged the child's decision, pointing out another's needs if the child made a selfish choice, and the consequences for the protagonist if he or she made a prosocial choice. The child could then make another choice or confirm the original one.

In the Eisenberg stories, each response was coded as selfish, prosocial, or, rarely, compromise (not further used). Responses were rated as follows: 0 = absent in story; 1 = first choice but changed when challenged (not final); 2 = second choice (changed and final); 3 = first and unchanged (final) choice. Reliability κ was .96 for both selfish and prosocial codes.

In the Nunner-Winkler stories, each response was coded as antisocial, moral, or compromise (not further used) and scored as 0 (absent) or 1 (present). Reliability κ was .94 for antisocial and .95 for moral scores.

Tallying across all stories, we created an overall selfish (or antisocial) and moral (or prosocial) score for each set. These scores correlated across both sets (the Eisenberg and Nunner-Winkler series): selfish

with antisocial, $r(83) = .47, p < .001$; prosocial with moral, $r(83) = .29, p < .01$. We therefore summed them across the two sets, creating an overall *selfish/antisocial* score and *prosocial/moral* score across all eight stories.

Prior Measures of Children's Conscience

Children's conscience measures at toddler and preschool age were described in our previous work (1997). Because they are used in the current analyses to control for the developmental continuity of conscience, they are presented here, albeit briefly. We consider the toddler-age measure (internalization of maternal prohibition) and three preschool-age measures aggregated into one composite of preschool-age conscience (internalization of mother prohibition, internalization of mother's request, and reluctance to violate established rules of conduct).

Internalization of Maternal Prohibition (Child Alone: Toddler and Preschool Age)

The child was alone for 12 min in the laboratory with the attractive toys the mother had prohibited him/her from touching. For each 5-s segment, behavior was coded as looking/no attempt to touch, sorting dull "legal" blocks, other activity (snacking, playing with "legal" toys), self-correcting (extending and retracting hand), touching gently, or deviating (playing with the toys). Reliability κ was .90 at toddler age and .92 at preschool age.

At both ages principal components analyses produced at both times, an analogous internalization factor (low, deviation; high, other activity; and high, looking with no attempt to touch). The factor scores were used in further analyses.

Internalization of Mother Request (Child Alone: Preschool Age)

The paradigm, coding, and score were identical to those at early school age, except that toys, rather than craft materials, were to be cleaned up.

Reluctance to Violate Rules of Conduct (Preschool Age)

The experimenter induced the child to perform five "legal" and five analogous "illegal" acts violating established rules (scribble in a pad versus in a textbook; tear a page out of the pad versus out of the textbook; throw a nerf ball at the wall versus at the experimenter's face; spill water into a cup versus on the floor; tear up a

² To account for the impact of the behavior of peers, we coded, for each child, the instances when he or she was the target of the peers' attempts to induce him or her to violate the rules. Then we added an additional credit to the internalization scores of those children who resisted that influence, and we conducted all analyses using thus altered scores. All findings remained fundamentally unchanged.

Table 1 Overview of Measures and Descriptive Data

Measure	<i>M</i>	<i>SD</i>	<i>Range</i>
Toddler Age, ^a <i>n</i> = 103			
Mother-child mutually responsive orientation			
Observed	.00	.66	-2.49-1.45
Mother-reported	5.46	.44	4.25-6.00
Children's conscience ^b	.00	1.00	-1.86-2.04
Preschool age, ^a <i>n</i> = 99			
Mother-child mutually responsive orientation			
Observed	.00	.54	-2.41-1.09
Mother-reported	5.42	.45	3.96-6.00
Children's conscience ^c	-.01	.60	-1.58-1.29
Early School Age, <i>n</i> = 83			
Children's conscience			
Internalization of maternal request	.75	.30	.00-1.00
Internalization of experimenter's rules			
Throwing game, child alone			
Internalization composite	.00	.65	-2.26-.68
Ring toss game, child with peers			
Internalization composite	.00	.79	-1.86-1.27
Readiness to cheat	2.40	1.23	1.00-4.00
Moral cognition			
Selfish/antisocial score	4.42	4.11	.00-14.00
Prosocial/moral score	9.27	3.75	1.00-16.00
Children's conscience ^d	-.01	.54	-1.45-1.09

^a Descriptive data for each component of these measures were presented in our previous report (Kochanska, 1997).

^b Internalization of maternal prohibition.

^c A composite of three measures: internalization of maternal prohibition, internalization of maternal request, and reluctance to violate established rules of conduct.

^d A composite of six measures: internalization of maternal request, internalization of experimenter's rules when alone (1) and with peers (2), and two moral cognition scores.

blank card versus a photo). We coded for each the latency to act, the readiness (0 = never, even after prompting, to 3 = immediately), and an overall lack of reluctance (1 = very uncomfortable, to 3 = no hesitation, gleeful). Reliability κ s were .84 to .90; 100% of the latencies were within 1.5 s. Difference scores between the "legal" and "illegal" acts were created for the average latency, readiness, and lack of reluctance. These scores were standardized and aggregated into a composite of the *reluctance to violate rules of conduct* ($\alpha = .80$). All descriptive data are shown in Table 1.

RESULTS

Developmental and Gender Effects in Children's Conscience

Developmental Effects

Cross-sectional analyses. The cross-sectional analyses at early school age indicated that older children behaved in a more morally mature manner in some paradigms. They had higher scores on internalization of maternal request, $r(83) = .24, p < .05$, and on moral

cognition measures; they had lower *selfish/antisocial* scores, $r(83) = -.42$, and higher *prosocial/moral* scores, $r(83) = .45; ps < .001$. Therefore, age was covaried in all analyses.

Longitudinal analyses. In the longitudinal analyses, we examined the continuity of conscience from toddler and preschool ages to early school age. The correlations are shown in Table 2.

There were several longitudinal relations, particularly from preschool to early school-age measures. The preschool age conscience composite significantly predicted all but one measure (moral/prosocial cognition score) at early school age. The toddler-age conscience measure predicted internalization of maternal request and both internalization measures in the peer context at early school age.

Gender Effects

All conscience measures at early school age were submitted to a MANOVA, with sex as the between-subjects factor and age as the covariate. The multivariate effect of sex was significant, $F(6, 69) = 2.35, p <$

Table 2 Correlations between Mother–Child Mutually Responsive Orientation and Child Conscience Measures at Toddler and Preschool Age and Child Conscience Measures at Early School Age

	Mother–Child Mutually Responsive Orientation					
	Toddler Age		Preschool Age		Child Conscience ^a	
	Observed	Mother-Reported	Observed	Mother-Reported	Toddler Age	Preschool Age
Child conscience, early school age						
Internalization of maternal request	.29***	.02	.12	.19 ⁺	.22*	.37****
Internalization of experimenter's rules						
Throwing Game, child alone						
Internalization composite	.31****	-.01	.34***	.01	.10	.26**
Ring Toss Game, child with peers						
Internalization composite	.27**	.20 ⁺	.32***	.27**	.31***	.41****
Readiness to cheat	-.28**	-.15	-.22 ⁺	-.20 ⁺	-.22 ⁺	-.25*
Moral cognition						
Antisocial score	-.24*	-.19 ⁺	-.23*	-.24*	.05	-.18 ⁺
Moral/prosocial score	.21 ⁺	.11	.12	.19 ⁺	.03	.16

Note: All partial correlations covarying child age; all two-tailed.

^a At toddler age, child conscience was based on internalization of maternal prohibition; at preschool age, it was a composite of three measures: internalization of maternal prohibition, internalization of maternal request, and reluctance to violate established rules of conduct.

* $p < .05$; ** $p < .025$; *** $p < .01$; **** $p < .005$; ⁺ $p < .10$.

.05. The follow-up ANOVAs revealed that girls surpassed boys on four measures: internalization of maternal request, girls $M = .83$, $SD = .23$, boys $M = .68$, $SD = .34$, $F(1, 74) = 4.92$, $p < .05$; internalization of the experimenter's rules (Throwing Game), girls $M = .16$, $SD = .63$, boys $M = -.16$, $SD = .68$, $F(1, 74) = 4.51$, $p < .05$; and both peer-context measures: internalization score, girls $M = .25$, $SD = .82$, boys $M = -.27$, $SD = .70$, $F(1, 74) = 8.69$, $p < .005$, and readiness to cheat, girls $M = 2.05$, $SD = 1.23$, boys $M = 2.64$, $SD = 1.16$, $F(1, 74) = 4.73$, $p < .05$.

Mother–Child Mutually Responsive Orientation at Toddler and Preschool Age and Children's Conscience at Early School Age

Correlational Analyses

The longitudinal correlations (covarying children's age) between observed and mother-reported mutually responsive orientation at earlier ages and child conscience at early school age are shown in Table 2. There were many significant longitudinal links, both for the observed and the mother-reported scores (the findings were essentially unchanged when gender was also covaried).

Prediction from toddler age mutually responsive orientation. Children who at toddler age had been in dyads high in observed mutually responsive orientation with their mothers scored higher on all conscience measures at early school age. The links were much weaker, however, when mother-reported mutually re-

sponsive orientation was considered. That score only marginally predicted two early school-age measures: internalization score in the peer context and antisocial score in moral cognition measures.

Prediction from preschool-age mutually responsive orientation. Those children who at preschool age had been in dyads high in observed mutually responsive orientation also scored higher at early school age on all conscience measures except internalization of maternal request and the moral/prosocial score in hypothetical stories. There were also significant links with mother-reported mutually responsive orientation for all conscience measures except the internalization score in the Throwing Game.

Multiple Regression Analysis

The longitudinal predictions from mother–child mutually responsive orientation at toddler and preschool age to children's conscience at early school age were addressed within a hierarchical multiple regression, which had several goals. The first goal was to gain a comprehensive view of moral development using an aggregated conscience score at early school age as the outcome measure. To that end, all separate measures were standardized and reversed if necessary, and averaged; they were moderately coherent ($\alpha = .61$). The second goal was to consider both the observed and mother-reported mutually responsive orientation scores in the same equation. Given the significant longitudinal stability of both observed

and mother-reported mutually responsive orientation scores from toddler to preschool age, the third goal was to examine these measures jointly as predictors to establish their unique contributions at each age. The fourth goal was to control for the developmental continuity in children's conscience, what Maccoby and Martin (1983) referred to as the "self-component," and to assess the contributions of the predictors to school-age conscience above the influence attributable to the simple continuity of conscience. The overall conscience scores were indeed longitudinally stable: toddler to preschool age, $r(99) = .35, p < .001$, preschool to early school age, $r(83) = .48, p < .001$, and toddler to early school age, $r(83) = .29, p < .01$. The findings are presented in Table 3.

At the first step, two predictors were entered, child age and sex. This step explained 20% of the variance in early school-age conscience. The inspection of β s revealed that each predictor made a significant contribution.

At the second step, the two earlier conscience scores were added, one from toddler age and one from preschool age, to control for the self-component. This step contributed 12% of variance beyond that explained by age and sex, due to the significant influence of the preschool-age conscience score.

At the third step, the two mutually responsive orientation scores at toddler age—observed and mother-reported—were entered. This step accounted for an

additional 8% of the explained variance, owing to the predictive power of the observed mother-child mutually responsive orientation.

At the fourth step, the two mutually responsive orientation scores at preschool age—observed and mother-reported—were entered, accounting for another 8% of the explained variance, due to the predictive power of the mother-reported score.

Ultimately, all predictors jointly explained 48% of the variance in the comprehensive measure of conscience at early school age, resulting in the significant equation: final $F(8, 74) = 8.58, p < .001$. After controlling for factors such as age, sex, and the continuity of conscience itself, the measures of mother-child mutually responsive orientation at toddler and preschool age accounted for 16% (one third) of the explained variance in children's conscience at early school age.

Additionally, for exploratory purposes, we performed a similar regression, varying somewhat the order of entry of the predictors to examine the contributions of the observed versus mother-reported mutually responsive orientation measures. The first and the second step were unchanged. At the third step, the observed measures of mutually responsive orientation were entered (toddler and preschool age). This step accounted for an added 9% of variance, $F_{ch} = 5.52, p < .01$, again due to the toddler-age score, $F(1, 76) = 6.17, p < .025, \beta = .26$. At the fourth step, the

Table 3 Mother-Child Mutually Responsive Orientation (Toddler and Preschool Age) as Predictors of Children's Moral Development at Early School Age: Multiple Regression Analysis

Predictors Entered	Step 1		Step 2		Step 3		Step 4	
	<i>F</i>	β	<i>F</i>	β	<i>F</i>	β	<i>F</i>	β
Age	8.52****	.29	3.53 ⁺	.19	3.97*	.19	6.71**	.23
Sex	11.30****	-.34	4.43*	-.21	4.31*	-.20	4.54*	-.19
	$R^2 = .20, F_{ch} = 10.06****$							
Toddler-age conscience			<1	.05	<1	-.02	<1	-.06
Preschool-age conscience			11.68****	.37	7.34***	.28	8.85****	.30
			$R^2 = .32, F_{ch} = 6.99****$					
Toddler age								
Observed mutually responsive orientation					8.93****	.29	4.86*	.22
Mother-reported mutually responsive orientation					<1	.08	1.08	-.11
					$R^2 = .40, F_{ch} = 5.22***$			
Preschool age								
Observed mutually responsive orientation							1.16	.11
Mother-reported mutually responsive orientation							9.94****	.32
							$R^2 = .48, F_{ch} = 5.49***$	

* $p < .05$; ** $p < .025$; *** $p < .01$; **** $p < .005$; ***** $p < .001$; + $p < .10$.

mother-reported measures were entered (toddler and preschool age), explaining another 7% of variance, $F_{ch} = 5.20, p < .01$, again due to the preschool-age score, $F(1, 74) = 9.94, p < .01, \beta = .32$.

In yet another regression, we examined the potential contribution of the interaction between toddler and preschool-age mutually responsive orientation by entering the interaction terms (one for observed and one for mother-reported scores) in an additional step. This step, and the respective F and β values were not significant.

Although at early school age we did not have measures of mother-child mutually responsive orientation comparable to those at toddler and preschool ages, we obtained a measure of mother-child shared positive affect during the toy cleanup, based on the coding of each 30-s segment ($M = .78, SD = .26$). To examine, at least partially, the impact of the contemporaneous mother-child orientation, we reran this regression entering the shared positive affect measure after child age, sex, and toddler and preschool-age conscience. Mother-child shared positive affect at early school age did not predict the contemporaneous conscience score, either at entry, $F(1, 77) = 1.91, \beta = .13$, or in the final equation, $F(1, 75) = 1.21, \beta = .10$.

Structural Equation Analyses

Overview. The model used in this study was designed to evaluate direct and indirect effects of mother-child mutually responsive orientation at toddler age on conscience at early school age, as well as

the significance of these effects after controlling for the longitudinal stability of conscience from toddler age to early school age. Using structural equation modeling, separate analyses were conducted for the observed and mother-reported measures of mutuality. Analyses were performed using standard model-fitting procedures with maximum likelihood estimation (LISREL 7; Joreskog & Sorbom, 1989). Even though LISREL procedures are considered conservative due to their sensitivity to violations of normality and homoscedasticity, these analyses should be viewed as exploratory given the size of the sample and the number of predictors included in the model.

The fit of the data to the model was tested by the value of the resultant χ^2 statistic. The fit is said to be adequate if the probability of the χ^2 statistic is greater than .05. Reduced models, in which a specific path is constrained to zero, were tested against the full model allowing for a statistical evaluation of the significance of the paths that were dropped. The difference in the χ^2 values of the two models is also distributed as a χ^2 statistic, with degrees of freedom equal to the number of constraints imposed in going from one model to the other (Hayduk, 1987). If the resultant χ^2 statistic has a probability of .05 or less, the path (or paths) dropped from the full model is considered to be significant.

Observed measures of mother-child mutually responsive orientation. Figure 1 presents the final results of the analyses examining the effects of observed measures of mutually responsive orientation on children's conscience. Children's age and gender were in-

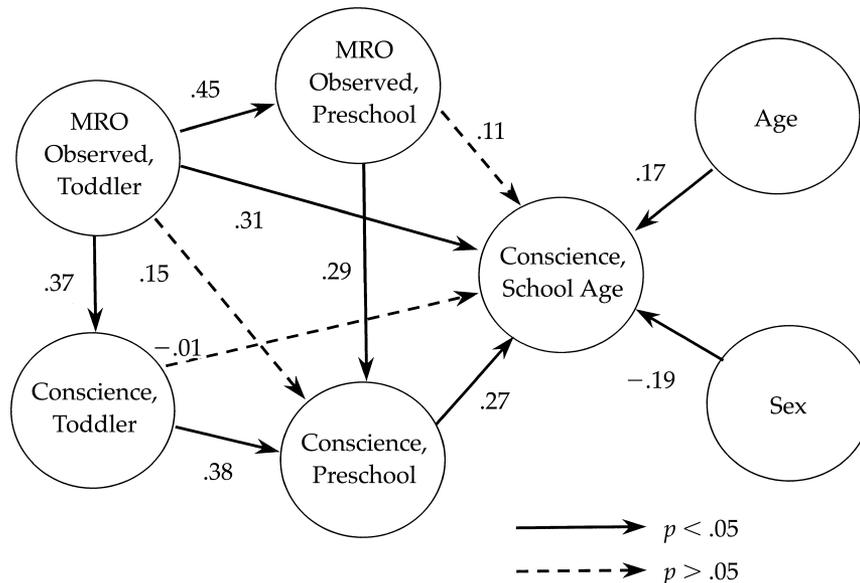


Figure 1 Structural equation model of the effects of observed mutually responsive orientation (MRO) on children's conscience. Nonsignificant path coefficients are those values prior to the final reduced model in which these paths were eliminated.

cluded as control variables for the outcome measures. This model provided an adequate fit to the data, $\chi^2(16, N = 83) = 25.06, p = .07$.

The results suggest that observed mother-child mutually responsive orientation at toddler age directly contributed to conscience development at early school age. This effect was significant after controlling for the longitudinal stability of conscience and for children's age and gender, and it was not mediated by the observed measure at preschool age. Furthermore, mother-child mutually responsive orientation was contemporaneously associated with conscience at both toddler and preschool ages.

Mother-reported measures of mother-child mutually responsive orientation. Figure 2 presents the final results of the analyses examining the effects of mother-reported mutuality on children's conscience. Again, child age and gender were included in the structural equation model as control variables. This model also provided an adequate fit to the data, $\chi^2(16, N = 83) = 24.93, p = .07$.

Mother-reported mutually responsive orientation at toddler age contributed to conscience at early school age only indirectly, mediated by mother-reported mutually responsive orientation at preschool age. This effect was significant after controlling for the longitudinal stability of conscience and for child's age and gender. Furthermore, mother-reported mutually responsive orientation was not significantly associated with the contemporaneous measures of conscience at either toddler or preschool ages. The longitudinal ef-

fects of mother-reported mutuality on conscience, however, were significant both from toddler to preschool age and from preschool to early school age.

DISCUSSION

This long-term longitudinal extension of the earlier short-term study further supports the value of the construct of mother-child mutually responsive orientation in research on socialization, and it expands considerably on our past work. The results were straightforward, although they varied somewhat depending on how mother-child orientation was measured.

Mother-child mutually responsive orientation, conceptualized here as encompassing shared cooperation and shared positive affect within the dyad during the first four years, was associated with several positive outcomes at the first study, as shown in the earlier report (Kochanska, 1997); it also robustly predicted children's willingness and eagerness to accept rules and norms of behavior assessed several years later and in expanded ecological spheres. This is a more powerful test of the model depicting reciprocity between mother and child as the important context in which the foundations for future socialization are laid. The findings also bridge literatures on early responsive relationships and later moral development. Despite strong conceptual arguments for such links (Bretherton, Golby, & Cho, 1997), those bodies of research have rarely been connected empirically.

New to this study, and still relatively uncommon

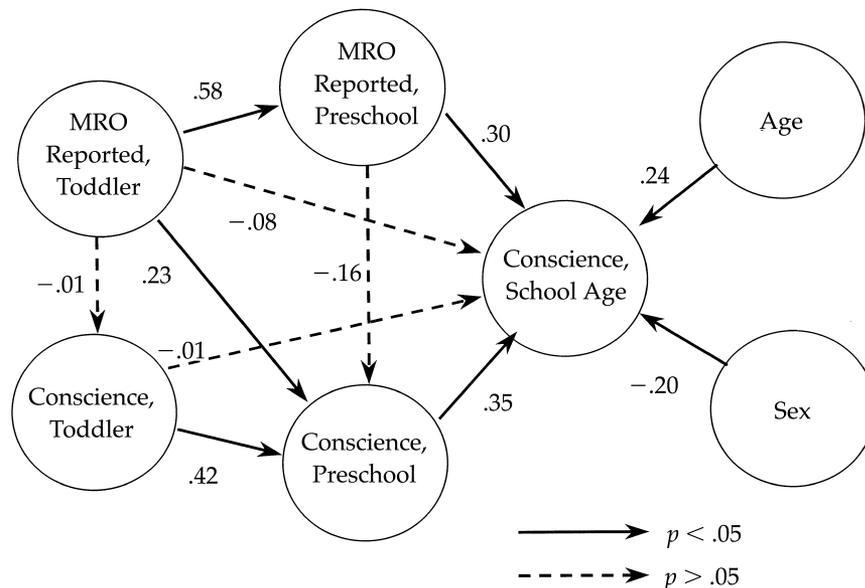


Figure 2 Structural equation model of the effects of mother-reported mutually responsive orientation (MRO) on children's conscience. Nonsignificant path coefficients are those values prior to the final reduced model in which these paths were eliminated.

in social development research despite the argument made by Maccoby and Martin (1983), is the demonstration of the predictive power of parent-child mutuality beyond and above the continuity of conscience itself. The conservative analytic strategy, both the multiple regressions and structural equations, eliminated the possibility that the findings were carried by the developmental stability of conscience.

Both regression and structural equation approaches converged regarding the findings that the quality of mother-child relationship observed at toddler rather than preschool age was a particularly potent predictor, which argues for that importance of that early relationship for future social-emotional development. This reaffirmed some similar recent claims (Emde et al., 1991, Kochanska, 1994), to some extent influenced by the growing impact of the attachment research (Thompson, 1998; Waters, Vaughn, Posada, & Kondo-Ikemura, 1995).

By using structural equations, this study made a new contribution to our understanding of the developmental mechanism by which mutually responsive orientation may exert its influence. In the previous work (Kochanska, 1997, p. 109), we posed the question of whether mother-child early and later mutuality provide direct or indirect paths to future socialization outcomes. It appears that for observed measures of mutuality the path is a direct one, leading from positive mother-child orientation established early in toddler age to conscience assessed at early school age. Although, early mutuality did set the stage for later mutuality as predicted, its effect did not seem to be mediated through later mutuality, which, in fact, did not contribute to school-age conscience beyond the impact of the early relationship.

In contrast, it was puzzling that mother-reported mutually responsive orientation at preschool rather than toddler age predicted future conscience, both in the regressions and structural equations. Although maternal report of mutuality when the child was a toddler predicted the report at preschool age, which in turn predicted the child's conscience at early school age, the earlier measure did not exert a direct influence on early school-age conscience.

A possible explanation may involve the developmental appropriateness of the mutually responsive orientation measures. Whereas shared cooperation and positive affect between mother and child may indeed be critical "building blocks" of this orientation at toddler age, somewhat different aspects of the relationship might be significant at age 4. Possibly, some of the latter aspects were better captured by the maternal reports, which included several items pertaining to parental encouragement of children talking about their troubles and feelings, and expressing their

views. Future work using behavioral measures of the corresponding parental style at older ages will help address this issue.

Structural equations also revealed other differences in the associations between observed and mother-reported mutuality and conscience. Both observed mutually responsive orientation measures (at toddler and preschool age) were significantly linked to concurrent conscience outcomes. In contrast, mother-reported score at either toddler or preschool age was unrelated to the concurrent measure of conscience. The only significant effects were longer term: from the maternal report at toddler age to conscience at preschool age, and from the mother's report at preschool age to conscience at early school age.

Taken together, these findings contradict the occasional claims that observed and mother-reported parenting measures are equivalent. They may both inform us about significant aspects of parenting, however. In contrast to observed measures of mother-child interactions, which provide an accurate window into the quality of their current relationship, self-reported measures may afford access to parental values and goals of which the impact may not be seen immediately, but which may have longer term effects.

Socialization implications of the early mutually responsive orientation were notable not only in terms of their enduring temporal impact, but also in terms of the diverse aspects of children's conscience that were influenced. Children who as toddlers had experienced shared cooperation and positive affect with their mothers were not only more eager to accept rules and requests coming from the mothers, but were also more internally regulated while following another adult's directions, whether alone or with other children. They also expressed more internalized and morally mature views in the cognitively oriented paradigms. These findings suggest that the impact of the early mother-child relationship may be potentially very wide-ranging. An intriguing question is whether other early relationships, with other caregivers, may play a similar potent role in the development of multiple aspects of children's future conscience.

In this study, we collected the measures of mother-child mutually responsive orientation at toddler and preschool ages, but not at early school age. Thus, it was not possible to examine the impact of contemporaneous orientation on conscience development. It appeared, however, that the score on mother-child shared positive affect, available from one interactive context at early school age, did not predict concurrent conscience beyond the effects of age, sex, and developmental continuity of conscience (see above, under Multiple Regression Analysis). In view of the fact that

the earlier mutually responsive orientation composites were based on much richer data, this null finding must be treated very cautiously. Still, it is consistent with the other results indicating the importance of the toddler period in terms of establishing the child's future eagerness to internalize standards of conduct.

An interesting and new additional contribution came from the findings revealing the relative coherence of aspects of childhood conscience across contexts and over time. This informs the classic controversy about the interrelations among many dimensions of morality dating back to Hartshorne and May (1928), Burton (1963), Sears, Rau, and Alpert (1965), and Radke-Yarrow, Campbell, and Burton (1968), and revisited by Rushton et al. (1983). It appeared that multiple aspects of 5½-year-olds' consciences were relatively coherent across several measures and paradigms: compliance with requests from the mother as well as another adult; assessed alone and in the peer context; and the cognitive views expressed in the realm of hypothetical moral dilemmas. Moreover, conscience was longitudinally quite stable from toddler to early school age. At least as measured in this study, during the first 5 or 6 years a relatively coherent system of internalized standards of behavior appears to emerge. This system incorporates a child's beliefs and behavior in a wide range of situations and has some degree of developmental stability. More research into this old issue of the "moral character" is needed.

Many factors besides the mother-child relationship contribute to the origins and growth of conscience, such as qualities of children's temperament. In our overall research program with the same sample, we have shown that inhibitory or effortful control, or ability to suppress a dominant response for the sake of a subdominant response (Rothbart, 1989), measured at toddler, preschool, and early school age, predicted conscience assessed both concurrently and longitudinally (Kochanska, Murray, & Coy, 1997). Even after controlling for those strong effects, however, the mother-child mutually responsive relationship continued to account for additional significant variance, and the results in the present report were basically unchanged,³ increasing our belief in the value of the relationship approach to socialization.

³We assessed the temperament dimension of inhibitory or effortful control using multitask batteries at toddler, preschool, and early school ages, each highly convergent and resulting in one composite score (Kochanska et al., 1997). To assure that the findings reported in the current paper remain significant beyond the influence of effortful control at all those ages, we conducted an additional hierarchical regression predicting conscience at early school age. Following the first two steps (age, sex, and child conscience at toddler and preschool age), we entered the effortful control composite scores at toddler, preschool, and early school age at Step 3. This

After a period of waning interest, children's conscience has returned to its well-deserved central place among the topics in social development research. This study helps foster our growing understanding of the process.

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