

Early Childhood Behavioral Inhibition and Social and School Adjustment in Chinese Children: A 5-Year Longitudinal Study

Xinyin Chen

University of Western Ontario

Huichang Chen

Beijing Normal University

Dan Li

Shanghai Normal University

Li Wang

Peking University

This study examined relations between early behavioral inhibition and social and school outcomes in Chinese children ($N = 200$). Data on behavioral inhibition were collected from a sample of 2-year-olds in China. Follow-up data on social behaviors, peer relationships, and school performance were collected from multiple sources at 7 years of age. Behavioral inhibition was found to be positively associated with later cooperative behavior, peer liking, perceived social integration, positive school attitudes, and school competence, and negatively associated with later learning problems. Highly inhibited toddlers were generally better adjusted than others in social and school areas in middle childhood. The results indicate the distinct functional meaning of behavioral inhibition in Chinese children from a developmental perspective.

There are substantial individual differences in behavioral reactions to unfamiliar or challenging situations during infancy and toddlerhood (e.g., Asendorpf, 1991; Kagan, 1997; Rubin, Hastings, Stewart, Henderson, & Chen, 1997). Whereas some children are relaxed and spontaneous and display relatively little distress, others tend to be vigilant, anxious, and wary. The term *behavioral inhibition* has been used to characterize individual differences in this type of reaction (Fox, Henderson, Marshall, Nichols, & Ghera, 2005; Garcia-Coll, Kagan, & Reznick, 1984; Rubin et al., 1997). It has been argued that behavioral inhibition is a significant phenomenon in early childhood that plays an important role in the development of social, cognitive, and psychological functioning (Fox et al., 2005; Kagan, 1997). Empirically, it has been found in North America and Western Europe that behavioral inhibition is associated with, and predictive of,

socioemotional and school difficulties (e.g., Asendorpf, 1991; Asendorpf, Denissen, & van Aken, 2008; Coplan, Prakash, O'Neil, & Armer, 2004; Gest, 1997; Kagan, Reznick, Snidman, Gibbons, & Johnson, 1988; Rubin, Burgess, & Coplan, 2002). Moreover, when inhibited children realize their difficulties in social functioning, they may develop negative self-perceptions of their social competencies and other internalizing problems such as depression (e.g., Caspi, Moffitt, Newman, & Silva, 1996; Caspi et al., 2003; Coplan et al., 2004; Gest, 1997; Schwartz, Snidman, & Kagan, 1999), although the findings are sometimes inconsistent with each other (e.g., Asendorpf & van Aken, 1994).

Behavioral patterns reflecting the construct of inhibition in unfamiliar or challenging situations have been found in many societies such as China, Germany, Italy, Japan, and Sweden (e.g., Asendorpf, 1991; Broberg, Lamb, & Hwang, 1990; Wang, Chen, & Chen, 2002, 2003; Zappulla & Lo Coco, 2003). What is less clear is the functional meaning that inhibition carries with it in different contexts, especially from a developmental perspective. In a study concerning toddlerhood inhibition in novel social situations, Chen et al. (1998) found that children's inhibited behavior was associated

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Correspondence concerning this article should be addressed to Xinyin Chen, Department of Psychology, University of Western Ontario, London, ON, Canada N6A 5C2, or to Huichang Chen, Institute of Developmental Psychology, Beijing Normal University, Beijing, China. Electronic mail may be sent to xchen@uwo.ca or to chen47hc@yahoo.com.cn.

with different maternal childrearing attitudes in Canada and China. Whereas this behavior was associated with maternal rejection and punishment orientation in Canadian children, it was associated with mothers' positive attitudes such as warmth, support, and acceptance in Chinese children. The different parental attitudes may constitute distinct social environments in which inhibited children develop. Thus, it seems reasonable to argue that behavioral inhibition may be associated with developmental outcomes in Chinese children that are different from those found in Western children. Unfortunately, there is little longitudinal research into behavioral inhibition and, as a result, the developmental outcomes of inhibition in non-Western societies, including China, are largely unknown. Therefore, in the present study, we sought to examine, in a sample of Chinese children, how behavioral inhibition in toddlerhood predicted social and school adjustment in middle childhood.

Behavioral Inhibition and Social and School Adjustment

The adjustment difficulties that inhibited children experience in the West may be related to the emphasis on social assertiveness and self-expression in human development (e.g., Oyserman, Coon, & Kimmelmeier, 2002; Rubin et al., 2002). Acquiring autonomy and assertive social skills is an important socialization goal in Western societies (Greenfield, Suzuki, & Rothstein-Fisch, 2006). Behavioral inhibition, which indicates anxiety and lack of confidence in expressing one's self, is inconsistent with this socialization goal. Social evaluations of children's behaviors may depend, in part, on specific personal and contextual characteristics (e.g., Maccoby, 1998), which may account for some mixed results in the previous studies concerning relations between inhibition and adjustment such as social self-esteem (e.g., Asendorpf & van Aken, 1994; Gest, 1997). It is the case, however, that during development, children in Western societies are generally expected and socialized to be increasingly assertive rather than reserved and inhibited (e.g., Maccoby & Martin, 1983). Inhibition is considered socially immature, incompetent, and "toxic" (Pennebaker, 1993; Rubin & Asendorpf, 1993). As a result, the behaviors that inhibited children display are often responded to by peers and adults with negative emotions and actions, which in turn may facilitate the development of social and psychological problems in inhibited children (e.g., Coplan et al., 2004; Mills & Rubin, 1993).

Achieving and maintaining social order and interpersonal harmony are the primary concern in traditional and contemporary Chinese societies. Accordingly, individuals are encouraged to restrain personal desires for the benefits of the group. In Confucian and Taoist philosophies, for example, behavioral wariness, cautiousness, and self-restraint are considered indications of social maturity, accomplishment, and mastery (King & Bond, 1985; Liang, 1987). The expression of individual desires or striving for autonomous behaviors is sometimes viewed as selfish and socially unacceptable (Ho, 1986). This general background may have an impact on the development of inhibited behavior. In the literature (e.g., Coplan & Armer, 2007; Rubin & Asendorpf, 1993; Stevenson-Hinde & Shouldice, 1993), behavioral inhibition is conceptually and empirically linked to shy-sensitive behavior in middle and late childhood and adolescence. Inhibition and shyness-sensitivity both tap individual reactivity to stressful or challenging situations, with the former focusing on the dispositional characteristic in early childhood to be wary and fearful when encountering unfamiliar social or nonsocial situations and the latter focusing on the anxious response to social novelty or perceived social evaluation (Coplan & Armer, 2007; Rubin et al., 2002). It has been found that shyness-sensitivity, as assessed by peer evaluations, is associated with positive adjustment outcomes in Chinese children (e.g., Chen, Rubin, & Li, 1995). Specifically, unlike their counterparts in North America, shy and sensitive children and adolescents in China are accepted by peers, rated as competent by teachers, and are well adjusted to the environment (e.g., Chen, Rubin, & Sun, 1992). Moreover, shy and sensitive Chinese children perform competently in social, school, and psychological areas in adolescence (Chen, Rubin, Li, & Li, 1999). The results suggest that Chinese cultural norms and values may be involved in determining the developmental significance of socioemotional characteristics such as reactivity to stressful situations.

In the present study, we were interested in how toddlerhood inhibition would predict later social behaviors, peer experience, and school adjustment in Chinese children. Concerning the relations between inhibition and social behaviors, it has been argued that the internal anxiety that inhibited children experience may impede the development of active and altruistic responses to situations in which someone is in distress or need (Hastings, Rubin, & DeRose, 2005). Nevertheless, inhibited children may learn cooperative, polite, and

compliant behaviors that require relatively lower levels of social initiative, particularly in an environment where inhibited children receive social support (Chen & French, 2008). For example, vigilant, reticent, and anxious behaviors that inhibited children display in social situations (e.g., Rubin et al., 2002; Zheng, Chen, & Chen, 2005) may be perceived by others as appropriate or even desirable in China, indicating cautiousness, courteousness, and a signal of looking for social engagement (Chen, DeSouza, Chen, & Wang, 2006). Consequently, peers and adults may respond positively by encouraging and supporting inhibited children in social interactions (Chen, Wang, & DeSouza, 2006). Participating in social activities may provide opportunities for inhibited children to learn social norms and cooperative, rule-abiding behaviors. At the same time, social support and encouragement are conducive to the development of positive attitudes about themselves and others, which may help inhibited children maintain their cooperative and polite behaviors and control their impulsive and disruptive behaviors in interactions (e.g., Rubin et al., 2002). Therefore, we expected in this study that behavioral inhibition would be positively associated with cooperative behaviors and negatively associated with antagonistic behaviors.

In addition to social behaviors, we were interested in how behavioral inhibition was associated with later social and school adjustment. The endorsement of wary and anxious behaviors in China is likely to help inhibited children establish group affiliation and integration (Chen, DeSouza, et al., 2006; Chen, Wang, et al., 2006). This environment may also inspire inhibited children to display their competence in the school and to obtain social acceptance and approval. Thus, we expected that early inhibition would be positively associated with peer belongingness and social status in Chinese children. Further, the favorable social experiences that inhibited children obtain in the school would contribute to the development of positive school attitudes and achievement motivation. Therefore, behavioral inhibition might positively predict later school achievement and negatively predict later learning problems.

Researchers have not found consistent gender differences in the prevalence of behavioral inhibition in childhood (e.g., Chen et al., 1998; Rubin et al., 2002). However, some evidence suggests that in China and some other countries, inhibited behavior tends to be viewed as more negative and less acceptable in boys than in girls by adults and peers (Caspi, Elder, & Bem, 1988; Chen et al., 1995;

Gest, 1997; Stevenson-Hinde & Hinde, 1986). This may be related to gender-stereotypical ideologies. In many societies, boys often receive greater pressure to become autonomous and assertive during socialization (Chen, Kaspar, Zhang, Wang, & Zheng, 2004; Maccoby, 1998; Rubin et al., 2002). Therefore, we expected in this study that behavioral inhibition would be associated with less positive developmental outcomes in boys than in girls.

Outline of the Present Study

The purpose of the study was to examine relations between early inhibition and social and school adjustment in Chinese children. A sample of children, initially at 2 years of age, participated in the longitudinal project. Behavioral inhibition in toddlerhood was assessed in the laboratory situation using an inhibition paradigm (e.g., Kagan et al., 1988). Follow-up data were collected 5 years later when the children were 7 years old. Children in China enter elementary school at 6 years of age and start to engage in extensive social interactions with peers in the school. At the same time, because academic achievement is highly emphasized, it is important for school-age children to develop positive school attitudes and perform competently on schoolwork (e.g., Chen, Rubin, & Li, 1997; Stevenson, Chen, & Lee, 1993). In the follow-up study, we assessed children's cooperative and antagonistic behaviors in peer interaction, which are regarded as important in evaluating children's social functioning in Chinese schools (e.g., Chen et al., 1995; Ho, 1986), and different aspects of social and school performance including peer liking, social affiliation and integration, and school attitudes and achievement.

We expected that early inhibition would be positively associated with cooperative behavior, peer integration and social status, positive school attitudes, and school competence. We also expected that inhibition would negatively predict antagonistic behavior and school problems. We believe that the study would help understand the developmental significance of behavioral inhibition in the Chinese context.

Method

Participants

The participants in the original study included 247 children (119 boys and 128 girls) in Beijing and

Shanghai, China. The mean age of the children was 24.42 months ($SD = 2.16$). The participants were randomly selected through local birth registration offices. In the sample, 33% of the mothers and 32% of the fathers had an educational level of high school or below high school, 41% of the mothers and 29% of the fathers had an education of community college or professional training school, and the others had an education of university undergraduate or graduate. Seventeen percent of the mothers and 23% of the fathers were nonprofessional workers such as laborers, cooks, and salespersons; 42% of the mothers and 49% of the fathers were secretaries, company staff members, nurses, or other workers with certain vocational training background; and 40% of the mothers and 27% of the fathers were professionals such as teachers, doctors, engineers, and experts in financial and other areas. Four mothers and three fathers were unemployed. Due to the "one-child-per-family" policy that was implemented in the late 1970s, 96% of the toddlers were only children; the only-child phenomenon has been an integral part of the family and sociocultural background for child development in contemporary China. Preliminary analyses indicated no significant effects of the demographic variables in this study. The randomly selected sample was representative of the urban population of children in China.

The follow-up data were collected 5 years later when the children were 7 years. From the original sample, 200 children (86 boys and 114 girls) participated in the follow-up study; the others did not participate in the study mainly because they moved to different places. The children attended different schools in the cities during the follow-up study. Nonsignificant differences were found on the demographic and other variables of interest in the original study between children who participated in the follow-up study and those who did not.

Procedure

In the original study, mothers and toddlers were invited to visit the university laboratory within 3 months of each toddler's second birthday. During the visit, each toddler-mother dyad experienced an adapted version of the Behavioral Inhibition Paradigm (e.g., Chen et al., 1998; Garcia-Coll et al., 1984; Rubin et al., 1997). First, after each dyad entered an unfamiliar room, the child was allowed to play with an assortment of attractive toys for 10 min while the mother sat in a chair and filled out a questionnaire (free play). Then, after a clean-up session, an unfamiliar woman entered the room

with a toy dump truck and some blocks. She sat quietly for 1 min, played with the truck for 1 min, then (if the toddler had not yet approached), encouraged the child to join her in play. In the next session, the adult brought a toy robot that was black, moving, "smoking," and making noises. She was silent for 30 s, and then invited the child to play with the robot for 1 min. The child continued to experience other sessions assessing different abilities and behaviors such as reactions to frustration. The data from these sessions were not included in the present study.

In the follow-up study, the children were invited to the university laboratory in quartets, with their parents (mostly mothers). Quartets were composed of children of the same sex and within 6 months of each other in age. After a brief introduction to each other, each quartet spent the first 15 min in a free-play session, followed by a few other sessions including a second 15-min free-play session. The two free-play sessions were used to assess children's social behaviors in this study. Social behaviors in the unfamiliar laboratory situations have been found to be associated with social behaviors in naturalistic settings such as the school (e.g., Li, Cui, Cen, Zhou, & Chen, 2004; Wang, Chen, Chen, Cui, & Li, 2006). After the observational sessions, the children were interviewed individually about peer liking, school attitudes, and perceived social affiliation and integration. In addition, teachers of the children were contacted and asked to complete a rating scale concerning each child's school-related competence and learning problems. The procedure and measures have proved to be valid and appropriate in Chinese children (e.g., Chen et al., 1995; Chen et al., 1998; Wang et al., 2006).

The administration of the sessions was conducted by the authors, as well as by graduate and senior undergraduate students in China. Written consent was obtained from parents of all participants. All laboratory sessions were videotaped through a one-way mirror. The data were coded by students in the psychology department of a Canadian university who were fluent in both Chinese and English and trained rigorously following the same procedure. Behavioral inhibition in toddlerhood and social behaviors in middle childhood were coded by different coders, each blind to the coding of the other data.

Inhibition Coding at 2 Years

Following procedures described by Garcia-Coll et al. (1984) and Rubin et al. (1997), behavioral

inhibition was coded based on (a) duration of the child's physical contact with the mother in the free play, (b) duration of physical contact with the mother in truck and robot episodes, (c) latency to approach the stranger, and (d) latency to touch the toys. Specific coding and scoring systems are described in Chen et al. (1998).

Reliability was computed for 10% of the sample as suggested by other authors (e.g., Garcia-Coll et al., 1984). The intercoder reliability for the inhibited behaviors (dividing the amount of time of agreement by the total amount of time of agreement and disagreement in seconds) was 96%, ranging from 93% (contact with mother in the robot episode) to 100% (contact with mother in free play; see Chen et al., 1998). The procedure has been used and proved to be valid in North America and other countries such as China, Korea, and Italy (e.g., Rubin et al., 2006; Wang et al., 2002). Following the instruction described by Rubin et al. (1997), the inhibition scores were standardized and aggregated and then used in the analyses.

Behavior Coding and Measures at 7 Years

Social behavior coding. Children's social behaviors, including cooperative and antagonistic behaviors, were coded using an event-sampling coding scheme (e.g., Chen, Wu, Chen, Wang, & Cen, 2001; Wang et al., 2006), based on peer interactions in free-play sessions in the follow-up study. The coders watched the free-play sessions on the videotape. When a cooperative or antagonistic behavior was identified, the coders stopped the videotape and recorded the behavior on the recording sheet. The coders then continued to watch the videotape until one of the behaviors was identified again. *Cooperative* behaviors included cooperating (verbally or nonverbally agreeing to help, share, or play upon request of another child; e.g., giving a toy to another child after he asks if he can use it), polite acts (after a behavior, making a polite response; e.g., saying "thank you" after receiving help, saying "sorry" after accidentally knocking over another child's castle), and friendly comments and behaviors (compliments to another child or positive comments; e.g., "I like your picture!" "Your shirt is really cool"). *Antagonistic* behaviors included aggressive, disruptive, and rejecting behaviors. Aggressive and disruptive behaviors were coded when a child displayed verbal (negative comments, arguing, and verbal attack toward other children; e.g., "You are stupid") or physical (expressions of displeasure, anger, and disapproval through physi-

cal means including hitting, pushing, kicking, grabbing toys, etc.) behaviors that might hurt another child or children or disturb the activity of others. Rejecting behaviors included refusing to share or comply (negative responses to the request or suggestion of another child; e.g., Child A asks Child B if he can use the doll that B is playing with, B says, "No"; Child A asks Child B, "Do you want to play?" Child B responds, "No") and exclusion (not allowing another child to be involved in a group activity). The original coding scheme also included more active prosocial behaviors (e.g., comforting, voluntary helping), which were deleted because of their generally low occurrence in the study. Frequency scores of social behaviors were computed and used in the study. Interrater agreement (Cohen's *k*), based on 10% of the sample, was .86 and .92 for cooperative and antagonistic behaviors, respectively.

The assessment of peer liking. After the observation paradigm at 7 years, each participant was interviewed individually in the laboratory. Following the procedure outlined by Rubin, Lynch, Coplan, Rose-Krasnor, and Booth (1994), the participant was asked during the interview to rate, on a 5-point scale (1 = *not at all*, 5 = *a whole lot*), each of the 3 children with whom he or she had played. The rated item was "How much did you like to play with _____?" The average score of ratings received from all children was computed and used as an index of peer liking, with higher scores indicating greater peer liking.

Self-perceptions of social integration. A measure of perceived social integration, based on Harter (1985) and Cassidy and Asher (1992), was administered to the children during the individual interviews. The seven items (e.g., "Do you have a lot of kids to play with at school?" "Do you get along with other kids in school?") tapped children's social experience with peers in the school. Children's responses were scored 1–4 (1 = *no, not at all*, 4 = *yes, very much/always*). Before the measure was administered, children were provided detailed explanations about the task and trained on how to respond to the questions. When it was clear that children understood the task, the researcher read aloud each item and recorded the responses. Factor analysis showed that the items indicated a single factor representing children's perceived social affiliation and integration. Previous research has indicated that self-perceptions of social integration are associated with peer social competence as assessed by others such as peers and teachers (e.g., Chen, He, Li, & Li, 2004; Chen et al., 1999). Internal reliability was .71 in this

study. The average score of the responses was computed and used in the analysis, with higher scores indicating more positive perceptions of social integration.

School attitudes. A measure of school attitudes, adapted from Ladd, Kochenderfer, and Coleman (1997), was administered to the children during individual interviews. The four items in the measure ("Do you like school?" "Are you happy at school?" "Do you like your teacher?" and "Do you wish you could stay home and did not have to go to school?"—reversed scored) tapped individual differences in their school attitudes. Children's responses to the questions (*no, not at all; no, sometimes/somewhat not; yes, sometimes/somewhat* and *yes, very much/always*) were assigned scores of 1–4. Factor analysis revealed that the items loaded on a single factor reflecting children's general attitudes toward school. Internal reliability was .68. The average score of the responses was computed and used in the study, with higher scores indicating more positive school attitudes.

Teacher ratings. In Chinese schools, one teacher is usually in charge of a class. This head instructor often teaches one major course, such as Chinese language or mathematics. He or she also takes care of the various social and daily activities of the class and thus is very familiar with the students. In this study, the head teacher was contacted and asked to rate each child in the study on the 20 items of school-related competency and 6 items of learning problems in the Teacher–Child Rating Scale (T-CRS; Hightower et al., 1986). Teachers were asked to rate, on a 5-point scale, how well each of these items described each child, ranging from 1 (*not at all*) to 5 (*very well*).

The items in the original competence measure (e.g., "participates in class discussion," "copes well with failure") involved several highly overlapping areas including frustration tolerance, assertive social skills, task orientation, and peer social skills (Hightower et al., 1986). Factor analyses of the data in the Chinese sample revealed that the items indicated a single competence factor. Thus, consistent with the approach in previous studies (e.g., Chen et al., 1995), only a global score of school-related competence was calculated in this study. The six items in the learning problems scale tapped children's difficulties in academic performance (e.g., "underachieving," "poorly motivated to achieve," "having difficulties in learning academic subjects"; Hightower et al., 1986). Internal consistencies were .86 for school competence and .81 for learning problems in this study.

Distinguished studentship. In Chinese schools, there is usually a formal evaluation of each student in each academic year. Students who are judged by classmates and teachers to be socially/morally, intellectually, and physically competent may be nominated for the award of "distinguished student." There are different levels of distinguished studentship, from the class level, to the school level, to the district level. Once approved by the school or the Educational Bureau, the students who obtain the status of "distinguished student" are given awards in public meetings. Distinguished studentship was coded as follows: students who did not receive any distinguished studentship awards received a score of 0; students who received an award at the class level received a score of 1, and students who received an award beyond the class level received a score of 2. This information has proved to be a useful and reliable indicator of school competence in Chinese children (e.g., Chen et al., 1999).

Results

Descriptive Data

A multivariate analysis of variance (MANOVA) revealed a significant overall effect of gender on all the variables, Wilks = .57, $F(9, 190) = 16.03$, $p < .001$, $\eta^2 = .43$. Follow-up univariate analyses indicated that boys had lower scores on cooperative behavior, peer liking, perceived social integration, school attitudes, and teacher-rated competence, and higher scores on antagonistic behavior and teacher-rated learning problems, with η^2 ranging from .02 (teacher-rated learning problems) to .29 (antagonistic behavior). Means and standard deviations of the variables for boys and girls are presented in Table 1. Intercorrelations among the adjustment outcome variables are presented in Table 2. The magnitudes of the correlations were generally weak to moderate, suggesting that these measures tapped different, overlapping aspects of social and school adjustment.

Relations Between Toddlerhood Inhibition and Outcome Variables

A series of hierarchical regression analyses was conducted to examine the relations between inhibition at 2 years and outcome variables at 7 years. In the analyses, child gender (first step) and parental education and occupation (second step) were

Table 1
Means and Standard Deviations of the Variables for Boys and Girls

| Variables | Boys (n = 86) | | Girls (n = 114) | | F value |
|---------------------------------|---------------|------|-----------------|------|----------|
| | M | SD | M | SD | |
| Cooperative behavior | 5.14 | 4.16 | 8.99 | 5.52 | 29.42*** |
| Antagonistic behavior | 4.53 | 3.19 | 1.29 | 1.94 | 79.47*** |
| Peer liking | 4.26 | 0.65 | 4.66 | 0.45 | 26.76*** |
| Perceived social integration | 3.20 | 0.50 | 3.45 | 0.41 | 14.40*** |
| School attitudes | 3.44 | 0.42 | 3.63 | 0.41 | 10.91*** |
| Teacher-rated competence | 3.22 | 0.62 | 3.53 | 0.63 | 11.63*** |
| Teacher-rated learning problems | 2.47 | 0.83 | 2.22 | 0.82 | 4.58* |
| Distinguished studentship | 0.63 | 0.67 | 0.74 | 0.71 | 1.22 |
| Inhibition | -0.10 | 1.02 | 0.08 | 0.98 | 1.55 |

* $p < .05$. *** $p < .001$. Two-tailed.

Table 2
Pearson Correlations Among Outcome Variables

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|------------------------------------|---------|--------|--------|--------|--------|---------|---------|--------|
| 1. Cooperative | | | | | | | | |
| 2. Antagonistic | -.38*** | | | | | | | |
| 3. Peer liking | .24*** | -.18** | | | | | | |
| 4. Perceived social integration | .10 | -.04 | .23*** | | | | | |
| 5. School attitudes | .15* | .00 | .12 | .51*** | | | | |
| 6. Teacher-rated competence | .13 | -.12 | .15* | .20** | .28*** | | | |
| 7. Teacher-rated learning problems | -.08 | .15* | -.08 | -.13 | -.13 | -.60*** | | |
| 8. Distinguished studentship | .26*** | -.09 | .03 | .19** | .26*** | .25*** | -.25*** | |
| 9. Inhibition | .24*** | -.15* | .17* | .23*** | .18** | .19** | -.16* | .27*** |

Note. $N = 200$.

* $p < .05$. ** $p < .01$. *** $p < .001$. Two-tailed.

entered. Behavioral inhibition was entered next into the equation. Interactions between gender and inhibition and between parental education and occupation and inhibition were then entered to examine the effects of child gender and parental education and occupation on the relations between inhibition and later outcomes. The variables were centered in the analyses.

The results concerning the effects of inhibition and unique variances accounted for by inhibition in predicting the outcome variables are presented in Table 3. Inhibition was positively associated with later cooperative behavior, peer liking, perceived social integration, school attitudes, teacher-rated competence, and distinguished studentship. Inhibition was also negatively associated with later teacher-rated learning problems. Inhibition was not significantly associated with antagonistic behavior. Concerning the covariates, the effects of gender were similar to those based on MANOVA. The effects of

parental education and occupation were all nonsignificant, except for fathers' education in predicting teacher-rated learning problems, $\beta = -.28$, $b = -.23$, $SE = .09$, $\Delta R^2 = .04$, $F = 3.15$, $p < .05$. Total variances accounted for by the covariates and inhibition (R^2) were mostly .10s to .20s, ranging from .13 (perceived social integration) to .32 (antagonistic behavior), $F_s = 2.57-7.91$, $p_s < .01$. Finally, no significant interactions were found, suggesting that the relations between early inhibition and later social and school adjustment were consistent for boys and girls and for children from families with different parental education and occupation status.

Differences Among Inhibited, Average, and Uninhibited Groups

To further explore the nature of the relations between inhibition and adjustment variables (e.g., whether the relations were due to differences

Table 3
Effects of Inhibition in Predicting Outcome Variables

| Outcome variable | β | <i>B</i> | <i>SE</i> | ΔR^2 | <i>F</i> value |
|---------------------------------|---------|----------|-----------|--------------|----------------|
| Cooperative | .20 | 1.08 | .35 | .04 | 9.75** |
| Antagonistic | -.11 | -.32 | .18 | .01 | 2.98 |
| Peer liking | .14 | .08 | .04 | .02 | 4.08* |
| Perceived social integration | .21 | .10 | .03 | .04 | 8.96** |
| School attitudes | .16 | .07 | .03 | .03 | 5.77* |
| Teacher-rated competence | .17 | .11 | .04 | .03 | 6.69** |
| Teacher-rated learning problems | -.16 | -.13 | .06 | .02 | 5.18* |
| Distinguished studentship | .27 | .19 | .05 | .07 | 16.21*** |

Note. The effects of sex and parental education and occupation were controlled in the analyses. $N = 200$.
* $p < .05$. ** $p < .01$. *** $p < .001$. Two-tailed.

between highly inhibited or uninhibited children and "average" children), we examined group differences among children with high, intermediate, and low inhibition scores, as suggested by other researchers (e.g., Asendorpf et al., 2008; Kagan, 1989; Stevenson-Hinde & Glover, 1996). Children whose inhibition scores at 2 years were in the top 15% for their sex group were identified as highly *inhibited*, children in the bottom 15% for their sex were identified as highly *uninhibited*, and those in the middle 30% were identified as *average*. In addition, based on the suggestion by Asendorpf et al. (2008) and Caspi et al. (2003), a similar approach was taken, using a more stringent criterion (top and bottom 8%), to identify extremely inhibited and uninhibited groups.

A MANOVA first revealed a significant overall effect of the group on all the adjustment variables, Wilks = .71 and .62, $F(16, 206) = 2.40$ and $F(16, 150) = 2.56$, $ps < .01$, $\eta^2s = .16$ and .22, for the groups using the 15% and 8% criteria, respectively. Nonsignificant Group \times Gender and Group \times Parental Education or Occupation effects were found. Follow-up ANOVA results and means and standard deviations are presented in Table 4. In general, the results indicated that inhibited children had higher scores than uninhibited children on cooperative behavior, perceived social integration, school attitudes, teacher-rated competence, and distinguished studentship. The results also indicated that whereas the average group was largely not different from the uninhibited group, the inhibited group had higher scores on cooperative behavior and distinguished studentship and lower scores on antagonistic behavior and learning problems than the average group. The results suggested relatively extensive differences in developmental outcomes between inhibited children, on the one hand, and average and uninhibited children, on the other.

Discussion

Despite the argument about the importance of social and cultural context for the development of behavioral inhibition (Asendorpf, 1993; Chen & French, 2008), research in this area has been conducted mostly in Western societies. As a result, little is known about inhibition and its significance in non-Western societies, especially from a developmental perspective. In the present study, we investigated how inhibition in early childhood contributed to social and school adjustment in China. The results indicated that the pattern of relations between inhibition and later adjustment outcomes in Chinese children was different from that typically found in Western children (e.g., Rubin et al., 2002). These results constitute a significant contribution to the understanding of the role of context in socioemotional development.

Gender Differences

Our results first indicated gender differences in social behaviors and school attitudes and adjustment. Boys displayed more antagonistic behaviors in peer interactions and learning problems in the school. In contrast, girls were more cooperative in peer interactions and more likely to form social affiliation with peers, had more positive attitudes toward the school, and performed more competently in school. These results are consistent with those found in previous studies in North America, China, and other countries (e.g., Chen et al., 1995; Eisenberg, Fabes, & Spinrad, 2006; Whiting & Edwards, 1988). To what extent the gender differences are cross-culturally universal is an interesting issue that requires further study.

No significant gender difference was found on behavioral inhibition in the present study. Similar

Table 4

Means and Standard Deviations of the Variables for Extremely Inhibited and Uninhibited and Average Groups

| Variables | Inhibited (<i>n</i> = 30/16) | Average (<i>n</i> = 60) | Uninhibited (<i>n</i> = 30/16) | <i>F</i> value |
|---------------------------------|---|------------------------------|--|----------------|
| Cooperative behavior | 9.54 _A /10.61 _a (6.22/7.37) | 7.00 _{B/b} (5.22) | 6.60 _B /6.35 _b (5.39/4.94) | 3.00*/3.08* |
| Antagonistic behavior | 2.14 _B /1.27 _b (2.69/1.62) | 3.56 _{A/a} (3.40) | 2.34 _{A,B} /2.75 _{a,b} (2.59/2.79) | 4.47**/5.40** |
| Peer liking | 4.60/4.54 (.51/.59) | 4.44 (.51) | 4.46/4.55 (.68/.67) | .77/.35 |
| Perceived social integration | 3.54 _A /3.58 _a (.40/.42) | 3.39 _{AB/a,b} (.48) | 3.23 _B /3.19 _b (.50/.56) | 4.48**/3.46* |
| School attitudes | 3.71 _A /3.80 _a (.32/.32) | 3.60 _{A/a} (.39) | 3.42 _B /3.30 _b (.42/.43) | 6.89**/6.97** |
| Teacher-rated competence | 3.58 _A /3.76 _a (.44/.32) | 3.47 _{AB/a,b} (.65) | 3.24 _B /3.23 _b (.64/.71) | 3.26*/3.46* |
| Teacher-rated learning problems | 2.07/1.82 _b (.77/.60) | 2.31 _a (.83) | 2.41/2.35 _a (.86/.87) | 1.47/3.40* |
| Distinguished studentship | 1.03 _A /1.06 _a (.77/.77) | .65 _{B/b} (.63) | .37 _B /.56 _b (.56/.63) | 9.03***/4.57** |

Note. Standard deviations are in parentheses after mean scores. Means, standard deviations, and *F* values before and after the slash with corresponding uppercase and lowercase subscripts are for the extreme groups identified using the top and bottom 15% and 8% criteria, respectively. Groups that do not share the same subscript are significantly different. *n* = 13 boys and 17 girls and *n* = 7 boys and 9 girls in each of the inhibited and uninhibited groups, using the two criteria, respectively, and 26 boys and 34 girls in the average group.

p* < .05. *p* < .01. ****p* < .001. Two-tailed.

results have been reported in previous studies of inhibition during early childhood (Broberg et al., 1990; Kochanska, 1991). Although these results need to be replicated in the future, it seems that other early socioemotional characteristics and socialization (e.g., Maccoby, 1998) may play an important role in the emergence of gender differences in social and school adjustment in the later years. It will be interesting to examine what personal and socialization factors predict gender differences and, more important, how they facilitate or hinder social and behavioral development in Chinese boys and girls.

Contributions of Inhibition to Later Social and School Adjustment

The primary purpose of the study was to examine relations between inhibition in toddlerhood and social and school adjustment in middle childhood. Because of the link between behavioral inhibition and social, relational, and other difficulties found in Western children, it is argued that early inhibition represents an individual dispositional factor that may lead to maladaptive development; inhibited children may be at heightened risk for developing adjustment problems (e.g., Coplan et al., 2004; Gest, 1997; Rubin et al., 2002). Inconsistent with this argument, the results of the present study indicated that inhibition was positively associated with later social and school adjustment including cooperative behavior, peer acceptance and integration, positive attitudes toward the school, and school competence in Chinese children. Further analyses showed that the associations were driven mainly by the differences between highly inhibited children and

average/uninhibited children; inhibited children had higher scores on social and school adjustment and lower scores on behavioral and learning problems than average and uninhibited children.

The associations between inhibition and later adjustment in extensive social and school settings in China indicate that inhibited children are not inherently at risk of maladaptive development. In an environment where behavioral restraint is encouraged, inhibited children may have favorable experiences during development. As indicated earlier, inhibited children in China may not have evident obstacles in getting involved in social interactions because adults and peers may view wary, anxious, and vigilant behaviors that inhibited children display as appropriate and acceptable. Moreover, social support and encouragement that inhibited children receive help them develop confidence and ability to establish relationships (Chen, DeSouza, et al., 2006; Chen, Wang, et al., 2006). This is reflected in the associations between inhibition and peer liking based on interaction in the laboratory as well as perceived peer affiliation and integration in school. The engagement in activities with peers provides the opportunity for inhibited children to learn social norms and skills to behave appropriately in social situations. At the same time, social relationships that inhibited children establish in school may be beneficial to the development of positive attitudes toward the school and intrinsic motivation to achieve academically. Taken together, the results of this study support the belief that children's adaptive and maladaptive functioning is likely defined by specific social and cultural contexts (Benedict, 1934; Bornstein, 1995; Ogbu, 1981).

We conducted extreme group analyses to further explore the relations between inhibition and adjustment. This approach allowed us to inspect how inhibited children stood out from others on the adjustment variables. Whereas the group differences were largely in agreement with the associations as revealed in the regression analyses, the two analytic approaches led to some different results (i.e., highly inhibited children were found to display less antagonistic behavior than others but the association between inhibition and antagonistic behavior was not significant; no group differences were found on peer liking, although its association with inhibition was significant). The results suggest that each of the approaches may provide information that the other does not. Thus, it may be useful to examine the development of inhibition from different perspectives.

There were no significant interactions between gender and inhibition and between parental education and occupation and inhibition in predicting outcome variables. The results suggested that the relations between inhibition and social and school adjustment were consistent for boys and girls and for children from families with different socioeconomic backgrounds. Although we did not expect particular effects of parental education or occupation on the relations, based on the argument that boys tend to receive greater pressure than girls to learn autonomy and assertiveness during socialization (e.g., Maccoby, 1998; Stevenson-Hinde & Hinde, 1986), we expected that inhibition would be associated with less positive adjustment in boys than in girls. Our results did not support this expectation. Similar results have been found by Kochanska and Radke-Yarrow (1992) and Stevenson-Hinde and Glover (1996), although in the latter study, highly inhibited boys did have the highest problem behavior scores in playground. Nevertheless, this issue needs to be examined further in the future given the literature suggesting that due to the gender-stereotypical ideologies, inhibited behaviors are considered less acceptable for boys than for girls (Rubin et al., 2002).

Conclusions, Limitations, and Future Directions

The results of the present study showed that behavioral inhibition was associated positively with later cooperative behavior, peer liking, and positive school attitudes and performance. Inhibited children generally had better adjustment outcomes than others. The results indicate that inhibition in early childhood is an adaptive characteristic that

contributes to social and school achievement in Chinese children.

There were several limitations in the study. First, behavioral inhibition tends to be associated with adjustment problems in social, school, as well as psychological problems (e.g., loneliness, depression) in Western societies (e.g., Rubin et al., 2002; Schwartz et al., 1999). Although we examined children's perceived peer integration in this study, which largely represented self-perceptions of social competence, it will be important to investigate other aspects of psychoemotional functioning, especially in late childhood and adolescence when children's sense of self becomes a salient issue and when children are more capable of reporting their self-feelings.

Research has indicated that behavioral inhibition is associated with similar affective reactions such as anxiety in Chinese and Western children (e.g., Zheng et al., 2005). Moreover, consistent with the literature (e.g., Rubin et al., 2002), behavioral inhibition is distinct from such characteristics as self-control and impulsivity in Chinese children (Chen et al., 2003). Nevertheless, it will be important to pay attention to the possible confounding effects of other dispositional characteristics including self-control on relations between behavioral inhibition and adjustment in Chinese children. Moreover, behavioral inhibition is considered biologically rooted (Kagan, 1989). To fully understand its nature in Chinese children, it will be interesting to investigate how behavioral inhibition is associated with biological/physiological functions such as heart rate variability, cortisol reactivity, and frontal brain activities in novel situations (e.g., Fox et al., 2005).

We focused in this study mainly on the contribution of behavioral inhibition to social and school adjustment. The contribution of child characteristics to development occurs in larger contexts. It will be important to explore how different social relationships such as parent-child and teacher-student relationships and friendships serve to maintain, strengthen, or undermine the role of child inhibition in adjustment. In addition, although we examined children's adjustment in social and school areas, it is necessary to study how inhibition is associated with other developmental outcomes including children's social behaviors in naturalistic environments.

Finally, the present study was conducted in 1994-1999. China has been undergoing dramatic social and economic changes over the past 15 years. Researchers have found that as social assertiveness and competitiveness are increasingly required in

the contemporary Chinese society, shyness-sensitivity in school-age children is viewed as less adaptive and beneficial for social and school adjustment (e.g., Chen, Cen, Li, & He, 2005; Hart et al., 2000). It will be interesting to study how societal changes affect the nature and significance of behavioral inhibition. In spite of the limitations, as the first attempt to examine the developmental outcomes of behavioral inhibition in Chinese children, the present study provided valuable information about the importance of context for human development.

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