

Maternal Mind-Mindedness and Children's Behavioral Difficulties: Mitigating the Impact of Low Socioeconomic Status

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Abstract Relations between mothers' tendency to comment appropriately on their 8-month-olds' internal states (mind-mindedness) and children's behavioral difficulties (Strengths and Difficulties Questionnaire) at ages 44 and 61 months were investigated in a socially diverse sample ($N=171$, 88 boys). Controlling for maternal depressive symptoms, perceived social support, sensitivity, child language ability, and child gender, maternal mind-mindedness was negatively related to children's externalizing and internalizing behaviors specifically in low socioeconomic status (SES) families. Furthermore, behavioral difficulties at age 44 months mediated the relation between maternal mind-mindedness and behavioral difficulties at age 61 months, but only for low SES families. These findings are discussed with reference to possible ways in which mind-mindedness could inform interventions targeted at at-risk groups.

Keywords Maternal mind-mindedness · Low socioeconomic status · Internalizing difficulties · Externalizing difficulties · Strengths and Difficulties Questionnaire

The predictors and developmental consequences of behavioral difficulties in early childhood are of growing research and clinical interest. Behavioral difficulties include externalizing behaviors such as aggression, noncompliance, overactivity, and lack of impulse control, and internalizing behaviors such as shyness, social withdrawal, and depressive symptoms. Behavioral difficulties that appear early in development are relatively stable and often persist to school-entry age and beyond (Campbell 1995). Given their

importance for development, researchers have attempted to establish factors that might account for the initial occurrence and maintenance of these forms of behavior.

Various studies have highlighted a link between the child's family environment and the occurrence of behavioral difficulties. Parents of children with externalizing problems have been found to report more environmental adversity and family dysfunction than do those whose children show no behavioral difficulties (Cunningham and Boyle 2002; DuPaul et al. 2001; Foley 2011). Compared with parents from high socioeconomic status (SES) backgrounds, low SES parents tend to report more inattentiveness, withdrawal, and aggression in their children (Hurtig et al. 2005; van Oort et al. 2011). Studies also suggest there is a higher risk for more severe externalizing symptoms and comorbid child behavioral problems in non-intact and low SES families (Hurtig et al. 2007).

It is likely that family environment and children's behavioral difficulties are linked via the impact of environmental factors on the parent. For example, low SES is associated with increased levels of stress and higher rates of psychopathology in adults (Fryers et al. 2003; Lorant et al. 2003), and parental stress and depression are known to relate to children's behavioral difficulties (e.g., Crnic et al. 2005; Yates et al. 2010). However, understanding the precise developmental pathway that leads to behavioral problems in the child is difficult. In particular, establishing the direction of cause and effect between parent-centered factors and children's behavioral difficulties is complicated by the fact that parental stress or depression may be the result rather than the cause of the child's behavioral difficulties.

Patterson's (1982) "coercive family process" model provides a framework for understanding bidirectional effects in the development of child behavioral difficulties. According to this model, following several unsuccessful interactions with their difficult children, caregivers either withdraw or

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respond with hostility, serving to exacerbate the child's maladaptive behavior. Yates et al. (2010) investigated reciprocity between parent-centered factors and child behavioral difficulties using a prospective design in which they assessed mothers' contextual strain (stressful life events, tension in relationship with partner, lack of social support), the quality of mother-child interaction, and child adjustment at 24, 42, and 72 months. Interestingly, Yates et al. reported that bidirectional influences between maternal factors and child behavior were especially salient in boys. Boys' behavioral dysregulation at 24 months was related to lower levels of maternal sensitivity and less effective limit setting at 42 months, which in turn related to more externalizing behaviors and lower levels of academic achievement at 72 months.

Despite the wealth of studies on parent-centered factors associated with children's behavioral difficulties, research has not yet considered whether certain parent-centered factors might protect against such problem behaviors. Exploring this possibility was the main aim of the study reported here. Specifically, we investigated whether *mind-mindedness* (Meins 1997)—the caregiver's tendency to treat the young child as an individual with a mind—predicted fewer behavioral difficulties in the child. Mind-mindedness is operationalized in terms of caregivers' tendency to: (a) focus on mental characteristics when describing their preschoolers (Meins et al. 1998), (b) attribute meaning to their infants' early non-word utterances (Meins 1998; Meins and Fernyhough 1999), or (c) comment in an attuned manner on their infants' putative internal states during play interactions in the first year of life (Meins et al. 2001). Mind-mindedness is associated with a range of positive child outcomes. Higher levels of caregiver mind-mindedness in the first year of life are known to predict secure caregiver-child attachment (Arnott and Meins 2007; Lundy 2003; Meins et al. 2001, 2012a) and superior performance on theory of mind tasks at ages 2 (Laranjo et al. 2010) and 4 (Meins et al. 2002, 2003, 2013). But mind-mindedness is unrelated to children's temperament (Meins et al. 2011) and general cognitive ability (e.g., Meins et al. 2001), suggesting that individual infant characteristics do not determine caregivers' mind-mindedness.

Although mind-mindedness is unrelated to global social factors such as SES, maternal depression, and perceived social support (Meins et al. 2011; Pawlby et al. 2010), it is associated with certain aspects of parenting. Mothers' references to mental characteristics when describing their 4-year-olds relate to lower concurrent levels of reported parenting stress (McMahon and Meins 2012). McMahon and Meins (2012) argued that mind-mindedness was associated with lower levels of parenting stress because being mind-minded gives the parent greater access to the thoughts and feelings that govern the child's behavior, thus reducing the parent's tendency to see behaviors as irrational, irritating, or difficult.

Recent research has also shown that mothers' references to needs, intentions, and desires in a task to assess children's empathy related to lower scores on a concurrent maternal-report measure of aggression in 2-year-olds (Garner and Dunsmore 2011). We thus predicted that mothers' mind-mindedness would be negatively associated with maternal report of behavioral difficulties in their children. The present study investigated relations between maternal mind-mindedness and both internalizing and externalizing behaviors.

The fact that mind-mindedness focuses specifically on the caregiver's attunement to the child's internal states and ability to take the child's perspective give us reasons for supposing that these aspects of parenting may be more important than general caregiver sensitivity (Ainsworth et al. 1971, 1974) in predicting subsequent behavioral difficulties. Caregiver sensitivity is defined in terms of responding promptly and consistently to the child's cues, but does not necessarily entail any attribution of internal states to the infant. However, previous research has shown that mothers' comments that are attuned to infants' internal states are positively correlated with concurrent scores for maternal sensitivity (Laranjo et al. 2008; Meins et al. 2001, 2012a). Thus, in order to establish whether any association between mind-mindedness and children's behavioral difficulties was specific to mothers' attunement to their infants' internal states, rather than their more general responsiveness, we included a measure of sensitivity. We also sought to establish whether any relation between maternal mind-mindedness and children's behavioral difficulties (a) was stable over time, and (b) applied to independent reports of children's behavior. To address these issues, the present study assessed children's reported behavioral difficulties in the preschool years (at age 44 months) and in the first year of school (61 months), with independent reports of children's behavior provided by both the mother and the child's class teacher at the later age.

Our final aim was to investigate whether early maternal mind-mindedness could serve to protect children against vulnerability factors for developing behavioral difficulties. Our sample of families was drawn from socially diverse backgrounds, enabling us to explore whether SES moderated any relation between mind-mindedness and children's behavioral difficulties. For example, it could be the case that maternal mind-mindedness plays a more important protective role against behavioral difficulties when family circumstances are more stressful. On this account, the negative association between early mind-mindedness and later behavioral difficulties would be stronger in families from low SES backgrounds compared with their high SES counterparts. Maternal depressive symptoms and perceived social support, and children's early language abilities were also assessed in the present study to establish whether any

observed relations between mothers' mind-mindedness and children's behavioral difficulties were independent of mothers' psychological wellbeing and children's early linguistic development.

Method

Participants

Participants were 171 children (88, 51 % boys) and their mothers, recruited through mother and baby groups and local health care professionals. The vast majority of the children (168, 98 %) were White. With respect to parity, 82 (47.7 %) infants were first-born. The Hollingshead Index (Hollingshead 1975) was used to assess families' SES, and scores ranged from 11 to 66. Scores below 20 indicate that the parents have no post-16 education and are in no/mental/manual employment. At the beginning of the study, maternal age was $M=28.08$ years, $SD=5.48$, range 16–41.

At Phase 1, children were 8 months old ($M=8.52$, $SD=0.48$, range 7–10), at Phase 2 children were age 26 months ($M=26.04$, $SD=0.86$, range 24–28), at Phase 3 children were age 44 months ($M=44.06$, $SD=0.83$, range 42–46), and were age 61 months ($M=61.35$, $SD=1.08$, range 58–64) at Phase 4. At Phase 4, maternal-report data were available for 160 children (94 %) and teacher-report data were available for 164 children (96 %). Attrition was due to families either moving away from the area or being unable to schedule convenient testing times. Compared with the families who were retained throughout the study, those who failed to complete the Phase 4 testing did not differ on scores for any of the variables. Three infants were diagnosed with significant health problems (Turner's syndrome, ectodermal dysplasia, profound hearing loss) by age 2. Initial analyses showed that exclusion of these cases made no difference to the overall results for the sample, and these cases were therefore included in the analyses.

The study received ethical approval from the relevant University committee and the Ethics Committees of the individual National Health Service Authorities from which the participants were recruited. Mothers gave full informed consent at each phase, and testing was carried out in accordance with American Psychological Association and British Psychological Society guidelines.

Maternal Mind-Mindedness

At Phase 1, mothers and their 8-month-olds were filmed in a 20-minute free play interaction that was part of a testing session lasting around 1 hour. Mothers were instructed

simply to play with their infants as they would do if they had a few spare minutes together at home. A range of age-appropriate toys was available, and mothers were free to move around the room, although every session began with the mother and child together on a play mat in the center of the room. Maternal mind-mindedness was coded using the procedures outlined by Meins and colleagues (Meins and Fernyhough 2012; Meins et al. 2001). Mothers' speech during the sessions was transcribed verbatim, and all comments that included an internal state term referring to the infant's mind or emotion (mind-related comments) were identified from the transcripts. Mind-related comments included references to wishes and desires, mental states (e.g., thoughts, knowledge, interests), mental processes (e.g., recognition, remembering, decision-making), emotions, and attempts to manipulate people's beliefs (e.g., joking, teasing). Comments where the mother "put words into her infant's mouth" so that her speech took the form of a dialogue were also classified as mind-related.

Each mind-related comment was then classed as appropriate or non-attuned by a researcher who was blind to all other measures. Appropriateness was assessed by watching the filmed interaction and using the verbatim transcript to identify all mind-related comments. Meins and colleagues' (Meins and Fernyhough 2012; Meins et al. 2001) criteria for appropriateness were used. A comment was classified as an appropriate mind-related comment if: (a) the independent coder believed the mother's reading of her infant's mind to be accurate; (b) it linked the infant's current activity with related past or future events; (c) it was a suggestion for a new activity after a lull in the interaction (e.g., "Do you want to play with this now?"). A comment was coded as non-attuned if: (a) the coder disagreed with the mother's reading of her infant's mind; (b) the comment referred to a past or future event that had no obvious relation to the infant's current activity; (c) the mother asked what the infant wanted to do, or commented that the infant wanted or preferred a different object or activity, when the infant was already actively engaged in an activity or was showing a clear preference for a particular object; (d) the referent of the mother's comment was not clear. A second researcher, blind to all other measures and to the hypotheses of the study, coded a randomly selected 25 % of the mother–infant interactions. Inter-rater agreement was $\kappa=0.70$ (87 % agreement).

In order to control for differences in maternal verbosity, scores for appropriate mind-related comments were calculated as a proportion of the mother's total number of comments made during the 20-minute session. Note, however, that frequency and proportional scores were highly positively correlated, $r(169)=0.88$, $p<0.001$. Higher scores for appropriate mind-related comments indicate higher levels of mind-mindedness.

Maternal Sensitivity

The Phase 1 free-play interactions were also coded for maternal sensitivity using Ainsworth et al.'s (1974) measure, which assesses general sensitivity on a 1–9 point scale ranging from 'highly insensitive' (1) to 'highly sensitive' (9). A trained researcher who was blind to all other measures and to the study's hypotheses coded all sessions, with a second trained, blind researcher coding a randomly selected 25 %. Neither of these researchers was involved in the mind-mindedness coding. Inter-rater reliability (intra-class correlation) was 0.83.

Maternal Depressive symptoms

Maternal depressive symptoms were assessed using the Beck Depression Inventory (BDI; Beck et al. 1961), which contains 21 items, each rated on a 0–3 scale, yielding possible scores between 0 and 63. Mothers completed the BDI twice, when children were aged 8 and 15 months.

Perceived Social Support

At Phase 1 (8 months), mothers' perceived social support was assessed using Henderson et al. (1978) index of social support. The 15 items focus on social isolation, loneliness, and whether individuals feel they have someone who can provide psychological support if needed. Items are rated using a 5-point Likert scale, yielding possible scores between 15 and 75.

Children's Language

We controlled for children's early language abilities given that previous research has reported an association between poorer language skills and higher levels of behavioral difficulties (Menting et al. 2011; see also Moffit 1993). Children's language abilities were assessed at Phase 2 (26 months) using the Preschool Language Scale-3 (UK) (Boucher and Lewis 1997), which measures children's receptive and expressive verbal abilities. During the assessment, children sat on a small chair across a table from a female researcher with whom they were familiar. The mother sat directly behind the child. Total language standardized scores, calculated using combined receptive and expressive abilities, were used in the analyses.

Children's Behavioral Difficulties

Mothers reported on children's difficulties at Phases 3 and 4 (ages 44 and 61 months), and teachers also rated behavioral difficulties at the final phase. Children's behavioral

difficulties were assessed using the Strengths and Difficulties Questionnaire (SDQ; Goodman 1997). The SDQ is a widely used screening questionnaire for a range of behavioral difficulties, suitable for use with children aged between 3 and 16 years. The SDQ includes 25 items that are each rated on a 3-point scale ("not true", "somewhat true", "certainly true"), yielding scores of behavioral difficulties in four areas: (a) emotional symptoms (e.g., worried, nervous, fearful, or unhappy behavior), (b) conduct problems (e.g., temper tantrums, fighting, bullying, lying), (c) hyperactivity (e.g., restlessness, concentration difficulties, impulsivity), and (d) peer problems (e.g., solitary behavior, being picked on or bullied). The SDQ also includes a subscale of prosocial behavior. Scores on the four behavioral difficulties subscales can be totaled to give a Total Difficulties score ranging between 0 to 40. Subscales scores can also be totaled to give overall scores for externalizing difficulties (total of conduct problems and hyperactivity) and internalizing difficulties (total of emotional symptoms and peer problems), each of which can range between 0 and 20. Behavioral difficulties scores on the SDQ have been validated against clinical assessments of children's externalizing and internalizing problems (e.g., Goodman et al. 2000; Goodman and Goodman 2009; Goodman and Scott 1999).

Cronbach's α for the SDQ at 44 months (maternal report) was 0.80 for externalizing behaviors and 0.73 for internalizing behaviors. For the SDQ at 61 months, consistent with prior research on reports of externalizing and internalizing behaviors from multiple sources (Reynolds and Kamphaus 1992), parent–teacher agreement using correlations was higher for externalizing (intra-class correlation=0.43) than for internalizing behaviors (intra-class correlation=0.18). Because externalizing behaviors are more readily observable than are internalizing behaviors, maternal and teacher ratings may reflect particular biases in the ability to observe these behaviors, leading Kamphaus and Frick (2002) to suggest that discrepancies are due to differences in child functioning across different contexts. Indeed, mothers might have the opportunity to observe different behaviors at home than behaviors that teachers observe in the classroom. Importantly, it appears that parents' and teachers' SDQ responses are equally predictive of children's psychiatric diagnoses (Goodman et al. 2004), although there are indications that parents and teachers provide unique information (e.g., Kerr et al. 2007). Thus, following Kamphaus and Frick (2002), a simple either/or approach was used, such that the child scored for a particular behavior if the item was endorsed by either the mother or the teacher. These resolved ratings for each item in the externalizing and internalizing subscales were subsequently summed. Cronbach's α at 61 months was 0.81 for externalizing behaviors and 0.70 for internalizing behaviors.

Data Analytic Strategy

In line with our aims, we tested indirect and direct paths from mothers' appropriate mind-related comments to the resolved child internalizing and externalizing behavior scores at 61 months (note that running the models with only parent-reported or teacher-reported behaviors at 61 months resulted in a similar pattern of findings to those presented). The mediating effects of internalizing and externalizing behaviors at 44 months were tested. Mplus 6.11 (Muthén and Muthén 2011) was used for all analyses, using bootstrapping of standard errors and confidence intervals to determine significance of effects (Preacher and Hayes 2008). Bootstrapping has been recommended when multivariate normality cannot be assumed, which is typically true with small sample sizes. Multivariate normality is especially important when multiple mediators are being included in determining indirect effects in path analysis models using the delta method (Preacher and Hayes 2008; Sobel 1982, 1986). In this case, we had two mediators: internalizing and externalizing behaviors. Bootstrapping was tested at various samples, with no further changes noted after 1000 samples; bootstrapping at 1000 samples was used for all analyses.

We used full information maximum likelihood (FIML) because we used raw data with some missingness at Phases 3 and 4. The full information maximum likelihood techniques provide less biased estimates than listwise or pairwise deletion (Schafer and Graham 2002), and are used even when data are not missing at random (Little and Rubin 2002). Proportions of missing data are examined by a covariance "coverage" provided by Mplus. The minimum coverage is recommended at 0.10 (Muthén and Muthén 2011), and the default is to delete observations with missing covariates from the analyses ($n=26$) because missing data theories fail to account for the treatment of covariates. In the present study, coverage ranged from 0.93 to 1.00.

To examine the possible moderating effects of SES on the effect of appropriate mind-related comments on internalizing and externalizing symptoms, participants were divided into two SES groups on the basis of their Hollingshead Index category. The low SES group ($n=60$) consisted of families in the lowest two categories (parents with no post-16 education and unemployed or in unskilled/mental or semi-skilled/manual jobs); all other participants ($n=91$) were in the high SES group. Splits based on meaningful differences such as these have been used in prior research as measures of risk (e.g., Hay et al. 2011a). This split resulted in relatively equal sample sizes with similar covariance coverage.

In terms of group differences between the high and low SES groups for control variables, compared with their high SES counterparts, the low SES group attained (a) higher scores for maternal depressive symptoms at 8 months (low

SES $M=10.06$, high SES $M=6.81$), $t(169)=2.79$, $p<0.01$, (b) lower scores for perceived social support (low SES $M=62.84$, high SES $M=56.45$), $t(169)=5.15$, $p<0.001$, and (c) lower child language scores at 26 months (low SES $M=88.00$, high SES $M=96.50$), $t(169)=3.30$, $p<0.001$. The low SES group also had 83 % of mothers at ages 19 years or younger, compared to 41 % at ages 20 years or older in the high SES group, $\chi^2(1)=8.14$, $p<0.01$; these correspond to sociodemographic risk factors used in prior research (e.g., Hay et al. 2011a). The high and low SES groups did not differ on maternal depressive symptoms at 15 months (low SES $M=6.41$, high SES $M=6.74$), $t(169)=0.36$, $p=0.717$.

With respect to the independent and dependent variables, compared with their high SES counterparts, the low SES group scored more highly for (a) internalizing behaviors at 44 months (low SES $M=3.66$, high SES $M=2.77$), $t(169)=2.24$, $p<0.05$, (b) externalizing behaviors at 44 months (low SES $M=8.24$, high SES $M=6.25$), $t(169)=3.43$, $p<0.001$, and (c) externalizing behaviors at 61 months (low SES $M=8.21$, high SES $M=5.78$), $t(161)=4.12$, $p<0.001$. There was a non-significant trend for the low SES group to score higher for child internalizing behaviors at 61 months compared with their high SES peers, (low SES $M=4.54$, high SES $M=3.63$), $t(161)=1.85$, $p=0.066$. Notably, the high and low SES groups did not differ on appropriate mind-related comments (low SES $M=4.95$, high SES $M=5.64$), $t(169)=1.21$, $p=0.227$.

Results

Descriptive Statistics and Preliminary Analyses

Descriptive statistics for the whole sample are shown in Table 1. With respect to gender differences, (a) girls ($M=97.30$, $SD=16.35$) had higher child language scores than did boys ($M=89.89$, $SD=16.67$), $t(168)=3.20$, $p<0.005$; and (b) boys ($M=7.71$, $SD=3.87$) scored more highly than did girls ($M=5.76$, $SD=3.67$) on externalizing behaviors at 61 months, $t(161)=3.35$, $p<0.001$. There were no gender differences on internalizing and externalizing behaviors at 44 months, or internalizing behaviors at 61 months ($ts<1.17$, $ps>0.244$). Mothers of girls and boys did not differ with respect to appropriate mind-related comments, $t(203)=0.07$, $p=0.942$, and sensitivity, $t(203)=1.65$, $p=0.101$.

Predictors of Behavioral Difficulties at 44 and 61 Months

Zero-order correlations are shown in Table 1. In the full sample, we tested whether appropriate mind-related comments predicted variance in resolved child externalizing and internalizing behaviors beyond that predicted by perceived social support, maternal depressive symptoms at two time

Table 1 Descriptive statistics and zero-order correlations among covariates

	M	SD	1	2	3	4	5	6	7	8
1. Socioeconomic Status	34.01	13.74	–							
2. Social Support	60.45	8.69	0.32**	–						
3. Maternal BDI 8 m	8.45	7.95	–0.24**	–0.58**	–					
4. Maternal BDI 15 m	7.19	6.54	–0.02	–0.02	–0.01	–				
5. Maternal Age	28.75	5.36	0.41**	0.30**	–0.30**	0.06	–			
6. Gender (1 = female)			0.03	0.07	0.09	–0.07	–0.08	–		
7. Appropriate Mind-Related Comments	5.27	3.57	0.15	0.14	–0.13	–0.10	0.24**	–0.01	–	
8. Child Language	94.10	17.01	0.33**	0.29**	–0.14	–0.05	0.07	0.23**	0.27**	–
9. Sensitivity	5.63	1.48	0.27**	0.28**	–0.30**	–0.01	0.19*	–0.09	0.38**	0.24**

* $p < 0.05$; ** $p < 0.01$. *BDI* Beck Depression Inventory.

points, maternal age, maternal sensitivity, child language abilities, and child gender. Thus, we regressed these predictors onto externalizing and internalizing behaviors at 44 months and 61 months while also including the auto-regressive coefficients between externalizing and internalizing behaviors at 44 months and 61 months. The model was fully saturated.

Standardized and unstandardized estimates and the associated confidence intervals of all regression paths are presented in Table 2. As shown in Table 2, externalizing behaviors at 44 months were negatively predicted by maternal age, maternal sensitivity, and child language abilities; thus, higher verbal ability at 26 months and having an older or more sensitive mother predicted fewer reported externalizing behaviors. None of the independent variables accounted for unique variance in children's internalizing behaviors at age 44 months (see Table 2).

As shown in Table 2, resolved scores for externalizing behaviors at 61 months were predicted by externalizing behaviors at 44 months, social support, and gender, such that higher levels of externalizing behaviors were associated with higher externalizing behaviors at 44 months, mothers reporting less social support, and the child being male. Resolved scores for internalizing behaviors at 61 months were predicted by both externalizing and internalizing symptoms at 44 months (see Table 2). Externalizing and internalizing behaviors at 44 months were positively correlated in the model (estimate=1.41, 95 % CI: 0.23–2.58; $\beta = 0.19$), as were externalizing and internalizing behaviors at 61 months (estimate=1.93, 95 % CI: 0.61–3.24; $\beta = 0.28$). Because appropriate mind-related comments did not predict the outcomes, the direct and indirect effects were not explored for the full model.

Table 2 Path analysis predicting internalizing and externalizing behaviors at 44 and 61 months

	Externalizing 44 m			Internalizing 44 m			Externalizing 61 m			Internalizing 61 m		
	B	Percentile 95 % CI	β	B	Percentile 95 % CI	β	B	Percentile 95 % CI	β	B	Percentile 95 % CI	β
Externalizing 44 m							0.66	0.52–0.79	0.62 ^a	0.17	0.04–0.31	0.20 ^a
Internalizing 44 m							0.03	–0.20–0.26	0.02	0.51	0.23–0.79	0.41 ^a
Social Support	0.01	–0.08–0.09	0.01	–0.06	–0.12–0.01	–0.18	–0.09	–0.17–0.01	–0.18 ^a	–0.02	–0.09–0.05	–0.05
Maternal BDI 8 m	0.05	–0.05–0.16	0.10	0.05	–0.03–0.13	0.15	0.01	–0.09–0.10	0.01	0.03	–0.06–0.12	0.08
Maternal BDI 15 m	0.03	–0.05–0.11	0.06	0.00	–0.05–0.06	0.01	–0.02	–0.11–0.07	–0.04	–0.03	–0.08–0.03	–0.06
Maternal Age	–.17	–0.30–0.03	–0.24 ^a	–0.02	–0.10–0.06	–0.04	0.03	–0.05–0.12	0.04	–0.02	–0.11–0.07	–0.03
Gender	–0.12	–1.28–1.04	–0.02	–0.35	–1.21–0.51	–0.07	–2.06	–3.13–0.99	–0.26 ^a	–0.09	–1.01–0.82	–0.02
Child Language	–0.04	–0.07–0.01	–0.17 ^a	0.00	–0.02–0.02	0.00	0.01	–0.02–0.04	0.04	0.02	–0.01–0.05	0.13
Sensitivity	–0.40	–0.76–0.05	–0.16 ^a	–0.03	–0.31–0.26	–0.02	0.03	–0.31–0.36	.01	–0.11	–0.47–0.25	–0.05
Appropriate mind-related comments	–0.07	–0.23–0.09	–0.08	–0.08	–0.19–0.03	–0.12	–0.03	–0.16–0.10	–0.03	–0.07	–0.19–0.06	–0.08
R ²	0.20**			0.12*			0.52**			0.34**		

^a significant based on absence of zero in the bootstrapped confidence intervals; Gender (0 = male; 1 = female); *BDI* Beck Depression Inventory.

* $p < 0.05$; ** $p < 0.01$

Moderating Effects of SES

To explore the potential moderating effect of SES on the relation between appropriate mind-related comments and children’s behavioral difficulties, path analyses were conducted separately (i.e., using a multi-group model) for the low and high SES groups.

Predicting Behavioral Difficulties in the Low SES Group

We tested the multi-group model to explore the moderating effect of SES; the interest was in whether appropriate mind-related comments were more influential in the outcome for the low SES group than for the high SES group. For the sake of brevity, only the standardized estimates are shown in Table 3, but unstandardized estimates are presented in the text below. As shown in Table 3, appropriate mind-related comments predicted both externalizing behaviors (estimate=−0.29, 95 % CI: −0.55–−0.02) and internalizing behaviors (estimate=−0.24, 95 % CI: −0.42–−0.05) at 44 months. Mothers who commented appropriately on their infants’ internal states in the first year of life were less likely subsequently to report that their children engaged in internalizing or externalizing behaviors at age 44 months. Internalizing behaviors at 44 months were also positively predicted by maternal depressive symptoms at 8 months (estimate=0.11, 95 % CI: 0.00–0.22).

Externalizing behaviors at 61 months were positively predicted by externalizing behaviors at 44 months (estimate=0.68, 95 % CI: 0.44–0.92) and negatively by gender (female=1; estimate=−3.18, 95 % CI: −5.46–−0.90). Internalizing behaviors at 61 months were positively predicted by externalizing behaviors at 44 months (estimate=0.29, 95 %

CI: 0.08–0.51), with a trend (i.e., zero is contained in the confidence interval) for internalizing behaviors at 44 months (estimate=0.33, 95 % CI: −0.10–0.75).

Predicting Behavioral Difficulties in the High SES Group

Table 3 also shows the standardized estimates for the regression analyses investigating predictors of child internalizing and externalizing behaviors in the high SES group. Externalizing behaviors at 44 months were negatively predicted by maternal age (estimate=−0.21, 95 % CI: −0.34–−0.09) and maternal sensitivity (estimate=−0.51, 95 % CI: −0.96–−0.06). No independent predictors of internalizing behaviors at 44 months were identified. In contrast to the low SES group, mothers’ appropriate mind-related comments did not predict children’s internalizing or externalizing behaviors at 44 months in the high SES group.

Externalizing behaviors at 61 months were positively predicted by externalizing behaviors at 44 months (estimate=0.66, 95 % CI: 0.48–0.84) and negatively by perceived social support (estimate=−0.13, 95 % CI: −0.21–−0.05) and gender (estimate=−1.37, 95 % CI: −2.56–−0.18). Internalizing behaviors at 61 months were positively predicted by internalizing behaviors at 44 months (estimate=0.61, 95 % CI: 0.26–0.96).

Mediating Effects of Behavioral Difficulties at 44 Months

We then tested whether behavioral difficulties at 44 months mediated the relation between mothers’ appropriate mind-related comments and behavioral difficulties at 61 months, within the multi-group path analyses for the low and high SES groups. The results of these analyses are summarized in

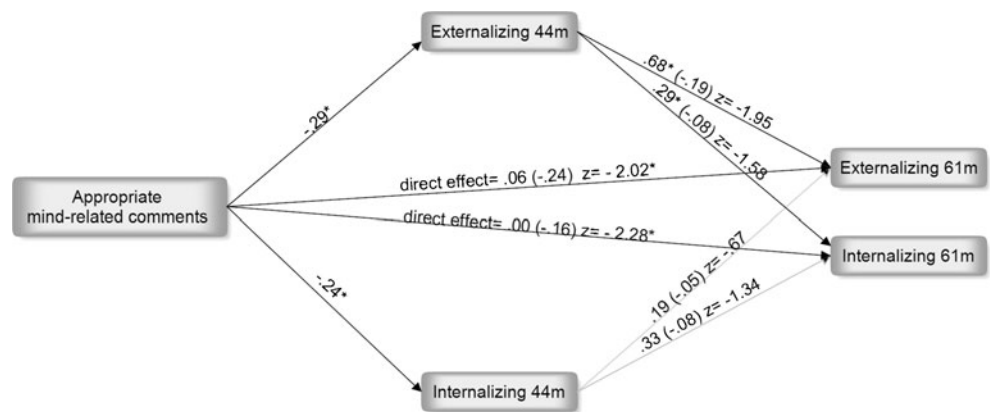
Table 3 Multi-group (low versus high SES) regression predicting externalizing and internalizing behaviors at 44 and 61 months

	Externalizing 44 m		Internalizing 44 m		Externalizing 61 m		Internalizing 61 m	
	Low SES	High SES	Low SES	High SES	Low SES	High SES	Low SES	High SES
Externalizing 44 m					0.67 ^a	0.58 ^a	0.40 ^a	0.08
Internalizing 44 m					0.12	0.02	0.28	0.46 ^a
Social Support	−0.22	0.17	−0.24	−0.08	−0.11	−0.26 ^a	−0.08	−0.00
Maternal BDI 8 m	0.05	0.19	0.38 ^a	−0.06	0.03	0.01	0.14	0.11
Maternal BDI 15 m	0.12	0.01	0.13	−0.08	−0.10	0.02	0.07	−0.12
Maternal Age	−0.02	−0.32 ^a	0.16	−0.08	0.08	0.01	0.00	−0.08
Gender	0.18	−0.13	0.06	−0.19	−0.38 ^a	−0.20 ^a	−0.14	0.03
Child Language	−0.23	−0.18	0.09	−0.06	0.15	−0.02	0.26	0.02
Sensitivity	0.07	−0.23 ^a	0.05	−0.00	0.14	−0.09	−0.01	−0.08
Appropriate mind-related comments	−0.28 ^a	0.09	−0.37 ^a	−0.04	0.06	−0.06	0.00	−0.14
R ²	0.26**	0.23*	0.35**	0.06	0.55**	0.52**	0.44**	0.34**

^asignificance based on absence of zero in the bootstrapped confidence intervals; Gender (0 = male; 1 = female); SES socioeconomic status; BDI Beck Depression Inventory.

p*<0.05; *p*<0.01

Fig. 1 Path analysis showing significant mediation of appropriate mind-related comments to internalizing and externalizing behaviors at 61 months via the total of internalizing and externalizing (44 months) indirect effects for low SES group (Note: covariates were controlled in the analysis; unstandardized estimates presented with significance based on absence of zero in bootstrapped confidence



Figs. 1 and 2. As shown in Fig. 1, the two mediator variables (children's externalizing and internalizing behaviors at 44 months) mediated the relation between mothers' mind-mindedness and both externalizing and internalizing behaviors at 61 months in the low SES group. In contrast, there was no such mediation in the high SES group (see Fig. 2). We then tested whether the estimates for the indirect effect of maternal mind-mindedness on the outcomes differed significantly by SES group. Chi-square tests revealed that the unstandardized total indirect effects were stronger for predicting externalizing behaviors at 61 months in the low SES group (estimate= -0.24 , 95 % CI: -0.47 – -0.01) as compared to the high SES group (estimate= 0.05 , 95 % CI: -0.08 – 0.19), $\chi^2(1)=3.83$, $p<0.05$. The total indirect effects were also stronger for predicting internalizing behaviors at 61 months in the low SES (estimate= -0.16 , 95 % CI: -0.30 – -0.02) group than high SES (estimate= -0.01 , 95 % CI: -0.13 – 0.11) group, $\chi^2(1)=3.84$, $p=0.05$.

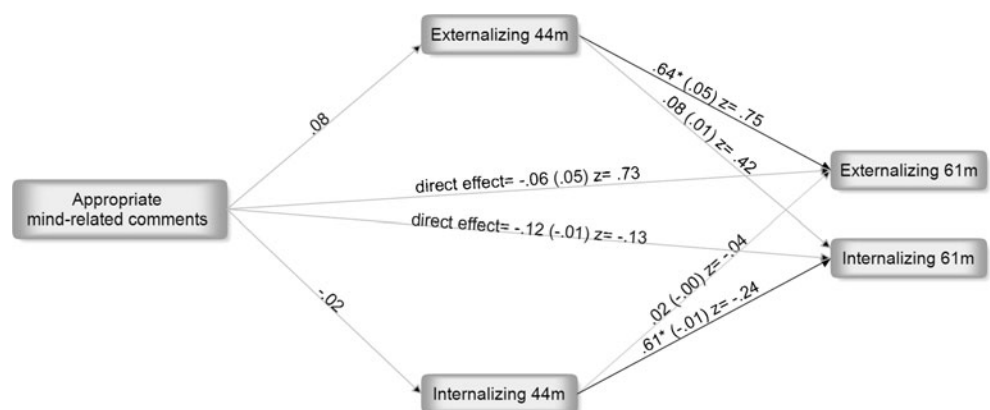
Discussion

The present study investigated whether aspects of infant–mother interaction in the first year of life longitudinally predict children's externalizing and internalizing behaviors.

Replicating previous research showing a link between social adversity and children's behavioral problems (Hurtig et al. 2005; van Oort et al. 2011), we found that children in the low SES group were more likely than their high SES peers to have internalizing and externalizing difficulties. However, our multi-group findings showed that maternal mind-mindedness in the first year of life was related to fewer behavioral difficulties in the child, specifically in the low SES group. Although the low SES families experienced difficulties associated with their low income status (higher levels of maternal depressive symptoms in the first year of life, lower perceived social support, lower child language abilities), having a mind-minded mother mitigated their negative effects on children's behavioral outcome at age 44 months and in the first year of school. In contrast, maternal mind-mindedness was not associated with behavioral difficulties in the high SES group; rather, early maternal sensitivity predicted fewer externalizing behaviors at age 44 months in this group. These findings suggest that conventional sensitivity may be important for reducing the likelihood of subsequent externalizing behavioral difficulties in low-risk families, but that mothers' attunement specifically to their infants' internal states predicts fewer internalizing and externalizing behaviors in the context of low SES.

The findings reported here are in line with recent research that suggests differential benefits of early positive

Fig. 2 Path analysis for high SES group, from appropriate mind-related comments to internalizing and externalizing behaviors at 61 months (Note: covariates were controlled in the analysis; unstandardized estimates presented with significance based on absence of zero in bootstrapped confidence intervals; values in parentheses are indirect effects)



interaction for low and high SES children. For example, Tucker-Drob (2012) found that attending preschool was associated with higher reading and mathematics scores at age 5 specifically in children from low SES families; attending preschool had no impact on academic achievement in children from high SES families. Similarly, in a sample of low SES families, Brophy-Herb et al. (2012) reported that mothers' emotion-related socialization of their toddlers was positively related to children's ability to regulate their own behavior. Our findings extend this previous research by showing the unique contribution of mind-mindedness in reducing the tendency for mothers from low SES backgrounds to rate their children's behavior as difficult. It is important to highlight the fact that these relations between maternal mind-mindedness and children's behavioral difficulties in the low SES group were observed when maternal sensitivity was controlled, suggesting that attunement to infants' internal states plays a specific role in the prevention of behavioral difficulties over and above any contribution of caregivers' more general responsiveness.

The present study was also unique in examining both internalizing and externalizing behaviors in the same children. Prior research shows that although internalizing and externalizing behaviors denote problems indicative of distinct diagnostic categories and forms of psychopathology, they do co-occur (Fanti and Heinrich 2010). In the full sample, we found externalizing behaviors at 44 months to predict externalizing behaviors at 61 months, yet both internalizing and externalizing behaviors significantly predicted internalizing behaviors at 61 months. This is consistent with research by Gilliom and Shaw (2004), who found that higher levels of externalizing behaviors were associated with increasing levels of internalizing behaviors. Thus, there may be a cumulative process by which social failures, including but not limited to parent–child conflict (Ingoldsby et al. 2001) and peer rejection (Calkins et al. 1999), lead to children experiencing internalizing symptoms such as sadness and anxiety (Gilliom and Shaw 2004). Previous research also suggests that there is a higher risk for more severe externalizing symptoms and comorbid child behavioral problems in non-intact and low SES families (Hurtig et al. 2007). Consistent with this, we found that externalizing behaviors were a significant predictor of later internalizing behaviors for the low SES families. Hence, the social failures of parent–child conflict and peer rejection may have a more pronounced effect for those coming from low SES families.

In the context of low SES, reducing the daily stressors of parenting may be especially important in terms of responding to one's child in a less hostile manner (Crnic et al. 2005; McMahan and Meins 2012), thus reducing the cycle of behavior described in Patterson's (1982) coercive family process model. Being mind-minded will arguably make

the mother less likely to withdraw or respond in a hostile manner if the interaction with the child is difficult, and this ability to tune into what the child may be thinking or feeling will serve to avoid any escalation in the child's maladaptive behavior. It is interesting that the predictive relations between mind-mindedness and behavioral difficulties at 61 months were stronger for externalizing than for internalizing behaviors, despite the fact that externalizing behaviors would appear to be more onerous to parents, and the coercive process more extreme (Patterson 1982). Given that externalizing behaviors are more related to social functioning problems than are internalizing behaviors (Fanti and Heinrich 2010), the promotion of social competence in children from low SES families may be especially important for adapting to school and avoiding conflicts with peers. Thus, maternal mind-mindedness may be a way to promote school readiness in children from low SES families, given the observed negative links between mind-mindedness and externalizing behaviors. The findings reported here may help inform potential interventions that could be targeted at low SES families. Educating low SES mothers about the importance of being attuned to their children's thoughts and feelings, and how this attunement can serve to reduce parenting stress and problem behavior, would seem to be an obvious way in which these findings could have meaningful impact.

One of the main strengths of the present study is the social diversity of the participating families. This enabled us to divide the sample into low and high SES groups on the basis of objective social and economic criteria that indicate meaningful risk (see e.g., Hay et al. 2011a) rather than a median split. The present study also included multiple informants on children's behavioral difficulties (mothers and teachers). That said, the present findings should be interpreted with regard to some limitations. The maternal mind-mindedness data were obtained from observations of infant–mother interaction, but children's behavioral difficulties were assessed only on the basis of questionnaire report using the SDQ, with mothers being the sole informants on behavioral difficulties at age 44 months. Although the SDQ has been validated against clinical assessments of children's internalizing and externalizing problems (e.g., Goodman et al. 2000; Goodman and Goodman 2009; Goodman and Scott 1999), future research should investigate how mothers' early mind-mindedness relates to observational assessments of children's behavior in the preschool and early school years. Such studies could additionally assess how mothers deal with problem behaviors, to explore how early mind-mindedness relates to mothers' later behavior-management strategies. It would also be interesting to investigate how early mind-mindedness relates to problem behaviors that are evident in the first year of life, such as prolonged crying or sleeping or eating difficulties, given that these early regulatory problems have been found to

predict behavioral difficulties in later childhood (Hemmi et al. 2011). Moreover, a larger sample would allow an exploration into any moderating effect of gender on mind-mindedness, since girls tend to show a reduction in aggression in toddlerhood that might be related to their learning to use prosocial ways of dealing with peer conflict (Hay et al. 2011b). This research could help shed light on the developmental pathways via which maternal mind-mindedness in the first year of life relates to behavioral difficulties in early childhood.

In summary, relations between mothers' tendency to comment appropriately on their 8-month-olds' internal states and children's later externalizing and internalizing behaviors were observed specifically in the context of low SES. These relations were independent of maternal depressive symptoms, social support, and sensitivity, as well as children's gender and early language abilities. Thus, the results suggest that mothers' mind-mindedness may protect children from risk factors associated with their low SES that predict internalizing and externalizing behavior problems.

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