Stability and Social–Behavioral Consequences of Toddlers’ Inhibited Temperament and Parenting Behaviors

Kenneth H. Rubin, Kim B. Burgess, and Paul D. Hastings

A prospective longitudinal design was employed to ascertain whether different types of behavioral inhibition (i.e., traditional, peer–social) were stable from toddler to preschool age, and whether inhibited temperament and/or parenting style would predict children’s subsequent social and behavioral problems. At Time 1, 108 toddlers (54 males, 54 females) and their mothers were observed in the Traditional Inhibition Paradigm and in a toddler–peer session; then at age 4 years, 88 children were observed with unfamiliar peers, and maternal ratings of psychological functioning were obtained. How mothers and their toddlers interacted was also observed. Results revealed meaningful connections between toddler inhibition, maternal intrusive control and derision, and nonsocial behaviors at age 4. Both forms of toddler inhibition predicted socially reticent behavior during free play at 4 years. If mothers demonstrated relatively high frequencies of intrusive control and/or derisive comments, then the association between their toddlers’ peer inhibition and 4-year social reticence was significant and positive; whereas if mothers were neither intrusive nor derisive, then toddlers’ peer inhibition and 4-year reticence were not significantly associated. Thus, maternal behaviors moderated the relation between toddlers’ peer inhibition and preschoolers’ social reticence.

INTRODUCTION

In the developmental study of children’s social and emotional adaptation, researchers have recognized the importance of examining intrapersonal factors, such as temperament and gender, as well as interpersonal factors, such as relationships and interactions with significant others. With regard to intrapersonal factors, certain dispositional characteristics have been associated with, and predictive of, behavioral maladjustment. On the one hand, a difficult temperament among infants and toddlers is often manifested by high activity level and anger proneness, or high emotional reactivity and poor regulatory control. Difficult temperament has been associated contemporaneously and predictively with behavioral undercontrol, aggression, and interpersonal conflict (Bates, Bayles, Bennett, Ridge, & Brown, 1991; Rubin, Hastings, Chen, Stewart, & McNichol, 1998; Sanson, Oberklaid, Pedlow, & Prior, 1991). On the other hand, an inhibited, fearful temperament may be an early precursor of internalizing behavior problems such as anxious and depressive symptoms (Fox, Calkins, Schmidt, Rubin, & Coplan, 1996; Fox et al., 1995; Kagan & Snidman, 1999).

Compared with studies on difficult temperament, there have been fewer investigations—especially those of a longitudinal nature—focused on inhibited temperament. Behavioral inhibition has been defined as a pattern of responding or behaving, possibly biologically based, such that when unfamiliar or challenging situations are encountered, the child shows signs of anxiety, distress, or wariness (Kagan, 1989). The standard paradigm for assessing behavioral inhibition is usually not applied before approximately 2 years of age. Typically, an inhibited (i.e., wary, fearful) disposition has been measured using a paradigm developed by Kagan, wherein toddlers’ reactions to unfamiliar objects and adults are observed in an unfamiliar setting. Behavioral inhibition is marked by the toddler’s latency to speak to an unfamiliar adult, latency to approach the stranger or unfamiliar objects, and time spent near or away from the mother. Importantly, this particular procedure is usually employed in the very early years of childhood and not in subsequent developmental periods. As a consequence, other than in the landmark work of Kagan and colleagues (e.g., 1989), as well as recent research by Fox and colleagues (e.g., Fox, Henderson, Rubin, Calkins, & Schmidt, 2001), relatively little is known about either the temporal and cross-situational stability of inhibited temperament or the longitudinal relations between behavioral inhibition and subsequent (mal)adaptive child behaviors.

Insofar as stability is concerned, Kagan and colleagues have suggested that extremely inhibited toddlers may be characterized as inhibited with adults and peers in later childhood (e.g., Kagan, Reznick, & Snidman, 1987, 1989; Reznick et al., 1985). For example, toddlers identified as extremely inhibited are likewise identified 5 years later (Kagan, Reznick, & Snidman, 1988). Yet the stability of behavioral inhibition is moderate at best (e.g., Broberg, 1993; Scarpa,
Raine, Venables, & Mednick, 1995), and it is possible that different types of inhibition in very early childhood may predict different “outcomes.” Whereas Kagan and colleagues (Kagan 1989; Kagan, Reznick, & Snidman, 1987) have focused primarily on the stability and predictive “outcomes” of fearful/wary toddler behavior in the company of an unfamiliar adult, virtually nothing is known of the stability and outcomes of toddler wariness and inhibition in the company of a peer. Further, it is presently unknown how and whether toddler inhibition in its various forms (e.g., Kochanska, 1991; Rubin, Hastings, Stewart, Henderson, & Chen, 1997) is associated with nonsocial behavior in its various forms in early childhood.

As noted above, the standard assessment of behavioral inhibition involves observations of a toddler and his or her mother in an unfamiliar setting and in the presence of an adult stranger. It seems feasible, however, that inhibition in the face of novel objects and unfamiliar adults may represent a markedly different phenomenon than inhibition in the face of unfamiliar peers. Indeed, Rubin et al. (1997) recently found that the correlation between inhibition, as assessed in the traditional fashion, and inhibition assessed in a peer context, was significant, $p < .01$, but rather modest, $r = .28$. Further, of 39 children who showed extreme levels of inhibition in either the “traditional” inhibition session or the peer session (of an original sample of 108 children), only 12 were extremely inhibited in both sessions. Because the distinction between traditional and peer inhibition has not been made in the past, there may have been an underestimation of the stability and predictive strength of inhibition to social adjustment problems. Put succinctly, inhibition in the company of a toddler age-mate may be a stronger predictor of later interpersonal difficulties among unfamiliar peers and intrapersonal difficulties such as anxiety than might inhibition in the company of unfamiliar adults or objects. Social withdrawal from peers may be a specific interpersonal difficulty that inhibited toddlers face.

During early childhood, three forms of socially withdrawn behavior have been described: solitary–passive, solitary–active, and reticent behaviors (Coplan, Rubin, Fox, Calkins, & Stewart, 1994; Rubin, 1982). Solitary–passive behavior involves object exploration and constructive activity while playing alone in the presence of peers. Such behaviors appear to indicate a lack of motivation to either approach or avoid others, and are not associated with psychological maladjustment in early childhood (Rubin, Coplan, Fox, & Calkins, 1995). Solitary–active behavior involves repeated sensorimotor actions with or without objects, and solitary dramatizing. Although very infrequent, this behavior has been associated with impulsivity and aggression among preschoolers. Reticence, which is most relevant to the construct of inhibition, is characterized by the frequent production of onlooking, unoccupied, and socially wary behaviors. Whereas reticent preschoolers may desire peer interaction, social approach elicits anxiety and causes them to avoid interaction. Reticence has been related to overt indicators of anxiety (e.g., crying, automanipulatives), poor performance on cooperative group tasks, refraining from speaking in groups of unfamiliar peers, and an inability to regulate negative emotions (Coplan et al., 1994; Fox et al., 1995; Rubin, Coplan, Fox, & Calkins, 1995). Like traditionally assessed behavioral inhibition, reticence is a construct that describes the child’s wariness in novel situations; unlike traditional inhibition, reticence refers to the display of wary behavior in unfamiliar social situations, most notably with peers.

Comparison of these three types of behavioral soli- tude reveals that they represent independent constellations of behaviors with potentially different etiologies and outcomes. The present study examined whether behavioral inhibition as assessed at age 2 years predicted the display of social reticence at age 4. Given the fearful, wary features of inhibition, it was expected that this kind of temperament would be a natural precursor to socially reticent behavior, which reflects social anxiety, rather than being a precursor to solitary–passive or solitary–active behaviors. Further, it was anticipated that inhibited behavior with a toddler peer would be more strongly predictive of reticence at age 4 than traditionally assessed inhibition.

Researchers who have studied the associations between behavioral inhibition and later social–emotional development have typically adhered to a model in which biologically driven, fearful, wary temperament in infancy and toddlerhood is viewed as the major cause and predictor of later social wariness and anxiety in childhood and adolescence (e.g., Fox et al., 2001; Kagan & Snidman, 1999). Support for such a model is derived from studies in which researchers demonstrate physiological concomitants of behavioral inhibition and its putative consequences. For example, stable patterns of right frontal EEG asymmetry in infancy predict temperamental fearfulness and behavioral inhibition in early childhood (Fox et al., 2001). Relatedly, preschoolers who display high frequencies of socially reticent behavior among unfamiliar peers are more likely to display right frontal EEG asymmetry (Fox et al., 1995, 1996). In addition, increased cortisol production in saliva is associated with the demonstration of extremely inhibited behavior not only in the toddler period (Kagan et al., 1987; Nachmias, Gunnar, Mangelsdorf, Parritz, & Buss, 1997).
In early childhood, some well-intended parents whose children are dispositionally wary and fearful may believe that they can (and must) protect their children from potentially emotion-arousing situations. Following from earlier conceptualizations of the construct, protection may be evidenced through the discouragement of independent attempts to explore the unfamiliar, the direction and restriction of children’s actions and activities (telling them what to do), and the intrusion on children’s ongoing activities (stepping in to preclude the possibility of an upsetting experience). For example, when accompanying their children to an unfamiliar play setting, some parents who view their youngsters as being emotionally vulnerable may attempt to shield them from emotional upset by being highly affectionate. At the same time they may take over situations in which they expect that their children might feel anxious, regardless of whether their children are actually experiencing anxiety. Thus, overprotective parenting is characterized by displays of warmth, intrusiveness, and restrictiveness in situations that do not warrant it. The upshot of this parenting style may be to prevent children from engaging in necessary self-initiated coping techniques and autonomous behaviors.

Support for the conjecture that overcontrolling and oversolicitous parenting is associated with socially wary and fearful behavior is drawn from a number of recent studies. Rubin et al. (1997) found that toddlers whose mothers perceived them as being socially wary and who directed highly affectionate and intrusively controlling behaviors toward their children during a free-play situation were more likely to demonstrate observed inhibited behaviors in the company of a same-age peer than those toddlers whose mothers perceived them to be socially wary but refrained from oversolicitous behavior. In another recent study, Park and colleagues (Park, Belsky, Putnam, & Crnic, 1997) found that the stability of inhibition among males (ages 2 to 3 years) was accompanied by inappropriately affectionate parenting. Note that these studies primarily involved either concurrent or very short-term longitudinal analyses of toddler and parental behaviors. Few, if any, investigators have examined inhibition and parenting behaviors as predictors of subsequent socially reticent behavior among both males and females.

Another defining feature of psychological control is the extent to which parents use criticism and derision. Researchers have posited that parents who are critical and derisive of their children, especially in the company of others, may incite the development of negative thoughts and feelings of the self and withdrawal from the social world (Barber et al., 1994; Mills & Rubin, 1998; Zahn-Waxler & Kochanska, 1990). Mills and Rubin (1998) found a positive association...
between mothers’ use of both intrusive control and derogation and elementary school-age children’s social withdrawal in the peer group.

Children who have experienced excessive psychological control as evidenced by intrusive, overly solicitous, and protective parenting and/or who have experienced criticism from their parents have been thought to be at risk for the development of internalizing difficulties of which reticent withdrawn behavior is an early marker (Coplan et al., 1994). This being the case, the experience of psychological control may lead these children to withdraw from social company, even if that company comprises age-mates. It was therefore predicted that psychologically controlling parenting during the toddler period would predict children’s display of socially reticent behaviors among peers at age 4 years.

Lastly, few researchers have attempted to examine both temperamental characteristics and children’s parenting experiences in the same longitudinal investigation (Rothbart & Bates, 1998). Another purpose of the present study, therefore, was to examine the extent to which inhibited temperament and parenting style independently and interactively predicted social–behavioral and psychological outcomes for young children. Parenting behavior was expected to moderate the stability of children’s wariness, such that the links between toddler inhibition and preschoolers’ reticence and internalizing problems would be strongest if mothers were psychologically controlling of their toddlers.

METHOD
Participants

In this longitudinal study, 108 toddlers (54 males, 54 females) and their mothers were identified by newspaper birth announcements and recruited through telephone solicitation. Of the two-parent families contacted, 75% agreed to participate, and all lived in the cities of Kitchener and Waterloo, Ontario. 97% of the participants were White; 96% of the couples were married; and, on average, both parents had some college education. Mothers’ mean age was 31.1 years old ($SD = 4.12$, $range = 23–41$) and fathers’ mean age was 32.5 years ($SD = 3.91$, $range = 24–43$). The mean score of families on the Hollingshead Social Status Index (Hollingshead, 1965) was 46.47 ($SD = 10.80$, $range = 18–66$).

For the Time 1 assessments, mothers and toddlers visited the laboratory on two occasions (Sessions 1 and 2) with the first occasion being within 3 months of each toddler’s second birthday (age: $M = 25$ months, $SD = 1.08$). Second visits were scheduled within 12 weeks of the first session, and 104 (52 males, 52 females) of the participants returned for a second session. For the Time 2 assessment (approximately 2 years later) 46 boys and 42 girls from Time 1 participated again (age: $M = 51$ months, $SD = 1.33$). The sample was examined for selective attrition by comparing the 88 families who completed this longitudinal study to the 20 families who only participated at Time 1. Multiple $t$ tests showed no significant differences on demographic (parents’ education, family SES) or inhibition (traditional, peer) variables, all $t < 1.41$. Therefore, there was no reason to suspect that selective attrition produced a biased sample for this investigation. To complete quartets for the Time 2 (age 4) peer session, 2 additional boys and 5 additional girls were recruited; however, no data from these additional children were included in the analyses. These additional children were described by their mothers and/or preschool teachers as “sociable” and neither shy nor disruptive.

Procedures at Age 2, Time 1 (Sessions 1 and 2)

Session 1. Each toddler–mother dyad participated in an adapted version of the Behavioral Inhibition Paradigm (e.g., Garcia Coll, Kagan, & Reznick, 1984; Kochanska, 1991). After entering an unfamiliar room, each child was allowed to play with an assortment of attractive toys for 10 min while his or her mother sat in a large chair and filled out a questionnaire (Free Play 1). Then an experimenter, whom the child had already met, entered with a basket, asked the child to tidy up the toys, and left (cleanup); afterward, the experimenter removed the toys. An unfamiliar woman entered the room with a toy dump truck and some blocks. She sat quietly for one minute, played with the truck for 1 min, then (if the toddler had not yet approached) encouraged the child to join her in play. After this third minute, she left and returned with a toy robot that moved, made noises, and emitted smoke. The experimenter did not say anything for 30 s, and then invited the child to play with the robot for 1 min. In her third visit to the room, the experimenter brought an inflatable tunnel that she encouraged the child to crawl through. After she left, a third woman dressed as a clown entered the room. The clown was silent for 30 s, then invited the child to approach for 1 min, then removed enough of her disguise for the child to realize that she was another experimenter that the child had met earlier. The mother and child were allowed another free-play period for 3 min (Free Play 2). Following this was a separation-stranger-reunion sequence, lasting up to 3 min. After a third and final free-play session lasting 6 min (Free Play 3), the mother and child were brought a snack.
Identifying children for Session 2 pairings. For the second laboratory visit, the procedures were identical to those described in Rubin et al. (1997), in which two toddler–mother dyads were in the room. Same-sex toddlers were paired based on their inhibition-related behavior during the first visit. “Wary” toddlers were identified as those who did not approach the truck, robot, or tunnel; “average” toddlers approached one or two of these three objects; and “not wary” toddlers approached all three objects. Each toddler was paired with an average toddler for the second session, such that pairings were comprised of wary–average, average–average, or not wary–average children.

Session 2. For the second visit, a large unfamiliar room was divided in half by a large two-sided bookcase that extended across two thirds of the room’s width. The first mother–toddler dyad was brought into the room and led to the far side of the bookshelf where there were six toys and a large and small chair; the mother was asked to sit in the large chair. Then, the second dyad was brought to the near side of the shelves where there were six similar but not identical toys and two chairs; again, the mother sat in the large chair. Two closed-circuit TV cameras with a split-screen monitor filmed the dyads. During the first episode (10 min) toddlers were allowed to play with the toys and wander freely, but their mothers were asked to remain seated. Then, two experimenters entered the room, moved the barrier against one wall, and placed all toys in the middle of the room for the second episode of free play (25 min). Mothers were asked to remain seated for the first 5 min of free play, and then were free to move around the room. Following Episode 2, a low table was brought into the room, onto which was placed juice and cookies for the toddlers, and juice, coffee, and tea for the mothers (snack time, 15 min). The two large chairs were placed at either end of the table, and the two small chairs were placed beside each other facing the wall. Participants were told that it was snack time, but mothers were not instructed to keep their children seated at the table.

Measures at Age 2, Time 1

Session 1. Traditional inhibition comprised the aggregate of the amount of time each toddler spent in physical contact with his or her mother in the first and second free-play episodes; the toddler’s maintenance of contact with mother in the truck, robot, and tunnel episodes; and latency to approach the stranger and/or touch the truck and robot, and latency to pass through the tunnel (all of which required approaching the stranger within touching distance). Virtually no children spontaneously approached the clown either prior to or following an invitation to approach; therefore, because of low response variability, the clown episode was dropped from further analysis. Each of the aforementioned scores was standardized via \( Z \) transformations and then aggregated. Reliability was computed for 10% of the sample using percent agreement given that all measures were based on recordings of time. The average intercoder reliability for the inhibition behaviors was 89.8%, ranging from 80% (contact with mother in first free play) to 100% (contact with mother and latency for tunnel episode).

Session 2. Using the Toddler Play Observation Scale (Rubin & Stewart, 1994), coding involved 10-s time sample observations of the particular play forms (unoccupied, onlooking, solitary, and parallel behaviors; imitative play; conversations with peers; rough and tumble play; and interactions with adults), affect, and proximity to and contact with the playmate and mother as displayed by each toddler. The frequencies of anxious and aggressive behaviors were also recorded. The following data points were obtained from each of the first two episodes: toddler’s maintenance of contact with his or her own mother, time spent engaged in unoccupied behavior (inactive and unfocused, not including time spent actively watching the other peer), and frequency of anxious behaviors (e.g., finger pulling, thumb sucking, and hair twisting). These were normalized via \( Z \) transformations and aggregated to form an index of peer–social inhibition. Coders for Session 2 were not involved in the coding of Session 1, and were blind to the toddlers’ group categorizations (wary, average, or not wary). Reliability was computed for 10% of the sample using \( \kappa \) coefficients for the time-sampled data and percent agreement for the frequency counts of anxious behavior. Kappa coefficients for play behaviors (including unoccupied behavior) and the contact variables were .92 and .99, respectively; percent agreement for the presence or absence of anxious behaviors was 82%.

Maternal behavior at child age 2 years. As in Rubin et al. (1997), observations were made of each mother’s behavior during the cleanup and free-play episodes of Session 1, as well as during the snack time, cleanup, and free-play episodes of Session 2. When the child was told it was cleanup time and asked to put toys in a basket, mothers were told to do whatever they normally do at home (to get the child to clean up toys). During Session 1 cleanup, mothers received a score of 1 if they did not participate in the exercise; 2, if they did less than one half the cleanup relative to the child; 3, if the mother and child completed equal amounts; 4, if the mother did most of the cleaning up; and 5, if she did all the cleaning up for the child. The higher the score, the more solicitous the mother appeared to be.
For each Session 1 free-play period, mothers were coded on whether they used physical affection (e.g., kissing and hugging; yes = 1; no = 0), with a maximum score of 3. In addition, mothers were coded on whether or not they scolded the child during free play (a “yes” for each free-play episode), with a maximum score of 3.

During the snack time, cleanup, and free-play episodes of Session 2, mothers’ displays of unsolicited interventions toward their children were recorded using time-sampling procedures. An unsolicited intervention was defined by mother’s interruption of her child’s independent or social behavior with the apparent goal of assisting the child, despite lack of evidence that the child was experiencing difficulty, distress, or was requesting maternal intervention. For every minute, mothers were coded as using such behavior never, once, or more than once. Further, during Session 2, mother’s derogatory statements or derisive comments about her child to the other mother (in full earshot of her own child) were coded (e.g., “Don’t be such a baby”; “Don’t be like that, she just wants to play with you”). Within each of the free-play, cleanup, and snack-time episodes, mother’s derisive comments were coded as 1 = an absence of negative comments during the episode; 2 = a single instance of a negative comment; and 3 = multiple instances of negative, derogatory comments.

Lastly, as in Rubin et al. (1997), during each minute of Session 2 snack time, mothers’ positive affect was recorded as absent, moderate (positive tone of voice, mild praise, smiling, laughing), or high (physical affection—strong praise or verbal affection, e.g., “You’re so great! Mommy loves you!”).

The Session 2 coders for maternal behavior were neither involved in coding maternal behavior in Session 1 nor in coding toddler behavior in Sessions 1 and 2. The same coders recorded maternal and toddler behavior in Session 1; however, they were blind to all hypotheses of this investigation. Session 1 interrater reliability based on 10% of the sample was 82% for the cleanup episode; and 90% and 91% for scolding and physical affection, respectively, during the free-play period. Kappa coefficients for the time-sampled Session 2 positive affect, unsolicited intervention, and negative comments were .79, .86, and 1.00, respectively.

Composites were made of the aforementioned variables to yield two indices of maternal behavior typically included in the construct of psychological control: (1) intrusive, overprotective control; and (2) derisive comments. Intrusive, overprotective control comprised the mother’s restriction of independent activity (doing the majority of cleaning up for her child, unsolicited interventions) and other enmeshment with her child (high amounts of physical affection during snack time, kissing or hugging child during free play). These variables were standardized via Z-score transformation and aggregated. Scolding her child and making negative derogatory comments about her child were likewise aggregated to form a measure of derisive comments.

Procedures at Age 4 (Time 2)

Four same-sex children, unknown to each other and approximately the same age (within 6 months of each other), were scheduled to arrive at the laboratory at the same time. In keeping with standard procedures followed by Fox and colleagues (e.g., 2001) to assess the stability of behavioral inhibition, children were selected based on their observed behavioral inhibition at age 24 months. Each group consisted of one previously inhibited, one previously noninhibited, and two average children. The quartet entered a playroom with several age-appropriate toys and was videotaped through a one-way mirror. Each visit comprised five episodes: (1) unstructured Free Play 1 (15 min), (2) a cleanup task (5 min), (3) “show-and-tell” speeches (10 min); (4) ticket-sorting task (10 min), and (5) unstructured Free Play 2 (15 min).

During the first free play session, each group of four children was left alone in the playroom. After 15 min had elapsed, a female research assistant entered the room and told the children that the play period was over and that it was time to clean up. Children were asked to place all the toys in a large cardboard box. After cleanup, the research assistant asked children to sit in a circle and each child, individually and in turn, was asked to stand up and tell everyone about his or her last birthday party, “like show-and-tell in school.” The research assistant encouraged the children to speak; if and when necessary, children received verbal prompts during their speeches (e.g. “What else did you do?”). Next children were asked to sit at a small table and “help out” the researcher by sorting several colored tickets into packets. Each child was asked to make 10 packets, each of which contained one blue, red, yellow, and green ticket. Subsequently, children were left alone again for a second free-play session with the original toys.

Measures at Age 4 Years

Free play. For the first and second free-play sessions, four independent observers coded behaviors using the Play Observation Scale (Rubin, 1989). Ten-second intervals were coded for social participation (unoccupied, onlooking, solitary play, parallel play,
conversation, and group play) and the cognitive quality of play (functional, dramatic, and constructive play; exploration; games with rules). Approximately 90 coding intervals per child were obtained in each free-play session. Interrater reliability on 12 randomly selected children totalling 90 minutes of free play was calculated using Cohen's \( \kappa \), overall \( \kappa = .74 \). Intercoder disagreements were resolved by review and discussion.

**Cleanup and ticket-sorting sessions.** During the cleanup and ticket-sorting sessions, the proportion of time each child spent on-task (i.e., actually cleaning up or sorting tickets) was recorded. Off-task unoccupied behaviors were coded if the child was off task, inactive, and not engaging in any other activities (e.g., not searching for toys to put away, not picking up toys, not placing toys in toy box). Examples of off-task behaviors in the ticket-sorting task were picking up and placing tickets in various piles or talking about the task at hand (e.g., “I just finished one pile”). Time spent off task but engaged in another type of alternate activity (e.g., goofing off, continuing to play with toys, disrupting others who were trying to clean up or sort tickets) was coded as off-task goofing off. Unoccupied behavior was defined as in the free-play sessions.

**Speeches.** The speeches were coded for (1) duration of the entire speech episode, and (2) percentage of time each child actually spent speaking. Duration of the episode was defined as the amount of time that each child “held the floor” from the moment he or she was asked to speak until the researcher asked the next child to speak. Each child was asked “Do you have anything else you would like to tell us?” before the next child spoke. The percentage of time spent talking was calculated by dividing the amount of real time during which each child verbally described his or her birthday party by the duration of the speech episode.

**Aggregate variables.** Reticent behavior was computed by summing the proportion of coding intervals spent in unoccupied and/or onlooking behaviors during two free-play sessions plus hesitancy during speech episode (inverse of time spent talking) and off-task unoccupied behaviors during cleanup and ticket sorting. This reticence aggregate, which is theoretically derived and empirically substantiated (Coplan et al., 1994; Fox et al., 1996), is thought to represent poor performance due to social wariness and anxiety. Solitary–passive behavior was computed by summing the proportion of time spent in solitary–exploratory or solitary–constructive play. To compute solitary–active behavior, the proportion of coding intervals spent in solitary–functional or solitary–dramatic play was summed. The latter variables were standardized across subjects and summed to compute aggregates. Z scores for the speech variable (episode duration and proportion of time actually speaking) were reversed so that high scores on all variables reflected poor performance.

**Maternal reports.** Mothers completed the Child Behavior Checklist (CBCL; Achenbach & Edelbrock, 1981) in which parents use a 3-point scale to rate how descriptive 113 behavior problems are of their own child. The broadband factor of internalizing problems was used in the present study.

## RESULTS

**Overview of Analytic Aims**

Analyses were used to address the following aims. First, as in Rubin et al. (1997), the association between different types of inhibition was presented to assess the degree of independence among traditional inhibition and peer–social inhibition. Second, concurrent correlations among the outcome measures of nonsocial behaviors and psychological functioning were used to assess the degree of independence among the subtypes of withdrawal and degree of independence among these subtypes and internalizing problems. Third, a series of hierarchical regression analyses was conducted to examine hypotheses about (1) the additive and differential contributions of inhibition types (i.e., traditional, peer–social) to solitary–passive behaviors, solitary–active behaviors, the observed reticence composite (unoccupied/onlooker behaviors plus speech reticence and off-task behaviors), and internalizing problems; and (2) the additive or moderated contributions of maternal intrusiveness and derisive comments to solitary–passive withdrawal, solitary–active withdrawal, reticence, and internalizing problems. Means and SDs for nonstandardized child behaviors and parenting behaviors are shown in Table 1.

**Associations among Inhibition Types, Parenting, and Social–Behavioral Outcomes at Each Time of Measurement**

Correlations among the toddler temperament and maternal behavior predictors (i.e., traditional inhibition, peer–social inhibition, maternal intrusiveness, and derisive comments) and preschool outcome criteria (i.e., solitary–passive withdrawal, solitary–active withdrawal, reticence, internalizing difficulties) are shown by domain and assessment occasion in Table 2. Observed reticence as measured by onlooker plus unoccupied behaviors was strongly correlated with observed social wariness as measured by the aggregate of speech hesitancy plus off-task behaviors during
ticket sorting and cleanup, \( r = .71, p < .001 \); therefore, a composite variable of overall reticence was used for the analyses presented in Tables 2 and 3.

The correlations obtained were generally consistent with the hypotheses for each measure: (1) types of toddler inhibition (traditional versus peer–social), and the paradigms used to assess these types, are useful as separate constructs—the correlation between the two was low, albeit significant, and shared variance between traditional inhibition and peer inhibition was less than 8%; (2) both forms of toddler inhibition were positively correlated with the 4-year reticence aggregate; (3) differentiation (distinction) between types of withdrawn behavior was obtained, as solitary–passive behavior and solitary–active behavior were independent of each other; and solitary–passive behavior was significantly and negatively associated with the reticence aggregate; and (4) internalizing problems were moderately and significantly associated with the observed reticence composite as well as with both forms of toddler inhibition.

Do Inhibition Types and/or Maternal Behaviors Predict Withdrawn Behaviors and Internalizing Problems?

The hierarchical regressions calculated to examine these objectives were structured as follows. A separate analysis was calculated for each adjustment criterion, and in these analyses, variables were entered in the following order: Inhibition Z scores for traditional and peer inhibition in the first step as a block; maternal behavior scores for intrusiveness and derisiveness in the second step as a block; and lastly, the four Inhibition \( \times \) Maternal Behavior interaction terms as a block (see Table 3). In an initial analysis, child gender had been entered in the first step, but this variable was subsequently removed because it bore no relation to any outcome variable except for solitary–active behavior (males engaged in more solitary–active play at age 4). For each of the analyses, statistics are provided.

<table>
<thead>
<tr>
<th>Table 1 Unstandardized Means and Standard Deviations for the Child Behavior and Parenting Behavior Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M</strong></td>
</tr>
<tr>
<td><strong>Child behaviors</strong></td>
</tr>
<tr>
<td>Solitary–passive</td>
</tr>
<tr>
<td>Solitary–active</td>
</tr>
<tr>
<td>Reticence</td>
</tr>
<tr>
<td>Internalizing</td>
</tr>
<tr>
<td><strong>Parenting behaviors</strong></td>
</tr>
<tr>
<td>Intrusive control</td>
</tr>
<tr>
<td>Unsolicited intervention</td>
</tr>
<tr>
<td>Physical affection (free play)</td>
</tr>
<tr>
<td>Affection (snack time)</td>
</tr>
<tr>
<td>Cleaning up for child</td>
</tr>
<tr>
<td>Derisiveness</td>
</tr>
<tr>
<td>Derogatory comments</td>
</tr>
<tr>
<td>Scolding child</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2 Correlations between Inhibition Types and Parenting at Age 2 and Social–Behavioral Adjustment at Age 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Predictors at Time 1: Age 2</strong></td>
</tr>
<tr>
<td><strong>Inhibition type</strong></td>
</tr>
<tr>
<td>1. Traditional</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>2. Peer–social</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td><strong>Parenting</strong></td>
</tr>
<tr>
<td>3. Maternal intrusiveness</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>4. Maternal Derisiveness</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td><strong>Outcomes at Time 2: Age 4</strong></td>
</tr>
<tr>
<td>5. Solitary–passive</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>6. Solitary–active</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>7. Reticence</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>8. Internalizing problems</td>
</tr>
<tr>
<td>N</td>
</tr>
</tbody>
</table>

* \( p < .05 \); ** \( p < .01 \) (one-tailed).
Table 3  Regression Analyses Predicting Withdrawn Behaviors and Internalizing Problems at Age 4 from Inhibition Type and Maternal Behavior at Age 2

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Solitary–Passive</th>
<th>Solitary–Active</th>
<th>Reticence</th>
<th>Internalizing Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhibition</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traditional</td>
<td>.06 .06</td>
<td>.06 .06</td>
<td>.10 .10*</td>
<td>.06 .06</td>
</tr>
<tr>
<td>Peer</td>
<td>−.18</td>
<td>−.13</td>
<td>.20</td>
<td>.18</td>
</tr>
<tr>
<td>Maternal behavior</td>
<td>.11 .05</td>
<td>.07 .01</td>
<td>.11 .01</td>
<td>.11 .05</td>
</tr>
<tr>
<td>Intrusive</td>
<td>−.10</td>
<td>−.03</td>
<td>.07</td>
<td>.13</td>
</tr>
<tr>
<td>Derisive</td>
<td>.19</td>
<td>−.08</td>
<td>.07</td>
<td>.22</td>
</tr>
<tr>
<td>Inhibition × Maternal Behavior</td>
<td>.21* .10</td>
<td>.08 .010</td>
<td>.25** .14*</td>
<td>.18 .07</td>
</tr>
<tr>
<td>Traditional × Intrusive</td>
<td>.01</td>
<td>.01</td>
<td>−.04</td>
<td></td>
</tr>
<tr>
<td>Traditional × Derisive</td>
<td>−.01</td>
<td>−.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer × Intrusive</td>
<td>−.05**</td>
<td>.29**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer × Derisive</td>
<td>−.04</td>
<td>.25**</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Reticence was a composite variable of unoccupied and onlooker behaviors across two free-play sessions plus speech hesitancy and off-task behaviors during ticket sorting and cleanup.

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

that reflect the efficacy of individual predictors relative to other predictors entered on prior steps (ΔR²), and relative to other predictors at each step (β).

The results for these analyses revealed nonsignificant overall regression equations for the outcome criteria of solitary-active behavior, overall F(8, 77) = .79, ns, and internalizing problems, F(8, 63) = 1.77, ns. Solitary-passive behavior, F(8, 77) = 2.53, p < .05, however, was predicted only by the interaction of toddlers’ peer inhibition and maternal behavior (both intrusion/overprotection and derision). Analysis of the interaction between peer inhibition and intrusive/overprotective parenting, based on a tertile split of maternal behavior scores, revealed that for the high intrusive/overprotective group, toddlers’ peer–social inhibition was negatively correlated with age 4 solitary–passive behavior, r = −.66, p < .001, n = 27; but not for the low intrusive/overprotective group, r = .19, ns, and for the moderately intrusive/overprotective group, r = −.06, ns. Due to a restricted range on the maternal derisive comments scores, only two groups could be created—a derisive group that consisted of mothers who made one or more derisive comments (n = 28) and a nonderisive group that consisted of mothers who made no derisive comments (n = 60). For the derisive group, toddlers’ peer inhibition was negatively correlated with solitary–passive behavior at age 4, r = −.31, p < .05; but for the nonderisive group, the correlation was nonsignificant, r = −.08, ns. Therefore, toddlers who were highly inhibited with peers and had intrusive or derisive mothers were less likely to engage in solitary constructive and exploratory behaviors as preschoolers.

The overall regression predicting reticence at age 4 accounted for a significant proportion of the variance, overall F(8, 77) = 3.15, p < .01. A significant change in the reticence aggregate was attributable to both inhibition types, β for traditional = .20 and β for peer = .19. Hence, the extent to which children were inhibited at age 2 predicted a higher level of reticence in unfamiliar nonsocial and social situations at age 4. After controlling for inhibition type and maternal behavior, two significant Peer Inhibition × Maternal Behavior interactions were obtained. Analysis of the interaction between peer inhibition and intrusive/overprotective parenting, based on a tertile split of mothers’ intrusion/overprotection scores, revealed that for the high intrusive/overprotective group, toddlers’ peer inhibition was positively correlated with reticence, r = .67, p < .001, n = 27; but this correlation was nonsignificant for children whose mothers were low intrusive/overprotective, r = .05, ns, and moderately intrusive/overprotective, r = .09, ns. Analysis of the interaction between peer inhibition and derisiveness showed that for the derisive group, toddler peer inhibition was positively correlated with reticence, r = .38, p < .05, n = 28. This correlation was nonsignificant for the nonderisive group, r = .16, ns, n = 60. Thus, toddlers who had been inhibited with peers were likely to be highly reticent 2 years later only if their mothers had been intrusively controlling or derisive.
DISCUSSION

The first and most general purpose of this study was to examine whether behavioral inhibition at age 2 years was predictive of solitude and internalizing difficulties at age 4 years. The second purpose was to discover whether toddlers’ behavioral inhibition assessed in the traditional manner (Kagan et al., 1987, 1989) represented a weaker predictor of subsequently assessed reticence among preschool peers than did behavioral inhibition assessed in the peer context (Rubin et al., 1997). Third, this study explored whether parenting behaviors were predictive of age 4 characteristics, either directly or indirectly via the moderation of earlier inhibition.

With regard to the first and second objectives, results showed continuity from assessments of inhibition at 2 years to specific forms of socially wary behavior at 4 years. Although the correlations suggested that there was a significant but weak association between traditional inhibition and solitary–passive behaviors, the more conservative regressions showed that this association was not robust. Given that this form of solitude in which children quietly construct and explore objects has been found to be benign among preschoolers (Coplan et al., 1994; Rubin, 1982; Rubin, Coplan, Fox, & Calkins, 1995), this finding was not surprising. Similarly, neither traditional nor peer inhibition predicted solitary–active behavior among preschoolers, the form of solitude associated with preschoolers’ cognitive immaturity, impulsivity, and aggression (Coplan et al., 1994; Rubin, 1982).

Insofar as the prediction of socially wary reticent preschool behavior is concerned, the results proved significant in a number of ways. The preschool children who stood aside and watched their peers from afar (i.e., socially reticent; Coplan et al., 1994; Fox et al., 1995) when confronted by unfamiliar peers in a free-play situation, were those toddlers who refrained from interacting and approaching unfamiliar toddler peers as well as unfamiliar adults and objects. These data support previous findings concerning the stability of “traditionally” assessed inhibition from toddlerhood to the preschool period (e.g., Fox et al., 2001; Reznick et al., 1985), as well as extend the research to implicate social wariness during toddler peer interaction as a predictor of socially reticent behavior among preschoolers. Thus, when comparing findings of the subtypes of solitude, meaningful specificity was found in the stability of behavioral patterns. Early inhibition does not predict all forms of solitary behavior during the preschool years; rather, it appears to be linked to specific patterns of social responsiveness underlaid with anxiety. Further, note that the present study’s measure of reticence encompassed unoccupied and onlooking behaviors during free play as well as similar behavior during the cleanup and cooperative tasks, plus the reluctance to provide unfamiliar peers with a description of a recent event.

With respect to inhibited temperament and internalizing difficulties, the regression analyses did not support predictive associations between toddler inhibition and maternally rated problems of an internalizing nature. Although the predictive correlations between both forms of inhibition and internalizing problems were statistically significant (only very modestly), it may have been that a smaller sample size precluded obtaining hierarchical regression results similar to those for social reticence at age 4 (CBCL, N = 74; child observation, N = 88).

Thus far, few researchers have examined the role that early parenting may play in predicting retentive behavior in preschoolers. Studies of the association between parenting and preschoolers’ solitary behavior have been contemporaneous in nature (e.g., Mills & Rubin, 1998; Rubin, Cheah, & Fox, 2001). In the present investigation, constructs of maternal overcontrol comprising observed warmth and solicitousness along with inappropriate intrusiveness and control, and maternal desisiveness comprising scolding and public derision of children, were found to moderate the association between toddler inhibition and preschool reticence. If mothers behaved in either a psychologically controlling or a derivative manner, then toddler peer inhibition predicted social reticence. For mothers who were neither psychologically controlling nor derivative, there was no significant relation between toddler peer inhibition and social reticence.

There are also no other studies of the predictive associations between inhibited temperament (or lack thereof), maternal behavior when their children are age 2 years, and preschoolers’ production of benign forms of solitude (solitary–exploratory and solitary–constructive play, Coplan et al., 1994; Rubin, 1982). In the present study, the data revealed that neither traditional nor peer inhibition in toddlerhood predicted a benign form of solitude at age 4 years. Toddler inhibition among unfamiliar peers, however, was significantly and negatively predictive of benign solitude when mothers displayed intrusive or derivative parenting behaviors. It appears that inhibited toddlers remained on a stable track vis-à-vis their anxious—solitary behavioral profile when their mothers engaged in negative parenting, but displayed a more “healthy” form of solitude during early childhood when their mothers did not.

These two constructs—intrusive psychological con-
control and derisiveness—are similar to those that comprise the control and affective aspects of authoritarian parenting. In this regard, mothers undermine the development of competence and independence in vulnerable children by not allowing them adequate opportunity to practice and improve their skills (overcontrol); or mothers can implicitly or explicitly tell their young children that they are incompetent or behaving poorly (derision). These maternal behaviors may work hand-in-hand to chip away at children’s sense of self-regard, as well as their belief that a secure base is available from which they can safely explore the world.

The findings pertaining to parenting, and specifically to maternal behaviors, are important given that previous research on behavioral inhibition has focused almost exclusively on biologically based “ contributions” to childhood, adolescent, and adult social wariness, phobias, and anxieties (e.g., Fox et al., 1996; Kagan & Snidman, 1999; Merikangas, Avenevoli, Dierker, & Grillon, 1999; Schwartz, Snidman, & Kagan, 1999). One potential problem with this unidimensional focus on biology is that suggested interventions may also center on “cures” that are biological. As an example, despite the lack of strong longitudinal and developmental data, children’s social phobia is now being viewed as a derivative of behavioral inhibition (e.g., Beidel & Turner, 1999; Hayward, Killen, Kraemer, & Taylor, 1998). The interventions that are currently prescribed and widely advertised in the American media are prescription drugs, most notably those of the serotonin reuptake inhibitor variety. As this study has demonstrated, however, the “effects” of toddler inhibition can be moderated by maternal behavior.

Maternal behavior that is overly warm, unresponsive, intrusive, and derisive has been shown to moderate the contemporaneous relation between dispositional shyness and behavioral inhibition among toddlers (Rubin et al., 1997). Recently, it has been shown that a similar parenting style, as observed during parent–preschooler free-play time, moderates the contemporaneous association between emotion dysregulation and the demonstration of preschoolers’ reticent behavior among peers (Rubin et al., 2001); and herein, we have reported that maternal behavior moderates the predictive association between toddler peer inhibition and preschoolers’ cross-situational social reticence and wariness. In many ways, these data are consistent with those described by Kagan and Moss (1962) in their groundbreaking monograph Birth to Maturity. In that volume, Kagan and Moss reported that shyness and withdrawal in female adults were associated with mothers’ retrospective reports of protection of the children between birth and age 3 years. Other clinical, retrospective reports have also shown that socially reticent, shy, and wary adults viewed their parents as overprotective, intrusive, and more likely to use shame induction than did their normal counterparts (e.g., Arrindell, Emmelkamp, Monsma, & Brilman, 1983; Bruch & Heimberg, 1994). Taken together, the present study’s results and these retrospective reports suggest that further prospective, longitudinal research is necessary to examine whether maternal (and paternal; see Park et al., 1997) behavior can moderate the influence of toddler inhibition in predicting later childhood, adolescent, and adult outcomes. Perhaps more importantly, studies are needed that contrast drug-related interventions with parenting interventions for the treatment of psychological difficulties that “derive” from biologically based behavioral inhibition.

ACKNOWLEDGMENTS

The research reported in this manuscript was supported by a grant from the Social Sciences and Humanities Research Council of Canada to the first author. In addition, an Ontario Mental Health Foundation Senior Research Fellowship supported the first author. The authors are grateful to the children and mothers for their participation and to the following individuals who helped collect and code the data: Charissa Cheah, Lynne Fenton, Daniele Hermann, Kerri Hogg, Carolyn Krygsman, Loretta Lapa, Kelly Lemon, Jo-Anne McKinnon, Kevin McNichol, Amy Rubin, Alice Rushing, and Cherami Wischman.

ADDRESSES AND AFFILIATIONS

Corresponding author: Kenneth H. Rubin, University of Maryland, Center for Children, Relationships, and Culture, 3304 Benjamin Building, College Park, MD 20742-1131; e-mail: kr61@umail.umd.edu. Kim B. Burgess is also at the University of Maryland, College Park; Paul D. Hastings is at Concordia University, Montreal, Canada.

REFERENCES


Hollingshead, A. B. (1965). *Four Factor Index of Social Status*. Unpublished manuscript. Yale University, Department of Sociology.