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EMPIRICAL RESEARCH

# Divergent School Trajectories in Early Adolescence in the United States and China: An Examination of Underlying Mechanisms

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**Abstract** There is increasing concern that American children are not achieving at their full potential. A particular point of risk is early adolescence when American children often view school as less valuable, becoming less engaged as well. Initial research in China does not find such a trend. The goal of the current research was to elucidate why the movement away from school evident in the United States does not appear to be evident in China. 4 times over the 7th and 8th grades, 825 (48 % female) American and Chinese children (mean age = 12.73 years) reported on the value they place on school and their engagement (i.e., use of self-regulated learning strategies) in school. They also reported on their sense of responsibility to parents (e.g., feelings of obligation to parents), parents' involvement in their learning, and their autonomous motivation in school. A decline in American but not Chinese children's sense of responsibility to parents accounted for divergent trajectories in the value they place on school and their engagement in school over the seventh and eighth grades. Neither parents' involvement nor children's autonomous motivation played a mediating role. The findings suggest that maintaining American children's sense of responsibility to parents during early adolescence may protect children from moving away from school.

**Keywords** Adolescence · Culture · Motivation · Parent–child relationships · School engagement · School value

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## Introduction

There is much evidence that American children not only place less value on school, but are also less engaged in school than are Chinese children (for a review, see Pomerantz et al. 2008). This likely contributes to American (vs. Chinese) children's poorer performance in a variety of academic subjects (e.g., PISA 2012; Stevenson et al. 1993; TIMSS 2011). The differences in how American and Chinese children approach school appear to widen over the initial adolescent years (e.g., Yang et al. 2013): For example, the typical decline in the value that children place on school and their engagement (e.g., use of self-regulated learning strategies) in school during middle school in the United States (for a review, see Wigfield et al. 2006) was not found in a recent study conducted in China (Wang and Pomerantz 2009). Understanding why Chinese children may be better able to maintain the value they place on school along with their engagement in school during this often challenging phase of development could provide insight into how to prevent the movement away from school among American children. The goal of the current research was to elucidate why American but not necessarily Chinese children often see school as less valuable over early adolescence, becoming less engaged as well.

### American and Chinese Children's Approach to School Over Early Adolescence

Focusing on the United States, Eccles and colleagues argued in 1993 that changes in children's school environment as they move into adolescence often cause children to move away from school. Despite major innovations in the decade after Eccles and colleagues highlighted the problems with American middle schools, such schools still

appear to be at odds with the psychological needs of the children they serve (Juvonen et al. 2004), given that children move away from school along multiple dimensions over the course of middle school (e.g., McGill et al. 2012; Wang and Eccles 2012a, b). Indeed, children's views of the school climate become increasingly negative over the course of middle school (e.g., Espinoza and Juvonen 2011; Wang and Dishion 2012; Yang et al. 2013)—for example, children often feel that there is less support from teachers and see school rules as less fair during middle school. In addition, American children's entry into middle school is characterized by an intensified focus on performance by teachers (Midgley et al. 1995; Midgley and Edelin 1998) that may put heightened pressure on children.

There has been far less research on Chinese middle schools. The research to date suggests that Chinese children may view the middle school climate more positively than do American children (Jia et al. 2009; Yang et al. 2013). However, similar to their American counterparts, Chinese children see the climate as more negative than the elementary school climate (Chen and Li 2008), albeit to a lesser extent than do American children (Yang et al. 2013). Indeed, Chinese middle school teachers provide children with less emotional support than do Chinese elementary school teachers (Liu 2004). There is also a heightened emphasis on performance given that at the end of middle school in China children take a major exam that determines their high school placement, which is influential in whether and where they attain a college education. Because children's achievement is one of Chinese parents' top priorities for children during adolescence, the pressure may be even more intense than for American children whose parents do not put such weight on children's achievement (Qu et al., in press).

Given that both American and Chinese middle schools appear to have drawbacks, it is not surprising that recent research finds that children in both the United States and China lose interest in learning over early adolescence. For example, Yang et al. (2013) documented a decrease in children's school liking from elementary to middle school in both the United States and China, although it was larger in the United States. Studying children as they began middle school in seventh grade, Wang and Pomerantz (2009) found that both American and Chinese children reported becoming less interested in learning in that their orientation toward mastery (i.e., importance placed on learning and inclination to do difficult work) declined over the seventh and eighth grades. For American children, this decline was paralleled by a decline in seeing school as valuable as well as their engagement (e.g., self-regulated learning strategies). However, Chinese children maintained the value they placed on school as well as their engagement, despite their waning mastery orientation, as well as autonomous (vs. controlled) motivation.

A key question is why Chinese children did not move away from school as manifest in the value they place on school and their engagement in school, as did their American counterparts. This is of particular import given that both the value children place on school and their engagement are predictive over time of children's achievement adjusting for their earlier achievement in the United States and China (e.g., Wang and Eccles 2012b; Wang and Pomerantz 2009). The different trajectories in how children approach school could be due in part to differences in the climate of American and Chinese middle schools, with the latter being more positive (Jia et al. 2009; Yang et al. 2013). However, it could also be due to differences in what American and Chinese children bring to school either directly or indirectly via parents. The current research examined this possibility. To this end, we tested three hypotheses we developed based on prior theory and research: (1) The sense of responsibility hypothesis, (2) the parents' involvement in children's learning hypothesis, and (3) the autonomous motivation in school hypothesis.

Although Wang and Pomerantz (2009) documented differences in how American and Chinese children approach school over early adolescence, they did not address the issue of what underlies such differences. Their report and others based on the same project (Cheung and Pomerantz 2011; Pomerantz et al. 2011), along with additional research (e.g., Chen and Stevenson 1989; Stevenson et al. 1990), are suggestive of why the value children place on school and their engagement may decline in the United States but not China. However, as illustrated by the three mediation hypotheses we delineate (see below), the differences in American and Chinese children's school trajectories over early adolescence may be multiply determined with more than one mechanism playing a role or singly determined with only one mechanism doing so. The endeavor of identifying underlying mechanisms is essential to understanding how culture exerts its influence (e.g., Bukowski and Sippola 1998; Bond et al. 2002; Heine and Norenzayan 2006). Moreover, it can provide insight into how to reduce the deterioration that often occurs in American children's approach to school over early adolescence.

## The Sense of Responsibility to Parents Hypothesis

Cultural conceptions of adolescence may lead to psychological resources that shape how children approach school. American adolescence is considered a time of establishing independence from parents (for a review, see Collins and Steinberg 2006). Indeed, although adolescence is not a

period of severe "storm and stress" between children and parents (Arnett 1999), American children's relationships with parents often become more distant as they enter early adolescence. Specifically, children spend less time with parents and more time with peers as they move into adolescence (e.g., Larson et al. 1996), with decrements in their feelings of warmth toward parents as well (e.g., Shanahan et al. 2007). In addition, with the entry into adolescence, the affective intensity of conflicts between children and parents becomes more heated (for a review, see Laursen et al. 1998). In China, however, emphasis is placed on filial piety, which entails children repaying the family for their efforts in raising them, bringing honor to the family, and making sacrifices for the family (e.g., Chao and Tseng 2002; Ho 1996). Thus, children's progress toward maturity may be defined in part by their fulfilling their responsibilities to parents (e.g., Nelson and Chen 2007; Pomerantz et al. 2011). Consistent with this idea, Pomerantz et al. (2011) found that Chinese children maintained their sense of responsibility to parents (i.e., the belief that children should support parents by, for example, meeting their expectations) over the initial adolescent years; but American children's sense of responsibility to parents declined over this phase of development.

Children's sense of responsibility to parents may protect children from moving away from school when their interest wanes due to environmental changes such as the heightened emphasis on performance in middle school. Focusing on a key form of children's sense of responsibility to parents—their feelings of obligation to the family—Fuligni and Flook (2005) make the case that a sense of responsibility to parents may allow children to stay on track in school during adolescence by orienting them toward parents' values as well as providing them with purpose; this, in turn, may lead children to value school, ultimately keeping them engaged. Indeed, for both American and Chinese children, the more they feel a sense of responsibility to parents, the more they subsequently value school and are engaged in it controlling for their earlier approach to school as well as the quality of their relationships with parents; there also appears to be benefits for children's achievement (Pomerantz et al. 2011; see also Fuligni et al. 1999; Fuligni and Zhang 2004). Hence, the difference in the trajectories of American and Chinese children's sense of responsibility to parents may underlie the difference in the trajectories of the value that children place on school and their engagement in school during early adolescence.

### The Parents' Involvement in Children's Learning Hypothesis

It is also possible that American and Chinese children's experiences prior to adolescence differ such that American children enter middle school with fewer psychological resources to support their approach to school over this often challenging phase of development. Although children's learning in school is of significance in the United States, it is of more significance in China given that it has greater implications for children—for example, if and where they go to high school. Beyond such practical considerations, learning is also viewed as a moral endeavor in China—a perspective which is less common in the United States (Li 2004; Ng et al. 2013; Tweed and Lehman 2002). Given the heightened practical and moral significance of learning in China (vs. the United States) along with the Chinese view that children's learning is a major responsibility of parents (Chao 1994; Ng et al. 2013), it is not surprising that as early as the elementary school years—if not before—American parents are less involved in children's learning than are their Chinese counterparts (for a review, see Pomerantz et al. 2014). For example, American parents spend less time working with children on academic activities such as homework (e.g., Chen and Stevenson 1989; Ng et al. 2007). Despite the tendency for both American and Chinese parents to cutback on their involvement in children's learning over the initial years of adolescence, the difference appears to continue over these years (Cheung and Pomerantz 2011).

Parents' involvement in children's learning has been argued to convey to children that school is valuable, thereby heightening children's engagement as they pursue what they come to see as an important endeavor (e.g., Grolnick and Slowiaczek 1994; Epstein 1988). Indeed, the more parents are involved, the more children value school, the more engaged they are, and the better they do in school (e.g., Grolnick et al. 2000; Hill et al. 2004). These effects hold when children's earlier academic adjustment is taken into account (e.g., Wang and Sheikh-Khalil 2014) as well as other dimensions of parenting (e.g., autonomy support) in both the United States and China (Cheung and Pomerantz 2011, in press). Hence, the tendency for American parents to be less involved than Chinese parents in children's learning as children enter middle school may place American children's approach to school on a downward trajectory as the value of school is not salient to them.

### The Autonomous Motivation in School Hypothesis

Another possibility suggested by theory and research is that American and Chinese children enter middle school with different motivational orientations toward school that shape how they approach school. Li (2002) has suggested that there is a unique Chinese model of learning—that is, hao-xue-xin, which can be translated into "heart and mind for wanting to learn" (p. 250); this model involves seeking knowledge and cultivating a passion for lifelong learning.

Such a passion may be manifest in children's motivational orientation toward school. In line with Li's ideas, American children are less autonomously motivated as they enter middle school than are their Chinese counterparts. For example, Stevenson et al. (1990) study of elementary children found that children in the United States like school less than children in China, with a similar pattern evident for attitudes toward homework (see also Chen and Stevenson 1989). In addition, Wang and Pomerantz (2009) found that, in early seventh grade, American (vs. Chinese) children endorsed fewer autonomous (e.g., "I do my homework because it's fun.") than controlled (e.g., "I do my homework because I'll get in trouble if I don't.") reasons for doing their schoolwork; this difference was maintained over the middle school years, despite the decline in autonomous (vs. controlled) motivation among Chinese, but not American, children over these years.

As part of being autonomously motivated, children may view school as valuable; moreover, a key tenet of Self-Determination Theory is that there is a natural inclination to engage in activities that are experienced as autonomous (Deci and Ryan 1985; Ryan and Deci 2000). Hence, when children are autonomously motivated in school, they may continue to see school as valuable over the middle school years, maintaining their engagement as well—despite the environmental changes (e.g., heightened emphasis on performance) that often undermine children's approach to school. Indeed, there is much evidence that the more autonomously motivated individuals are, the more they value school and the more engaged they are, with heightened performance as well in not only the United States but also China (e.g., d'Ailly 2003; Vansteenkiste et al. 2005; Wang and Pomerantz 2009). Thus, the value children place on school and their engagement in school may decline during middle school among American but not Chinese children because American (vs. Chinese) children are less autonomously motivated as they enter middle school.

## The Current Research

Using the same data set as Wang and Pomerantz (2009), we evaluated three hypotheses (i.e., the sense of responsibility to parents hypothesis, the parents' involvement hypothesis, and the children's autonomous motivation in school hypothesis) as to why American and Chinese children's approach to school may differ over early adolescence in terms of the value they place on school and their engagement in school. Beginning with their entry into middle school, children were followed over four waves across the seventh and eighth grades in the United States and China. At each wave, children indicated the value they place on school and their engagement (i.e., use of self-regulated learning strategies). Children also reported on their sense of responsibility to parents (i.e., feelings of obligation to parents and motivation in school to please parents), parents' involvement in children's learning, and their autonomous (vs. controlled) motivation in school. Given our concern with what children bring to middle school (e.g., the parents' involvement in children's learning hypothesis) as well as how children change over this phase of development (i.e., the sense of responsibility to parents hypothesis), we conducted analyses looking at the mediating role of the intercept (i.e., the beginning of seventh grade) which reflects what children bring to middle school and slope (i.e., over the seventh and eighth grades) which reflects how children change over middle school.

## Method

### Participants

This research was part of the University of Illinois US-China Adolescence Study (e.g., Pomerantz et al. 2011; Wang and Pomerantz 2009), which started when children in the United States and China entered public middle school at seventh grade and concluded at the end of eighth grade. The 374 American children (187 boys, 187 girls; mean age = 12.78 years, $SD = 0.34$ in the fall of 7th grade) were from primarily working- and middle-class suburbs of Chicago; the 451 Chinese children (240 boys, 211 girls; mean age = 12.69 years, $SD = 0.46$ in the fall of 7th grade) were from primarily working- and middle-class suburbs of Beijing. Reflecting the ethnic composition of the areas in which they resided, American children were predominantly European American (88 %), with 9 % Hispanic American, 2 % African American, and 1 % Asian American. Over 95 % of the residents in the areas in which Chinese children resided were of the *Han* ethnicity (Beijing Municipal Bureau of Statistics 2005), which is the majority ethnicity in China.

### Procedure

Beginning in the fall of seventh grade, children completed a set of questionnaires every six months until the end of eighth grade. In total, there were four waves of data collection: Fall of seventh grade (Wave 1), spring of seventh grade (Wave 2), fall of eighth grade (Wave 3), and spring of eighth grade (Wave 4). A trained native research assistant read the instructions and items aloud to children in their native language in the classroom; children responded on their own using various rating scales. Attrition over the entire study was 4 % (2 % in the United States and 6 % in China). Ninety-two percent of children had the data required for the central analyses at three or more waves of the study. At Wave 1, children with no missing data did not

**Table 1** Measure means, standard deviations, and associations at Wave 1

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1. Child value | – | .24*** | .14** | .27*** | .21*** | −.08 |
| 2. Child engagement | .58*** | – | .34*** | .32*** | .41*** | .32*** |
| 3. Feelings of obligation | .33*** | .47*** | – | .34*** | .32*** | .15** |
| 4. Parent-oriented motivation | .27*** | .26*** | .21*** | – | .26*** | −.22*** |
| 5. Parental involvement | .27*** | .48*** | .52*** | .13** | – | .03 |
| 6. Child autonomous motivation | .20*** | .22*** | .14** | −.36*** | .14** | – |
| *M* (*SD*) for the United States | 6.02 (1.05) | 3.38 (0.81) | 4.32 (0.57) | 3.71 (0.90) | 3.61 (0.71) | −1.92 (2.64) |
| *M* (*SD*) for China | 5.91 (1.07) | 3.34 (0.69) | 4.34 (0.56) | 3.46 (0.87) | 3.79 (0.62) | 0.08 (2.67) |

Correlations for the American sample are presented in the lower triangle; those for the Chinese sample are presented in the upper triangle

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

differ from those with missing data on any of the variables examined in this report.

## Measures

The means and standard deviations of the measures at Wave 1 as well as their associations with one another are presented in Table 1. The measures were initially created in English. Standard translation and back-translation procedures (Brislin 1980) were followed to generate the Chinese versions with repeated discussion among American and Chinese members of the research team to modify the wording of the items to ensure equivalence in meaning (Erkut 2010). Linguistic factors were taken into account so that the measures were understandable to children in both the United States and China. Minor modifications were also made to some measures so that they would be relevant to the lives of American as well as Chinese children. For example, in compiling the parental involvement measure, items about volunteering at school were excluded, as opportunities for such volunteering are rare in China. An item about purchasing extra learning materials for children was added because Chinese parents often become involved in such a manner.

A series of Confirmatory Factor Analyses (CFAs) were conducted in the context of two-group Structural Equation Modeling (SEM) to examine the metric and intercept invariance of the measures between the United States and China over the four waves of the study. Metric and intercept invariance is essential and sufficient in making valid comparisons of the associations and means, respectively (e.g., Chen 2007; Little 1997). In each set of CFAs, a baseline (i.e., unconstrained) model was compared to constrained (i.e., metric and intercept invariance) models. The baseline model consisted of the same latent construct repeatedly assessed over the four waves yielding a total of four latent constructs, which were allowed to correlate with one another. For each measure, two indicators were used for the latent construct; these were based on parcels comprised of multiple items ($\alpha$s = .72 to .91 in the United States and .69 to .94 in China) determined conceptually when possible (e.g., for self-regulation, a cognitive strategies parcel and meta-cognitive strategies parcel was used), but otherwise randomly, with the parcels being unidimensional as indicated by Principal Component Factor Analyses (PCAs) which yielded single factors as determined by eigen values over one. Errors of the same indicators over time were allowed to correlate when suggested by modification indexes from the CFAs conducted on the sample with no missing data.

The parameters in the baseline models were freely estimated without any between-country or across-time equality constrains. In the more parsimonious constrained models, the factor loadings and intercepts of the same indicators were forced to be equal between the two countries and across the four waves. Based on statistical modeling, Chen (2007) recommends that changes in CFI from the baseline model to a corresponding constrained model be used as the main criterion for assessing measurement invariance, with an increase of less than .01 reflecting invariance. Both the baseline and constrained models fit the data adequately, $\chi^2$s (N = 825) < 127.06, CFIs > .98, TLIs > .96, RMSEAs < .06. Using Chen's (2007) criteria, the measures analyzed in this report demonstrated metric and intercept equivalence between the United States and China as well as over the four waves of the study, thereby permitting valid comparisons of the associations and means of the measures between countries and over time (see also Cheung and Pomerantz 2011; Pomerantz et al. 2011; Wang and Pomerantz 2009).

*Value*

The value children place on their academic achievement was assessed with a modified version of Pomerantz et al.'s (2000) measure. Children answered (1 = *not at all important*, 7 = *very important*) two questions (e.g., "How important is it to you to do well in this subject?") for language arts and the same two for math, yielding a total of four items. Children's value was also assessed for other school subjects as well. However, as in Wang and Pomerantz (2009), we focused only on language arts and math because these were the only two subjects that were identical in the two countries; the two are also considered the most important subjects in both countries. However, analyses using the full set of subjects for which children received grades did not yield different results from those using only language arts and math. The mean of the items across the two school subjects was taken, with higher numbers indicating greater value (αs = .82 to .88 in the United States and .78 to .88 in China).

*Engagement*

Multiple types of engagement in school have been identified as important (Fredricks et al. 2004), we focused on children's self-regulated learning, which is a cognitive form of engagement that appears to play a role in children's achievement (e.g., Wang and Eccles 2012b; Wang and Pomerantz 2009). Children's self-regulated learning strategies were assessed with 30 items from Dowson and McInerney's (2004) Goal Orientation and Learning Strategies Survey. Twelve items ask about cognitive strategies involving rehearsal or elaboration (e.g., "I memorize the material I want to learn for school."); the remaining 18 items ask about meta-cognitive strategies—that is, monitoring, planning, and regulating strategies (e.g., "If I get confused about something at school, I go back and try to figure it out."). Children rated how true (1 = *not at all true*, 5 = *very true*) each statement was of them. Their responses were averaged, with higher numbers indicating greater use of self-regulated learning strategies (αs = .96 to .97 in the United States and .93 to .96 in China).

*Child Sense of Responsibility to Parents*

In assessing children's sense of responsibility to parents, we measured children's feelings of obligation to parents, which are associated with children placing heightened value on school as well as being particularly engaged in school (e.g., Fuligni et al. 1999; Fuligni and Zhang 2004). However, given our focus on the academic arena of children's lives, we also assessed children's motivation in school to please parents. This more narrow form of children's sense of responsibility to parents predicts children's approach to school above their feelings of obligation to parents (e.g., Pomerantz et al. 2011). Both forms revolve around children's concern with taking parents' wishes into consideration. However, because not all parents see achievement in school as a priority, not all children seek to fulfill their responsibilities to parents academically (Hardway and Fuligni 2006). The two forms of children's sense of responsibility to parents have similar trajectories over early adolescence; they are also positively associated, but not to such an extent that they are redundant with one another (Pomerantz et al. 2011).

Children's *feelings of obligation to parents* were assessed with four items from Fuligni et al.'s (1999) measure of family obligation and five from Ng et al.'s (2000) measure (see Pomerantz et al. 2011). The items were ones particularly relevant to children during early adolescence in the United States and China. The three components (i.e., respect for the family, current assistance, and future support) of family obligation identified by Fuligni and colleagues were all represented. For each of the nine items (e.g., "How much do you feel you should spend time at home with your parents?") children indicated how much (1 = *not at all*, 5 = *very much*) they feel they should engage in the activity described. The mean of the items was taken, with higher numbers representing greater feelings of obligation (αs = .85 to .93 in the United States and .81 to .88 in China).

Children's *parent-oriented motivation in school* was assessed with six of the items from Dowson and McInerney's (2004) social approval and responsibility scales that could most easily be modified so that they referred to parents; six additional items were also created (see Pomerantz et al. 2011). For each of the 12 reasons about why they try to do well at school (e.g., "To show my parents that I am being responsible."), children indicated how true it was of them (1 = *not at all true*, 5 = *very true*). Their responses were averaged, with higher numbers representing greater parent-oriented motivation (αs = .92 to .95 in the United States and .90 to .94 in China).

*Parental Involvement in Children's Learning*

Ten items used in prior research (Chao 2000; Kerr and Stattin 2000; Kohl et al. 2000; Stattin and Kerr 2000) covering a range of parents' involvement practices (e.g., ''My parents help me with my homework when I ask.'' and ''My parents try to get to know the teachers at my school.'') were adapted for use in the current research (see Cheung and Pomerantz 2011). Children indicated (1 = *not at all true*, 5 = *very true*) the extent to which each item was true of their parents. The mean of the items was taken, with higher numbers reflecting greater involvement

(αs = .83 to .85 in the United States and .77 to .83 in China).

*Children's Autonomous (vs. Controlled) Motivation in School*

The Academic Self-Regulation Questionnaire (Ryan and Connell 1989) was used to assess the extent to which children engage in academic activities for autonomous versus controlled reasons. This questionnaire consists of statements describing four types of reasons for engaging in various academic activities. Across the activities, there are seven statements about intrinsic reasons (e.g., ''I try to answer hard questions in class because I enjoy answering hard questions.''), seven about identified reasons (e.g., ''I work on my classwork because it's important to me to do so''), nine about introjected reasons (e.g., ''I work on my classwork because I'll be ashamed of myself if it doesn't get done''), and nine about external reasons (e.g., ''I do my homework because I'll get in trouble if I don't''). Children rated how true (1 = *not at all true*, 5 = *very true*) each statement was of them. Following previous studies, an index of autonomous (vs. controlled) motivation was created by subtracting the controlled motivation composite (the sum of the mean of the extrinsic reasons weighted by 2 and the mean of the introjected reasons weighted by 1) from the autonomous motivation composite (the sum of the mean of the intrinsic reasons weighted by 2 and the mean of the identified reasons weighted by 1), with higher numbers indicating greater endorsement of autonomous versus controlled reasons (αs = .92 to .95 in the United States and .88 to .94 in China).

## Results

To evaluate the three hypotheses about why the value children place on school and their engagement in school appear to decline in the United States but not China over early adolescence, we conducted mediation analyses in the context of Structural Equation Modeling (SEM) with Amos 17.0 (Arbuckle 2008). Amos handles missing data with Full Information Maximum Likelihood (FIML) estimation, which provides more reliable standard errors under a wider range of conditions than does not only list- and pair-wise deletion but also mean-imputation (Arbuckle 1996; Wothke 2000). Because of our focus on elucidating differences in the trajectories of American and Chinese children's approach to school over early adolescence, the mediation analyses were conducted using growth curve models including such trajectories (for an example, see Fig. 1).

We employed a latent construct for children's sense of responsibility to parents with children's feelings of obligation to parents and their parent-oriented motivation in school as indicators. Invariance analyses indicated that the latent construct possessed metric and intercept equivalence between countries and across waves: The baseline and constrained models fit the data well, $\chi^2$ (N = 825) < 170, CFI > .96, TLI > .93, RMSEA < .05, with changes in CFI from the baseline to constrained models of less than .01. For parents' involvement in children's learning and children's autonomous motivation in school, the observed variables at each wave were used.

The value children place on school and their engagement as well as the other constructs were each represented by two higher-order latent constructs: The intercept and slope of the growth curve, which were allowed to freely correlate. The factor loadings from the intercept to the construct (e.g., value in school or sense of responsibility to parents) at each of the four waves were fixed to 1, with those from the slope fixed to 0, 1, 2, and 3, respectively (for an example, see Fig. 1). By such specification, the intercept indicates children's standing in the fall of seventh grade when the study began, and the slope indicates the linear rate of change among children across the four waves over the seventh and eighth grades.

### Evaluation of the Total Effect

Guided by the three criteria set forth by Baron and Kenny (1986), we first tested whether the independent variable (IV)—in this case, country—is associated with the dependent variables (DV)—in this case, children's value and engagement trajectories—thereby, establishing a total effect (for the perspective that this criteria is unnecessary, see Shrout and Bolger 2002). To evaluate such an effect, we examined the country difference in children's value and engagement trajectories in the context of SEM models—one for each approach to school—in which country (−1 = United States, 1 = China) was a predictor of the intercept and slope of children's value and engagement, $\chi^2$s < 51.23, CFIs > .96, TLIs > .92, RMSEAs < .05. Consistent with Wang and Pomerantz's (2009) analyses, these models indicated that although American and Chinese children did not differ in the value they place on school or their engagement during the fall of seventh grade (standardized estimates = −.02 for value and −.03 for engagement, *ns*), the trajectories over the seventh and eighth grades differed (standardized estimates = .24 for both value and engagement, *p*s < .001): American (slope estimate = −.10, *SE* = .02, for value and −.07, *SE* = .01, for engagement, *p*s < .001) but not Chinese (slope estimate = .03, *SE* = .02, for value and −.01, *SE* = .01, for

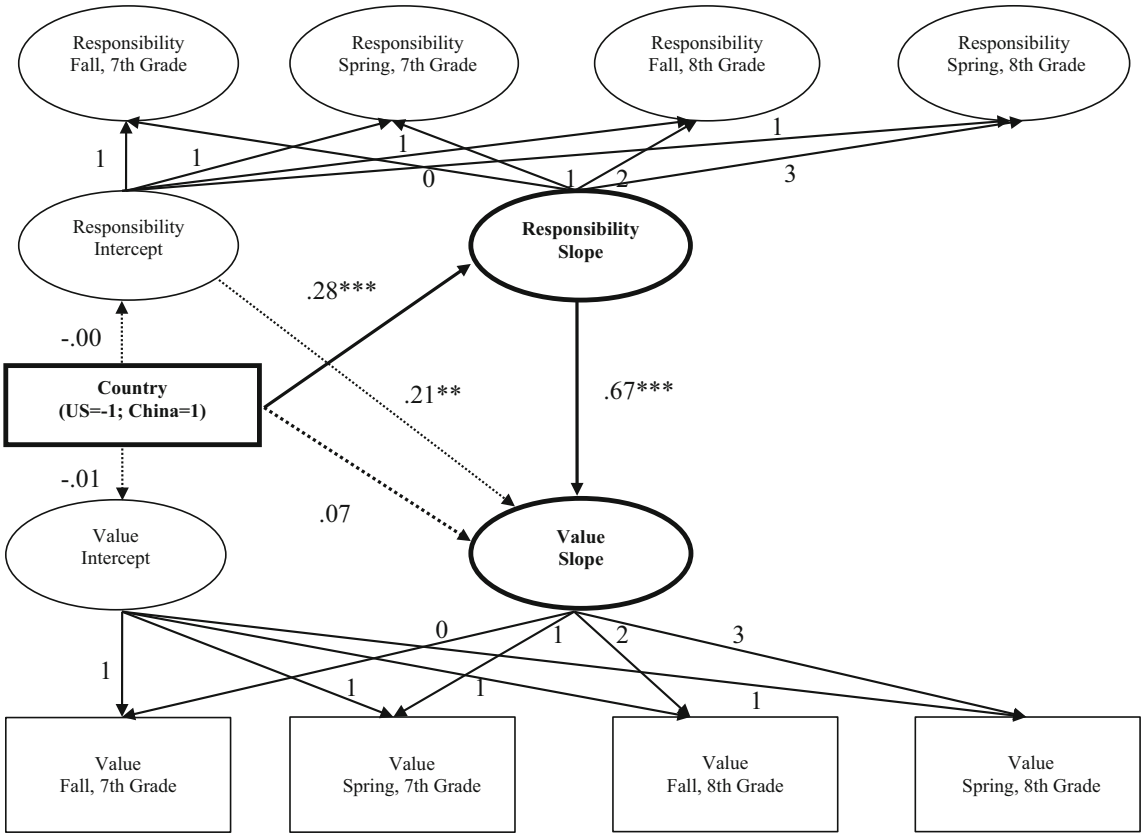


**Fig. 1** Differences in the trajectories of American and Chinese children's value are mediated by differences in the trajectories of their sense of responsibility to parents. Children's feelings of obligation to parents and parent-oriented motivation in school served as indicators of their sense of responsibility to parents. The intercept and slope for each construct were allowed to freely correlate. Coefficients are standardized estimates. The Sobel test for the indirect effect was significant, $z = 4.26$, $p < .001$. *** $p < .001$

engagement, *ns*) children had declining trajectories over the four waves (see Figs. 2, 3, panel a).

## Evaluation of the Indirect Effects

Given the existence of the total effect, we next evaluated the links comprising the indirect effect (i.e., the IV → the mediator → the DV) key to each of the three mediating hypotheses. For each hypothesis, we tested the mediating role of the intercept (i.e., what children bring to middle school) and slope (i.e., changes among children over middle school) of the hypothesis' mediator (e.g., sense of responsibility) simultaneously (for an example, see Fig. 1). Each hypothesis was tested with a separate model yielding three models for each approach to school (i.e., value and engagement).

### *The Sense of Responsibility to Parents Hypothesis*

Consistent with findings in Pomerantz et al.'s (2011) analyses, as depicted in Fig. 1 (see also Tables 2, 3), American and Chinese children did not differ in their sense of responsibility to parents in the fall of seventh grade (i.e., the intercept). The sense of responsibility to parents intercept was predictive of children's value, but not engagement trajectory. Meeting the second criteria set forth by Baron and Kenny (1986) that the IV predicts the mediator, the trajectory of children's sense of responsibility to parents differed by country, such that American but not Chinese children's sense of responsibility to parents declined over the seventh and eighth grades (slope estimate $= -.07$, $SE = .01$, $p < .001$, for Americans and .01, $SE = .01$, *ns*, for Chinese) (see Pomerantz et al. 2011). In line with the third criteria for mediation that the mediator predicts the DV, the responsibility trajectory was positively associated with both the value and engagement trajectories, such that the more children maintained their sense of responsibility to parents over the seventh and eighth grades, the more they maintained the value they placed on school and their engagement. The Sobel test indicated that the indirect effects from country to the responsibility trajectory to the value and engagement trajectories were significant, $zs > 4.25$, $ps < .001$. Moreover, with the inclusion of the trajectory of children's sense of responsibility to parents in the model, the difference in American and Chinese children's value and engagement trajectories

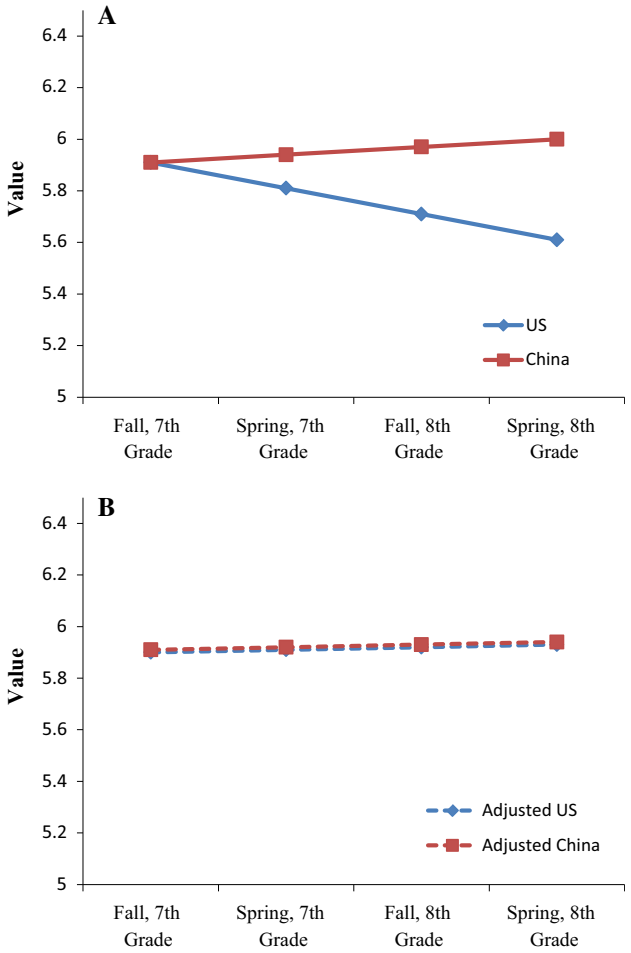


**Fig. 2** Trajectories of children's value over the seventh and eighth grades in the United States and China before (**a**) and after (**b**) adjusting for the trajectories of children's sense of responsibility to parents. The trajectories are estimated from the two-group nested SEM models with constrained intercepts and unconstrained slopes for American and Chinese children's value in **a**, and constrained intercepts and slopes in **b**

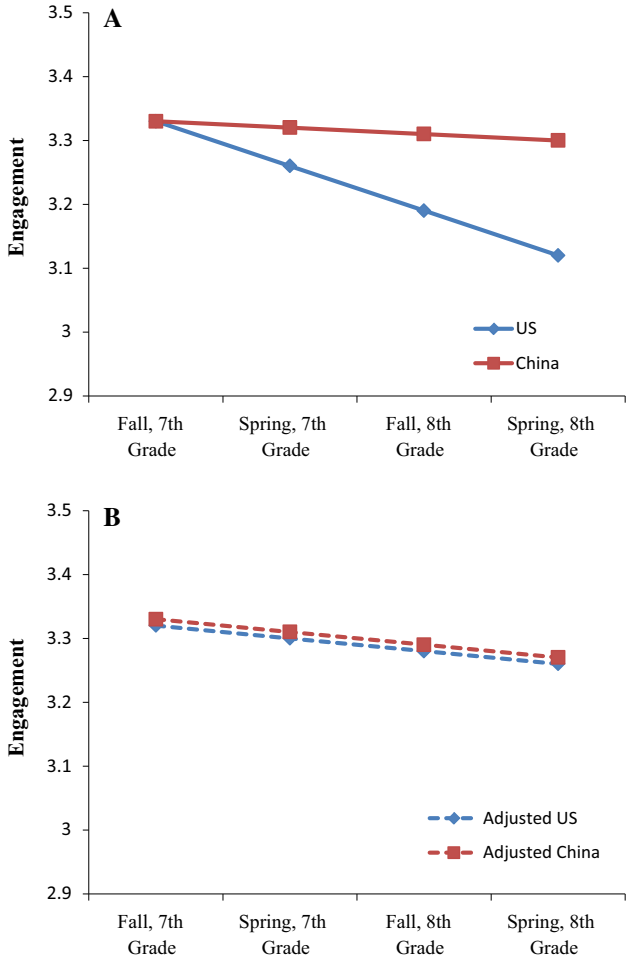


**Fig. 3** Trajectories of children's engagement in school over the seventh and eighth grades in the United States and China before (**a**) and after (**b**) adjusting for the trajectories of children's sense of responsibility to parents. The trajectories are estimated from the two-group nested SEM models with constrained intercepts and unconstrained slopes for American and Chinese children's engagement in **a**, and constrained intercepts and slopes in **b**

were no longer significant (see Tables 2, 3); the original differences were reduced by over 72 %.

### *The Parents' Involvement in Children's Learning Hypothesis*

A second model was examined to test whether parents' involvement in children's learning contributes to American and Chinese children's divergent value and engagement trajectories (see Tables 2, 3). Country was associated with the intercept of parents' involvement in children's learning: Consistent with Cheung and Pomerantz's (2011) analyses, American (vs. Chinese) parents were less involved in children's learning at the beginning of seventh grade (intercept). However, the involvement intercept was not associated with children's value or engagement trajectories, thereby making an indirect effect impossible. In terms of the trajectory of parents' involvement, the difference in American and Chinese parents' involvement was maintained over time as there was no difference in the downward trajectory of such parenting (slope estimates $= -.07$, *SE*s $= .01$, for both American and Chinese children, $ps < .001$; see Cheung and Pomerantz 2011). The involvement trajectory was positively associated with the value and engagement trajectories, but because there was no country difference in the involvement trajectory, it was not a mediator as indicated by the Sobel test for the indirect effect, zs $< 1.08$, *ns*.

### *The Autonomous Motivation in School Hypothesis*

Consistent with Wang and Pomerantz's (2009) analyses, the intercept of children's autonomous motivation differed by country, such that American children were less

**Table 2** Child value: standardized estimates from mediation models

| Effect | Mediator model | | |
|---|---|---|---|
| | Sense of responsibility to parents | Parental involvement in child learning | Child autonomous motivation |
| Effect of country | | | |
| Mediator intercept | −.00 | .41*** | .43*** |
| Mediator slope | .28*** | .07 | −.12* |
| Value slope | .07 | .19** | .18** |
| Effect of mediator on value slope | | | |
| Mediator intercept | .21** | .08 | .10 |
| Mediator slope | .67*** | .35** | −.12 |

For country, the United States = −1 and China = 1

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

**Table 3** Child engagement: standardized estimates from mediation models

| Effect | Mediator model | | |
|---|---|---|---|
| | Sense of responsibility to parents | Parental involvement in child learning | Child autonomous motivation |
| Effect of country | | | |
| Mediator intercept | −.01 | .42*** | .44*** |
| Mediator slope | .29*** | .07 | −.12* |
| Engagement slope | .03 | .21** | .31*** |
| Effect of mediator on engagement slope | | | |
| Mediator intercept | −.01 | −.08 | −.07 |
| Mediator slope | .73*** | .72*** | .42*** |

For country, the United States = −1 and China = 1

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

autonomously motivated at the beginning of seventh grade than were Chinese children (see Tables 2, 3). However, the autonomous motivation intercept did not predict children's value or engagement trajectories. The trajectory of children's relative autonomy also differed by country, such that there was a decline in relative autonomy among Chinese (slope estimate = −.12, $SE = .04$, $p < .01$) but not American (slope estimate = .02, $SE = .05$, *ns*) children (see Wang and Pomerantz 2009). The trajectory was not associated with the value trajectory, with no mediation, as indicated by the Sobel test, z = 1.24, *ns*. The autonomous motivation trajectory was associated with the engagement trajectory: The more children maintained their autonomous motivation over the seventh and eighth grades, the more they maintained their engagement. Notably, the signs of the path from the country (i.e., the IV) to the autonomous motivation trajectory (i.e., the mediator) and from the autonomous motivation trajectory to the engagement trajectory (i.e., the DV) were not of the same valence. Thus, the inclusion of children's relative autonomy trajectory in the model made the country difference in children's engagement strategies trajectory larger (see Table 3), with the Sobel test indicating a suppression effect of the difference in American and Chinese children's engagement trajectory due to the difference in their autonomous motivation trajectories, z = −4.03, $p < .001$.

## Additional Evaluation of the Sense of Responsibility to Parents Hypothesis

The results from the SEM analyses supported the sense of responsibility to parents hypothesis and not the other hypotheses. Hence, we further investigated the sense of responsibility to parents hypothesis in three ways. First, although the other hypothesized mediators were not significant, they could still account for a substantial portion of the trajectory of children's sense of responsibility to parents. To examine this possibility, we included the intercepts and slopes of the other potential mediators (e.g., parents' involvement in children's learning) one at a time in the model depicted in Fig. 1 along with children's sense of responsibility to parents to identify the unique effect of children's sense of responsibility to parents. Each of the links comprising the indirect pathway via children's sense of responsibility to parents trajectory remained significant with the inclusion of the other potential mediators in the model. Moreover, the Sobel tests revealed significant indirect effects via the sense of responsibility trajectories, $zs > 2.59$, $ps < .01$, accounting for 65 to 87 % of the variance.

Second, our approach in conducting the analyses was to ensure the most comprehensive representation of sense of responsibility to parents construct by using the two forms of such responsibility as indicators of this latent construct; this also permitted fewer models. However, it is possible that in taking this approach we overgeneralized the phenomenon—for example, it may be that the trajectory of only one form of children's sense of responsibility to parents plays a mediating role. To ensure this was not the case, we conducted the analyses using the indicators of sense of responsibility to parents on their own (e.g., feelings of obligation predicting value). This yielded a total of four models examining mediation as in Fig. 1, but using the indicators themselves of the sense of responsibility to parents construct, rather than the latent construct. All four models yielded links practically identical to that using the

latent constructs. The Sobel test indicated, that regardless of form, the responsibility trajectories mediated the country difference in the value and engagement trajectories, $zs > 3.68$, $ps < .001$. The differences in American and Chinese children's value and engagement trajectories were reduced to nonsignificance (standardized estimates = −.06 to .11, *ns*), with the reduction ranging from 81 to 125 %.

Third, to unpack the implications of the mediation process for children's school trajectories, we evaluated how the value and engagement trajectories in each country (see Figs. 2, 3, panel a) changed when controlling for the responsibility trajectories. To this end, we used two-group nested SEM models to examine country differences in the school trajectories over early adolescence, adjusting for the responsibility trajectories. The constrained models forcing the value and engagement intercepts and slopes to be equal between the two countries, $\chi^2s < 498.37$, CFIs > .91, TLIs > .90, RMSEAs < .06, fit the data as well as the baseline models, $\chi^2s < 497.65$, CFIs > .91, TLIs > .90, RMSEAs < .06, in which these two parameters were allowed to vary between countries, $\Delta\chi^2s < 1.31$, indicating similarity between American and Chinese children's value and engagement trajectories over the seventh and eighth grades. Both American and Chinese children maintained the value they placed on school (slope estimates = .01, *SE*s = .02, for both American and Chinese children, *ns*) and their engagement (slope estimates = −.02, *SE*s = .01, for both American and Chinese children, *ns*) over the seventh and eighth grades when controlling for their responsibility trajectories (see Figs. 2, 3, panel b).

## Discussion

Despite middle school reforms over the last two decades, American children's approach to school continues to deteriorate during the early adolescent years (e.g., McGill et al. 2012; Wang and Eccles 2012a, b). This may lead some to conclude that the movement away from school is an inevitable part of children's entry into adolescence. However, a recent report using the same data set as the current report suggests that declining interest in learning does not necessarily translate into decrements in the value children place on school or their engagement in school in China (Wang and Pomerantz 2009). By testing three theory-based mediation hypotheses, we provided insight into why children's approach to school as manifest in the value they place on school and their engagement in school may deteriorate over the middle school years in the United States but not China: Over 70 % of the differences in American and Chinese children's school trajectories were accounted for by the tendency for American but not Chinese children's sense of responsibility to parents to decline during this phase of development. Taken with prior findings that children's sense of responsibility to parents predicts how they approach school controlling for their earlier approach (Pomerantz et al. 2011), these findings suggest that efforts to support children in preserving their sense of responsibility to parents as they enter adolescence in the United States may be useful in maintaining the value children place on school and their engagement in school.

### Distinguishing Three Mediation Hypotheses

The finding that the divergent trajectories in the value American and Chinese children place on school and their engagement in school over the early adolescent years are accounted for by divergent trajectories in children's sense of responsibility to parents over these years was quite robust. Not only was it substantial in the proportion of variance for which it accounted, but it was also evident across two forms of children's sense of responsibility—their feelings of obligation to parents and motivation in school to please parents. In addition, the early adolescent trajectories of children's sense of responsibility to parents served as a mediator when theory-based alternative mechanisms were included in the analyses as covariates. Specifically, the mediating role of such trajectories was not accounted for by the tendency for American (vs. Chinese) parents to be less involved in children's learning during middle school; it was also not due to American children being less autonomously motivated in school than their Chinese counterparts. It may not only be the climate of American middle schools that leads to children's movement away from school as suggested by prior theory and research (e.g., Eccles et al. 1993), but also children's connections to parents as manifest in their sense of responsibility to them in the United States.

Our evaluation of the theory-based mediation hypotheses revolving around parents' involvement in children's learning and children's autonomous motivation provided little support for these hypotheses. Whereas the sense of responsibility to parents hypothesis focused on the mediating role of differences in how American and Chinese children navigate early adolescence, these hypotheses focused on differences in what American and Chinese children bring to this phase of development. Counter to the parental involvement in children's learning hypothesis, parents' involvement as children entered middle school was not associated with children's value and engagement trajectories over this phase of development. Moreover, there were similar declines in both American and Chinese parents' involvement. Hence, despite the positive association between parents' trajectories of involvement and children's trajectories of the value they place on school and their engagement, parents' trajectories of involvement were

not a viable mediator. This is not to say that differences in American and Chinese parents' involvement do not play a role in how children approach school. It may do so prior to adolescence or even during adolescence, but for approaches for which there are not divergent trajectories in the United States and China such as is the case for children's interest in learning.

Similarly, although American children entered middle school less autonomously motivated in school than did their Chinese counterparts, such a motivational orientation did not predict children's value or engagement trajectories. Although Chinese children are more autonomously motivated than their American counterparts before and as they enter adolescence (e.g., Stevenson et al. 1990; Wang and Pomerantz 2009), their autonomous motivation trajectory—but not that of American children—declines over this phase of development, albeit not to such an extent that they lose their motivational edge (Wang and Pomerantz 2009). Children's autonomous (vs. controlled) motivation trajectories were positively associated with their engagement trajectories, but because Chinese children's autonomous motivation declined to a greater extent did that of American children, there was actually an indirect suppression effect: Once the differences in American and Chinese children's autonomous motivation trajectories were taken into account, the differences in their value and engagement trajectories became even larger, suggesting that if Chinese children's autonomous motivation did not decline, children's school trajectories as manifest in the value they place on school and their engagement would be even more divergent in the United States and China.

## Limitations and Future Directions

Several limitations of the current research necessitate interpreting the findings with caution, while also setting the stage for future research. First, the associations between the responsibility and school trajectories we identified do not provide a window into the direction of effects. However, prior analyses of this data set examining the effect of children's sense of responsibility to parents on their subsequent value and engagement in school, adjusting for their earlier value and engagement as well as the quality of their relationships with parents (Pomerantz et al. 2011) suggest that the association is due at least in part to the role of children's sense of responsibility to parents. However, the association between the responsibility and school trajectories may reflect transactions between children's sense of responsibility to parents and their value and engagement in school: For example, children's sense of responsibility to parents may facilitate their engagement, which in turn facilitates their sense of responsibility to parents as they feel that they are capable of meeting their responsibilities via their engagement in school.

Second, due to the focus on normative differences between the United States and China, we did not examine variation within each country. In both the United States and China, children vary in their trajectories of sense of responsibility to parents as well as the value they place on school and their engagement in school, such that not all children adhere to the culturally normative trends (Pomerantz et al. 2011; Wang and Pomerantz 2009). American children's approach to school may not deteriorate over early adolescence if their environment affords psychological resources supporting it. For example, studying American children, Wang and Eccles (2012a) found that the more social support from parents and teachers increased over adolescence, the less children's engagement decreased. Our samples in each country were ethnically and geographically homogenous, but within each country there may be variation due to ethnic and geographic influences. There is also some evidence that girls and boys' engagement in school differs in the United States as well as China (e.g., Kenney-Benson et al. 2006; Wang and Pomerantz 2009). It is of note that a set of supplementary analyses demonstrated that the mediation effects of children's sense of responsibility to parents we examined do not differ among girls and boys in either country.

Third, key for future research is to elucidate the cultural forces that allow children to maintain their sense of responsibility to parents over the initial adolescent years. We have suggested that different conceptions of adolescence in the United States and China (i.e., establishing independence from parents versus fulfilling obligations to parents) play a role. Such conceptions, however, need empirical examination in the two countries. Moreover, it will be critical to identify how conceptions of adolescence ultimately influence children such that their trajectories of sense of responsibility to parents during early adolescence decline in the United States but not China. It is likely that multiple forces are involved. For example, parents may play a fundamental role (e.g., by setting clear expectations for children to act as responsible members of the family), but so may peers (for a model of peers as agents of cultural socialization, see Chen 2012) who are often particularly influential—at least in the United States—as children navigate adolescence (Brown 2004). For example, American (vs. Chinese) children may be less accepting of their peers working to fulfill obligations to parents over the middle school years. Indeed, in the United States, highly engaged children are seen as less "cool" in middle (vs. elementary) school (e.g., Galvan et al. 2011).

## Conclusions

There has been much attention to understanding why American children move away from school over the middle school years (e.g., Eccles et al. 1993; Juvonen et al. 2004). Much of the attention has focused on understanding the role of children's school climate (e.g., Jia et al. 2009; Wang and Eccles 2012a; Yang et al. 2013). Using a cultural framework, the current research suggests that although such a climate may be important, so too are children's relationships with parents. When children maintain their connectedness to parents over middle school, they may continue to see the value of school and stay engaged. The achievement gap between American and Chinese children starts far before children enter adolescence—at least in math (Siegler and Mu 2008). However, Wang and Pomerantz's (2009) findings that there is a decline in the value children place on school and their engagement in school over early adolescence in the United States but not China suggest that the achievement gap may increase during this phase of development. The current research extends the prior findings in revealing that American and Chinese children's divergent school trajectories during middle school are accounted for by the tendency of American but not Chinese children to feel less responsible to parents over this time. As such, the research points to the usefulness of efforts aimed at maintaining American children's sense of responsibility to parents during early adolescence; such efforts may reduce American vulnerability in regards to how children approach school at this time, which may ultimately reduce the achievement gap between children in the United States and China.

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