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## Bidirectional Relations between Temperament and Parenting Styles in Chinese Children

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### Abstract

The present study examined bidirectional relations between child temperament and parenting styles in a sample ( $n = 425$ ) of Chinese children during elementary school period (age range = 6 to 9 years at Wave 1). Using two waves (3.8 years apart) of longitudinal data, we tested two hypotheses: (1) whether child temperament (effortful control and anger/frustration) at Wave 1 predicts parenting styles (authoritative and authoritarian parenting) at Wave 2, controlling for Wave 1 parenting; and (2) whether parenting styles at Wave 1 predict Wave 2 temperament, controlling for Wave 1 temperament. We found support for bidirectional relations between temperament and authoritarian parenting, such that higher effortful control and lower anger/frustration were associated with higher authoritarian parenting across time and in both directions. There were no significant cross-time associations between children's temperament and authoritative parenting. These findings extend the previous tests of transactional relations between child temperament and parenting in Chinese children and are consistent with the cultural values toward effortful control and control of anger/frustration in Chinese society.

### Keywords

temperament; parenting styles; bidirectional

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The common theme across transactional models of development is the mutual interplay between parents and children in the socialization process (Bell, 1980; Sameroff & MacKenzie, 2003). Although researchers interested in the relations between child temperament and parenting behaviors have primarily focused on the socialization influence of parents on children's temperament (Pardini, 2008), a number of longitudinal studies have shown that children's temperament tendencies may also evoke and predict changes in parenting (e.g., Bates, Pettit, Dodge, & Ridge, 1998; Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000; Eisenberg, Fabes, Shepard, Guthrie, Murphy, & Reiser, 1999). Yet, there have been relatively few longitudinal studies testing bidirectional relations between child temperament and parenting in the same model (see Bridgett, Gartstein, Putnam, McKay, Iddins, & Robertson et al., 2009; Eisenberg et al., 1999; Lengua & Kovacs,

2005, for exceptions). Additionally, studies that tested bidirectional relations generally have focused on specific parenting practices (e.g., parental responses to children's emotions, Eisenberg et al., 1999) or individual dimensions of parenting (e.g., warmth or inconsistency of discipline, Lengua & Kovacs, 2005) rather than global parenting styles such as authoritative and authoritarian parenting (Baumrind, 1967). The present study tested bidirectional relations between child temperament (effortful control and anger/frustration) and global parenting styles (authoritative and authoritarian parenting) in a two-wave (3.8 years apart) longitudinal study of Chinese children ( $n = 425$ ) between early and late elementary school. As one of the first longitudinal investigations of bidirectional parent-child relations conducted with non-Western samples, the study provides a unique opportunity to test the cross-cultural generalizability of the developmental transactional model.

## Transactional Relations between Child Characteristics and Parenting

Since Bell (1968) characterized child socialization as a process in which both child and caregiver seek to influence the other's behavior, growing attention has been paid to the mutual impact of parenting and child characteristics. Transactional models view children and parents as simultaneously and dynamically affecting each other at any given time and attempt to determine the directionality of parents' and children's behavior changes (Sameroff & MacKenzie, 2003). An example is Patterson and colleagues' theory on the development of antisocial behaviors (Patterson, 1982). According to this theory, there are bidirectional relations between children's irritable and defiant temperament and parental use of harsh and coercive disciplinary strategies. As a result of the coercive parent-child interactions, children's antisocial behaviors become reinforced and intensified. Indeed, empirical supports for the bidirectional relations between children's conduct problems and negative parenting behaviors have been reported (e.g., Baldwin & Skinner, 1989; Eddy, Leve, & Fagot, 2001).

Similarly, researchers have found evidence for bidirectional relations between child temperament and parenting. For example, Bridgett et al. (2009) found that infants' higher negative emotionality and lower self-regulation from 4–12 months of age predicted more negative parenting at 18 months, and that the children with the steepest increases or decreases in these behaviors over time experienced the highest negative parenting. In a longitudinal study of children in middle childhood, Eisenberg and colleagues (1999) found that children's negative emotionality from ages 6–8 predicted parental distress reactions to children's negative emotions at ages 8–10, which in turn predicted children's higher negative emotionality at ages 10–12. They also found that children's regulatory abilities at 6–8 predicted parents' punitive reactions to children's negative emotions at 8–10, which in turn negatively predicted children's regulation at ages 10–12. Lengua and Kovacs (2005) found bidirectional and positive relations between inconsistent parental discipline and school-aged children's fearfulness and irritability over a one-year period.

There are at least two limitations in the small existing literature on bidirectional relations between child temperament and parenting. First, although there is evidence for bidirectional relation between temperament and specific parenting practices or behaviors (e.g., parents' punitive reactions to children's emotion or use of inconsistent discipline), few researchers have studied bidirectional relations involving global parenting styles (e.g., authoritative and authoritarian parenting). In contrast to parenting behaviors, parenting styles are thought to reflect a "constellation of attitudes toward the child that are communicated to the child and create an emotional climate in which parents' behaviors are expressed" (Darling & Steinberg, 1993, *p.* 493). Because dimensions of global parenting styles include a wide range of parenting attitudes and practices and may be more stable over time than specific

parenting behaviors (Dallaire & Weinraub, 2005), it remains a question to what degree child temperament shapes parenting styles. Second, although cross-cultural theory and research have suggested that cultures may differ in their socialization models of temperament or personality characteristics (Chen & French, 2008; Trommsdorf, 2012), few investigators have tested the bidirectional relations between child temperament and parenting in non-Western samples. Thus, the cross-cultural generalizability of the developmental transactional model has not been extensively tested.

## Temperament Effortful Control and Anger/Frustration and Their Relations to Parenting

Separating dimensions of children's temperament allows for closer examination of the specific temperamental characteristics that might influence parenting style. The current study focuses on two temperament dimensions, effortful control and anger/frustration, and both dimensions have been found to differentially predict parenting (e.g., Lengua & Kovacs, 2005). First, Rothbart and Bates (2006) defined effortful control as "the efficiency of executive attention-including the ability to inhibit a dominant response and/or to activate a subdominant response, to plan, and to detect errors" (p.129). Effortful control is conceptually linked to self-regulation (Zhou, Chen, & Main, 2012), an umbrella term encompassing psychological processes that enable goal-directed activities (Karoly, 1993). In the present study, we focus on two components of effortful control: inhibitory control and voluntary attention focusing. Second, temperamental anger/frustration refers to a child's tendency to experience negative affect in relation to the interruption of an ongoing task or the blocking of a goal (Rothbart, Ahadi, Hershey, & Fisher, 2001). Some researchers have theorized that anger/frustration reflects the function of the brain's approach system and thus may be especially relevant to the development of externalizing behaviors (Derryberry & Rothbart, 1988).

Although researchers have typically studied temperament effortful control and anger/frustration as outcomes of parenting (e.g., Eisenberg, Cumberland, & Spinrad, 1998; Patridge & Lerner, 2007), some researchers have examined children's effortful control or related characteristics and negative emotionality as predictors of parenting with longitudinal data and found evidence for child-driven effects. For example, children's temperament difficultness and negative affect predicted unresponsive, harsh, and controlling parenting (e.g., Bates, Pettit, & Dodge, 1995), and lower levels of children's effortful control predicted more parental rejection and inconsistent discipline (Lengua, 2006). Feldman and Klein (2003) reported an association between children's increased emotion regulation (a construct related to effortful control) and adults' higher sensitivity and use of warm control. Similarly, Pettit, Keiley, Laird, Bates, and Dodge (2007) found that children who were less regulated at age 5 were more likely to have parents with low monitoring behavior between the 5<sup>th</sup> and 11<sup>th</sup> grades, but not vice-versa.

## Influence of Cultural Context on the Relations between Temperament and Parenting

According to cross-cultural theories on temperament (e.g., Chen & French, 2008; Kerr, 2001), the socio-cultural context can modify the expression of temperament tendencies and how they are received or responded to in social interactions (e.g., parent-child interactions). For example, in a cross-cultural study on parenting and toddlers' behavioral inhibition (a temperament trait reflecting individual differences in reactions to novel social and nonsocial situations), Chen et al. (1998) found that Chinese toddlers' inhibition was associated positively with maternal acceptance and negatively with maternal punishment, whereas the

opposite relations were found in a Canadian sample. Chen et al. (1998) attributed the findings to cultural differences in adaptive meanings of behavioral inhibition: shy and inhibited behaviors tend to be positively valued and encouraged in traditional Chinese culture, whereas they are perceived negatively in Western cultures.

In contrast to behavioral inhibition, the literature on effortful control and anger/frustration suggests that the adaptive functions of these two temperament traits seem to be similar across the Chinese and Western cultures. Trommsdorff (2012) argued that self-regulation (a construct related to effortful control) is promoted in both independent (e.g., Western) and interdependent (e.g., Asian) cultures, although for different goals/purposes. In independent cultures, self-regulation serves the purpose of attaining autonomy and individual achievement, whereas in interdependent cultures, self-regulation serves the purpose of fostering relatedness and maintaining interpersonal harmony. In empirical studies, children's effortful control has been associated with positive adjustment outcomes (including lower behavioral problems and higher social competence) in both Western and Chinese samples (e.g., Zhou, Lengua, & Wang, 2009; Porter, Hart, Yang, Robinson, Olsen, Zeng, et al., 2005). The adaptive meaning of anger/frustration is also similar across cultures. Excessive and intensive experience and expression of anger/frustration is viewed as disruptive even in independent cultures (Sanson, Hemphill, & Smart, 2004). In interdependent cultures, socially disengaging emotions such as anger and frustration are especially (and even more so) discouraged because they may disrupt social harmony (Kitayama, 2001; Trommsdorff, 2012). Not surprisingly, children and youths with high dispositional anger/frustration displayed higher behavioral problems than their peers in both Asian and Asian American samples (Park, Kim, Cheung, & Kim, 2010; Zhou et al., 2009).

## **Authoritative and Authoritarian Parenting Styles and Their Relations to Child Outcomes across Cultures**

Based upon Baumrind's (1967) widely cited definitions, authoritative parenting is characterized by high levels of warmth, acceptance, and responsiveness, encouragement of children's autonomy, and disciplinary strategies such as the setting of reasonable limits on children's behavior and the use of reasoning and induction. Conversely, authoritarian parenting is characterized by low levels of warmth and responsiveness, high control over children's autonomy, and frequent use of disciplinary strategies such as punishment, verbal hostility, and physical coercion rather than reasoning (Baumrind, 1996; Maccoby & Martin, 1983).

Although there is consistent evidence that authoritative parenting is associated with positive child outcomes and authoritarian parenting is associated with poor child outcomes in European American families (see Steinberg, 2001 for a review), researchers continue to debate whether and to what degree these relations can be generalized to families in East Asian cultures. On one hand, Chinese and European American parents differ in their mean levels of authoritative and authoritarian parenting, with Chinese parents scoring higher on authoritarian parenting and lower on authoritative parenting than European American parents (e.g., Steinberg, Dornbusch, & Brown, 1992; Wu, Robinson, Yang, Hart, Olsen, & Porter, et al., 2002). On the other hand, researchers examining the associations between authoritative and/or authoritarian parenting and Chinese children's psychological adjustment report patterns of findings similar to those found in European American samples (e.g., Chen, Dong, & Zhou, 1997; Chen, Liu, Li, Cen, & Chen, 2000; Nelson, Hart, Yang, Olsen, & Jin, 2006). Thus, despite the cultural differences in norms or preferences for authoritative and authoritarian parenting, there are at least some cross-cultural similarities in the adaptive functions of these two parenting styles.

Researchers studying Chinese samples have also examined the relations of authoritative and authoritarian parenting styles to children's temperament effortful control and negative emotionality. For example, Chinese immigrant mothers' self-reported authoritative parenting style negatively predicted preschoolers' attentional and behavioral self-regulation (Cheah, Leung, Tahseen, & Schultz, 2009). Moreover, harsh parenting was positively related to children's anger/frustration and negatively related to children's effortful control in a sample of Chinese third and fourth graders (Xu, Farver, & Zhang, 2009). Using the Wave 1 (W1) cross-sectional data from the present sample, we found that authoritarian parenting was associated with Chinese children's lower effortful control and higher anger/frustration, and children's effortful control and anger/frustration mediated the negative association between authoritarian parenting and children's social functioning (masked for blind review).

## The Present Study

Using two waves of longitudinal data, our goal was to test the bidirectional associations between child temperament (effortful control and anger/frustration) and parenting styles (authoritative and authoritarian parenting) in a sample of Chinese children during the transition from middle to late childhood. Previous analyses with this sample found that child temperament and parenting styles had additive and interactive relations to children's behavioral problems and social functioning (masked for blind review), but the hypothesized cross-time bidirectional relations between child temperament and parenting have not yet been tested in this sample. To address the issue of shared reporter effects, a multi-informant approach was used to assess child temperament and parenting, and a latent factor approach (i.e., structural equation modeling) was used to analyze the relations between temperament and parenting (when there was evidence for positive cross-reporter associations). Two main hypotheses were tested: (1) whether temperament at W1 predicts Wave 2 (W2) parenting styles, controlling for W1 parenting styles; and (2) whether parenting styles at W1 predict W2 temperament, controlling for W1 temperament. Based on the above literature review, we hypothesized that: (1) authoritative parenting would be positively related to subsequent effortful control and negatively related to anger/frustration, whereas authoritarian parenting would be negatively predictive of effortful control and positively predictive of anger/frustration; and (2) effortful control and anger/frustration would be predictive of later parenting in the same direction as just described. In contrast to the divergent cross-cultural findings on behavior inhibition and parenting described above (Chen et al., 1998), we expected children's temperament effortful control and anger/frustration would show similar associations to parenting in Chinese culture as have been found in the Western culture. Because some investigators previously reported that relations between child temperament and parenting might differ for boys and girls (e.g., Bezirgianian & Cohen, 1991), we also tested whether child gender moderated the hypothesized relations.

## METHODS

### Participants

The sample for this study came from a two-wave (3.8 years apart) longitudinal study of 1<sup>st</sup> and 2<sup>nd</sup> grade children and their parents in Beijing, China (masked for blind review). At Wave 1 (W1, summer 2000), 425 children (55.5% girls, 49.4% 1<sup>st</sup> graders, *M* age = 7.7 years, *SD* = .6 years, age range = 6.6–9.1 years) were recruited from 14 classrooms of two public elementary schools (range = 25–40 students per classroom). Similar to other urban Chinese public elementary schools, both participating schools consisted of grades 1–6, with a total of 28–34 classrooms and 1100–1300 students at each school. Ninety-one percent of children were the only children in their family. The majority (75%) of children came from two-parent families, 22% from extended families (including parents and grandparents or other family members), and 3% from single parent homes. The sample included primarily



low- to middle-income families, as determined by urban Beijing demographic statistics (National Bureau of Statistics of China, 2000). Monthly family income ranged from 200 to 10000 RMB ( $M = 2456.3$  RMB,  $SD = 1454.4$ ). The currency exchange rate between U.S. dollar and Chinese RMB was about 1:8.3 at W1. Parental education was reported on the following scale: 1 = 9 or fewer years (middle school or lower), 2 = 10 to 12 years (high school), 3 = 13 to 16 years (college), and 4 = greater than 16 years (graduate school). Mean maternal and paternal education levels were 2.46 ( $SD = .66$ ) and 2.49 ( $SD = .67$ ), respectively (i.e., high school diploma to some college education).

At Wave 2 (W2, spring 2004), 89.9% of the children participating in W1 were reassessed ( $N = 382$  children; 52.9% girls,  $M$  age = 11.6 years,  $SD = .6$  years, age range = 10.1–12.9 years) when they were in 5th (50%) or 6th (50%) grade. The percentages of children from two-parent, extended, or single-parent families were 79.2%, 16.7%, and 4.1%, respectively. Attrition analyses comparing those children assessed only at W1 with those who participated in both W1 and W2 suggested that those who completed only the W1 assessment ( $N = 43$ ) had higher levels of maternal and parental education, family income, and authoritative parenting compared to those also participating at W2 ( $N = 382$ ) ( $t$  [ $dfs = 393, 383, 354, \text{ and } 394$ ] =  $-2.7, -3.3, -2.2, \text{ and } -2.6$ ,  $ps < .01, .01, .05, \text{ and } .01$ .) No significant differences were found between the two groups on authoritarian parenting or any child temperament variables. Most (86%) of the children who were not retained at W2 could not be located because they transferred to a different school.

## Procedures

At W1, an introduction letter and consent form were distributed to the parents of all 1st and 2nd graders ( $N = 589$ ), and at W2, to the parents of all 5th and 6th graders who participated in W1 ( $N = 387$ ) at the two schools. A total of 425 parents at W1 (72%) and 382 parents at W2 (99%) provided written consent. All the children whose parents provided written consent were allowed to participate in the study. Data were collected through questionnaires completed by children, parents, and teachers. At both waves, questionnaires were administered to groups of children by two research assistants following completion of written assent forms. It was requested that mothers complete the parent questionnaires whenever possible. 78% percent and 82% of the parent questionnaires at W1 and W2 were completed by mothers, 16% and 12 % by fathers, and 6% and 6% by other caregivers, respectively. The head teacher ( $Ns = 14$  at both W1 and W2; children had different head teachers at W1 and W2) completed the teacher questionnaires with return rates of 98.9% at W1 ( $N = 420$ ) and 97.9% at W2 ( $N = 374$ ). Parents and teachers were paid for their participation, and children were given a small gift.

## Measures

All study instruments were administered in Chinese. At the time of data collection, all the parenting and temperament measures selected for the present study were available in Chinese and had been used with Chinese-speaking samples by other research teams.

**Parenting Style (W1 and W2)**—At both waves of the study, parents completed two subscales of the Parenting Styles and Dimensions (PSD, Robinson, Mandlco, Olsen, & Hart, 1995). The Authoritative subscale consisted of four dimensions: (a) Warmth/Acceptance (9 items, e.g., “I express affection by hugging, kissing, etc.”  $as = .76$  and  $.80$  for W1 and W2, respectively); (b) Reasoning/Induction (9 items, e.g., “I give child reasons why rules should be obeyed”;  $as = .70$  and  $.81$ ); (c) Democratic Participation (4 items, e.g., “I take into account child’s preferences in making plans for the family”;  $as = .72$  and  $.73$ ); and (d) Easygoing/Responsiveness (4 items, e.g., “I am easy going and relaxed with child”;  $as = .70$  and  $.74$ ). The authoritarian subscale consisted of four dimensions: (a) Non-reasoning/

Punitive strategies (4 items, e.g., “I punish by taking privileges away from child with little if any explanations”;  $\alpha$ s = .61 and .78); (b) Corporal Punishment (5 items, e.g., “I use physical punishment as a way of disciplining our child”;  $\alpha$ s = .80 and .51); (c) Directiveness (4 items, e.g., “I demand that child does/do things”;  $\alpha$ s = .49 and .61); and (d) Verbal Hostility (4 items, e.g., “I yell or shout when child misbehaves”;  $\alpha$ s = .72 and .61). At both waves, the four dimensions of Authoritative Parenting were positively correlated with each other ( $r$ s ranged from .51 to .63,  $df$ s = 394 to 401,  $p$ s < .001, for W1;  $r$ s ranged from .61 to .76,  $df$ s = 373 to 374,  $p$ s < .001, for W2), as were the four dimensions of Authoritarian Parenting ( $r$ s ranged from .38 to .61,  $df$ s = 394 to 400,  $p$ s < .001 for W1;  $r$ s ranged from .41 to .62,  $df$ s = 394 to 395,  $p$ s < .001, for W2). Thus, item scores within each subscale were averaged to form composites of Authoritative Parenting and Authoritarian Parenting at both waves. At W1, the alphas for the Authoritative Parenting and Authoritarian Parenting subscales were .89 (24 items) and .82 (17 items), and at W2, the alphas were .92 (27 items) and .80 (14 items). Cross-cultural comparative studies using this measure have shown an invariant two-factor structure in both Chinese and US samples (Wu et al., 2002). Although Baumrind’s (1967) typology of parenting styles also includes permissive parenting, permissiveness was not assessed because at the time of both W1 and W2, reliable and valid measures of permissive parenting had not been established in the Chinese cultural context (e.g., Chen et al., 1997; McBride-Chang & Chang, 1998; Wu et al., 2002).

At W2 only, children also reported their perceptions of the participating parent’s parenting style using the child version of the PSD (Robinson et al., 1995). The child-report Authoritative Parenting subscale included three dimensions: (a) Warmth/Acceptance (7 items,  $\alpha$  = .80); (b) Reasoning/Induction (6 items,  $\alpha$  = .78); and (c) Democratic Participation (4 items,  $\alpha$  = .75). The child-report of Authoritarian Parenting subscale included three dimensions: (a) Non-reasoning/Punitive strategies (5 items,  $\alpha$  = .63); (b) Corporal Punishment (5 items,  $\alpha$  = .81); and (c) Verbal Hostility (3 items,  $\alpha$  = .80). To reduce children’s response burden, the Easygoing/responsiveness subscale in Authoritative Parenting and the Directiveness subscale of Authoritarian Parenting were not administered in the study. Similar to parents’ reports, children’s reports on the three dimensions of Authoritative Parenting were positively correlated with each other ( $r$ s ranged from .65 to .71,  $df$ s = 367 to 369,  $p$ s < .001), as were the three dimensions of Authoritarian Parenting ( $r$ s ranged from .57 to .63,  $df$ s = 367 to 369,  $p$ s < .001). Thus, composite scores of children’s reports of Authoritative and Authoritarian Parenting were created by averaging the subscale scores ( $\alpha$ s = .90 [17 items] and .87 [13 items], respectively).

**Child Temperament (W1 and W2)**—At both waves, parents’ and teachers’ reports on the Children’s Behavior Questionnaire (CBQ; Goldsmith & Rothbart, 1991; Rothbart et al., 2001) were used to assess two dimensions of children’s temperament: Anger/frustration and effortful control. The CBQ is a widely used parent report measure of temperament for preschoolers through school-age children. In a cross-cultural study, mothers’ reports on the CBQ demonstrated satisfactory alpha reliabilities in both Chinese and U.S. samples, and considerable similarities were found in the factor structure of CBQ subscales across these cultures (Ahadi, Rothbart, & Ye, 1993; Rothbart et al., 2001). Because the CBQ was originally designed for use by parents, the teacher version was adapted to be more appropriate for teachers by removing or modifying some items in the original version (see Eisenberg, Cumberland, Spinrad, Fabes, Shepard, & Resier, et al., 2001).

Three CBQ subscales were used in the present study: a) Anger/frustration, which measures the child’s negative affect related to interruption of ongoing tasks or goal blocking (e.g., “Has temper tantrums when s/he doesn’t get what s/he wants”), b) Attention focusing, which assesses a child’s ability to concentrate on a task when needed (e.g., “When drawing or reading a book, shows strong concentration”), and c) Inhibitory control, which assesses a

child's ability to regulate his or her behavior (e.g., "Can lower his/her voice when asked to do so"). Parents and teachers rated each item using a Likert scale ranging from 1 = "extremely untrue of my/this child" to 7 = "extremely true of my/this child" ( $\alpha$ s = .69, .77, and .64 at W1 and .68, .74, and .62 at W2 for parent reports of anger/frustration [10 items], attention focusing [11 items], and inhibitory control [10 items]; W1  $\alpha$ s = .88, .93, and .89 and W2  $\alpha$ s = .87, .91, and .88 for teacher reports of anger/frustration [10 items], attention focusing [10 items], and inhibitory control [9 items]).

Consistent with the argument that inhibitory control and attention focusing are two theoretically and empirically salient components of effortful control (Rothbart & Bates, 2006), the inhibitory control and attention focusing subscale scores were moderately to highly correlated within reporters at both waves:  $r$ s at W1 ( $df$ s = 401 and 419) = .40 and .82,  $p$ s < .001, for parents' and teachers' reports, respectively;  $r$ s at W2 ( $df$ s = 589 and 594) = .52 and .80,  $p$ s < .001. Thus, following the data reduction procedures typically used in studies with European American samples (e.g., Eisenberg, Zhou, Spinrad, Valiente, Spinrad, Fabes, & Liew, 2005; Olson, Sameroff, Kerr, Lopez, & Wellman, 2005) and supported by empirical work on the factor structure of effortful control (Rothbart et al., 2001), the Effortful Control composites for parents' and teachers' reports at both waves were computed by averaging the items across the two subscales. The  $\alpha$ s for the aggregated 21-item parent report and 19-item teacher report Effortful Control scales were .78 and .95 at W1, and .77 and .94 at W2, respectively.

## RESULTS

Descriptive statistics of all temperament and parenting variables are presented in Table 1. Using West, Finch, and Curran's (1995) cutoffs of 2 and 7 as indicators of high skewness and high kurtosis, respectively, no study variables had significant issues of univariate non-normality.

### Cross-Reporter Correlations on Temperament and Parenting

The zero-order correlations among all study variables are presented in Table 2. Because the study used a multi-informant approach to assessment, it is important to examine the degrees of associations on ratings of temperament and parenting across different reporters. For temperament, parents' and teachers' reports of Effortful Control were positively correlated at both waves,  $r$ s = .35 and .38 at W1 and W2, respectively,  $p$ s < .001. However, parents' and teachers' reports of Anger/Frustration were not significantly correlated with each other at W1,  $r$  = .08,  $p$  = .11, although they were positively correlated with each other at W2,  $r$  = .12,  $p$  < .05. Although only parents rated parenting styles at W1, both parents and children rated parenting styles at W2. Parents' and children's reports of Authoritative Parenting were positively correlated with each other at W2,  $r$  = .35  $p$  < .001, as were their reports of Authoritarian Parenting,  $r$  = .33,  $p$  < .001.

### Testing the Bidirectional Relations between Temperament and Parenting

**The bidirectional model for effortful control and parenting**—To test the bidirectional relations between temperament effortful control and parenting styles, a two-wave autoregressive model was specified (see Figure 1). In this model, the latent factors of Child Effortful Control at both W1 and W2 were indicated by the corresponding parents' and teachers' ratings, and the latent factors of Authoritative Parenting at W2 and Authoritarian Parenting at W2 were indicated by the corresponding parents' and children's reports. The model included both autoregressive paths (i.e., paths predicting a variable or latent factor from its prior levels) and cross-time paths from temperament to parenting styles and from parenting styles to temperament. Moreover, the effects of demographic variables



(child sex, child age, and family SES) on all temperament and parenting variables or latent factors were controlled in the model. A composite index of family SES was calculated by first averaging maternal and paternal education levels, and then averaging the standardized scores of parental education and family income at W1. In addition, as suggested by Cole and Maxwell (2003), to reduce residual variances due to shared methods effects, the measurement errors of measures rated by the same reporter (e.g., parents' reports of child Effortful Control and their reports of Authoritarian Parenting) were allowed to be correlated if doing so significantly improved the overall model fit.

The model was estimated using the MLR estimator in Mplus 5.2 (Muthen & Muthen, 1998–2006). Missing data were handled using the full information maximum likelihood estimation option. Because children were clustered within classrooms, we used the COMPLEX option, which takes into account the non-independence of observations (Muthen & Muthen, 1998–2006). The raw data were analyzed. Hu and Bentler (1999) recommended the cutoffs of comparative fit index (*CFI*)  $\geq .95$ , standardized root-mean-square residual (*SRMR*)  $\leq .08$ , and root mean square error of approximation (*RMSEA*)  $\leq .06$  as the criteria for a relatively good fit between the data and hypothesized model.

The model shown in Figure 1 fit the data well,  $\chi^2(df = 32, N = 425) = 58.2, p = .003$ , *CFI* = .97, *RMSEA* = .044, *SRMR* = .047. The model-estimated loadings for indicators of Effortful Control, Authoritative Parenting, and Authoritarian Parenting were positive and statistically significant. Moreover, all the autoregressive paths were statistically significant and in positive directions, suggesting that there is cross-time consistency in temperament effortful control and parenting styles. Controlling for demographics and baseline levels of temperament or parenting, W1 Authoritarian Parenting negatively and significantly predicted W2 Effortful Control, and W1 Effortful Control negatively and significantly predicted W2 Authoritarian Parenting. By contrast, W1 Authoritative Parenting did not uniquely predict W2 Effortful Control, and W1 Effortful Control did not uniquely predict W2 Authoritative Parenting.

**The bidirectional models for anger/frustration and parenting**—Similar models were specified to test the bidirectional relations between temperament anger/frustration and parenting styles. Because parents' and teachers' reports of anger/frustration were uncorrelated with each other at W1 and weakly correlated with each other at W2, two separate models were tested by using parents' (Figure 2) and teachers' (Figure 3) reports of Anger/Frustration.

The bidirectional model for anger/frustration and parenting styles using parents' reports of Anger/Frustration (Figure 2) fit the data well,  $\chi^2(df = 17, N = 425) = 26.94, p = .06$ , *CFI* = .98, *RMSEA* = .037, *SRMR* = .032. Controlling for demographics (child sex, child age, and family SES) and baseline levels of temperament and parenting, W1 Authoritarian Parenting positively and significantly predicted W2 Anger/Frustration (parent report), and W1 Anger/Frustration (parent report) positively and significantly predicted W2 Authoritarian Parenting. There were no significant cross-time relations between Anger/Frustration and Authoritative Parenting.

The bidirectional model for anger/frustration and parenting styles using teachers' reports of Anger/Frustration (Figure 3) also fit the data well,  $\chi^2(df = 17, N = 425) = 26.77, p = .06$ , *CFI* = .97, *RMSEA* = .037, *SRMR* = .033. Controlling for demographics and W1 Anger/Frustration (teacher report), W1 Authoritarian Parenting positively and significantly predicted W2 Anger/Frustration (teacher report). However, W1 Anger/Frustration (teacher report) did not predict W2 Authoritarian Parenting. There were no cross-time relations between Anger/Frustration and Authoritative Parenting.

**Moderation by child sex**—For the three models tested above, we also conducted multiple-group SEM by child sex to examine whether the loadings and path coefficients varied significantly between boys and girls. In this approach, the baseline model was estimated simultaneously among boys and girls. Two types of models were compared: the model in which the model-estimated loadings and path coefficients were constrained to be invariant between boys and girls, and the model in which the loadings and path coefficients were allowed to vary by child sex. The chi-square difference test was used to determine whether the path coefficients differed significantly by child sex. We found no evidence for moderation by child sex.

**Models using only parents' reports of parenting styles at both waves**—Because children's reports of parenting styles were not assessed at W1, to examine whether the results differed if only the same reporters of parenting were included at both waves, we also re-tested the models presented in Figures 1 to 3 by including only parents' (but not children's reports) of parenting styles at W2. When only parents' reports of parenting styles were included in the model at both waves, the same results were found (as those reported in Figures 1, 2, and 3). Thus, we presented the original models that included parents' reports of parenting at W1 and both parents' and children's reports of parenting at W2.

## DISCUSSION

Although transactional models of development have been widely acknowledged, studies that use longitudinal data to explicitly test bidirectional relations between child temperament and parenting are rare, especially those using samples of non-Western cultures. The current study was the first to test bidirectional relations between temperament and parenting in a longitudinal study of Chinese children. In summary, we found support for bidirectional relations between authoritarian parenting and children's temperament effortful control and anger/frustration. Specifically, the Chinese parents whose children were low on effortful control or high on anger/frustration became more authoritarian in their parenting styles over time. Conversely, the Chinese children whose parents were high on authoritarian parenting became less regulated and more prone to anger/frustration over time. By contrast, authoritative parenting did not predict child temperament over time, and neither did child temperament predict authoritative parenting.

### Authoritarian Parenting and Temperament Effortful Control and Anger/Frustration

Our results on bidirectional relations between high authoritarian parenting and Chinese children's low effortful control and high anger/frustration are generally consistent with previous work conducted with Western samples (e.g., Bates, Pettit, & Dodge, 1995; Coplan, Reichel, & Rowan, 2009; Lindhout, Markus, Hoogendijk, & Boer, 2009). It is important to note that in our study, the bidirectional relations were found after controlling for stabilities in parenting styles and temperament, as well as demographic characteristics such as family SES and child age. Because child temperament and parenting were assessed from multiple reporters (parents, teachers, and/or children), it is unlikely that the associations found are fully accounted for by shared reporter variance. Overall, these findings provide rather strong evidence that children's dysregulated or highly reactive temperament and negative parenting are mutually influencing each other. Consistent with the theory on coercive parent-child interactions in the development of antisocial behaviors (Patterson, 1982), Chinese children who are dysregulated or prone to anger/frustration in disposition may elicit parenting behaviors that are more punitive and controlling. On the other hand, Chinese parents who raise their children in an authoritarian manner may evoke more aversive reactions in children, making it more difficult for children to regulate their negative emotions. Over time, children's temperamental difficultness may become sensitized or heightened. As a

result of these transactional relations, authoritarian parenting and children's temperamental difficultness may escalate.

In this same vein, because temperament is genetically influenced from childhood through adolescence (e.g., Ganiban, Saudino, Ulbricht, Neiderhiser, & Reiss, 2008; Rothbart & Bates, 2006), child temperament has been conceptualized as a pathway through which children's genotypes affect parenting. Indeed, a recent behavioral genetic study found that children's negative emotionality was moderately associated with parental negativity, and children's negative emotionality accounted for 22% to 39% of the total child-based genetic contributions to parental negativity (Ganiban et al., 2011). By contrast, children's negative emotionality was only modestly related to parental warmth. Ganiban et al. (2011) concluded that children's negative emotionality may be a specific mediator that accounts for child-based genetic contributions to negative (but not positive) parenting. Although the present study did not use a genetically informed design, our findings on reciprocal relations between child temperament and negative (but not positive) parenting are consistent with Ganiban et al.'s (2011) findings.

Findings from the present study are also consistent with the adaptive meanings of temperamental effortful control and anger/frustration in Chinese culture. Because of the discouragement of dysregulated behaviors and open expression of anger/frustration in interdependent cultures (Markus & Kitayama, 1991; Trommsdorff, 2012), Chinese parents may have low tolerance and patience for children who are low on effortful control and high on anger/frustration. Moreover, because of the cultural acceptance of parental authoritarian control in Chinese families, the default strategy for Chinese parents may be to use authoritarian parenting tactics to teach children discipline and obedience to make them behave in socially appropriate ways (Chen, Liu, & Li, 2000). Thus, cultural valuing in China of temperament effortful control and the control of anger/frustration, as well as the relatively high cultural norm toward authoritarian parenting, may have strengthened the genetically based associations between dysregulated or negatively reactive temperaments and negative parenting.

### **Authoritative Parenting and Temperament**

In contrast to the findings for authoritarian parenting, we found no cross-time relations between authoritative parenting style and child temperament. There were few significant correlations between authoritative parenting and children's temperament effortful control or anger/frustration (especially across different reporters). In Western samples, some researchers found that positive parenting practices predicted children's higher effortful control or self-regulation (e.g., Brody & Ge, 2001; Lengua & Kovacs, 2005), whereas others failed to find such associations. In a recent behavioral genetic study, the association between positive parenting (e.g., warmth) and child temperament was weaker than the association between negative parenting and temperament (Ganiban et al., 2011). Thus, the lack of association between authoritative parenting and child temperament in this Chinese sample may not be attributed to cultural differences. Because we did not assess temperament dimensions (e.g., positive emotionality) that tend to elicit positive parenting behaviors (rather than merely decreasing negative parenting behaviors), our measures may not be sensitive to detecting bidirectional relations between positive parenting and child temperament.

### **Limitations and Conclusions**

The present study had several limitations. First, parents' reports were largely collected from mothers (78% in W1, 82% in W2). Traditional Chinese families are characterized by a hierarchical structure dominated by elders and men, and children's achievement is strongly

linked to a family's social reputation (Ho, 1987). Fathers are often seen as bearing more responsibility for enhancing children's achievement and learning of appropriate behaviors, while mothers are seen as providing emotional support and help with daily problems. Thus, it is important for future studies to also examine the relations between fathers' parenting and child temperament. Second, because we mostly used instruments adapted from previous studies of Western samples, they may not fully capture indigenous aspects of parenting (e.g., training, Chao, 1994) and temperament traits in Chinese culture. Future studies should consider both culturally common and culturally unique constructs when examining the transactional relations between temperament and parenting. Third, only parents reported on parenting styles at W1, while both parents and children reported on parenting styles at W2. Although the results on directional relations did not differ whether or not we included children's reports of parenting at W2, future longitudinal studies should try to collect the same measures from the same reporters over time. Moreover, future research can benefit from incorporating observational methods to capture a more complete picture of the reciprocal relations between parenting and child temperament. Fourth, while the present study focused on global parenting styles, it will be informative for future studies to also examine how individual components of global parenting styles (e.g., warmth, use of reasoning and induction) are reciprocally associated with child temperament.

In summary, the present study extended previous tests of transactional models between child temperament and parenting to Chinese families. The findings on the bidirectional relations between negative temperament (low effortful control and high anger/frustration) and authoritarian parenting highlight the importance of early intervention for children and families high on these risk factors.

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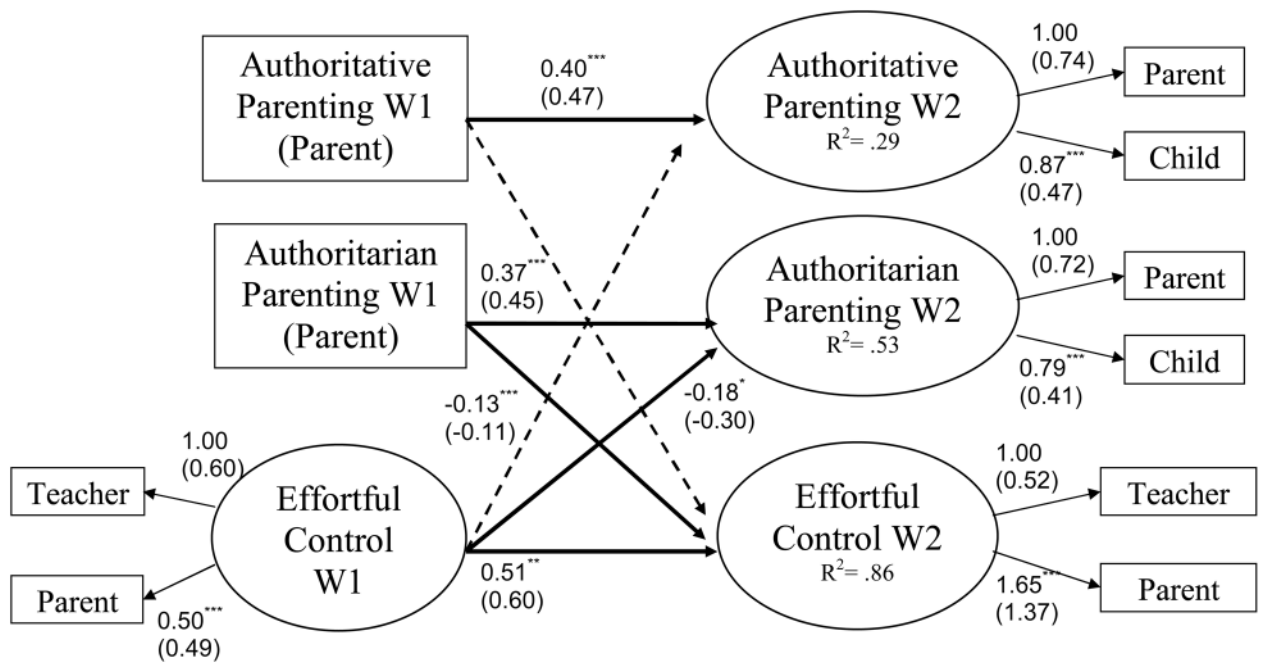
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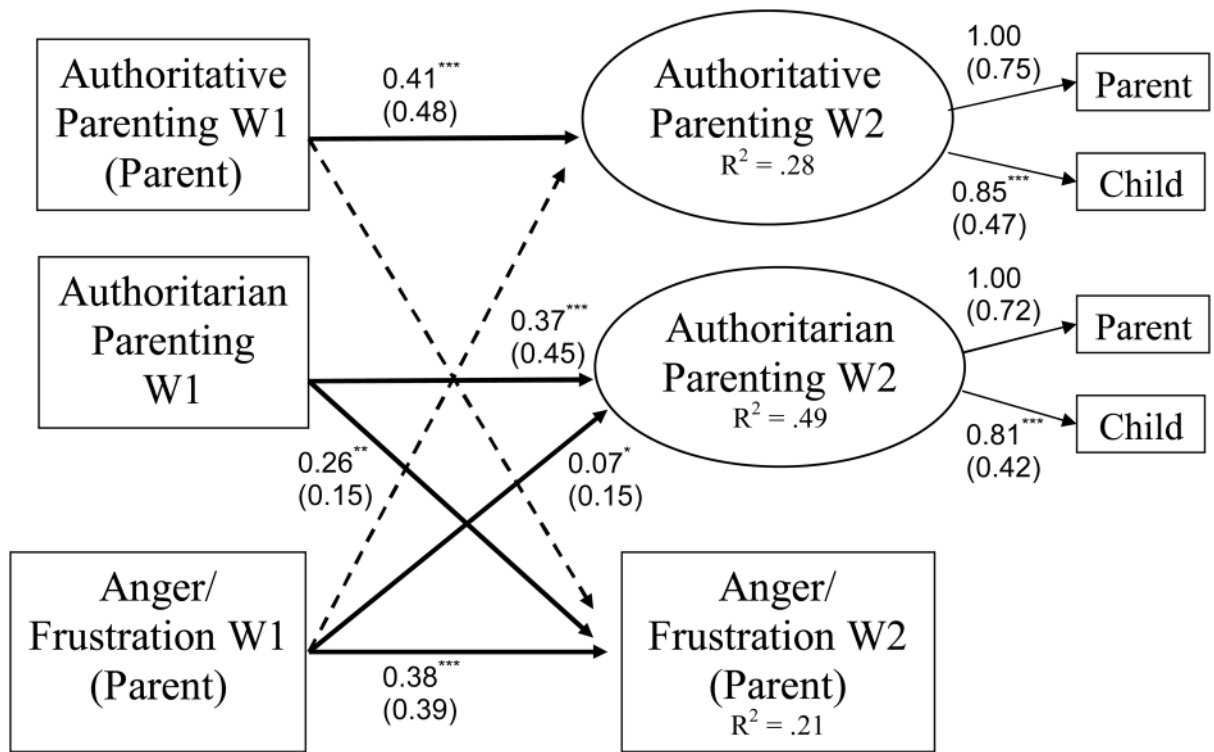


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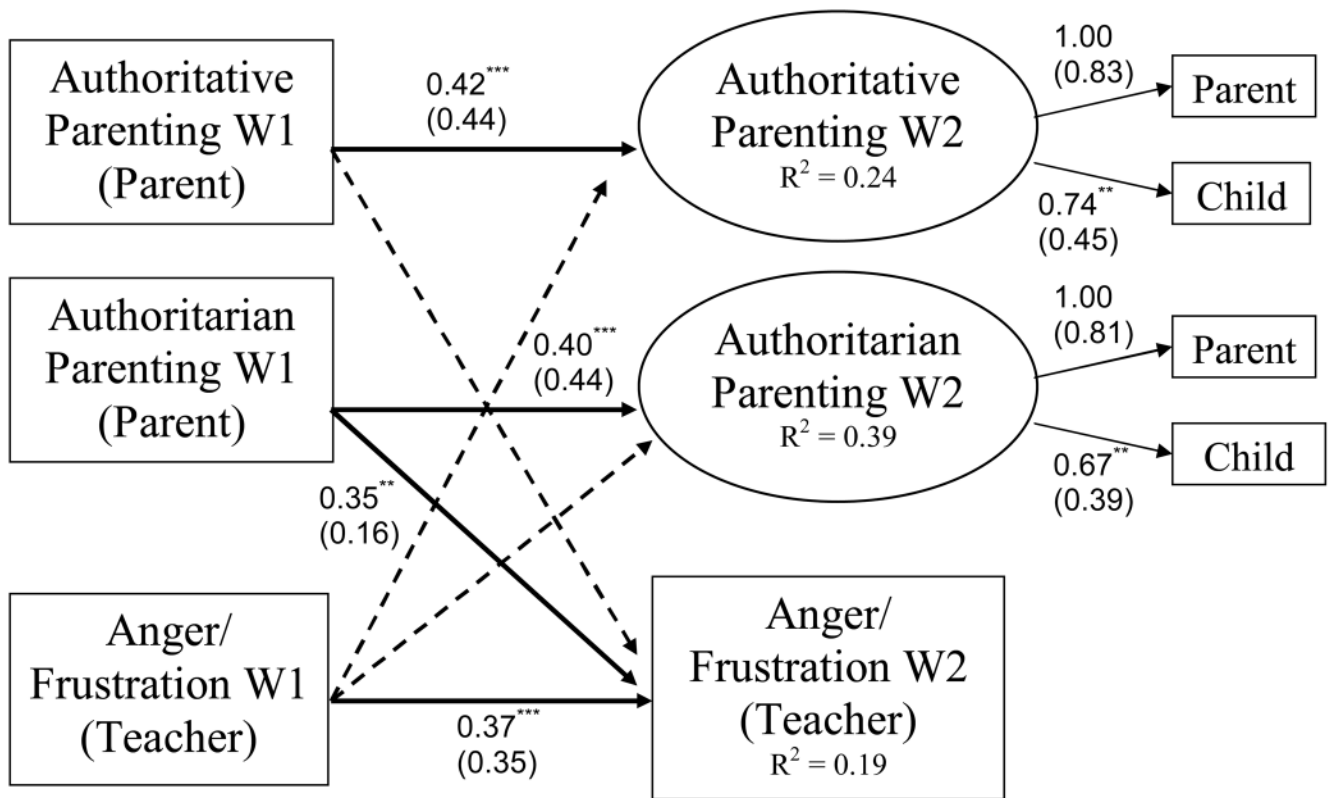
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**Figure 1.** Bidirectional model for temperament effortful control and parenting styles. Solid lines indicate significant paths or loadings, and dotted lines indicate nonsignificant paths or loadings. The numbers above the parentheses are unstandardized loadings or path coefficients. The numbers inside the parentheses are standardized loadings or path coefficients. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .



**Figure 2.** Bidirectional model for temperament anger/frustration and parenting styles (using parents' reports of anger/frustration). Solid lines indicate significant paths or loadings, and dotted lines indicate nonsignificant paths or loadings. The numbers above the parentheses are unstandardized loadings or path coefficients. The numbers inside the parentheses are standardized loadings or path coefficients. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .



**Figure 3.** Bidirectional model for temperament anger/frustration and parenting styles (using teachers' reports of anger/frustration). Solid lines indicate significant paths or loadings, and dotted lines indicate nonsignificant paths or loadings. The numbers above the parentheses are unstandardized loadings or path coefficients. The numbers inside the parentheses are standardized loadings or path coefficients. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .



Table 1

## Descriptive Statistics for Temperament and Parenting Variables

Variable	Range	Mean (N)	SD	Skewness	Kurtosis
Temperament					
W1 Effortful Control (P)	2.15–6.60	4.65 (402)	.65	-.01	.57
W1 Effortful Control (T)	1.00–7.00	4.89(419)	1.07	-.36	.02
W1 Anger/Frustration (P)	1.80–6.50	4.15 (401)	.83	-.21	.07
W1 Anger/Frustration (T)	1.10–6.20	3.46 (419)	.99	.19	-.38
W2 Effortful Control (P)	2.91–6.65	4.88 (375)	.66	-.06	-.09
W2 Effortful Control (T)	1.71–7.00	4.89 (374)	1.05	-.31	-.16
W2 Anger/Frustration (P)	1.40–6.20	3.86 (375)	.81	-.13	1.0
W2 Anger/Frustration (T)	1.00–6.50	3.71 (374)	1.04	-.23	-.15
Parenting Style					
W1 Authoritative (P)	1.76–4.85	3.76 (396)	.52	-.33	-.13
W1 Authoritarian (P)	1.35–3.81	2.30 (399)	.46	.73	.77
W2 Authoritative (P)	1.37–5.00	3.87 (374)	.60	-.66	.77
W2 Authoritarian (P)	1.07–4.00	2.10 (374)	.54	.78	.69
W2 Authoritative (C)	1.24–5.00	3.78 (273)	.81	-.77	.12
W2 Authoritarian (C)	1.00–4.77	1.83 (273)	.74	1.55	2.30

Note. W1 = Wave 1, W2 = Wave 2; P = parent report, T = teacher report, C = child report.

Table 2

Zero-Order Correlations among All Temperament and Parenting Variables

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. W1 Effortful Control (P)	--												
2. W1 Effortful Control (T)	.35***	--											
3. W1 Anger/ Frustration (P)	-.29***	-.07	--										
4. W1 Anger/ Frustration (T)	-.17***	-.60***	.08	--									
5. W2 Effortful Control (P)	.47***	.43***	-.17**	-.26***	--								
6. W2 Effortful Control (T)	.23***	.63***	-.05	-.46***	.38***	--							
7. W2 Anger/ Frustration (P)	-.22***	-.15**	.42***	.14**	-.42***	-.15**	--						
8. W2 Anger/ Frustration (T)	-.23***	-.43***	.07	.38***	.04	-.27***	.12*	--					
9. W1 Authoritative Parenting Style (P)	.30***	.09	-.06	-.05	.23***	.07	-.15**	.02	--				
10. W1 Authoritarian Parenting Style (P)	-.36***	-.19***	.22***	.08	-.30***	-.13*	.23***	.18***	-.18***	--			
11. W2 Authoritative Parenting Style (P)	.17***	.07	-.04	.01	.26***	.01	-.04	.04	.42***	-.21***	--		
12. W2 Authoritarian Parenting Style (P)	-.25***	-.30***	.18***	.13*	-.40***	-.28***	.23***	.23***	-.15**	.41***	-.34***	--	
13. W2 Authoritative Parenting Style (C)	.16**	.11	-.08	.02	.23***	.15*	-.06	-.04	.21***	-.08	.35***	-.29***	--
14. W2 Authoritarian Parenting Style (C)	-.18**	-.20***	.14*	.15*	-.28***	-.20***	.15**	.17**	-.09	.15*	-.17**	.33***	-.47***

Note. W1 = Wave 1, W2 = Wave 2; P = parent report, T = teacher report, C = child report.

\*  $p < .05$ ;\*\*  $p < .01$ ;\*\*\*  $p < .001$ .