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Prospective Relations among Fearful Temperament, Protective Parenting, and Social Withdrawal: The Role of Maternal Accuracy in a Moderated Mediation Framework

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Abstract

Early social withdrawal and protective parenting predict a host of negative outcomes, warranting examination of their development. Mothers' accurate anticipation of their toddlers' fearfulness may facilitate transactional relations between toddler fearful temperament and protective parenting, leading to these outcomes. Currently, we followed 93 toddlers (42 female; on average 24.76 months) and their mothers (9% underrepresented racial/ethnic backgrounds) over 3 years. We gathered laboratory observation of fearful temperament, maternal protective behavior, and maternal accuracy during toddlerhood and a multi-method assessment of children's social withdrawal and mothers' self-reported protective behavior at kindergarten entry. When mothers displayed higher accuracy, toddler fearful temperament significantly related to concurrent maternal protective behavior and indirectly predicted kindergarten social withdrawal and maternal protective behavior. These results highlight the important role of maternal accuracy in linking fearful temperament and protective parenting, which predict further social withdrawal and protection, and point to toddlerhood for efforts of prevention of anxiety-spectrum outcomes.

Keywords

Temperament; parenting; inhibition; social withdrawal

Fearful temperament and protective parenting have been linked to children's later social withdrawal, both independently and in interaction with one another. Recent theory and empirical investigations driven by the developmental psychopathology perspective have acknowledged fearful children's active role in eliciting protective responses from their parents. Yet, few studies delineate the conditions under which this occurs, particularly in toddlerhood, or the longitudinal outcomes of these interactions. The current study extends the extant literature by investigating how fearful temperament and protective parenting during toddlerhood predict both child social withdrawal and continued protective parenting in kindergarten. We specifically examined maternal accuracy in anticipating toddlers' fearful reactions as a moderator of these relations.

Fearful Temperament and Social Withdrawal

The construct of social withdrawal comprises shyness, reticence, and social inhibition, and it involves avoidance of social interaction with familiar and unfamiliar peers and adults, despite the desire for involvement with others (Kagan, Reznick, Snidman, Gibbons, & Johnson, 1988; Reznick, Kagan, Snidman, Gersten, Baak, & Rosenberg, 1986; Rubin, Burgess, & Hastings, 2002; Rubin, Coplan, & Bowker, 2009). Anxiety (particularly social anxiety), an internal state of unease about the future, may prompt or be prompted by social withdrawal behavior (Barlow, 1991; Rubin et al., 2009). Social withdrawal predicts peer difficulties, anxiety, and depression (Hayward, Killen, Kraemer, & Taylor, 1998; Prior, Smart, Sanson & Oberklaid, 2000; Rubin, Hymel, & Mills, 1989), so it is important to understand its development.

The extent to which children display an early disposition towards inhibited or fearful reactions to novelty has been referred to as fearful or inhibited temperament in general and when conceptualized dimensionally, and behavioral inhibition when describing the category of toddlers in the top 10–15% of these traits who are thought to have a unique biological profile from their peers (Kagan et al., 1988; Reznick et al., 1986). We currently use “fearful temperament” as an inclusive term to summarize this literature and because of the current study’s dimensional approach. Fearful temperament has been well established as a moderately strong predictor of social withdrawal (Rubin et al., 2009), possibly because they share the same underlying predisposition towards inhibition (Fox, Henderson, Marshall, Nichols, & Ghera, 2005). Not all children display stability in inhibition (i.e., from fearful temperament to social withdrawal), but those who do are at increased risk for maladaptive development (Hirshfeld et al. 1992; Prior et al., 2000), necessitating better understanding of how stability occurs.

Kindergarten is a salient point at which to examine such stability. When children must interact with many new peers and adults in authority, withdrawal may be highlighted (Coplan, Arbeau, & Armer, 2008). In addition to other methods (parent-report, laboratory observation), kindergarten teachers may uniquely contribute to the assessment of social withdrawal because inhibited/shy children demand more attention from and spend more time with their teachers (Coplan & Prakash, 2003; Rubin & Clark, 1983). High levels of social withdrawal at this age impair social and emotional development, are moderately stable through later development, and predict clinical disorders (Rubin et al., 2009), so social withdrawal in kindergarten is a clinically relevant construct. The transition into kindergarten is therefore a logical milestone at which to focus on the predictive relation between fearful temperament and social withdrawal.

Protective Parenting

One environmental mechanism through which fearful temperament may develop into social withdrawal is the caregiving environment. Parental protective behavior, in particular, has received attention. Certainly, there are situations in which parents need to act protectively to ensure their children’s safety. In contrast, we focus on protective behavior that occurs in novel or uncertain situations that, despite inducing discomfort for some children, present no actual danger. Others have used the term “overprotective” to denote these behaviors as unnecessary or excessive (e.g., Rubin et al., 2002), but we choose to use the term “protective” to maintain objectivity in describing these behaviors as a continuous dimension. Both original conceptualizations and recent studies of protective behavior (or “overprotection”) include both physical restriction of children’s behavior (e.g., holding them back from approaching, turning them away from a stimulus) and high levels of warmth and physical comfort (Becker, 1964; Maccoby & Masters, 1970; Rubin et al., 2002) and will therefore both be included under the term “protective.” Although warmth and physical

comfort may seem sensitive, high levels may encourage children to remain dependent on parents (Chorpita & Barlow, 1998). Indeed, measures of sensitivity that included comforting or physical affection have predicted children's anxiety-spectrum outcomes (Mount, Crockenberg, Bárrig J6 & Wagar, 2010; Park, Belsky, Putman, & Crnic, 1997). Other behaviors related to protection, although not the focus of the current study, include low levels of either granting autonomy or encouraging independence, in which case the parent is excessive in directing the child or making decisions for them (Rubin, Nelson, Hastings & Asendorpf, 1999).

Protective parenting occurs with great frequency with fearful children (Bayer, Sanson, & Hemphill, 2006; Shamir-Essakow, Ungerer, Rapee, & Safier, 2004; Siqueland, Kendall, & Steinberg, 1996). There has been recent acknowledgement that the strength of this association may result from inhibited children's elicitation of protective parental responses. Dadds and Roth (2001) proposed an "anxious-coercive cycle," in which fearful children solicit attention, comfort, and protection from their parents during novel situations, and children's avoidance and dependence are reinforced and maintained when parents respond accordingly.

Three key aspects of this model require investigation. First, many previous studies have advanced the field by examining protective parenting as a *moderator* of stability of fearfulness and anxiety (see Degnan & Fox, 2007 and Rubin et al., 2009 for recent reviews). However, if temperamentally fearful children systematically elicit protective behavior, and protective behavior predicts continued inhibition, mediation may also be an appropriate conceptualization, but it remains understudied. Second, although children's fearfulness predicts protective parenting over time (Hastings & Rubin, 1999; Rubin et al., 1999), protective behaviors have rarely been observed as direct reactions to children's solicitations for support. Third, given the transactional nature of parent-child interactions, fearful temperament and protective parenting in the toddler years would be expected to predict not only children's social withdrawal, but also future parental protective behavior (Hastings & Rubin, 1999; Rubin et al., 1999). Stable protective behavior may continue to provide an environment that fails to correct withdrawal tendencies. Protective behavior has shown stability across one year (McShane & Hastings, 2009), but longer time periods have infrequently been examined. The current study addresses these gaps.

Maternal Accuracy in Predicting Toddlers' Fear

Not all parents respond to their children's fearfulness with protective behavior, suggesting moderating influences on the relation between fearful temperament and protective parenting. It has been theorized that some parents are particularly attuned to their temperamentally fearful children's wariness and are therefore likely to respond with protection when they anticipate such displays (Hastings & Rubin, 1999; Rubin & Burgess, 2001). Studies examining children's noncompliance found that higher maternal accuracy in predicting their children's responses to conflict and discipline related to children's adaptive outcomes (Davidov & Grusec, 2006; Hastings & Grusec, 1997). However, for children with a history of fearfulness, accurately predicting their children's reactions to new situations may provide a context in which mothers act more decisively with protection. Accuracy, then, may serve as one condition, or moderator, under which toddlers' fearful temperament relates to maternal protective behavior.

In a previous wave of the longitudinal study from which the current data were derived, we found that mothers' accuracy in predicting their children's fearful responses to novelty strengthened the association between fearful temperament and protective behavior in the toddler years and moderated the indirect pathway from age 2 fearful temperament to maternal report of early anxiety problems at age 3 through protective behavior (Kiel & Buss,

2010). The current study extends this model beyond the toddler years and examines whether it accounts for development of social withdrawal into early childhood, when such anxiety-spectrum outcomes become increasingly predictive of later impairment. Unique contributions of the current study include extending further into children's development (2 years past the previous assessment) and using a multimethod assessment of social withdrawal instead of relying on maternal report. Also not addressed in the previous study were mothers' own tendencies towards inhibition.

Maternal Dispositional Inhibition

In examining the relation between fearful temperament and protective parenting, it is important to consider individual differences in mothers' own disposition towards inhibited behavior, as a shared disposition towards fearful, inhibited behavior may influence associations among these variables. Gray's motivational theory suggests that anxiety-proneness results from sensitivity to the Behavioral Inhibition System (BIS), which focuses on environmental cues of punishment and pain; anxiety may result when the BIS is activated, motivating avoidance, but the individual feels it is necessary or expected to approach (Gray, 1982). The more sensitive individuals are to punishment cues in their environment (i.e., higher BIS sensitivity), the more prone they are to anxiety. BIS sensitivity is similar to fearful temperament in its conceptualization as a biologically-based foundation for anxiety, although it is typically discussed in terms of adult personality rather than childhood temperament (Gray, 1982).

It would be understandable that mothers would experience some level of distress in response to their toddlers' expressions of negative affect. A mother high in BIS sensitivity would be thought to be motivated to avoid that experience by soothing toddlers' distress and facilitating their withdrawal from a novel, potentially fear-eliciting stimulus. Moreover, she may be highly vigilant about her environment. Thus, mothers high in BIS sensitivity may be more likely to engage in protective behavior and be more accurate in detecting stimuli that would be threatening towards their children. Indeed, BIS sensitivity has been associated with protective behavior in previous empirical work (Coplan et al., 2008). This suggests that shared anxiety proneness could account for relations found between toddler fearful temperament and maternal characteristics and behavior, calling into question the specific role of protective behavior in predicting later outcomes. Thus, stronger tests of the relations among fearful temperament, protective parenting, and maternal accuracy, both concurrently and in predicting later outcomes, would account for potential shared variance between maternal tendencies towards inhibition, examined as BIS sensitivity, and toddler inhibition.

The Current Study

Both theory and available empirical evidence support the role of maternal accuracy as a moderator of (1) the concurrent association between fearful temperament and toddler-elicited protective behavior and (2) the development from fearful temperament to social withdrawal through protective behavior. The current study expands this literature by examining the longitudinal pathway from the relation between fearful temperament and protective parenting in the toddler years, moderated by maternal accuracy, to children's social withdrawal and mothers' protective parenting assessed during children's kindergarten year.

The current study expands previous analysis of this moderated mediation framework in several important ways. First, we used a multi-method assessment of the broad construct of social withdrawal, including parent- and teacher-report and two laboratory observations. We hypothesized that fearful temperament would predict social withdrawal in kindergarten and that, as mothers demonstrated higher accuracy in predicting their toddlers' fearful reactions,

protective behavior would serve as a mediator of this relation. Rather than make claims about whether this early maternal behavior was *over*-protective, we sought to examine whether variance in behavior of a protective nature related to fearful temperament and social withdrawal.

Second, we assessed the outcome of maternal protective behavior at the kindergarten assessment. We hypothesized stability from protective maternal behavior in the toddler years to protective behavior with children in kindergarten and that this stability may provide an indirect means by which early fearful temperament relates to protective behavior in kindergarten, again depending on maternal accuracy.

Finally, we included maternal inhibition (i.e., BIS sensitivity) in analyses to acknowledge that it may account for shared variance between toddler fearful temperament and maternal protective behavior. We hypothesized that maternal accuracy would moderate the relation between fearful temperament and protective parenting above and beyond this shared variance.

Method

Participants

Ninety-three 2-year-old toddlers (42 female; $M_{\text{age}} = 24.76$ months, $SD_{\text{age}} = 0.42$ months) and their mothers participated in the current study. Participants were recruited from local birth records and were not recruited for any specific characteristic. The majority of participants were Caucasian (91% Caucasian, 3% African American, 2% Hispanic, 3% Asian American, and 1% American Indian) and middle class, although the sample spanned the range of socioeconomic status (Hollingshead Index: $m = 47.57$, $range = 13-66$). Immediately prior to the start of children's kindergarten year, we recontacted these families by letter to inquire about their interest in participating in a more extensive follow-up including a questionnaire mailing, questionnaire completion by the child's kindergarten teacher, an individual visit to the laboratory, and a laboratory visit involving interaction with same-aged same-sex peers.

Procedure

Age 2 laboratory visit—Mothers were mailed a consent form and a packet of questionnaires to complete and bring with them. Upon arrival to the laboratory, a primary experimenter told the mother that her toddler would be participating in a variety of games and activities (i.e., episodes), including the *Risk Room*, a traditional procedure for assessing fearful temperament (Reznick et al, 1986) and six novelty episodes modeled after Lab-TAB episodes modified for toddlers (Buss & Goldsmith, 2000) and other standard laboratory procedures (Nachmias, Gunnar, Mangelsdorf, Parritz, & Buss, 1996). After an explanation of each episode, the experimenter asked the mother to make several specific predictions about her toddler's reaction. For example, the experimenter asked, "Will your child want you to hold him/her?" and asked her to answer, "Definitely yes," "Probably yes," "Probably no," or "Definitely no." The toddler then participated in these episodes, with the mother present. The experimenter asked the mother to limit interaction with her child to those necessitated by toddler distress. Mothers nevertheless showed meaningful variance in protective behavior (Kiel & Buss, 2010).

Episodes—We provide brief descriptions of episodes here, as detailed descriptions are available elsewhere (see above). Toddlers first participated in the *Risk Room*, which was scored to assess fearful temperament. The primary experimenter led the mother and child into a room with a variety of activities (i.e., tunnel, low balance beam, trampoline, box with

face and cut-out mouth, gorilla mask on a pedestal) and told the toddler to play “however you like.” The child played for 3 minutes followed by request by the experimenter to play with each object.

The six novelty episodes provided observational assessments of toddlers’ distress behaviors (corresponding to maternal predictions). Episodes proceeded in one of four counterbalanced, randomly chosen orders. Counterbalancing resulted in no significant effect on children’s behavior. Episodes included: the *Stranger Approach*, in which an unfamiliar male experimenter attempted to engage the child in a 1-minute conversation; *Stranger Working*, in which an unfamiliar second female experimenter entered the room and sat in a desk in the corner (for 2 minutes), appearing as though she were completing work; *Clown*, in which the second female experimenter, dressed in a clown costume (clown outfit, red nose, and colorful wig), attempted to engage the child in three fun activities; *Puppet Show*, during which the child watched two puppets (controlled by a second female experimenter behind a small stage) engage in three activities and invite the child to play; *Robot*, in which a 1-foot-tall remote-controlled robot toy stood on a 1” high wooden platform, moving and making noises randomly for 1 minute; and, finally, *Spider*, in which a large stuffed animal spider (secured to the top of a hidden remote controlled car) controlled from behind the room’s one-way mirror, approached and withdrew from the mother and child twice, with a 10-second pause in between each movement. In between these episodes, toddlers participated in neutral or pleasurable games and short breaks.

Age 5/kindergarten visit—Kindergarten assessments included two visits to the laboratory (individual visit and peer interaction visit) and mailings of questionnaires to parents and teachers.

During the individual visit, children participated in age-appropriate novelty episodes, similar to the toddler visit. The current study focused on the *Stranger Approach* episode. An unfamiliar male experimenter entered the room and introduced himself to the child, sat in a chair approximately 3 feet away from the child, and engaged the child in conversation by asking standardized questions (e.g., “Have you been having fun today?”).

During the peer interaction visit, children engaged in a free-play session with 2–3 unfamiliar same-age same-sex peers. This visit adhered to the “free play” procedure outlined by Rubin (2001). An experimenter led the children into a room with a variety of toys, instructed them to play “however you like,” and left the room for 15 minutes.

The age 2 and kindergarten visits were videotaped for later scoring of observational data. Coders, who were blind to study hypotheses, received approximately 10 to 20 hours of training, depending on the particular coding system. They then scored several cases independently and were required to achieve adequate inter-rater reliability (percent-agreement, intraclass correlation coefficient [ICC], or $\kappa = .80$) with a master coder (the first or second author). Reliability checks occurred throughout coding to prevent coder drift.

Measures

Toddler fearful temperament—Fearful temperament was computed as a dimensional composite of fearful behaviors observed in the Risk Room. Behaviors included: latency to touch first toy, attempt to be held by mother, approach towards parent, tentativeness of play, and compliance to the experimenter. Latency to touch the first toy was measured as the number of seconds between the start of the episode and the toddler’s first intentional contact with one of the toys. Attempt to be held, approach towards parent, and tentativeness of play were scored on 0 to 3 scales in each 10-second epoch of the episode. For each of these behaviors, a final score was computed as the average of scores across epochs. Attempt to be

held was scored as 0 = no attempt, 1 = some contact seeking (e.g., touches mom) or child is picked up without resistance, 2 = active verbal or physical cue to be picked up or sits on mom's lap contentedly, 3 = two or more behaviors defined as a "2" or physically climbs on mother to reach her lap or arms. Approach towards parent was scored as 0 = no glances or comments to parent while playing or exploring, 1 = looks or verbalizes to mother *while* playing, 2 = looks or verbalizes to mother *before* engaging with an activity, 3 = initiates or maintains close proximity to mother. Tentativeness of play was scored as 0 = no hesitancy while playing, 1 = brief pause (2–5 s.) or slight hesitancy before touching or examining an object, 2 = moderate pause (> 6 s.) or hesitancy before contact with object or noticeably wary while in contact with object, 3 = extreme hesitancy or no contact with object. Finally, compliance to experimenter was the count from 0 to 5 of the number of objects with which the child interacted as instructed by the experimenter.

Reliability between coders and a master coder was computed on 15–20% of cases. Percent-agreement reliability was .90 for latency to touch first toy. For behaviors scored in epochs, reliability was computed on an epoch-by-epoch basis. Percent-agreement reliability was computed due to the large number of zero-values for the epoch-by epoch coding (attempt to be held = .94; approach towards parent = .73, and tentativeness of play = .83). Compliance with experimenter had more evenly distributed scores and was more categorical in nature, so Cohen's kappa was computed and reliability was found to be adequate, $\kappa = .75$. Because the behaviors for the composite were measured on different scales, each behavior was standardized and given a z-score. The mean of these scores (after reversing compliance to experimenter) was taken to form the composite, with higher values indicating more extreme fearful temperament.

Maternal accuracy—Maternal accuracy was assessed at the age 2 visit as the statistical association between mothers' predictions about their toddlers' reactions to novelty and toddlers' observed behaviors during the six novelty episodes (not Risk Room, so fearful temperament could remain distinct from accuracy). Mothers were asked to make 5–7 predictions per episode, encompassing both approach (e.g., "Will your child approach the puppets?", "Will your child talk to the clown?") and distress/avoidance (e.g., "Will your child cry or fuss?", "Will your child want you to hold him/her?") behaviors. Predictions were scored as 0 = *definite approach* or *definitely no distress*, 1 = *probably approach* or *probably no distress*, 2 = *probably no approach* or *probably show distress/avoidance*, or 3 = *definitely no approach* or *definite distress/avoidance* so that higher score always indicated more distress, wariness, or inhibition.

Toddlers' behaviors that corresponded to these predictions (e.g., attempt to be held for "Will your child want you to hold him/her?") were scored by trained coders. Behaviors were scored either as intensities or counts. The intensities of *shyness* and *approach* were scored on a five point scale considering the child's behavior throughout a particular episode (1 = *no display*, 5 = *extreme display*). Similarly, for *intensity of distress* after the Stranger's approach, one score ranging from 1 to 5 was given. *Intensity of help behavior* towards the puppets was scored as 0 = no display of help, 1 = some movement towards the puppets, 2 = throws ball to them from afar, 3 = hands ball to a puppet or throws from within 2 ft. *Intensity of play* with both the robot and the spider were scored as 0 = no interaction, 1 = approaches once and examines from afar, 2 = touches object briefly one time, 3 = touches more than once or prolonged engagement. For average *intensity of distress* after each of the Stranger's questions, one rating of distress, on a scale ranging from 1 to 5, was made after each of the stranger's questions, and scores were then averaged to get the final score. All other intensities were given a score of 0 (no behavior shown), 1 (mild or fleeting display of behavior), 2 (definite, moderate display of behavior), or 3 (prolonged or extreme display of behavior) in each 10s interval of the episode being scored. For each behavior, the average of

scores across these epochs yielded an overall score. Percent-agreement reliability with a master coder ranged from .70 to .98, with an average value of .84. Behaviors were standardized and given *z*-scores.

Maternal accuracy was computed statistically in a multilevel model as the strength with which maternal predictions (as the predictor variable) actually predicted corresponding toddler behaviors (as the dependent variable). Statistical procedures are explained in the Results.

Maternal protective behavior with toddlers—Coders scored protective behavior from the six novelty tasks. Consistent with previous research, *protective behavior* encompassed both comfort (i.e., showing affection or soothing the child) and protection (physically shielding the child or moving the child away from the stimulus or activity). Trained coders rated the maximum intensity with which mothers displayed each behavior on a 0 (*none*) to 3 (*extreme or prolonged display*) scale in each 10s interval, so each behavior could be displayed in a given interval with varying intensities, across each episode. Because of the current focus on protective behavior as elicited by children, comforting and protective behaviors were only scored when they occurred in response to children's bids for comfort or help. Percent-agreement reliability (assessed epoch-by-epoch) for each behavior between the coders and a master coder averaged .93 for comforting behavior and .96 for protective behavior. An average of each behavior was computed across the epochs of each episode and then across episodes (except for protective behaviors from Clown and Stranger Working because they occurred with near-zero frequency). Across remaining episodes, comforting and protective behavior had a strong relation, $r(91) = .84, p < .001$, so they were averaged to form age 2 protective behavior.

Maternal BIS sensitivity—Mothers completed the Behavioral Inhibition/Behavioral Activation (BIS/BAS) Scales (Carver & White, 1994), which measure an individual's proneness to avoid cues of punishment (BIS) and approach cues of reward (BAS). The current study utilizes the BIS scale, which has been established as a reliable measurement of withdrawal tendencies and anxiety proneness with both convergent and discriminant validity (Carver & White, 1994). The scale consists of 7 items ($\alpha = .77$; e.g., "If I think something unpleasant is going to happen I usually get pretty worked up") scored on a 1 (*very true for me*) to 4 (*very false for me*) scale. Items were reversed as necessary so higher scores indicated higher BIS sensitivity, and the mean of items was calculated to compute the scale score of maternal BIS sensitivity.

Kindergarten social withdrawal—We used a multi-method assessment of social withdrawal to incorporate potentially unique perspectives from parents, teachers, and laboratory observation. To assess the broad construct of social withdrawal, behavior was assessed for situations involving an unfamiliar adult, familiar peers, and unfamiliar peers.

Parent and teacher report of kindergarten children's social inhibition: The McArthur Health and Behavior Questionnaire (HBQ; Armstrong, Goldstein, & the McArthur Working Group on Outcome Assessment, 2003) has both parent- (140 items) and teacher-report (115 items) forms that inquire about symptoms and impairments in functioning of 4–8 year-olds. The HBQ was given to parents during the fall of children's kindergarten year, and it was given to teachers in the spring. Items are scored on a 3 point Likert-style scale (0 = *rarely applies*, 1 = *applies somewhat*, 2 = *certainly applies*). The current study used the Social Inhibition scale (3 items, e.g., "Shy with other children"), which was found to be internally consistent for both parents and teachers, $\alpha s = .77$ and .69, respectively.

Kindergarten laboratory observed shyness with an adult: Shyness with an unfamiliar adult was assessed from laboratory observation of children's behavior in the Stranger Approach episode of the individual visit. Trained coders scored children on a Likert-style scale of Shyness/Inhibition from 1 (*no display*) to 5 (*extreme display*). Coders maintained adequate reliability with a master coder, ICC = .71, throughout coding.

Kindergarten observed reticence with peers: Reticence with unfamiliar peers was scored from laboratory observation of a free play session during the peer visit using the Play Observation Scale (POS; Rubin, 2001). The 15-minute free-play session was divided into ten-second epochs and scored for the predominant social activity (i.e., the social activity engaged in for the most seconds out of the 10-second epoch). The current study focused on the proportion of epochs in which the child predominantly engaged in unoccupied behavior (e.g., staring blankly into space, wandering with no specific purpose) or onlooking behavior (e.g., watching the activities of others without joining). Reliability for these behaviors was calculated among coders on approximately 10% of cases and found to be adequate, percent-agreement = .93, $\kappa = .61$. Following guidelines by Rubin and colleagues (e.g., Coplan, Rubin, Fox, Calkins, & Stewart, 1994; Rubin et al., 2002) *reticence* was computed as the proportion of codable epochs in which either unoccupied or onlooking behavior was scored as predominant.

Maternal protective behavior in kindergarten—Facilitating children's interactions with unfamiliar peers becomes a common way that mothers are involved with novel situations as children enter school, so maternal report of protective behavior in social situations was selected for the kindergarten follow-up. Mothers reported on their protective behavior with the New Friends Vignettes (NFV; McShane & Hastings, 2009). The NFV provides mothers with two hypothetical vignettes in which they are asked to imagine their children displaying shy/reticent behavior with unfamiliar peers (e.g., "Your son/daughter sees [an unfamiliar child] and his/her mother and then immediately moves behind you;" see McShane and Hastings, 2009 for the full vignettes). Mothers are then asked whether they would display particular responses and can respond, "No," "Maybe," or "Yes" (scored 0, 1, and 2, respectively). The current study focuses on items indicating protective actions (6 items; $\alpha = .72$; e.g., "I would say, 'Would you rather go back home and play with me?'"). The mean of item scores was computed to yield the final score of *Age 5 protective behavior*. The NFV has been shown to have good psychometric properties, including convergent validity with mothers' observed behaviors (McShane & Hastings, 2009).

Results

Data Reduction

Given the intention of examining a multi-method assessment of adjustment, we examined the four measures of social withdrawal. Correlations among the measures ranged from $r = .21$ to $r = .57$, all $dfs = 93$, $ps < .05$, with an average correlation of .35. Internal consistency among measures was modest, $\alpha = .53$. To determine whether aggregation of all or only some of the social withdrawal variables was most appropriate, a principal components analysis was completed. Results of this analysis yielded a single component accounting for 52% of the variance with individual loadings ranging from .60 to .86. This very closely resembles previous studies' reports of multi-method assessments of social withdrawal (Coplan et al., 2008). We expected some uniqueness among indicators because of the differing aspects of social withdrawal assessed by the different measures. In other words, a child could increase in social withdrawal by being more inhibited with one reporter or in one context (e.g., in the laboratory) while maintaining a consistent level of inhibited behavior with other reporters or in other contexts (e.g., with his or her teacher). This is consistent with extant literature

indicating that the moderate agreement among social withdrawal measure may occur, not because of measurement error, but because of meaningful differences in specific measurements (Rubin et al., 2009). Because indicators were thought to be able to vary uniquely, as opposed to conjointly as in the case of a latent variable model, creating a composite is more statistically appropriate than creating a latent variable (Bollen & Lennox, 1991). We therefore formed one *social withdrawal* composite by summing the standardized scores of the measures. In this way, children with the highest scores were children who were high not only on one measure, but consistently high across the different measures, consistent with theory that the most extremely socially withdrawn children are inhibited across different contexts and people (Rubin et al., 2009).

Maternal Accuracy

Recall that, at the age 2 visit, mothers were asked to make predictions about their toddlers' behaviors for six fear-eliciting episodes, and toddlers were scored for corresponding behaviors within these episodes. Thirty-three prediction-behavior pairs across six episodes for 93 dyads resulted in 3069 observations. In examining their relations, the nesting of maternal predictions and toddler behaviors within episodes, which were themselves nested within mother-toddler dyads, warranted a three-level multilevel model (MLM; Raudenbush & Bryk, 2002). Level 1 included the dependent variable of toddler distress behaviors and the independent variable of maternal predictions. Level 2 accounted for the nesting of toddler behaviors and predictions within episodes. Level 3 accounted for the nesting of episodes within mother-toddler dyads. Results from a deviance-change test, $\chi^2(4) = 17.2, p < .01$, informed our decision to include random components for the maternal prediction variable. In this model, maternal predictions significantly related to toddler behaviors, $\gamma = .08, t(2986) = 4.22, p < .001$. Thus, overall, mothers predicted their toddlers' reactions to novelty relatively accurately.

We were most interested in determining each mother's accuracy in predicting her own toddler's behaviors. We created an accuracy variable by extracting the random component of the slope of the above relation for each dyad as an Empirical Bayesian (EB) estimate and adding each to the overall slope.¹ Thus, each dyad has its own estimate of how strongly the mother's predictions related to her toddler's corresponding behaviors, yielding *maternal accuracy*.

Several preliminary analyses were performed to understand the nature of the maternal accuracy variable. First, a positive correlation existed between maternal accuracy and mothers' means of predictions, $r(92) = .44, p < .001$, suggesting that mothers tended to become more accurate as they predicted their toddlers would be more distressed. Given this, in contrast to our treatment of accuracy as a maternal characteristic, we wanted to test an alternative interpretation: mothers predict their toddlers' distress with greater ease when toddlers display higher fearful temperament, so maternal accuracy is merely a proxy for fearful temperament. If this were so, we would expect mothers' predictions to be related to toddlers' behaviors only at high levels of toddler fearful temperament. On the contrary, within the multilevel framework, we found that the interaction between fearful temperament and maternal predictions in predicting toddler behavior was not significant $t[247.84] = 0.37, ns$. In addition, the correlation between fearful temperament and maternal accuracy (.35)

¹As opposed to a traditional ordinary least squares (OLS) method of estimating the dyad-specific relation between maternal predictions and toddler behaviors (i.e., calculating the slope from a regression equation using only that dyad's data), the EB estimates incorporate the data for a particular dyad with the pattern of information across all dyads, resulting in reduced sampling variance surrounding the estimate and yielding more stable and reliable estimates (Candel & Winkens, 2003; Raudenbush & Bryk, 2002). This is particularly needed for dyads in which mothers made consistently low or consistently high ratings, which could result in a restricted range and therefore a lower estimate of the association between predictions and toddler behaviors in an OLS framework. The EB estimates are strengthened by using all information.

suggests only 12% shared variance. Thus, mothers' accuracy is not merely dependent on toddler fearful temperament and therefore a maternal characteristic.

Missing Data and Attrition Analyses

Of the 93 families who participated in the age 2 visit, 72 (77%) completed at least one part of the kindergarten assessment. Comparing these 72 families to those who did not participate in the kindergarten assessment revealed no significant differences in SES, fearful temperament, maternal protective behavior, or maternal accuracy, all $ps > .05$. Missing Value Analysis in SPSS revealed a non-significant Little's MCAR test, $\chi^2(92) = 83.36, p = .44$, consistent with missing data occurring completely at random. Given current recommendations (Howell, 2007; Widaman, 2006), the expectation-maximization (EM) algorithm was used to impute missing data. Variables from the 24-month assessment and existing age 5 variables were used in the algorithm to impute missing values. Similar results were found when using only raw data (although analyses were understandably underpowered) and when using multiple imputation, so only the results using data imported with the EM algorithm are reported.

Descriptive statistics and bivariate relations among variables are presented in Table 1. Notably, SES related to maternal protective behavior in kindergarten, so it will be considered as a covariate in analyses assessing this outcome. Maternal BIS sensitivity did not relate significantly to any variables, but it related to both fearful temperament and maternal protective behavior with toddlers in the expected positive direction. To be conservative, BIS will be included as a covariate. No mean-level gender differences emerged, all $ps > .20$.

Predicting Longitudinal Outcomes

Longitudinal relations were investigated in a moderated mediation framework according to current guidelines in the literature (Baron & Kenny, 1986; Holmbeck, 1997; Muller, Judd, & Yzerbyt, 2005; Preacher, Rucker, & Hayes, 2007). As in traditional mediation, three paths were investigated: Path A represented the relation between fearful temperament and protective behavior, Path B represented the relation between protective behavior and the outcome above and beyond fearful temperament, and Path C represented the relation between fearful temperament and the outcome (Figure 1). Individual paths were examined using multiple regression, and maternal BIS sensitivity was included as a covariate in all paths. Path A contained the hypothesized moderated pathway, such that the association between fearful temperament and early protective behavior depended on maternal accuracy. Maternal BIS sensitivity was also explored as a moderator of this pathway, but it was not significant. For Path B to occur, protective behavior needed to predict the outcome above and beyond maternal BIS sensitivity, fearful temperament, maternal accuracy, and the fearful temperament X maternal accuracy interaction. Given the addition of these variables, the new relation between fearful temperament and the outcome (Path C') was examined for a drop in strength from Path C. For further evidence of moderated mediation, the conditional indirect effect was tested with the MODMED macro for SPSS, which determines the level of maternal accuracy at which the indirect effect of the relation between fearful temperament and the outcome through age 2 protective behavior reached significance. Following current recommendations for longitudinal studies, we relaxed the requirement of a significant C path for indirect pathways to be examined (Shrout & Bolger, 2002). If this path was not significant, however, we considered the effect as "indirect" rather than "mediated" (Holmbeck, 1997).

Social withdrawal—A summary of regression analyses examining the mediation paths for social withdrawal are presented in Table 2 and depicted in Figure 1. The regression equation

examining Path A, $R^2 = .39$, 95% CI [.24, .54], $F_{4,88} = 13.82$, $p < .001$, revealed a significant interaction between fearful temperament and maternal accuracy in relating to protective behavior. Simple slopes of the association between fearful temperament and protective behavior were examined at recentered values of maternal accuracy within the model. Fearful temperament did not relate to protective behavior at -1 SD of maternal accuracy, $b = -0.04$, 95% CI $[-0.10, 0.03]$, $\beta = -0.15$, $t(91) = -1.17$, *ns*, or at mean accuracy (see Table 2), but the association was significant at $+1$ SD of accuracy, $b = 0.05$, 95% CI $[0.001, 0.10]$, $\beta = 0.20$, $t(91) = 2.01$, $p < .05$. The region of significance of this interaction was examined using an online calculation tool (Preacher, Curran, & Bauer, 2006), which determines the value(s) of the moderator at which the relation between the predictor and the dependent variable shifts from non-significance to significance. The lower boundary of the region of significance occurred outside the range of maternal accuracy, and the upper boundary of the region of significance occurred at approximately 0.98 SD above the mean of accuracy. Thus, the relation between toddlers' fearful temperament and protective behavior increased as mothers displayed higher accuracy.

Paths B, C, and C' were examined using a hierarchical regression model. In Step 1, the regression equation examining Path C, $R^2 = .16$, 95% CI [.03, .29], $F_{2,90} = 8.35$, $p < .001$, yielded a significant predictive relation between fearful temperament and social withdrawal. To examine Path B in Step 2, maternal accuracy, the fearful temperament X maternal accuracy interaction, and age 2 protective behavior were added to the model, $R^2 = .29$, 95% CI [.14, .44], $F_{5,87} = 7.10$, $p < .001$, resulting in a significant change in the model, $\Delta R^2 = .13$, $p < .01$. Above and beyond the other variables, age 2 protective behavior predicted social withdrawal. Although fearful temperament remained a significant predictor (the C' Path), the strength of its association with Social Withdrawal decreased by 28% compared to Step 1 (Figure 1).

The test of the conditional indirect effect (the strength of the indirect effect at various levels of maternal accuracy, still including maternal BIS sensitivity as a covariate) revealed that protective behavior accounted for a significant portion of the relation between fearful temperament and social withdrawal once accuracy reached a value 1.85 SD above its mean. When mothers displayed accuracy at or above this value, protective behavior served as a partial mediator of the relation between fearful temperament and social withdrawal.

Age 5 protective behavior—A summary of regression equations examining the outcome of age 5 maternal protective behavior can be found in Table 2 and Figure 1. Recall that SES was to be included as a covariate, along with maternal BIS sensitivity, for analyses examining age 5 maternal protective behavior. In examining Path A with these covariates and the main effects of fearful temperament and maternal accuracy in the model, $R^2 = .39$, 95% CI [.25, .53], $F_{5,87} = 11.22$, $p < .001$, the fearful temperament X maternal accuracy interaction remained significant in relation to age 2 protective behavior. Examining simple slopes of fearful temperament at various levels of accuracy revealed that fearful temperament did not relate to age 2 protective behavior at -1 SD of fearful temperament $b = -0.04$, 95% CI $[-0.11, 0.03]$, $\beta = -0.16$, $t(91) = -1.20$, *ns* or mean fearful temperament (see Table 2), but it did relate at $+1$ SD of fearful temperament, $b = 0.05$, 95% CI $[0.001, 0.10]$, $\beta = 0.20$, $t(91) = 1.98$, $p = .05$. The upper boundary of the region of significance occurred at 1.00 SD above the mean of maternal accuracy.

In Step 1 of the hierarchical multiple regression used to examine the remaining paths, $R^2 = .12$, 95% CI [.002, .24], $F_{3,89} = 3.85$, $p < .05$, fearful temperament did not predict age 5 protective behavior. Adding maternal accuracy, the fearful temperament X accuracy interaction, and age 2 protective behavior resulted in a significant change in the model, ΔR^2

$= .10, p < .05; R^2 = .22, 95\% \text{ CI } [.08, .36], F_{6,86} = 4.00, p < .01$, and age 2 protective behavior predicted age 5 protective behavior above and beyond the other variables.

Testing the conditional indirect effect (still controlling for SES and maternal BIS sensitivity) revealed that fearful temperament displayed a significant indirect relation to age 5 protective behavior through age 2 protective behavior when accuracy exceeded a value of approximately 1.72 SD above its mean. Thus, protective behavior observed with toddlers predicted mothers' self-reported protective behavior when children entered kindergarten, and at high levels of accuracy, fearful temperament displayed an indirect relation to kindergarten protection through early protective behavior.

Discussion

The current study investigated protective behavior solicited by toddlers as a mediator of development from early fearful temperament to later social withdrawal and maternal protective behavior, with maternal accuracy as a moderator in this pathway. Maternal accuracy moderated the relation between fearful temperament and protective behavior, such that the association strengthened as maternal accuracy increased. Thus, the link between fearfulness and protective behavior, noted elsewhere in the literature as a contributor to children's anxiety development (Dadds & Roth, 2001), became stronger as mothers displayed relatively correct anticipation of their children's fearful reactions. In other words, as toddlers display increased temperamental fearfulness and mothers display predictive accuracy for their children's fear of novelty, mothers engage in more protective responses to their children's bids for support. Although suggested in theoretical discussions of how parents interact with anxious children (e.g., Rubin & Burgess, 2001), this study provided empirical evidence that it occurs. Moreover, our results suggest that maternal accuracy may increase the likelihood of responding protectively with fearful children above and beyond the influence of mothers' own inhibition on protective parenting.

We examined how these variables from the toddler years predicted children's social withdrawal when they entered kindergarten. Fearful temperament and protective behavior both predicted social withdrawal, and when mothers displayed a high level of accuracy, protective behavior partially mediated the relation between fearful temperament and social withdrawal. Thus, protective behavior may perpetuate patterns of fear from early reactions to novelty to later withdrawal from peers and adults. The current findings lend support to the following conceptualization of the dynamics between fearful children and their parents: temperamentally fearful children elicit protective behaviors from their mothers, and this occurs most strongly when mothers accurately anticipate fearful behavior in upcoming situations. This protective behavior then predicts social withdrawal, a precursor to anxiety, when children enter kindergarten. Granted, the current study did not measure the specific act of coercion of protective behavior by fearful toddlers. The protective response could be indicative of extreme attention to the child's comfort (Arcus, 2001) or a reflexive act of compliance lacking deliberation about the learned consequences of such a response for the child. That being said, we provided new evidence consistent with the notion that a transactional cycle may be developing between fearful children and their mothers very early in development, and that this association depends on maternal accurate anticipation of children's fear.

Results also suggested that fearful temperament may become associated with maternal protective behavior in kindergarten through its relation with protective behavior shown in the toddler years, under the condition of high maternal accuracy. We found evidence of stability between protective behavior demonstrated during novelty tasks in the toddler years and mothers' self-reported protective parenting with children as they enter into new peer

situations in kindergarten. Fearful temperament did not by itself predict protection in kindergarten, so early protective behavior served as an indirect effect, rather than a mediator, between fearful temperament and kindergarten protective behavior. When mothers predicted their toddlers' fearful responses to novelty with relative accuracy, fearful temperament related to protective behavior, which then remained relatively stable across early childhood. It was important to examine the outcome of protective behavior in kindergarten because protective parenting at this age may moderate continued stability in social withdrawal into middle childhood (Degnan & Fox, 2007), which further increases children's risk for internalizing problems. Future work will need to address relations further into the school years to determine whether this is the case.

Significantly, these results occurred while controlling for mothers' own inhibition or anxiety-proneness, as measured by BIS sensitivity. It could be that anxiety-proneness shared between mothers and toddlers accounts for mothers being protective and vigilant about their environment (i.e., accurate). Moreover, without controlling for maternal BIS sensitivity in longitudinal models, it would not be known whether the protective behavior itself contributed to children's later outcomes beyond representing disposition towards inhibition. Controlling for maternal BIS sensitivity clarified how fearful temperament and accuracy related to protective behavior above and beyond shared inhibition and increased confidence in the significance of protective behavior in predicting later outcomes.

Translational Implications

Increasingly, early childhood is being targeted for the prevention of later clinical problems. The mediating role of protective behavior found in the current study suggests that interventions may be limited by focusing only on children's individual characteristics. If protective behavior serves as a mechanism of anxiety development, change in protective behavior may serve as a mechanism of prevention of anxiety. An increasing number of studies have attempted to target children who do not respond to traditional individual cognitive-behavioral therapy by involving parents, although evidence for the effectiveness of parental involvement in anxiety treatment remains mixed (Silverman, Pina, & Viswesvaran, 2008). Perhaps temperament and parenting may be best targeted through prevention of anxiety problems. In one of the few studies of prevention programs targeting temperamentally inhibited children at risk for anxiety, inhibited children whose parents participated in an education program that specifically addressed the role of protective behavior in maintaining anxiety had a greater decrease in anxiety disorders over the subsequent year compared to inhibited children of parents in a monitoring condition (Rapee, Kennedy, Ingram, Edwards & Sweeney, 2005). One aspect of protective parenting that may still need to be more strongly addressed is children's elicitation of such behavior. Teaching parents adaptive responses to such elicitation may facilitate change. Certainly, the results of current study cannot speak to the effectiveness of intervention, but they do suggest continued attention to this possibility.

Because accuracy in predicting children's fearful responses may prompt protective behavior with temperamentally fearful children, it may also be incorporated into prevention efforts. Certainly, we would not suggest that mothers aim to be *less* accurate. Rather, accuracy could be channeled into prompting adaptive responses, such as anticipating novel situations in which mothers can help their children develop mastery over their fears. Acknowledging that children may be eliciting comfort and protection, and that mothers may be anticipating this, may help mothers plan out alternative responses ahead of time, potentially increasing the likelihood of mothers' follow-through with more adaptive behaviors. Examining the usefulness of targeting accuracy and protective parenting in early interventions with inhibited children will be an important undertaking in the future.

Limitations and Future Directions

Our sample consisted primarily of European American, middle-class families, so replicating these findings with a larger, more diverse sample may strengthen the current findings and provide stronger evidence for the role of maternal accuracy, particularly in longitudinal relations. Moreover, the current study focused on mothers. The important role of fathers in the development from fearful temperament to later outcomes should not be underestimated; more research is clearly needed in this area. In addition, results from this community sample may not be directly comparable to those found for selected samples of children with high inhibition or anxiety. Also important is determining whether observed protective behavior demonstrates the same relations as found currently with mothers' self-reported overprotection.

Despite medium to large effect sizes found in several of the multiple regression analyses, other variables not included in the current study likely play a role in the development of social withdrawal and protective parenting. For example, physiological characteristics and attention processes were not presently studied but certainly affect the outcomes of children's temperament and parenting (Degnan & Fox, 2007).

In sum, the current study suggests that maternal accuracy plays a significant role in the early association between fearful temperament and protective parenting, which in turn predicts social withdrawal and parental protective behavior when children enter kindergarten. These results add to the growing literature within developmental psychopathology by acknowledging the active role fearful children play in shaping the environments in which they develop.

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Figure 1.

A summary of regression models examining the development from toddler fearful temperament to anxiety-relevant outcomes through protective maternal behavior, moderated by maternal accuracy. Standardized beta coefficients are presented for paths named with traditional mediation terminology (Path A = the fearful temperament X maternal accuracy interaction in relation to protective behavior in toddlerhood, Path B = the relation between protective behavior in toddlerhood to either social withdrawal or protective behavior at age 5, controlling for fearful temperament, Path C = the relation between fearful temperament and social withdrawal, and Path C' = the relation between fearful temperament and social withdrawal with all other variables in the model)

Table 1

Descriptive Statistics and Bivariate Relations for Primary Variables

Variable	Mean (SD)	Range	2	3	4	5	6	7
<u>Age 2</u>								
1. SES (Hollingshead Index)	47.56 (11.75)	13.00 – 66.00	-.11	-.04	-.07	.05	-.09	-.32**
2. Maternal BIS sensitivity	3.04 (0.51)	1.43 – 4.00	--	.11	.09	-.15	.08	.05
3. Toddler fearful temperament	-0.01 (0.80)	-1.11 – 3.39		--	.30**	.35**	.39***	.12
4. Maternal protective behavior	0.16 (0.21)	0.00 – 1.08			--	.55***	.46***	.34**
5. Maternal accuracy	0.08 (0.02)	0.04 – 0.14				--	.35**	.06
<u>Age 5</u>								
6. Child social withdrawal	0.00 (2.85)	-5.06 – 13.07					--	-.02
7. Maternal protective behavior	1.03 (0.34)	0.17 – 1.67						--

Note. Statistics were computed after imputation of missing data. $N = 93$. The composite of maternal BIS sensitivity is the mean of items scored on a 1–4 scale. Toddler fearful temperament and child social withdrawal are composites of standardized variables. Age 2 maternal protective behaviors were scored on a 0 to 3 scale with averages taken across 10s epochs of the episode. Maternal accuracy is comprised of mothers' slope coefficients from a multilevel model. Age 5 maternal protective behavior was the mean of items scored on a 0–2 scale.

**
 $p < .01$,

 $p < .001$

Table 2
Summary of Multiple Regression Analyses for the Moderated Mediation Models

Variable	Social Withdrawal			Age 5 Protective Behavior		
	<i>b</i> (SE)	95% CI	β	<i>t</i>	<i>b</i> (SE)	95% CI
<u>Path A</u>						
Fearful temperament	0.01 (0.02)	-0.04, 0.06	0.02	0.26	0.01 (0.02)	-0.04, 0.05
Maternal accuracy	5.02 (0.94)	3.16, 6.88	0.50	5.36**	5.05 (0.94)	3.19, 6.91
Fearful temperament X accuracy	2.21 (0.81)	0.60, 3.81	0.25	2.73**	2.21 (0.81)	0.60, 3.81
<u>Paths C, C', and B</u>						
Step 1 (Path C)						
Fearful temperament	1.39 (0.35)	0.70, 2.08	0.39	3.99**	0.05 (0.04)	-0.03, 0.14
Step 2 (Path C' and B)						
Fearful temperament	1.00 (0.37)	0.27, 1.72	0.28	2.73**	0.03 (0.05)	-0.06, 0.12
Maternal accuracy	11.50 (16.15)	-20.60, 43.59	0.08	0.71	-2.91 (2.01)	-6.90, 1.09
Fearful temperament X accuracy	-8.72 (12.59)	-33.73, 16.30	-0.07	-0.69	-0.15 (1.56)	-3.26, 2.95
Age 2 protective behavior	4.89 (1.60)	1.72, 8.07	0.35	3.06**	0.65 (0.20)	0.25, 1.04
						0.40
						3.26**

Note. Naming of paths coincides with traditional mediation terminology (Baron & Kenny, 1986). CI = confidence interval for the unstandardized beta estimates. In the Social Withdrawal model, maternal BIS sensitivity was included as a covariate in all steps. In the Age 5 Protective Behavior model, both maternal BIS sensitivity and SES were included as covariates in all steps.

* $p < .05$,

** $p < .01$,

*** $p < .001$.