Journal of Adolescence 62 (2018) 162–170

Contents lists available at ScienceDirect

Journal of Adolescence

journal homepage: www.elsevier.com/locate/adolescence

Longitudinal relations between adolescents' materialism and prosocial behavior toward family, friends, and strangers

Zhixu Yang, Xinyuan Fu*, Xiaoxia Yu, Yichen Lv

Department of Psychology at School of Sociology and Psychology, Central University of Finance and Economics, Beijing 100081, China

ARTICLE INFO

Keywords:
Materialism
Prosocial behavior
Cross-lagged model
Multidimensionality

ABSTRACT

The present study examines the short-term changes and longitudinal relations between adolescents' materialism and prosocial behavior toward family, friends, and strangers over a year. A total of 434 Chinese adolescents (mean age at Time 1 = 11.27; 54% girls) participated in the two time points. From 6th grade to 7th grade, boys' and girls' materialism increased, whereas their prosocial behavior toward family, friends, and strangers declined, despite the stable trend in boys' prosocial behavior toward strangers. Furthermore, a cross-lagged model was conducted and the results showed that, adolescent materialism was associated longitudinally with decreased prosocial behavior toward friends and strangers, but not toward family. However, earlier prosocial behavior toward family, friends, and strangers were not associated with subsequent adolescent materialism. The findings point toward an understanding of materialism as a precursor rather than an outcome or byproduct to prosocial behavior.

1. Introduction

Adolescence is a crucial time period during which personal values and prosocial behavior are developing. Prosocial behavior, defined as voluntary behavior intended to benefit another (Eisenberg, Fabes, & Spinard, 2006), has been demonstrated to interrelate with personal values, such as prosocial values (Padilla-Walker & Fraser, 2014) and self-transcendence values (Caprara, Alessandri, & Eisenberg, 2012). Research even found that earlier prosocial values augmented subsequent prosocial behavior, and vice versa (Padilla-Walker & Fraser, 2014). However, the relations of prosocial behavior with other prevailing values, such as materialism, has received relatively limited attention, and longitudinal associations between adolescents' materialism and prosocial behavior remain unclear.

Materialism, defined as a set of values and goals focused on wealth, possessions, image, and status (Kasser, 2016, p. 489), is one of the most prevailing values among today's global adolescents (e.g., Fu, Kou, & Yang, 2015; Twenge & Kasser, 2013). Although there has been evidence indicating a negative association between materialism and prosocial behavior (Bauer, Wilkie, Kim, & Bodenhausen, 2012; Briggs, Landry, & Wood, 2007; Sheldon & Kasser, 1995), the studies were mostly correlational, and used only adult samples. Therefore, we aimed to further investigate longitudinal and bidirectional relations between materialism and prosocial behavior among early adolescents. We also examined the short-term changes (a one-year period) in adolescents' materialism and prosocial behavior.

Although many studies have treated prosocial behavior as a unidimensional construct, more recent research highlights the multidimensional nature of prosocial behavior (Padilla-Walker & Carlo, 2014). This multidimensionality can be represented by many

* Corresponding author. Department of Psychology at School of Sociology and Psychology, Central University of Finance and Economics, 39 Xueyuan South Road, Haidian District, Beijing 100081, China.
E-mail address: fu_xinyuan@126.com (X. Fu).

https://doi.org/10.1016/j.adolescence.2017.11.013
Received 13 July 2017; Received in revised form 23 November 2017; Accepted 25 November 2017
Available online 01 December 2017

ways, such as varying types of prosocial behavior (Padilla-Walker & Fraser, 2014; Yang & Xin, 2016), and different targets of prosocial behavior (Carlo, Crockett, Randall, & Roesch, 2007; Fu, Padilla-Walker, & Brown, 2017; Padilla-Walker, Dyer, Yorgason, Fraser, & Coyne, 2015). Specifically, targets (family, friends, and strangers) of prosocial behavior were the focus of the present study, as a key issue of multidimensional prosocial research is whether one's helping behavior varies as a function of his/her relationship with the recipient. Thus, we attempted to distinguish prosocial behavior toward different targets when testing the linkage between materialism and prosocial behavior, as well as the short-term changes of these variables.

1.1. Short-term changes and gender differences in materialism and prosocial behavior during early adolescence

Prior studies have found that girls reported lower materialism than boys in western samples (e.g., Flouri, 2004), whereas this gender difference was not observed in Chinese adolescents (Chan, Zhang, & Wang, 2006; Fu, Kou, et al., 2015). The findings among western adolescents are consistent with the explanation that men use goods to exhibit power, while women perceive possessions as a part of social relations (Rudmin, 1990). Males usually hold higher levels of power motivation than females (Schuh et al., 2014), and thus boys reported higher materialism than girls in western samples. By comparison, the lack of gender difference among Chinese adolescents may lie in the one-child policy in China whereby Chinese children become the focal point of the whole family; as a result, they can substantially affect household purchases and understand the social meaning of possessions regardless of gender (McNeal & Ji, 1999).

In addition, there exist limited studies on age differences in materialism during adolescence. These studies are mostly cross-sectional designs, demonstrating that Chinese 7^{th} graders showed lower materialism than did older adolescents from 8^{th} to 11^{th} grade (Chan et al., 2006; Fu, Kou, et al., 2015). According to model of consumer socialization (John, 1999), older children in the reflective stage (age 11 to 16) are more likely to value material goods than younger ones, because older ones tend to understand more about the meaning, value, and importance of possessions. Given the controversy on gender difference and scant evidence on longitudinal changes in materialism, the present study tried to investigate the short-term (a one-year period) changes and gender difference in materialism.

At the same time, studies on prosocial development among adolescents showed no changes (Flynn, Ehrenreich, Beron, & Underwood, 2015), decrease (Luengo Kanacri, Pastorelli, Eisenberg, Zuffianò, & Caprara, 2013; Carlo et al., 2007), or distinct trajectories for prosocial behavior toward different targets (Padilla-Walker, Dyer, et al., 2015). The general declining trend can be interpreted by the increasing path in self-focused modes of prosocial moral reasoning from early to middle adolescence (Eisenberg, Cumberland, Guthrie, Murphy, & Shepard, 2005), whereas the distinct prosocial developmental trajectories toward different targets highlight a need for multidimensional approach in examining prosocial development (Padilla-Walker & Carlo, 2014).

To take gender into account, studies have provided evidence that both boys and girls drop in prosocial behavior across early to middle adolescence, but boys drop more rapidly than girls (e.g., Carlo et al., 2007), and suggested that boys have lower levels of societal pressures to be kind and helpful than do girls (Nielson, Padilla-Walker, & Holmes, 2017). By contrast, other evidence did not show such a gender difference in the declining trend of prosocial behavior (Luengo Kanacri et al., 2013). Considering the inconsistent evidence on gender and age differences in adolescent prosocial development, the current study explored the short-term changes and gender differences in prosocial behavior toward different targets among Chinese adolescents.

1.2. The role of materialism on prosocial behavior

Theoretically, according to circumplex model of values (Schwartz, 1992), human values are organized in a “circumplex” fashion such that each value is consistent with some values, and incompatible with other values. Compatible values are adjacent to each other, while conflicting values are opposite each other. Specifically, there are two opposite higher-order types of values that express conflicting goals: Self-enhancement values promote personal interest (e.g., wealth, hedonism), whereas self-transcendence values transcend self-interest to benefit others (e.g., prosocial values, universalism). Based on this theory, values conflict theory (Burroughs & Rindfleisch, 2002) proposes that materialism falls within the cluster of self-enhancement values and is opposite to self-transcendence values, such as prosocial values. The ultimate goal of materialistic individuals is to acquire possessions and pursue sensual pleasure (Kasser, 2016), rather than to transcend self-interest to consider the welfare of others. Taking these theories a step further, experimental research demonstrates that salience of a value could: (a) increase behaviors that reflect the values that are consistent with the salient value (the bleed-over effect), and (b) suppress behaviors that reflect the values that are opposite to the salient value (the seesaw effect; Maio, Pakizeh, Cheung, & Rees, 2009). Because materialism belongs to self-enhancement values, and prosocial behavior reflects the opposite self-transcendence values (Burroughs & Rindfleisch, 2002), it can be assumed that materialism and prosocial behavior are on the opposite sides of the value seesaw. As materialism becomes more important to adolescents, self-transcendent concerns and goals could be deprioritized and deactivated, leading one to exhibit less prosocial behavior. Extending these three theories (circumplex model of values, values conflict theory, and the seesaw effect) to the role of materialism on prosocial behavior, we speculated that greater materialism would be predictive of lower levels of prosocial behavior.

Empirically, a few studies have found that highly materialistic individuals engaged in less prosocial behavior, such as helping (Sheldon & Kasser, 1995) and volunteering (Briggs et al., 2007). Limited experimental studies also showed that individuals primed with materialism were less likely to help others subsequently (Bauer et al., 2012; Lamy, Guéguen, Fischer-Lokou, & Guegan, 2016). Nevertheless, these studies are mostly cross-sectional designs and conducted in adult samples. Therefore, we aimed to extend the existing research by examining the longitudinal relations between materialism and prosocial behavior in a sample of early adolescents.

There is no research, to our knowledge, that distinguishes the relationship between materialism and prosocial behavior toward different targets. However, substantial evidence has shown that higher materialism is related to poorer social functioning outside the family context (Kasser & Ryan, 1996), such as lower-quality social relationships beyond family (Kasser & Ryan, 2001), higher social comparison and competitiveness with friends (Chan & Prendergast, 2008), and less cooperation with strangers (Bauer et al., 2012). These findings suggest that materialism might be more likely to affect prosocial behavior toward friends and strangers than toward family. In addition, a relational approach toward prosocial development highlights that prosocial behavior toward family members could be more motivated by an effort to maintain the relationship, rather than empathic motivation (Padilla-Walker & Christensen, 2011), which can be lowered by materialism (Humphries & Jagers, 2009). We thus expected a less salient link between materialism and prosocial behavior toward family than toward friends and strangers.

1.3. The role of prosocial behavior on materialism

While materialism might be negatively predictive of prosocial behavior, prosocial behavior might also predict an alternation in materialism among adolescents. According to the circumplex model of values (Schwartz, 1992), values conflict theory (Burroughs & Rindfleisch, 2002) and the seesaw effect (Maio et al., 2009), individuals tend to deprioritize materialistic values when they place more priority on self-transcendence values/goals. Indeed, intervention research has demonstrated that encouraging the values and goals that stand in opposition to materialism could work as an effective way to inhibit materialism among adolescents (Kasser et al., 2014). Correlational evidence has also shown that earlier prosocial behavior can be positively predictive of subsequent prosocial values during adolescence (Padilla-Walker & Fraser, 2014), and prosocial values are negatively associated with materialism (Burroughs & Rindfleisch, 2002). This literature leads to our anticipation that prosocial behavior might be instrumental in alleviating materialism among adolescents.

Furthermore, prosocial behavior toward different targets might all reflect the values and goals of self-transcendence that are opposed to materialism. As shown in prior research, adolescent prosocial behavior toward family, friends, and strangers could predict increases in familism (Calderón-Tena, Knight, & Carlo, 2011), friend connection (Padilla-Walker, Carlo, & Nielson, 2015), and prosocial values (Padilla-Walker & Fraser, 2014), respectively. All of these factors are parts of self-transcendence values/goals that could suppress levels of materialism (Burroughs & Rindfleisch, 2002; Fu, Kou, et al., 2015; Jiang, Zhang, Ke, Hawk, & Qiu, 2015). We thus did not generate a specific hypothesis regarding whether prosocial behavior toward distinct targets affect adolescents' materialism to different extents.

1.4. The current study

We aimed to investigate the short-term changes of adolescents' materialism and prosocial behavior toward family, friends, and strangers, and how the changes would vary as a function of gender. More importantly, we explored the longitudinal and bidirectional relations between materialism and prosocial behavior toward family, friends, and strangers. We hypothesized that materialism would be negatively predictive of subsequent prosocial behavior, and expected a more salient link between materialism and prosocial behavior toward friends and strangers than toward family. We also hypothesized that earlier prosocial behavior toward family, friends, and strangers would be longitudinally associated with decreased materialism. Given the inconsistent evidence on gender differences and age trends of materialism and prosocial behavior during adolescence, we did not generate specific hypotheses concerning how the changes would be like and would differ across gender. Because few studies have found that correlates of prosocial behavior differ by gender (Eisenberg, Spinrad, & Knafo-Noam, 2015; Fu et al., 2017), we did not predict that gender would modulate the associations between materialism and prosocial behavior toward family, friends, and strangers.

2. Methods

2.1. Participants and procedures

A total of 543 adolescents from four middle schools in Beijing were recruited at Time 1 and 434 of them participated at Time 2 (235 girls, 197 boys, and 2 unspecific; M_{age} = 12.26 years, SD_{age} = 0.54, $range_{age}$ = 11–14), with approximately 1 year apart. Of the participants recruited initially, those participating at Time 2 resulted in a 79.93% response rate. The participants were in 6th grade (the last year of primary school) at Time 1 and in 7th grade (the first year of middle school) at Time 2. With regard to monthly family income, 21% made less than ¥5,000, 57% made between ¥5001 and ¥10,000, 18% made between ¥10,001 and ¥20,000, 3% made more than ¥20,000, and 1% were missing. Missing data were minimal in the original data set (< 5%) and were handled using Mplus's default data imputation program.

At each time point, the participants were group-tested in quiet classrooms and were told that they would complete an anonymous survey. After completing the survey, they were given small gifts for participation.

2.2. Measures

2.2.1. Materialism

Materialism was assessed at Time 1 and 2 using seven items (α = 0.80, 0.87) modified from the Youth Materialism Scale (Goldberg, Gorn, Peracchio, & Bamossy, 2003). The items (e.g., “When you grow up, the more money you have, the happier you'll

be") were rated on a 6-point scale ranging from 1 (*totally disagree*) to 6 (*totally agree*). The Chinese version of the scale revised and employed by Fu and her colleagues (Fu, Kou, et al., 2015) has demonstrated satisfactory construct validity and internal reliability. Latent variables for materialism at two time points were created and measurement invariance across time was tested. Invariance was reached ($\Delta\chi^2$ (6) = 12.25, $p > 0.05$), with factor loadings ranging from 0.44 to 0.95.

2.2.2. Prosocial behavior toward family, friends, and strangers

Seven items adapted from a modified version of the kindness/generosity subscale of the Values in Action Inventory of Strengths (VAIS; Peterson & Seligman, 2004) were used to assess prosocial behavior toward family members (e.g., "I really enjoy doing small favors for my family") at Time 1 and 2 (α = 0.86, 0.89). Similarly, seven items were adapted to gauge prosocial behavior toward friends (e.g., "I go out of my way to cheer up my friends when they seem sad"; α = 0.89, 0.93), and toward strangers (e.g., "I help people I don't know, even if it is not easy for me"; α = 0.87, 0.90), respectively. The items were rated on a 5-point scale ranging from 1 (*not like me at all*) to 5 (*very much like me*). The VAIS was used in ethnically diverse samples (Park, Peterson, & Seligman, 2006), yet we did not have the Chinese version of the scale. Therefore, we hired two English major graduates with a psychology background to translate and back translate the questionnaire (translation-back-translation method; Brislin, 1970). One graduate translated the scale from English to Chinese, while the other student back-translated it so as to ensure translation accuracy. Latent variables for prosocial behavior toward family, friends, and strangers at two time points were created and measurement invariance of these variables across time was tested. Invariance was reached for prosocial behavior toward family ($\Delta\chi^2$ (6) = 4.28, p = 0.639), toward friends ($\Delta\chi^2$ (6) = 8.53, p = 0.202), and toward strangers ($\Delta\chi^2$ (6) = 2.83, p = 0.830). Factor loadings ranged from 0.50 to 0.79, 0.55 to 0.88, and 0.63 to 0.79, respectively.

2.3. Attrition analyses

Attrition analyses (*t*-tests and chi-square tests) were conducted to examine whether the 434 retained adolescents differed from the 109 adolescents who were absent at Time 2. Results indicated that boys ($p < 0.001$), and participants whose mothers and fathers were less educated ($p < 0.001$; $p = 0.002$) were more likely to drop out of the study at Time 2. However, there were no significant differences ($ps > 0.181$) between these two groups on Time-1 ratings of the study variables (materialism, prosocial behavior toward family, friends, and strangers), other demographics (age and monthly family income), and grade point averages (GPAs). Thus, though the sample became more female and was more from highly-educated families, it did not experience differential attrition on the study variables, age, monthly family income, and GPAs.

3. Results

3.1. Descriptive statistics

Table 1 depicts means, standard deviations, and correlations for the study variables. Materialism at Time 1 was negatively correlated with prosocial behavior toward family, friends, and strangers at Time 2. Prosocial behavior toward family at Time 1, but not toward friends or strangers, was negatively correlated to materialism at Time 2.

3.2. Short-term development in materialism and prosocial behavior

Four repeated measures ANOVAs were conducted to determine differences in means over time and interactions between time point and gender, with materialism, prosocial behavior toward family, friends, and strangers as the dependent variables, time point as the within-subject variable, and gender as the between-subject variable (see Fig. 1). The results are as follows.

First, the main effect of time point on materialism was significant (F (1, 415) = 9.48, $p < 0.01$, η_p^2 = 0.02). Adolescents exhibited greater materialism at Time 2 than at Time 1 ($M_{\text{Time 1}}$ = 2.21, $M_{\text{Time 2}}$ = 2.39). The interaction between time point and

Table 1
Descriptive statistics and correlations between materialism and prosocial behavior toward family, friends, and strangers.

	01	02	03	04	05	06	07	08
01. Materialism_1	–							
02. Materialism_2	0.41**	–						
03. PB_Family_1	−0.18**	−0.10*	–					
04. PB_Family_2	−0.16**	−0.10*	0.43**	–				
05. PB_Friends_1	−0.11*	−0.02	0.71**	0.35**	–			
06. PB_ Friends_2	−0.16*	−0.08	0.29**	0.62**	0.40**	–		
07.PB_Strangers_1	−0.06	< 0.01	0.64**	0.36**	0.63**	0.32**	–	
08.PB_Strangers_2	−0.16**	−0.09	0.39**	0.67**	0.41**	0.70**	0.50**	–
M	2.21	2.39	4.04	3.94	4.26	4.15	3.58	3.56
SD	1.06	1.15	0.80	0.78	0.77	0.76	0.90	0.86

Note. PB = prosocial behavior, 1 = Time 1, 2 = Time 2.
*$p < 0.05$, **$p < 0.01$.

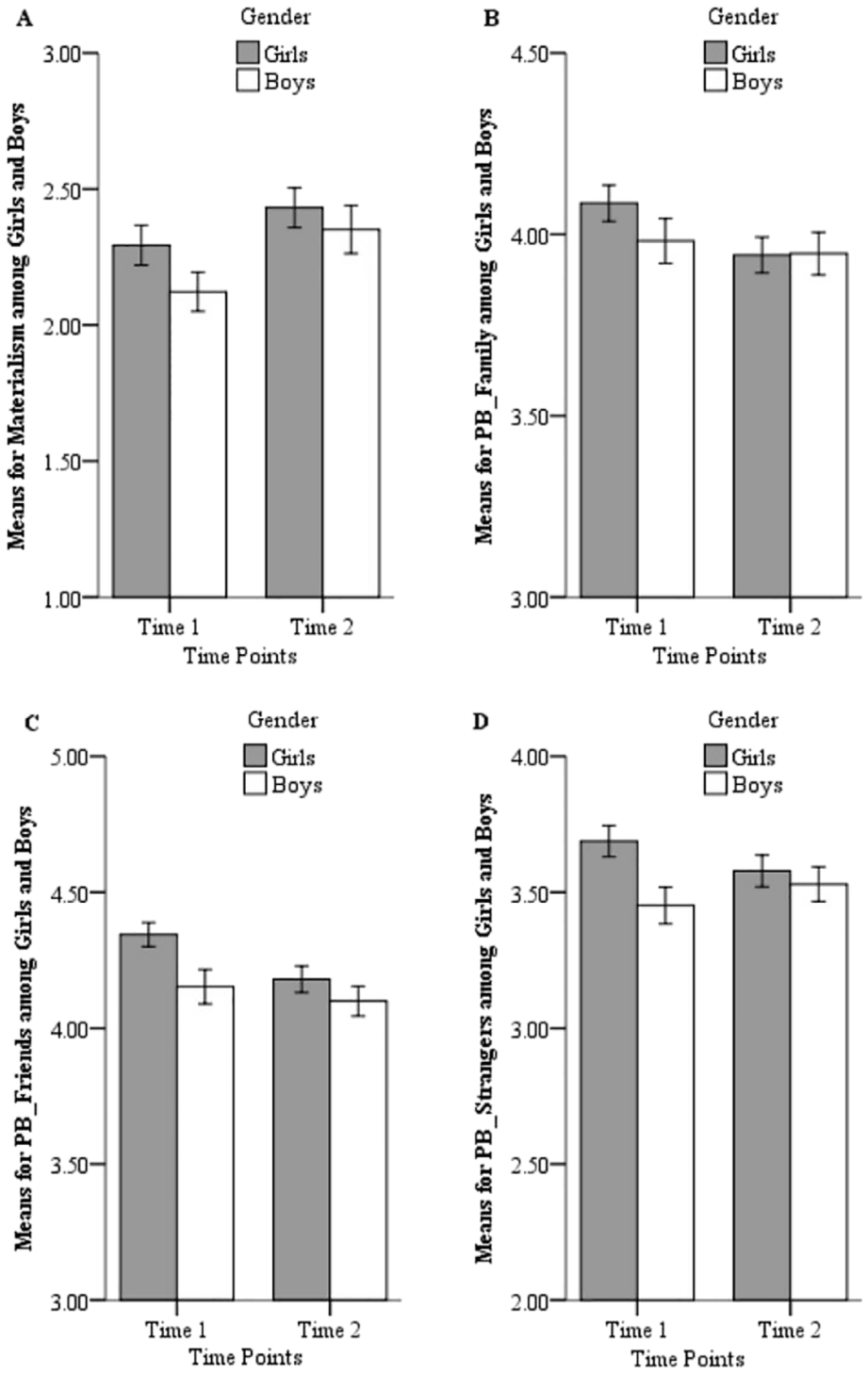

Fig. 1. The Short-Term Changes in Adolescent Materialism (A), Prosocial Behavior Toward Family (B), Friends (C), and Strangers (D). *Note*. PB = prosocial behavior.

gender was non-significant (F (1, 415) = 0.57, p = 0.449).

Second, the effects of time point on prosocial behavior toward family and friends were both significant (toward family: F (1, 420) = 4.61, $p < 0.05$, $\eta_p^2 = 0.01$; toward friends: F (1, 422) = 7.06, $p < 0.01$, $\eta_p^2 = 0.02$). Adolescents reported less prosocial behavior toward family and friends at Time 2 than at Time 1 (toward family: $M_{\text{Time 1}} = 4.04$, $M_{\text{Time 2}} = 3.94$; toward friends: $M_{\text{Time 1}} = 4.26$, $M_{\text{Time 2}} = 4.14$). The interactions between time point and gender on prosocial behavior toward family and friends were both non-significant (toward family: F (1, 420) = 1.71, p = 0.192; toward friends: F (1, 422) = 1.84, p = 0.176).

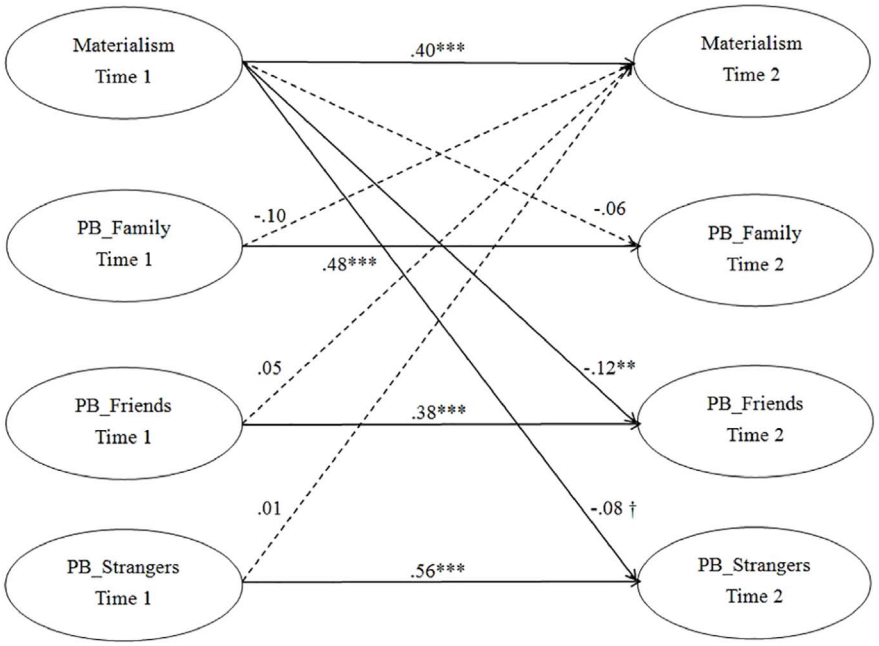

Fig. 2. The Cross-Lagged Model between Adolescent Materialism and Prosocial Behavior Toward Family, Friends, and Strangers. *Note.* PB = prosocial behavior. All paths represent standardized beta weighs. The dashed lines indicate nonsignificant paths. Control variables (monthly family income, gender), correlations between variables at Time 1, and residual covariances at Time 2 were omitted from figure for parsimony. $^{\dagger}p = 0.059$, $^{**}p < 0.01$, $^{***}p < 0.001$.

Third, the main effect of time point on prosocial behavior toward strangers was non-significant (F (1, 413) = 0.13, p = 0.719), while the interaction with gender was significant (F (1, 413) = 4.62, p = 0.032, η_p^2 = 0.01). Further analyses suggested stability in prosocial behavior toward strangers for boys, but a marginal decline for girls (boys: $M_{\text{Time 1}}$ = 3.45, $M_{\text{Time 2}}$ = 3.53, F (1, 413) = 1.49, p = 0.223; girls: $M_{\text{Time 1}}$ = 3.69, $M_{\text{Time 2}}$ = 3.58, F (1, 413) = 3.40, p = 0.066, η_p^2 = 0.01).

In the analyses above, the main effects of gender on materialism and prosocial behavior toward family were non-significant (materialism: M_{girls} = 2.36, M_{boys} = 2.24, F (1, 415) = 1.90, p = 0.169; prosocial behavior toward family: M_{girls} = 4.01, M_{boys} = 3.96, F (1, 420) = 0.58, p = 0.447), whereas girls reported more prosocial behavior toward friends and strangers than boys (toward friends: M_{girls} = 4.26, M_{boys} = 4.13, F (1, 422) = 4.78, $p < 0.05$, η_p^2 = 0.01; toward strangers: M_{girls} = 3.63, M_{boys} = 3.49, F (1, 413) = 3.61, p = 0.058, η_p^2 = 0.01).

3.3. Cross-lagged model

Using Mplus software, we conducted a cross-lagged model using both time points of adolescent materialism, prosocial behavior toward family, friends, and strangers. Because of the complexity of the present cross-lagged model, factor scores were saved for all latent study variables and entered the cross-lagged model. We first conducted a multiple group model as a function of gender. The multiple group comparison $\Delta\chi^2$ test suggested that, constraining all the pathways to be equal across gender groups did not result in a significant decrease in model fit, $\Delta\chi^2$ (10) = 7.99, p = 0.630. Therefore, a single group model was used as the final model and had good model fit (χ^2 (14) = 56.62, $p < 0.001$, CFI = 0.96, TLI = 0.91, RMSEA = 0.08). Gender and monthly family income were used as control variables.

As shown in Fig. 2, adolescent materialism at Time 1 was negatively associated with prosocial behavior toward friends ($\beta = -0.12$, $p < 0.01$), and was marginally and negatively associated with prosocial behavior toward strangers ($\beta = -0.08$, p = 0.059), but was not associated with prosocial behavior toward family ($\beta = -0.06$, p = 0.132) at Time 2. However, prosocial behavior toward family, friends, and strangers at Time 1 were all not significantly associated with materialism at Time 2 (all $ps > 0.05$). In terms of the controls, neither monthly family income nor gender was significantly associated with the variables at Time 2.

4. Discussion

We examined short-term changes and longitudinal relations between materialism and prosocial behavior toward family, friends, and strangers among early adolescents. From 6$^{\text{th}}$ grade to 7$^{\text{th}}$ grade, both boys' and girls' materialism increased, and their prosocial behavior declined, except that boys' prosocial behavior toward strangers remained stable. Importantly, adolescents' materialism was negatively predictive of subsequent prosocial behavior toward friends and strangers but not toward family, whereas prosocial behavior toward different targets did not longitudinally relate to materialism.

4.1. Short-term development in materialism and prosocial behavior in early adolescence

The finding that no gender differences existed in materialism at both time points was consistent with prior findings on materialism among Chinese adolescents (Chan et al., 2006; Fu, Kou, et al., 2015), but ran counter to the findings that boys showed higher materialism than girls among western adolescents (e.g., Flouri, 2004). Reasons could lie in the one-child policy and the similar patterns of family-child communication for girls and boys in China (Fu, Kou, et al., 2015). Because of the adolescents as the only child in their family, the parents tended to provide their children with abundant resources and as many positive experiences as possible, no matter the gender. In these circumstances, both female and male adolescents could receive expensive materials, understand the significance of material possessions, and thus display no difference in materialism. Yet these speculations need to be examined in future research.

Over the one-year period, levels of materialism among boys and girls significantly increased, which was in accordance with the findings using cross-sectional designs that older adolescents evinced greater levels of materialism than younger ones (Chan et al., 2006; Fu, Kou, et al., 2015). These findings can be interpreted by John's (1999) model of consumer socialization. The model postulated that children aged 11–16 belong to the reflective stage. Compared with younger adolescents, older ones during this stage could have more understanding of the values of possessions in terms of social meaning and significance, so they were more likely to equate self-worth to material goods, and then had higher materialism.

In addition, prosocial behavior toward family, friends, and strangers saw decline for early adolescents, except that boys' prosocial behavior toward strangers remained stable over the time. These findings were partially in line with prior studies indicating an overall decline in prosocial behavior across early to middle adolescence, for both boys and girls (Carlo et al., 2007; Luengo Kanacri et al., 2013). There are some plausible reasons why adolescents were less prosocial at Time 2 than at Time 1. Firstly, the participants were in 6^{th} grade (the last year of primary school) at Time 1 and 7^{th} grade at Time 2. As the adolescents entered the seventh grade, the first year of middle school, they faced greater study pressure, with longer study time, more subjects, and more frequent exams. This could result in inadequate opportunity and time for prosocial behavior toward others. Furthermore, adolescents in middle schools are more likely to focus on individual-based achievement and competitiveness with peers (Carlo, Fabes, Laible, & Kupanoff, 1999; Carlo et al., 2007), which could undermine their prosociality (Chan & Prendergast, 2008). Finally, through the transition period from elementary school to middle school, the adolescents tended to face increased levels of life challenges and mental health problems (Liu & Xin, 2015; Twenge & Campbell, 2001), and thus became less likely to behave prosocially.

4.2. Longitudinal relations between adolescent materialism and prosocial behavior

Among the three targets (family, friends, and strangers), materialism played the strongest role for the alternation of prosocial behavior toward friends, followed by that toward strangers, and that toward family was not influenced. This finding indicates that interactions with friends and strangers may be mostly influenced by materialism. Given the confliction and opposition between materialism and self-transcendence values (Burroughs & Rindfleisch, 2002; Maio et al., 2009; Schwartz, 1992), materialistic adolescents might have reduced levels of prosocial/self-transcendence values, which would in turn undermine prosocial behavior toward friends and strangers (Caprara et al., 2012; Padilla-Walker & Fraser, 2014). According to the seesaw effect, because materialism stands on the “self-enhancement values” side, whereas prosocial behavior belongs to the opposite “self-transcendence values” side (Burroughs & Rindfleisch, 2002; Maio et al., 2009; Schwartz, 1992), the materialistic adolescents' amassing wealth and acquiring possessions (Kasser, 2016) might interfere with or even crowd out their prosocial aims to transcend personal interest to benefit others (Eisenberg et al., 2006). Consequently, an emphasis on materialism made one have less interest in prosocial activities toward friends and strangers.

Another plausible explanation is that higher materialism could lead to greater social comparison and competitiveness with peers/friends (Chan & Prendergast, 2008), and less generousness and cooperation with strangers (Bauer et al., 2012), thereby decreasing prosocial behavior toward friends and strangers. Furthermore, a relational approach to prosocial development emphasizes that adolescents' prosocial behavior toward family members could be contingent upon parenting and parent-child attachment, and may not require empathic motivations as strong as prosocial behavior toward individuals outside the family (Padilla-Walker & Christensen, 2011). Considering the detrimental impact of materialism on empathy (Humphries & Jagers, 2009), and no evidence showing the association between adolescents' materialism and parenting or parent-child attachment, prosocial behavior toward family therefore was not subject to materialism.

Inconsistent with hypotheses, the current study did not show that earlier prosocial behavior toward family, friends, and strangers inhibited subsequent materialism. This finding suggests that adolescent materialism may be more influenced by other factors rather than prosocial behavior, such as rampant consumerism (Bauer et al., 2012; Lamy et al., 2016), television advertising targeting at youth (Buijzen & Valkenburg, 2003; Chan & Prendergast, 2008), parenting and peer relations (Fu, Kou, et al., 2015; Jiang et al., 2015), and dispositional traits like extrinsic aspirations (Fu, Liu, Yang, Zhang, & Kou, 2015). Taken together, the findings reported here point toward an understanding of materialism as a precursor rather than an outcome or byproduct to prosocial behavior.

4.3. Limitations and contributions

Several limitations should be acknowledged. First, though the relationship between materialism and prosocial behavior might be a global issue, the strength of this association and the role of targets (e.g., family, friends, and strangers) on this relationship may vary across cultures. Since findings in the current study were based on a sample of Chinese adolescents, the generalizability of the findings

should be examined in further research using culturally different samples. Second, the path from materialism at Time 1 to prosocial behavior toward strangers at Time 2 was marginally significant, and caution is needed in interpreting this effect. Third, despite the strength of a longitudinal design, it was relatively short-term across a one-year period of early adolescence. Future studies would profitably explore more waves of data to examine these patterns into later adolescence.

Despite these limitations, findings from the current study have important implications. Previous studies have found the negative relationship between materialism and prosocial behavior using cross-sectional designs or experimental methods (Bauer et al., 2012; Lamy et al., 2016). Nevertheless, the present study suggests for the first time that: (a) there is a longitudinally predictive impact of adolescents' materialism on prosocial behavior, and (b) such an effect is not ubiquitously salient because it is contingent upon the target of prosocial behavior.

Acknowledgement

This research was supported by 2017 Beijing Social Science Fund Project (17JYC017), 2016 Young Teachers' Development Fund from Central University of Finance and Economics (QJJ1624), and 2016 Academic Advancement Program from School of Sociology and Psychology, Central University of Finance and Economics.

References

Bauer, M. A., Wilkie, J. E., Kim, J. K., & Bodenhausen, G. V. (2012). Cuing consumerism: Situational materialism undermines personal and social well-being. *Psychological Science, 23*, 517–523.

Briggs, E., Landry, T., & Wood, C. (2007). Beyond just being there: An examination of the impact of attitudes, materialism, and self-esteem on the quality of helping behavior in youth volunteers. *Journal of Nonprofit and Public Sector Marketing, 18*, 27–45.

Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology, 1*, 185–216.

Buijzen, M., & Valkenburg, P. M. (2003). The effects of television advertising on materialism, parent–child conflict, and unhappiness: A review of research. *Journal of Applied Developmental Psychology, 24*, 437–456.

Burroughs, J. E., & Rindfleisch, A. (2002). Materialism and well-being: A conflicting values perspective. *Journal of Consumer Research, 29*, 348–370.

Calderón-Tena, C. O., Knight, G. P., & Carlo, G. (2011). The socialization of prosocial behavioral tendencies among Mexican American adolescents: The role of familism values. *Cultural Diversity and Ethnic Minority Psychology, 17*, 98–106.

Caprara, G. V., Alessandri, G., & Eisenberg, N. (2012). Prosociality: The contribution of traits, values, and self-efficacy beliefs. *Journal of Personality and Social Psychology, 102*, 1289–1303.

Carlo, G., Crockett, L. J., Randall, B. A., & Roesch, S. C. (2007). A latent growth curve analysis of prosocial behavior among rural adolescents. *Journal of Research on Adolescence, 17*, 301–324.

Carlo, G., Fabes, R. A., Laible, D., & Kupanoff, K. (1999). Early adolescence and prosocial/moral behavior II: The role of social and contextual influences. *The Journal of Early Adolescence, 19*, 133–147.

Chan, K., & Prendergast, G. (2008). Social comparison, imitation of celebrity models and materialism among Chinese youth. *International Journal of Advertising, 27*, 799–826.

Chan, K., Zhang, H., & Wang, I. (2006). Materialism among adolescents in urban China. *Young Consumers: Insight and Ideas for Responsible Marketers, 7*, 64–77.

Eisenberg, N., Cumberland, A., Guthrie, I. K., Murphy, B. C., & Shepard, S. A. (2005). Age changes in prosocial responding and moral reasoning in adolescence and early adulthood. *Journal of Research on Adolescence, 15*, 235–260.

Eisenberg, N., Fabes, R. A., & Spinard, T. L. (2006). Prosocial development. In (6th ed.). W. Damon, R. M. Lerner, & N. Eisenberg (Vol. Eds.), *Social, emotional, and personality development: Handbook of child psychology: Vol. 3*, (pp. 646–718). New York: Wiley.

Eisenberg, N., Spinrad, T. L., & Knafo-Noam, A. (2015). Prosocial development. In R. M. Lerner, & M. E. Lamb (Eds.). *Handbook of child psychology and developmental science* (pp. 1–47). Hoboken, NJ: Wiley.

Flouri, E. (2004). Exploring the relationship between mothers' and fathers' parenting practices and children's materialist values. *Journal of Economic Psychology, 25*, 743–752.

Flynn, E., Ehrenreich, S. E., Beron, K. J., & Underwood, M. K. (2015). Prosocial behavior: Long-term trajectories and psychosocial outcomes. *Social Development, 24*, 462–482.

Fu, X., Kou, Y., & Yang, Y. (2015a). Materialistic values among Chinese adolescents: Effects of parental rejection and self-esteem. *Child and Youth Care Forum, 44*, 43–57.

Fu, X., Liu, X., Yang, Y., Zhang, M., & Kou, Y. (2015b). The role of relative intrinsic aspirations in Chinese adolescents' prosocial behaviors. *Youth and Society*, 1–18.

Fu, X., Padilla-Walker, L. M., & Brown, M. N. (2017). Longitudinal relations between adolescents' self-esteem and prosocial behavior toward strangers, friends and family. *Journal of Adolescence, 57*, 90–98.

Goldberg, M. E., Gorn, G. J., Peracchio, L. A., & Bamossy, G. (2003). Understanding materialism among youth. *Journal of Consumer Psychology, 13*, 278–288.

Humphries, M. L., & Jagers, R. J. (2009). Culture: A possible predictor of morality for African American adolescents. *Journal of Research on Adolescence, 19*, 205–215.

Jiang, J., Zhang, Y., Ke, Y. N., Hawk, S. T., & Qiu, H. (2015). Can't buy me friendship? Peer rejection and adolescent materialism: Implicit self-esteem as a mediator. *Journal of Experimental Social Psychology, 58*, 48–55.

John, D. R. (1999). Consumer socialization of children: A retrospective look at twenty-five years of research. *Journal of Consumer Research, 26*, 183–213.

Kasser, T. (2016). Materialistic values and goals. *Annual Review of Psychology, 67*, 489–514.

Kasser, T., Rosenblum, K. L., Sameroff, A. J., Deci, E. L., Niemiec, C. P., Ryan, R. M., ... Hawks, S. (2014). Changes in materialism, changes in psychological well-being: Evidence from three longitudinal studies and an intervention experiment. *Motivation and Emotion, 38*, 1–22.

Kasser, T., & Ryan, R. M. (1996). Further examining the American dream: Differential correlates of intrinsic and extrinsic goals. *Personality and Social Psychology Bulletin, 22*, 280–287.

Kasser, T., & Ryan, R. M. (2001). Be careful what you wish for: Optimal functioning and the relative attainment of intrinsic and extrinsic goals. In P. Schmuck, & K. Sheldon (Eds.). *Life goals and well-being: Towards a positive psychology of human striving* (pp. 116–131). Ashland, OH: Hogrefe & Huber.

Lamy, L., Guéguen, N., Fischer-Lokou, J., & Guegan, J. (2016). “Wrong place to get help”: A field experiment on luxury stores and helping behavior. *Social Influence, 11*, 130–139.

Liu, D., & Xin, Z. Q. (2015). Birth cohort and age changes in the self-esteem of Chinese adolescents: A cross-temporal meta-analysis, 1996–2009. *Journal of Research on Adolescence, 25*, 366–376.

Luengo Kanacri, B. P., Pastorelli, C., Eisenberg, N., Zuffianò, A., & Caprara, G. V. (2013). The development of prosociality from adolescence to early adulthood: The role of effortful control. *Journal of Personality, 81*, 302–312.

Maio, G. R., Pakizeh, A., Cheung, W. Y., & Rees, K. J. (2009). Changing, priming, and acting on values: Effects via motivational relations in a circular model. *Journal of Personality and Social Psychology, 97*, 699–715.

McNeal, J. U., & Ji, M. F. (1999). Chinese children as consumers: An analysis of their new product information sources. *Journal of Consumer Marketing, 16*, 345–364.

Nielson, M. G., Padilla-Walker, L., & Holmes, E. K. (2017). How do men and women help? Validation of a multidimensional measure of prosocial behavior. *Journal of*

Adolescence, 56, 91–106.
Padilla-Walker, L. M., & Carlo, G. (2014). The study of prosocial behavior: Past, present, and future. In L. M. Padilla-Walker, & G. Carlo (Eds.). *Prosocial development: A multidimensional approach* (pp. 3–16). New York: Oxford University Press.
Padilla-Walker, L. M., Carlo, G., & Nielson, M. G. (2015a). Does helping keep teens protected? Longitudinal bidirectional relations between prosocial behavior and problem behavior. *Child Development, 86*, 1759–1772.
Padilla-Walker, L. M., & Christensen, K. J. (2011). Empathy and self-regulation as mediators between parenting and adolescents' prosocial behavior toward strangers, friends, and family. *Journal of Research on Adolescence, 21*, 545–551.
Padilla-Walker, L. M., Dyer, W. J., Yorgason, J. B., Fraser, A. M., & Coyne, S. M. (2015b). Adolescents' prosocial behavior toward family, friends, and strangers: A person-centered approach. *Journal of Research on Adolescence, 25*, 135–150.
Padilla-Walker, L. M., & Fraser, A. M. (2014). How much is it going to cost me? Bidirectional relations between adolescents' moral personality and prosocial behavior. *Journal of Adolescence, 37*, 993–1001.
Park, N., Peterson, C., & Seligman, M. E. (2006). Character strengths in fifty-four nations and the fifty US states. *The Journal of Positive Psychology, 1*, 118–129.
Peterson, C., & Seligman, M. E. P. (2004). *Character strengths and virtues: A handbook and classification.* Washington, DC: American Psychological Association.
Rudmin, F. W. (1990). German and Canadian data on motivations for ownership: Was Pythagoras right? *Advances in Consumer Research, 17*, 176–181.
Schuh, S. C., Bark, A. S. H., Van Quaquebeke, N., Hossiep, R., Frieg, P., & Van Dick, R. (2014). Gender differences in leadership role occupancy: The mediating role of power motivation. *Journal of Business Ethics, 120*, 363–379.
Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. In M. Zanna (Vol. Ed.), *Advances in experimental social psychology: Vol. 25*, (pp. 1–65). Orlando, FL: Academic Press.
Sheldon, K. M., & Kasser, T. (1995). Coherence and congruence: Two aspects of personality integration. *Journal of Personality and Social Psychology, 68*, 531–543.
Twenge, J. M., & Campbell, W. K. (2001). Age and birth cohort differences in self-esteem: A cross-temporal meta-analysis. *Personality and Social Psychology Review, 5*, 321–344.
Twenge, J. M., & Kasser, T. (2013). Generational changes in materialism and work centrality, 1976–2007. *Personality and Social Psychology Bulletin, 39*, 883–897.
Yang, Z. X., & Xin, Z. Q. (2016). Community identity increases urban residents' in-group emergency helping intention. *Journal of Community and Applied Social Psychology, 26*, 467–480.