The Cost of Materialism in a Collectivistic Culture: Predicting Risky Behavior Engagement in Chinese Adolescents

Randy P. Auerbach [a]; Chad M. McWhinnie [a]; Marc Goldfinger [a]; John R. Z. Abela [b]; Xiongzhao Zhu [c]; Shuqiao Yao [c]

[a] Department of Psychology, McGill University, [b] Department of Psychology, Rutgers University, [c] Medical Psychological Research Center, Central South University,

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Randy P. Auerbach, Chad M. McWhinnie, and Marc Goldfinger
Department of Psychology, McGill University

John R. Z. Abela
Department of Psychology, Rutgers University

Xiongzhao Zhu and Shuqiao Yao
Medical Psychological Research Center, Central South University

The goals of the current study were to examine whether (a) negative events mediate the relationship between materialism and risky behavior engagement and (b) materialism moderates the relationship between stress and engagement in risky behaviors in Chinese youth. At Time 1, 406 adolescents (ages 14–19) from Yue Yang, China, completed measures assessing engagement in risky behaviors and the occurrence of negative events. Follow-up assessments occurred once a month for 6 months. In line with our hypotheses, results of hierarchical linear modeling analyses indicated that higher levels of negative events mediated the relationship higher levels of materialism and greater risky behavior engagement. In addition, adolescents who exhibited higher levels of materialism were more likely than adolescents possessing lower levels of materialism to report increased engagement in risky behaviors in response to negative life events. At the same time, the effect was only present in boys. Unexpectedly, girls who reported lower levels of materialism also exhibited increased engagement in risky behaviors in response to negative events.

Materialism is the belief that an individual's worldly possessions are the greatest source of life satisfaction (Belk, 1985), and there is a large corpus of research suggesting that materialistic tendencies, disproportionately valuing ideals such as financial success, social recognition, and appealing appearance, are associated with reduced well-being (Kasser, 2002; Kasser & Ryan, 2001). To date, the vast majority of research examining materialism has utilized Western samples as such cultures typically embrace more consumer-oriented and capitalistic values, and results have indicated that higher levels of materialism among adolescents are associated with poorer school performance, fewer prosocial behaviors, and greater risky behavior engagement (Kasser, 2002). At the same time, as countries such as mainland China are experiencing widespread social and economic change, researchers have begun to explore the burgeoning role that materialism may play (e.g., Rosen, 2003).

In recent years, China has embraced a more capitalistic model that encourages the accumulation of personal wealth (Drissel, 2006; Kwong, 1994; Rojek, 2001). Such a shift in social values has resulted in younger generations embracing more individualistic values which may be coming into conflict with the collectivistic values of older generations (Chan, 2005; Deutsch, 2004; Drissel, 2006; Rosen, 2003; Yan, 1999). Recent research suggests

that Chinese adolescents may be endorsing higher levels of materialism (Chan, 2005; Pollay, Tse, & Wang, 1990; Rosen, 2003). Although no research to date has examined changing levels of materialism among adolescent populations over time, Rosen found that Chinese secondary school students endorsed higher levels of materialism as compared to adults. More specifically, students were more likely to endorse aspirations of wealth such as owning expensive goods, being a millionaire, and becoming boss of a corporation, and in contrast, adults reported aspirations more in line with collectivistic values including family cohesion, moderation, and self-sacrifice. As higher levels of materialism in Western adolescents are associated with greater engagement in risky behaviors, mainland China's ongoing ideological shift may be of particular concern for younger individuals (Kasser, 2002).

RISKY BEHAVIOR ENGAGEMENT IN MAINLAND CHINA

Although no research has examined the relationship between materialism and risky behavior engagement in Chinese adolescents, cross-sectional research examining Western samples has indicated that higher levels of materialism are associated with greater engagement in risky behaviors including vandalism, school truancy, and carrying weapons (e.g., Cohen & Cohen, 1996; Faber & O'Guinn, 1992; Kasser & Ryan, 2001; Rindfleisch, Burroughs, & Denton, 1997; Williams, Cox, Hedberg, & Deci, 2000). In addition, in a cross-sectional study of a sample of 271 adolescents ages 15 to 18, higher levels of materialism were associated with greater engagement in risky behaviors including sexual precociousness, as well as consumption of alcohol, cigarettes, and marijuana. Similarly, in a cross-sectional study examining 261 individuals between the ages of 18 and 21, results indicated that higher levels of materialism were associated with greater use of cigarettes, alcohol, marijuana, and other illicit drugs, as well as a higher frequency of substance abuse (Kasser & Ryan, 2001). Further, research has found that higher levels of materialism, as opposed to lower levels, were cross-sectionally associated with a greater occurrence of compulsive spending (Rindfleisch et al., 1997).

Although a growing body of research has established a clear link between materialism and risky behavior engagement, less research has delineated the mechanisms that underscores this association. Three mechanisms accounting for such a relationship may be that materialistic values are associated with unstable, contingent-based self-esteem, greater interpersonal difficulties, and impulsive personality characteristics (Kasser, 2002; Pirog & Roberts, 2007). First, when

individuals' assessment of their self-worth is intrinsically tied to external rewards including money, consumer goods, and status, they are likely to experience dramatic dips in their self-esteem when materialistic needs remain unfulfilled (Abela, Auerbach, Ho, Webb, & McWhinnie, 2009; Kasser, Ryan, Couchman, & Sheldon, 2004). Second, as materialistic individuals place a premium on actualizing goals centered on the attainment of wealth and status, these individuals have a tendency to treat people as instruments in their pursuit of materialistic needs. As a result, less effort and emphasis is spent on developing healthy interpersonal relationships, and consequently, interpersonal conflicts often emerge (Kasser, 2002). Last, research suggests that impulsiveness is closely associated with materialistic tendencies (e.g., shopping and credit card misuse; Pirog & Roberts, 2007), and similarly, impulsiveness also underlies a greater occurrence of negative events and risky behavior engagement (Auerbach & McWhinnie, 2009; Yao et al., 2007). Risky behavior engagement may play a dual role in these circumstances. On one hand, risky behaviors may provide temporary relief in order to cope or escape the painful negative affect associated with low self-esteem and interpersonal conflicts (e.g., Shrier, Harris, Sternberg, & Beardslee, 2001). Alternatively, risky behaviors may also provide a means by which adolescents may attempt to gain status among their peer group thereby satisfying the aspiration of being valued by others (e.g., Prinstein, Boergers, & Spirito, 2001).

NEGATIVE LIFE EVENTS

Past research has also found that stress is a significant cross-sectional (Bao, Haas, & Pi, 2004; Li, Fang, & Stanton, 1999; Li, Fang, Stanton, Feigelman, & Dong, 2003; Liu & Lin, 2007; Liu, Tein, & Zhao, 2004; Unger et al., 2001b) and prospective (Auerbach, Abela, Zhu, & Yao, 2007) predictor of risky behavior engagement among Chinese adolescents. These findings suggest that risky behavior engagement provides a "quick fix" following the occurrence of negative events given that such behaviors may provide short-term relief despite potential long-term negative consequences (Auerbach, Claro, Abela, Zhu, & Yao, 2009; Cooper, Wood, Orcutt, & Albino, 2003). For example, Unger and colleagues (2001b) found that the occurrence of negative life events including academic failure, punishment from parents, and peer conflict was cross-sectionally associated with greater engagement in risky behaviors such as smoking cigarettes and alcohol use in a sample of Chinese adolescents. Similarly, research examining Chinese adolescents indicated that higher levels of stress as a result of poor grades, negative interpersonal relationships, and disappointment with one's physical

appearance was cross-sectionally associated with a greater incidence of delinquent behavior (e.g., dishonesty, cheating, law breaking; Liu & Lin, 2007). Recent longitudinal research examining the relationship between stress and risky behaviors has reported similar findings. In a 6-month multiwave, longitudinal study, Auerbach and colleagues (2007) found that negative life events (e.g., failing a test, relationship difficulties, and family conflict) interacted with maladaptive emotion regulation strategies to prospectively predict increased risky behavior engagement (e.g., unsafe sex, aggression, and substance use).

GOALS OF THE CURRENT STUDY

To date, no research has examined the prospective relationship between materialism, negative events, and risky behavior engagement in Chinese adolescents. Such research is warranted to understand the psychosocial impact of materialistic values on Chinese adolescents, given that models developed in Western contexts cannot automatically be extended to Chinese individuals. In line with a transactional perspective, we hypothesized that materialistic individuals would report a greater occurrence of negative events, and subsequently, engage in greater number of behaviors (i.e., mediation). Such a model seems plausible given that materialistic individuals have impulsive tendencies and are "stress generators" (see Auerbach & McWhinnie, 2009), and thus may utilize risky behaviors as means of escape.

Alternatively, as higher levels of materialism and the occurrence of negative events are independently associated with higher levels of engagement in risky behaviors, we also hypothesized that materialism may moderate the relationship between negative events and subsequent risky behavior engagement. Following the occurrence of negative events, materialistic individuals may experience a double bind. More specifically, as materialistic individuals do not typically cultivate meaningful relationships, they may have fewer interpersonal resources to help effectively manage issues and emotions surrounding negative events. Further, such individuals also have a tendency to act impulsively forgoing long-term benefits for short-term relief (Pirog & Roberts, 2007). Thus, materialistic individuals may utilize risky behaviors in an effort to address the painful affect and consequences associated with negative events rather than employing more effective long-term problem solving strategies.

As past research has found that adolescent boys exhibit a greater frequency of antisocial behaviors (Bettencourt & Miller, 1996), we also examined whether gender predicted differential outcomes in boys as opposed to girls reporting higher levels of materialism.

More specifically, research has indicated that boys have a tendency to react to the occurrence of negative events in more destructive ways (e.g., Lindeman, Harakka, & Keltikangas-Järvinen, 1997), and thus, we hypothesized that adolescent boys would engage in a greater frequency of risky behaviors as compared to girls.

METHOD

Participants

Participants in the current study were recruited from an urban high school in Yue Yang, Hunan (China). The final sample consisted of 406 high school students (49.8% boys) whose ages ranged from 14 to 19 ($M = 16.18$, $SD = 0.95$). The sample was 97.1% Han and 2.9% ethnic minority. The monthly income of the participants' families varied significantly: $14.4\% < 1,000$ RMB, 25.1% 1,000–1,500 RMB, 19.0% 1,500–2,000 RMB, 15.8% 2,000–3,000 RMB, 10.0% 3,000–4,000 RMB, and 3.6% 4,000–5,000 RMB. The income distribution in Yue Yang is consistent with middle-class communities across mainland China. With regards to family composition, participants reported the following: 89.3% nuclear families, 6.1% divorced families, 2.2% remarried families, and 1.2% single-parent families.

Procedure

Approval for the study was granted by McGill University's ethics board, and the treatment of participants was in accordance with American Psychological Association ethical standards. Prior to the initial assessment, letters of informed consent detailing the aim of the present study were sent home to adolescents from participating classrooms in the high school. The adolescents were a representative sample, and the students who participated were intended to be a representative cross-section of the school as well as the community. After the consent forms were collected, researchers went to each school to meet with participating students. No student who received parental consent chose not to give personal consent. Consent was greater than 95% for all classes. During the initial assessment, which occurred during class time on school grounds, students completed a demographics form and the following questionnaires: Risky Behavior Questionnaire for Adolescents (RBQ-A; Auerbach & Abela, 2008), Adolescent Life Events Questionnaire (ALEQ; Hankin & Abramson, 2002), and and the Aspiration Index (AI; Kasser & Ryan, 1993). Follow-up assessments occurred once a month for 6 months (Times 2–7). At each follow-up, participants completed the RBQ-A and ALEQ.

With regards to our follow-up period, assessments were spaced close enough together to enable participants to accurately recall events that had occurred within their life but far enough apart such that individuals would experience changes in their levels of negative events and risky behavior engagement. With such research, 4 to 6 weeks has become the most commonly used interval between the initial and follow-up assessments. In addition, as our dependent variable is the slope of the relationship between negative events and risky behavior engagement, the six follow-up observations enable a more reliable estimate of the slope.

Measures

The Chinese version of all self-report measures was developed using the back-translation method. First, the original version was translated into Chinese by a bilingual translator from the psychology department at Central South University (Changsha, Hunan). Next, the Chinese version was back-translated into English by another bilingual translator from the psychology department at McGill University. If discrepancies among the translations arose in the back-translation, the translators willingly worked to make corrections to the Chinese version of the questionnaires.

RBQ-A (Auerbach & Abela, 2008).   The RBQ-A is a 20-item self-report measure that was created to assess frequency of engagement in the following types of risky behaviors in the past month: (a) unsafe sexual practices; (b) aggressive and/or violent behaviors; (c) rule breaking; (d) dangerous, destructive, and/or illegal behaviors; (e) self-injurious behaviors; and (f) alcohol and/or drug use. Examples of questions include "Have you had unsafe sex," "Have you destroyed property (other than your own)," and "Have you used illegal drugs?" Respondents reported the frequency of their engagement of the aforementioned behaviors using the following scale: *never, 1 time per month, 2–4 times per month, 2–3 times per week*, and *4 times or more per week*. Research examining the reliability and validity of the RBQ-A has found strong internal consistency (Cronbach's $\alpha = 0.95$), strong correlations between self- and peer-report ($r = .85, p < .01$), and significant positive correlations with measures of impulsivity ($r = .39, p < .01$), alcohol use ($r = .48, p < .01$), and negative consequences of alcohol use ($r = .33, p < .01$; Auerbach & Abela, 2008). In the current study, the Cronbach's alpha ranged from 0.81 to 0.85 across administrations indicating strong internal consistency.

ALEQ (Hankin & Abramson, 2002).   The ALEQ is a self-report questionnaire that was developed to assess a broad range of negative life events (e.g., school/ achievement problems, friendship and romantic problems, and family problems) occurring in the past month. Examples of questions include "You fought with your parents over your personal goals, desires, or choice of friends"; "You did poorly on or failed a test or class project"; and "You had an argument with a close friend." Participants were asked to indicate how often such events occurred on a Likert scale ranging from 0 (*never*) to 4 (*always*), with higher scores reflecting a greater number of negative life events. Past research has provided evidence support the reliability and validity of the ALEQ (Hankin & Abramson, 2002). In the current study, the Cronbach's alphas ranged from 0.92 to 0.96, indicating high internal consistency.

AI (Kasser & Ryan, 1993).   The AI is a 35-item self-report questionnaire, and each item utilizes the question prompt, "How important is this." Examples of questions include "To be a very wealthy person," "To have many expensive possessions," "To be famous," and "To have an image that others find appealing." Items on the scale range from 1 (*not at all*) to 7 (*very*), and higher scores reflect greater intrinsic and extrinsic goals. Whereas intrinsic goals are comprised of the subscales Self-Acceptance, Affiliation, and Community Feeling, extrinsic goals are the sum of subscales pertaining to Financial Success, Social Recognition, and Appealing Appearance. Past literature has utilized the AI to assess materialism (Kasser, Ryan, Zax, & Smeroff, 1995), and to do so, the following steps were taken. First, the Extrinsic Values scale was created by summing the Financial Success, Social Recognition, and Appealing Appearance subscales. Second, the Intrinsic Values subscale was created by summing the Self-Acceptance, Affiliation, and Community Feeling subscales. Last, in line with Kasser and Ryan's (1996) approach, the mean score for the Extrinsic Values subscale was subtracted by the mean for the total score (i.e., sum of the Extrinsic and Intrinsic subscales). In doing so, it delineates the relative importance an individual places on extrinsic values. Past research using the AI has provided evidence to support the reliability and validity of the measure (Kasser & Ryan, 1996). In the present study, the Cronbach's alpha was 0.92, which indicates high internal consistency.

Overview of the Data Analytic Approach

To examine our proposed mediation model, we utilized idiographic, time-lagged multilevel modeling in which individuals were nested over time and followed the guidelines set forth by Bauer, Preacher, and Gil (2006). Such an approach is ideal for examining

mediation models that include repeated measures, and given that the model is estimated in a single equation, one can directly estimate the covariance of the random effects that are encompassed in different Level 1 and Level 2 models. Consequently, Bauer and colleagues' data analytic approach is preferable to mediation models that utilize a step-by-step process, which makes the implicit assumption that each of the steps is independent (e.g., Baron & Kenny, 1986; Kenny, Korchmaros, & Bolger, 2003). To examine whether the occurrence of negative events$_{(Time\ T-1)}$ mediated the relationship between materialism and risky behavior engagement$_{(Time\ T)}$, analyses were carried out using SAS (version 9.1) mixed procedure and maximum likelihood estimation. Our dependent variable was within-subject fluctuations in risky behavior engagement$_{(Time\ T)}$, which is a Level 1 variable. The primary predictor of risky behavior engagement was materialism, a between-subject and Level 2 variable, and the mediator was within-subject fluctuations of negative events$_{(Time\ T-1)}$, a Level 1 variable. Three additional effects were also included in this initial mean structure. First, to control for individual differences in parental income and baseline levels of risky behavior engagement, participant's parental income and initial risky behavior score was included in the model. Second, to account for individual variability in the average level of risky behavior engagement at his or her mean level of negative events, a random effect for intercept was included in the model. Last, given that the occurrence of negative events is a within-subject predictor whose effect is expected to vary from participant to participant, a random effect for slope was included in the model.

To test our hypothesis that higher levels of materialism moderated the relationship between negative events$_{(Time\ T-1)}$ and risky behavior$_{(Time\ T)}$, we also utilized idiographic, multilevel modeling. Our dependent variable was within-subject fluctuations in risky behaviors$_{(Time\ T)}$ during the follow-up interval. As risky behavior scores$_{(Time\ T)}$ are a within-subject variable, such scores were centered at each participant's mean such that scores reflect upward or downward fluctuations in an individual's level of engagement of risky behaviors compared to his or her mean level of engagement. Our primary predictors of risky behavior engagement$_{(Time\ T-1)}$ were materialism and fluctuations in negative events$_{(Time\ T-1)}$ during the follow-up interval. Prior to analyses, materialism scores, a between-subject variable, were standardized. As follow-up negative event scores$_{(Time\ T-1)}$ are a within-subject predictor, scores were centered at each participant's mean prior to analyses such that scores reflect upward or downward fluctuations in an individual's reported number of negative events as compared to his or her mean number of negative events. Similar to the mediation model just

described, parental income, baseline risky behavior scores, a random slope, and a random intercept were included in the model.

One advantage of utilizing a multiwave, idiographic approach is that by obtaining repeated assessments of risky behavior engagement and the occurrence of negative events within individuals over an extended period, we are able to gather a relatively reliable estimate of each individual's level of engagement in risky behaviors following the occurrence of negative events. A second advantage of an idiographic approach is that by nesting observations over time within individuals, high levels of negative events can be operationalized in reference to each individual's own mean level of negative events. Thus, such an approach likely minimizes the impact of individual differences in the reporting of negative events.

RESULTS

Descriptive Data

Means, standard deviations, and intercorrelations between all Time 1 measures are included in Table 1. Throughout the 6-month follow-up period, our retention rates were excellent. More specifically, the retention rates were as follows: (a) follow-up $1 = 99\%$, (b) follow-up $2 = 97\%$, (c) follow-up $3 = 95\%$, (d) follow-up $4 = 97\%$, (e) follow-up $5 = 95\%$, and (f) follow-up $6 = 89\%$. In addition, 88% of individuals ($n = 357$) completed the initial assessment as well as all of the six follow-up assessments.

Statistical Analysis for Mediation Model

Preliminary analyses indicated that none of the reported associations were moderated by gender, and therefore, analyses are presented for the entire sample as a whole. When examining the covariance structure, the best fit was the first-order autoregressive ($r = .32$, $p < .001$). After choosing the covariance structure, we next examined the random-effects component of our model.

TABLE 1
Means, Standard Deviations, and Pearson Correlations for Gender, Materialism, Initial Stress, and Initial Risky Behaviors

	1.	*2.*	*3.*	*4.*
1. Age	—			
2. Materialism	.00	—		
3. Initial Stress	.12*	.27***	—	
4. Initial Risky Behaviors	.09	.30***	.45***	—
M	16.18	−0.51	104.21	9.06
SD	0.95	0.53	21.62	6.42

*$p < .05$. ***$p < .001$.

TABLE 2
Time Lagged Mediation Model: Estimates of the Fixed Effects
Component

Predictor	Parameter Estimate (b)	Standard Error	t Value	df
Negative Events Model				
Income	−0.09	0.68	−0.13	3044
Initial Risky Behavior Engagement	6.38	1.10	5.80***	3044
Materialism	2.41	1.08	2.23*	3044
Risky Behavior(Time T) Model				
Income	0.04	0.12	0.39	3044
Initial Risky Behavior Engagement	1.87	0.19	9.69***	3044
Negative Events (Time T−1)	0.02	0.01	3.99***	3044
Materialism	0.19	0.18	1.02	3044

*$p < .05$. ***$p < .001$.

The random intercept ($r = 166.37$, $p < .01$) and random slope ($r = 7.13$, $p < .001$) were significant and thus retained in the model. The final results with respect to the fixed-effects component of the model are presented in Table 2. Of primary importance, a significant mediation model emerged. More specifically, when controlling for the proportion of variance accounted for by negative events$_{(Time\ T−1)}$ in predicting changes in follow-up risky behavior scores$_{(Time\ T)}$ ($b = .02$, SE = 0.01), $t(3044) = 3.99$, $p < .001$, a greater occurrence of negative events$_{(Time\ T−1)}$ fully mediated the relationship between high levels of materialism and greater risky behavior engagement$_{(Time\ T)}$ ($b = .19$, SE = 0.18), $t(3044) = 1.02$, ns (see Figure 1).

Statistical Analysis for Moderation Model

Preliminary analyses indicated that time-lagged models were not significant, and thus, contemporaneous models were estimated. The random intercept ($p < .001$), random slope ($p < .001$), and autoregressive covariance structure ($r = .36$, $p < .001$) were significant and thus were retained in the model. The final results with respect to the fixed-effects component of the model are presented in Table 3. Of primary importance, a significant two-way, cross-level interaction emerged between materialism and the occurrence of negative events. Predicted risky behavior engagement scores for individuals with low or high materialism scores (plus or minus 1.5 between-subject standard deviations) who were experiencing a low or high level of negative events (plus or minus 1.5 within-subject standard deviations) were estimated using the fixed effects model (see Figure 2). Analyses were conducted for each materialism condition examining whether the slope of the relationship between negative events and materialism significantly differed from 0. Although the occurrence of negative events was associated with

increases in risky behavior engagement scores for individuals possessing both high ($b = .15$), $t(1707) = 9.76$, $p < .001$, and low ($b = .10$), $t(1707) = 5.73$, $p < .001$, levels of materialism, the slope of this relationship is 1.5 times greater in individuals possessing a high materialism. Of importance, the difference between these two slopes was significant ($b = .06$), $t(1707) = 2.05$, $p < .05$.[1]

Statistical Analysis for Reverse Moderation Model

As the occurrence of negative events and risky behavior engagement were assessed contemporaneously, these analyses cannot ascertain with certainty the direction of the effect. More specifically, they cannot determine whether materialism scores interacted with the occurrence of negative events to predict increased engagement in risky behaviors or whether materialism scores interacted with engagement in risky behaviors to predict a greater frequency of negative events. Given this interpretational ambiguity, we conducted additional analyses examining the reverse model using the same data analytic approach used in our first set of analyses with the exceptions that (a) our dependent variable was fluctuations in negative event scores during the course of the study rather than fluctuations in risky behavior scores, and (b) and our within-subject predictor variable was fluctuations in risky behavior scores during the course of the study rather than fluctuations in negative events.

When examining the effects of materialism scores and risky behavior scores on an individual's negative events scores over the follow-up period, the random intercept ($p < .0001$), random slope ($p < .0001$), and autoregressive covariance parameter ($p < .0001$) were significant and thus, retained in the model When examining the fixed effects component of the reverse model, the two-way, cross-level interaction between materialism and risky behavior engagement was not significant ($b = −0.05$), $t(1702) = −0.45$, ns.

Moderation Model Examining Gender

To determine whether gender was a moderator of the interaction between materialism and negative events, we examined a model that included materialism, negative events, and gender, and all two- and three-way interactions. In addition, we controlled for the participant's family monthly income and initial risky

[1]Given that there may be overlap between interpersonal items contained within the ALEQ-R and RBQ-A, we have re-estimated all two- and three-way models after removing conceptually similar items from the ALEQ-R (i.e., 5 items). Despite removing these items, we obtained comparable results suggesting that our findings are not spurious in nature. Consequently, all analyses presented include the complete 57-item ALEQ-R and 20-item RBQ-A.
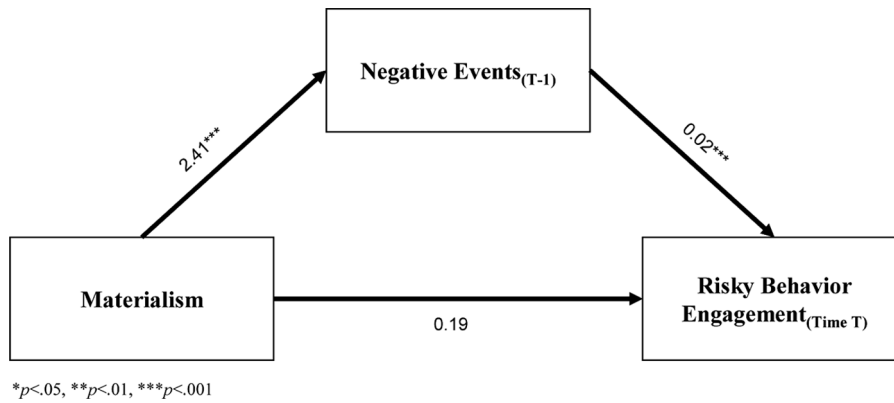
*p<.05, **p<.01, ***p<.001

FIGURE 1   Mediation model examining the relationship between materialism, negative events$_{(Time T-1)}$, and risky behavior engagement$_{(Time T)}$.

behaviors. Regarding random effects, the random intercept ($p < .001$), random slope ($p < .001$), and the autoregressive heterogeneous parameter ($p < .001$) were significant and were thus retained in the model. When examining the fixed effects component of the model, a significant three-way, cross-level interaction emerged between gender, materialism, and negative events. Using the fixed effects included in Table 4, we plotted the three-way interaction of predicted risky behavior scores for boys and girls with low or high materialism scores (plus or minus 1.5 between-subject standard deviations) who were experiencing a low or high level of negative events (plus or minus 1.5 within-subject standard deviations; see Figure 3). Analyses were conducted for boys and girls in each materialism condition examining whether the slope of the relationship between negative events and materialism significantly differed from 0. Among boys, the occurrence of negative events was associated with increases in risky behavior engagement for individuals possessing high ($b = .25$), $t(1705) = 7.73$, $p < .001$, but not low ($b = .06$), $t(1705) = 1.53$, ns, levels of materialism. Unexpectedly, among girls, the

occurrence of negative events was associated with increases in risky behavior engagement in girls possessing low levels of materialism ($b = .18$), $t(1705) = 2.83$, $p < .01$. At the same time, level of risky behaviors did not vary as a function of level of negative events for girls with higher levels of materialism ($b = -.06$), $t(1705) = -0.99$, ns.

Reverse Model Examining Gender

In the present study, the occurrence of negative events and the engagement in risky behaviors were assessed contemporaneously, and thus, the previous analyses

TABLE 3
Fluctuations in Follow-Up Risky Behavior: Estimates of the Fixed Effects Component for the Contemporaneous Model

Predictor	Parameter Estimate (b)	Standard Error	t Value	df
Income	0.11	0.12	0.93	360
Gender	−0.28	0.36	−0.80	360
Initial Risky Behavior Engagement	2.12	0.19	11.11***	360
Follow-Up Negative Events	0.13	0.01	13.80***	1707
Materialism	0.36	0.19	1.92*	360
Follow-Up Negative Events × Materialism	0.02	0.01	2.05*	1707

Note: Gender = coded variable (0 = boy and 1 = girl).
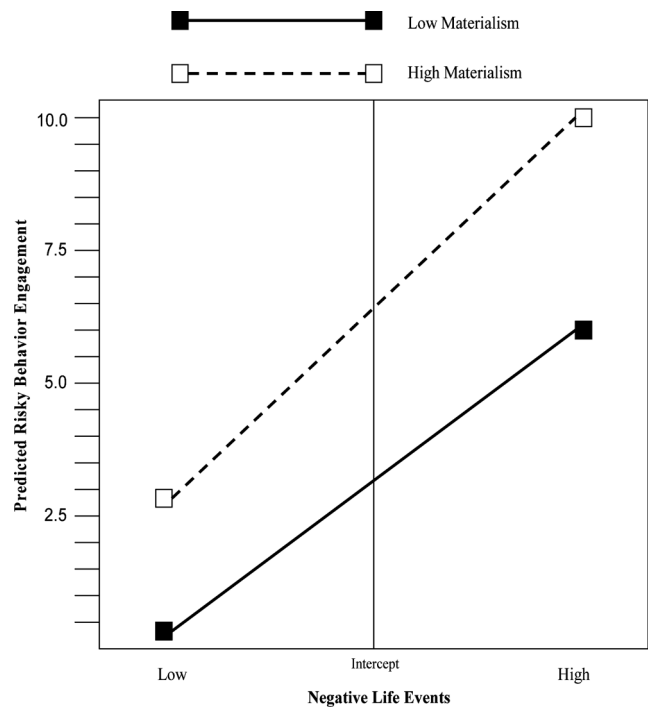*$p < .05$. ***$p < .001$.

FIGURE 2   Predicted risky behavior engagement scores as a function of materialism and the occurrence of negative events.

TABLE 4
Fluctuations in Follow-Up Risky Behavior: Estimates of the Fixed Effects Component for the Contemporaneous Model Examining Gender Differences

Predictor	Parameter Estimate (b)	Standard Error	t Value	df
Income	0.08	0.12	0.72	359
Gender	−0.12	0.37	−0.33	359
Initial Risky Behavior Engagement	2.03	0.19	10.70***	359
Follow-Up Negative Events	0.11	0.01	9.40***	1705
Materialism	0.14	0.25	0.58	359
Follow-Up Negative Events × Materialism	−0.01	0.01	−0.60	1705
Follow-Up Negative Events × Gender	0.31	0.02	1.89	1705
Materialism × Gender	0.36	0.35	1.03	359
Follow-Up Negative Events × Materialism × Gender	0.05	0.02	2.88**	1705

Note: Gender = coded variable (0 = boy and 1 = girl).

$^{**}p < .01.$ $^{***}p < .001.$

cannot ascertain with certainty the direction of the effect. We examined our reverse model utilizing the same data analytic approach just outlined when discussing the two-way interaction. Regarding random effects, the random intercept ($p < .0001$), random slope ($p < .0001$), and autoregressive heterogeneous parameter were significant ($p < .0001$) and thus, retained in the model. When examining the fixed effects component of the reverse model, the three-way, cross-level interaction between Gender × Materialism × Risky Behavior Engagement was not significant ($b = .06$), $t(1700) = 0.22$, *ns*. Whereas none of the two-way, cross-level interactions were significant, gender ($b = -5.34$), $t(358) = -3.36$, $p < .001$, and risky behavior engagement ($b = 2.01$), $t(1700) = 11.41$, $p < .001$, emerged as main effects of the occurrence of negative events, however, materialism did not ($b = .56$), $t(358) = 0.52$, *ns*.

DISCUSSION

Several findings from the current study warrant discussion. First, higher levels of materialism were both cross-sectionally and prospectively associated with greater engagement in risky behaviors. Although such findings are in line with past research conducted with Western youth (e.g., Cohen & Cohen, 1996; Kasser & Ryan, 2001; Rindfleisch et al., 1997), the present study also underscores the importance of examining culture-specific factors that confer vulnerability to risky behavior engagement.

Presently, China is undergoing rapid social and economic changes, and it is necessary to examine culturally relevant factors affecting adolescents that increase the likelihood of engaging in risky behaviors. For example, as the Chinese labor force becomes centralized in urban centers, a large portion of rural parents must leave their families and commute to cities in search of work (Zhao, 1999). Similarly, graduating secondary and university students are taking advantage of newfound autonomy and freedom which allows them to travel away from their families to pursue individual goals. Such changes have resulted in a breakdown of the traditional family structure (e.g., nuclear and extended families) and responsibilities (e.g., caring for aging family members) that is central to collectivist values (Deutsch, 2004). As the family structure slowly undergoes a metamorphosis,
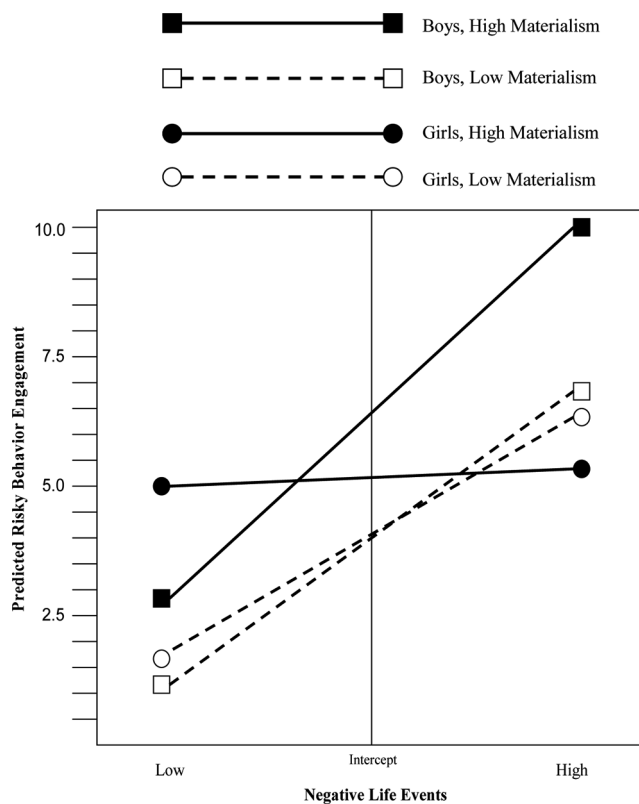

FIGURE 3   Predicted risky behavior engagement scores as a function of gender, materialism, and the occurrence of negative events.

adolescents have experienced greater independence and reduced oversight from family members (Zhao, 1999). Therefore, in addition to delineating the role the materialism plays, future research should examine culturally relevant factors including family cohesion and support that may contribute to the developmental unfolding of risky behavior engagement in Chinese adolescents.

Second, results of idiographic, time-lagged analyses indicated that the occurrence of negative events fully mediated the relationship between higher levels of materialism and subsequent risky behavior engagement. Given that higher levels of materialism represent an individualistic belief system that conflicts with core collectivistic values inherent to Chinese culture, the presence of such a trait may prove to be both a marker and contributor of acculturative stress (Auerbach & McWhinnie, 2009; Berry, 1970; Kim & Markus, 1999). Berry (1992) posited that acculturative stress arises when individuals develop new cultural identities that clash with more traditional cultural values. As Western ideologies of capitalism and individualism seep into China, the cultural identity of Chinese adolescents has begun to change. For those adolescents who exhibit vulnerability factors such as higher levels of materialism, the results suggest that they are at greater risk to experience the occurrence of negative events and then engage in risky behaviors as a way to manage the manage the negative affect associated with such events.

Last, in line with our hypothesis, higher levels of materialism interacted with negative events to predict increased engagement in risky behaviors, and conversely, materialism did not interact with risky behavior engagement to predict increases in negative events suggesting that the effect is unidirectional. At the same time, when examining the three-way interaction between gender, materialism, and negative events, results indicated that the effect was only significant in boys. Traditionally, risky behavior engagement including alcohol and cigarette use is an important part of social bonding for men and is often essential for occupational and social advancement (Zhang, Wang, Zhao, & Vartiainen, 2000). In contrast, there is often a stigma attached to risky behavior engagement amongst girls that greatly discourages and likely reduces the utilization of such behaviors (Zhang et al., 2000).

Unexpectedly, although risky behavior engagement did not vary as a function of higher levels of materialism and the occurrence of negative events for girls, lower levels of materialism interacted with the occurrence of negative events to predict risky behavior engagement. In contrast to boys, these findings suggest that girls who exhibit greater traditionalism, lower levels of materialism, may be more susceptible to the deleterious effects of negative events. China is a patriarchical society whereby women may have more traditionally

prescribed roles (Hamilton, 1990). In response to negative events, girls, but not boys, with traditional values may feel powerless to change and/or manage stressors given that such choices may be constrained by cultural expectations. More specifically, Chinese girls may be bound by societal obligations that underscore and shape their education, relationships, and aspirations. Consequently, Chinese girls may utilize risky behaviors as a means to obtain control as well as escape the negative affect associated with the occurrence of negative events. Conversely, traditional boys likely play a more pronounced role in influencing the trajectory of their lives with respect to school, relationships, and their future career, and thus, may be more effective at adaptively managing stress. Nevertheless, as the current finding was not hypothesized, future research needs to replicate it before being explored further.

Several limitations of the current study should be noted. First, the current study utilized self-reports to assess the participants' levels of risky behavior engagement, materialism, and negative life events. In addition, the study did not gather data from multiple informants nor utilize lab-based methods for assessing materialism, negative events, or risky behaviors. As self-report measures are often subject to response bias, future research would benefit from utilizing more sophisticated assessment techniques such as peer and parent ratings, semistructured interviews (e.g., life events interview), and direct behavioral observation to examine these constructs. Second, the current study used participants drawn from an urban adolescent sample from Yue Yang, China. The homogeneity of this sample may pose some limitations as to the generalizability of our results to other populations within China. Thus, future research should replicate our findings with community-based samples from different regions of China. Third, there is a strong association between childhood behavioral problems and adolescent risky behavior engagement. Given this association, a more stringent examination of our hypotheses would benefit from controlling for these childhood behaviors, and in doing so, it would allow researchers to better understand the unique contributions of variables that underlie risky behavior engagement. Last, the present study examined the role that materialism plays among Chinese adolescents, however, it is likely that additional culturally specific factors moderate and/or mediate the relationship between the occurrence of negative events and risky behavior engagement. More specifically, the concept of "face," the notion of public honor and respect attributed to oneself and one's family, is central to collectivist culture as it represents acceptance and belonging in Chinese society (Hu, 1944). Thus, loss of "face" may increase risky behavior engagement among Chinese adolescents because it may provide a means of escape and/or

avoidance. In addition, given that collectivism promotes social harmony primarily through hierarchical relationships, the notion of filial piety, adherence to family obligations and parental wishes, (Deutsch, 2004; Hamilton, 1990) may cause a significant amount of stress on adolescents and thus, play a substantial role in risky behavior engagement. Consequently, future research would benefit from examining additional culturally specific factors to better understand the mechanisms that underlie risky behavior engagement amongst Chinese adolescents.

Implications for Research, Policy, and Practice

In sum, the results of the current study provide insight into the relationship between negative events, materialism, and risky behavior engagement among Chinese adolescents. As past research suggests that stress levels are rising among Chinese adolescents (Chan, 2005; Fong, 2006; Rosen, 2003), it is important for researchers to identify factors that increase the likelihood of adolescents engaging in risky behaviors in response to negative events. By identifying such factors, clinicians may create more effective prevention, intervention and treatment strategies, and thereby help at-risk adolescents learn more adaptive strategies to manage the stress associated with the occurrence of negative events.

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