



I buy stability in a buying world: Social norms about materialism moderate the relation between perceived self-esteem stability and materialistic values

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ABSTRACT

In three studies, the current research examined how the presence of descriptive social norms about materialism moderated the relationship between perceived self-esteem stability and materialistic values. In Study 1, a two-wave longitudinal design across five weeks showed that initial self-esteem stability negatively predicted later materialistic values when participants perceived higher social norms about materialism. In Studies 2 and 3, we measured self-esteem stability and experimentally manipulated social norms about materialism. Similar to Study 1, results indicated a negative association between self-esteem stability and materialistic values when social norms about materialism were high, but not when they were low. This research suggests that both individuals' trait self-esteem stability and the materialistic contexts in which people are embedded contribute to the adoption of materialistic values, supporting a person-environment interaction view of materialism.

1. Introduction

The continuous growth of the global luxury market suggests a strong, ongoing demand for high-end material possessions. Materialistic values, or “the importance a person places on possessions and their acquisition as a necessary or desirable form of conduct to reach desired end states, including happiness” (Richins & Dawson, 1992, p. 307), is a key predictor of consumer behaviors, such as shopping intensity and amount of spending (Flynn et al., 2016). Advertisers often attempt to harness the power of people's materialism in order to maximize the effectiveness of their marketing strategies and stimulate economic growth (Song et al., 2014). Heightened materialistic values, however, also predict long-term impairments in mental health and well-being (Dittmar et al., 2014; Kasser, 2005). These myriad concerns have driven extensive research about the antecedents of materialism, resulting in two separate tracks of research. Research on individual differences has demonstrated that personal traits such as low self-esteem (e.g., Chaplin & John, 2007; Richins & Dawson, 1992), high narcissism (Rose, 2007), and insecure attachment style (Norris et al., 2012) significantly predict higher materialism. Investigations of environmental antecedents of materialism, in contrast, have highlighted the important role of social influences, including parents' consumption attitudes (Chaplin & John, 2010), peer group consumer culture (Isaksen & Roper, 2012), and media

influences (Opree et al., 2014). To date, few studies have simultaneously examined these two perspectives. Thus, it is currently unknown whether or how these two factors might work in conjunction to determine materialistic values.

Personal characteristics and environmental cues are both essential to individuals' decision-making processes (e.g., Kish-Gephart et al., 2010; Trevino, 1986). The current study proposes an integrated, person-environment interaction model to understand the foundations of materialism, considering both individual traits and contextual variables. We examine the individual factor of self-esteem stability, or over-time fluctuations in levels of self-esteem (Kernis et al., 1993), and prevalent materialistic social norms as a key contextual factor. By clarifying whether and how these factors might work together in determining individuals' endorsement of materialism, we aim to facilitate understanding of why people's materialism might vary across different contexts.

1.1. Self-esteem stability and materialistic values

Individuals' self-worth is not always consistent, and might vacillate with their experiences. Self-esteem stability refers to the magnitude of short-term fluctuations in individuals' global self-evaluation (Kernis et al., 1989; Kernis et al., 1993; Rosenberg, 1979). The stability of self-

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esteem differs from its level, as self-esteem can be stable or unstable regardless of being high or low (Foster et al., 2007; Kernis et al., 1993; Rosenberg, 1979). Thus, individuals can experience either high-unstable self-esteem (i.e., narcissism; Ames et al., 2006), low-stable self-esteem, high-stable self-esteem, or low-unstable self-esteem. Furthermore, these different stability-level combinations predict different motivations for pursuing positive (or avoiding negative) self-views, pointing to the distinction between these constructs (Kernis et al., 1992). Prior studies have also reported an interaction between the level and the stability of self-esteem in predicting individuals' depression (Kernis et al., 1991) and reactions to performance feedback (Seery et al., 2004). These findings speak to the necessity of controlling for self-esteem level while examining the unique effects of self-esteem stability on cognition, behavior, and well-being. Despite extensive investigation of links between level of self-esteem and materialism (e.g., Braun & Wicklund, 1989; Chaplin & John, 2007; Hanley & Wilhelm, 1992; Jiang et al., 2015; Solberg et al., 2004), the relationship between self-esteem stability and materialism has been largely ignored, even with increasing recognition that stability is an important consideration in various self-esteem processes (e.g., Kernis et al., 1993). The present study aimed to examine whether the stability of self-esteem, over and above levels of self-esteem, is a predictor of individuals' materialistic values.

Unstable self-esteem reflects self-worth perceptions that vary frequently with either external events (e.g., criticism) or individual states (e.g., rumination about personal performance) (Foster et al., 2007). Individuals with unstable self-esteem frequently experience fluctuating mood states (Waschull & Kernis, 1996), are sensitive to failure (Kernis et al., 1997), and show other biased cognitive, motivational and behavioral patterns such as depressive symptoms and aggressive behaviors (Tevendale et al., 1997). These observations were based on various measures of self-esteem stability, including subjective self-reports (e.g., Rosenberg, 1979) and calculated fluctuations in self-esteem levels across repeated assessments (Kernis et al., 1993). Importantly, experiences stemming from unstable self-esteem also hold conceptual overlaps with factors that contribute to materialistic values; Experiences of social exclusion (Jiang et al., 2015), anxious attachment (Norris et al., 2012), performance failures (Brunstein & Gollwitzer, 1996; Wicklund & Gollwitzer, 1981), and mood swings (Christopher & Schlenker, 2004; Müller et al., 2012) all elevate individuals' materialistic values and precede more intensive buying behaviors. These findings suggest a potential connection between unstable self-esteem and materialism.

Former studies indeed have provided indirect evidence for a connection between self-esteem instability and heightened materialism. Self-understanding (Schroeder & Dugal, 1995), self-clarity (Gil et al., 2012), and insecurity (Kasser, 2002), all of which reflect states of (in) stability in self-identity, predict materialistic values. Narcissism, a form of unstable and high self-esteem, is positively related with materialistic values and the purchasing of prestige products (Sedikides et al., 2007; Velov et al., 2014). Moreover, Zeigler-Hill (2006) and Park and John (2011) both described a pattern of high explicit/low implicit self-esteem as being relatively unstable, with the latter authors finding in two experiments that this pattern predicted elevated materialism. Both of these previous articles advanced the idea that discrepancies involving high explicit but low implicit self-esteem resulted in fragile and unstable self-worth. Multiple studies have also noted associations between self-esteem instability and contingent self-worth (Kernis & Goldman, 2006), which is a significant antecedent for materialism across both individualistic and collectivistic cultures (Zhang et al., 2020). These findings imply a role for self-esteem instability in fostering materialistic values. Based on this evidence, we expected a negative association between the stability of self-esteem and materialistic values.

1.2. Social norms about materialism and individuals' materialistic values

Social norms reflect the thoughts and behaviors of the majority of

people in a shared social context, and serve to regulate these activities (Morris et al., 2015). "High" or "low" social norms in a variety of dimensions at least partially dictate the prevalence of related beliefs and behaviors (e.g., Broadwater et al., 2006; Haug et al., 2011; Ridout & Campbell, 2014; Werch et al., 2000). Individuals are more likely to be materialistic when parents, siblings, friends, and others in their environment are materialistic (Chaplin & John, 2010; Goldberg et al., 2003). Youths frequently feel peer pressure related to consumer behavior, and adapt their attitudes and tastes accordingly (Isaksen & Roper, 2012). By conforming to materialistic norms, they can earn social acceptance and maintain friendships. Research on Russian immigrants in America indicated that, although these participants originally came from a non-consumer society, they picked up materialistic values very quickly and eventually showed the same levels as native-born Americans (Lerman & Maxwell, 2006). In fact, mere exposure to TV or social media advertising can elevate individuals' materialistic values and related consumer behaviors accordingly (Chia, 2010; Moschis et al., 2013). Based on these findings, the current study hypothesizes that social norms about materialism positively predict individuals' emphasis on materialistic values.

1.3. Social norms moderate the link between self-esteem stability and materialistic values

Individuals experiencing unstable self-esteem are more likely to base their self-worth on external factors (Deci & Ryan, 1995), such as others' approval. They are also more influenced by social feedback (Foster et al., 2007), concurring with suggestions that individuals with unstable self-esteem are less self-determined and more externally regulated (Kernis et al., 2000). Adopting others' attitudes and behaviors to attain interpersonal approval reduces self-determined regulation in maintaining personal standards (Kernis et al., 2000), decreases agency (Kernis & Paradise, 2002), and increases conformity. Examples of degraded agency/autonomy stemming from unstable self-esteem include greater excuse-making following an exam failure (Kernis et al., 1991), and weakened intrinsic motivation in important domains (e.g., academic performance) (Waschull & Kernis, 1996). In light of this, whether or not a social context emphasizes materialism is likely to be a factor determining the strength of association between unstable self-esteem and materialistic values and related consumer behaviors. That is, social norms might play a moderating role between self-esteem stability and materialistic values.

Embracing majority beliefs and behaviors maintains a sense of stability for individuals who frequently experience self-concept fluctuations (DeYoung et al., 2002). Following societal norms reduces potential social conflicts and decreases perceptions of outside threat. This suggests that individuals with less stable self-esteem might become more materialistic in highly materialistic contexts. We therefore hypothesized that materialistic social norms moderate the relation between self-esteem stability and materialistic values, in that the negative link between self-esteem stability and materialism becomes stronger when norms about materialism are high.

1.4. Overview of the current research

The current research applied a person-environment interaction perspective to examine self-esteem instability as an individual differences factor, and social norms about materialism as an environmental factor, that might conjunctively predict materialistic values. The present study was conducted in China, which is the world's largest consumer of luxury products and one of the world's most materialistic countries (D'Arpizio et al., 2017; IPSOS, 2013). Three studies examined our hypotheses. In Study 1, we employed a longitudinal survey, measuring the key variables at two time points across five weeks. In Studies 2 and 3, we measured self-esteem stability and experimentally manipulated perceived social norms about materialism to be high or low, allowing for inferences as to whether high vs. low materialistic norms was a causal

factor that moderated the link between self-esteem stability and materialistic values. Prior literature has reported the effects of demographic variables on materialism and other key variables in this research. For example, a nine-year longitudinal study indicated that materialistic values followed a curvilinear trajectory across the life span (Jaspers & Pieters, 2016). Furthermore, gender differences in materialism have been found inconsistently, with men scoring higher in some studies (e.g., Browne & Kaldenberg, 1997), females scoring higher in others (e.g., Cho et al., 2016; Handa & Khare, 2013), and sometimes no gender differences found (e.g., Richins & Dawson, 1992; Zhang et al., 2020). Furthermore, socioeconomic status has sometimes evidenced a positive association with materialism, and other times shown no relationship (Wang et al., 2020; Zhang et al., 2020). We therefore controlled for age, gender, and subjective socioeconomic status. We also controlled for levels of self-esteem, in order to demonstrate that effects involving (in) stability existed regardless of whether individuals' self-esteem was generally high or low.

2. Study 1

In Study 1, we utilized a longitudinal design to examine the over-time associations between self-esteem stability, perceptions of social norms, and materialistic values. Longitudinal designs can reveal the over-time sequence of events, and thus provide initial evidence for a developmental order that cannot be obtained via a cross-sectional study. We expected that, when individuals perceived higher social norms about materialism, earlier self-esteem stability would show a stronger negative link with later materialistic values.

2.1. Method

2.1.1. Participants

A total of 313 college students from two large public universities in Guangdong province and Beijing in mainland China finished the survey at T1, and 284 of them remained at T2. Sample size estimation through G.Power, with medium effect size of $f^2 = 0.10$, power = 0.95, indicated a necessity of 226 participants. We slightly expanded this recruitment goal in order to account for potential attrition over the course of the study. Eleven participants did not report demographic information. Therefore, data from 273 participants (73.6% female; $M_{\text{age}} = 19.74 \pm 1.25$; $M_{\text{SES}} = 6.29 \pm 1.45$) entered the longitudinal analysis. All studies were approved by the Ethics Committees of the universities where they were designed or implemented.

2.1.2. Measures

Measures for this study (as well as for Studies 2 and 3) were administered in Mandarin Chinese, adapted from the original English instruments through a translation and back-translation procedure.

2.1.2.1. Self-esteem level. The 10-item Rosenberg self-esteem scale (Rosenberg, 1965) measured the level of self-esteem on a four-point scale (1 = *strongly disagree*, 4 = *strongly agree*). A sample item is "On the whole, I am satisfied with myself". The Cronbach's alpha was 0.88 at T1 and 0.87 at T2.

2.1.2.2. Self-esteem stability. We assessed individuals' perceived self-esteem stability via Rosenberg's (1979) five-item self-report Stability of Self (RSS) scale. Using this self-report scale held the methodological advantage of examining self-esteem and social norm perceptions concurrently in one assessment, thus capturing concomitant scores of each construct at a single time point for the purposes of calculating the interaction. Furthermore, using self-reports of stability holds advantages in terms of avoiding response fatigue in multiple measures (Roth & Altmann, 2020). Empirical research has supported the validity and effectiveness of self-reported self-esteem stability for predicting

psychosocial constructs such as life satisfaction (Altmann & Roth, 2018). A sample item is "I change from a very good opinion of myself to a very poor opinion of myself (Reversed)." Participants answered on a seven-point scale (1 = *strongly disagree*, 7 = *strongly agree*). The Cronbach's alpha of the scale was 0.78 at both T1 and T2. We re-coded the scores of the reversed items to make higher scores indicate higher stability.

2.1.2.3. Social norms about materialistic values. Three items measured individuals' perceived descriptive social norms about materialistic values on a seven-point scale (1 = *strongly disagree*, 7 = *strongly agree*), including norms held by most people around them, the city/district they are living in, and the whole Chinese society. A sample item is "Most of the people around me take material and financial success as the standard of their life success". The Cronbach's alpha was 0.79 at T1 and 0.81 at T2.

2.1.2.4. Materialistic values. The nine-item Materialistic Values Scale (MVS; Richins, 2004) measured materialistic values. The items assess the use of possessions to judge the success of others and oneself, the centrality of possessions in a person's life, and the belief that possessions and their acquisition lead to happiness and life satisfaction. A sample item is "I like to own things that impress people". Participants rated the items on a seven-point scale (1 = *strongly disagree*, 7 = *strongly agree*). The Cronbach's alpha was 0.82 at T1 and 0.84 at T2.

2.1.2.5. Demographic information. Because this study did not collect data across a longer time span, the demographic information was only measured at T1. Participants reported age, gender, and subjective socioeconomic status. Similar to previous studies (e.g., Adler et al., 2000; Goodman et al., 2001), subjective socioeconomic status (SES) was measured by an abstract ladder with 10 rungs (1 = the lowest, 10 = the highest), where higher ladder indicates a higher subjective SES, relative to others in the same society.

2.1.3. Procedure

Participants were recruited from public elective courses from both universities, and voluntarily finished the study in exchange for course credits. All the questionnaires were uploaded to an online platform (Sojump) and participants finished them through links across five weeks. The two waves of data were matched through student ID numbers.

2.1.4. Data analysis

We used cross-lagged panel modeling (Selig & Little, 2012) in Mplus 6.2 (Muthén & Muthén, 1998) to examine the interaction effect from earlier self-esteem stability and social norms to later materialistic values, with level of self-esteem at each time point being controlled in the model. Age, gender, and SES were included as control variables in model testing. First, we standardized all the variables except gender in both waves (T1 and T2). We then calculated the product of self-esteem stability and social norms about materialism in T1. Gender was coded as 1 = male and 0 = female. Correlations between self-esteem, self-esteem stability, social norms, materialistic values, and the stability-social norms interaction were added in each wave, with the exception that it was not necessary to include the interaction predictor in T2. Age, gender, and SES were regressed onto each variable in both waves. Acceptable fit for models was set at $CFI \geq 0.95$, and $RMSEA$ and $SRMR \leq 0.08$ (Kline, 2010). Based on the results of the interaction model, we further explored the effect of earlier self-esteem stability (T1) at high (+1 SD) vs. low (-1 SD) social norms (T1) upon later materialistic values (T2).

2.2. Results

2.2.1. Means, standard deviations, and correlations between variables at T1 and T2

The means, standard deviations, and correlations between variables

at T1 and T2 are presented in Table 1. Results indicated that self-esteem stability and social norms were both significantly correlated with materialistic values within and between waves, but self-esteem stability and social norms were not correlated with each other within or between waves. Self-esteem was also modestly and positively correlated with self-esteem stability within each wave. A gender difference was found for materialistic values in T1, in which females ($M = 4.71, SD = 0.94$) reported higher levels than males ($M = 4.39, SD = 0.93$), $t(271) = 2.48, p = .014$. No gender differences existed for other variables in either T1 or T2.

2.2.2. Interaction between self-esteem stability and social norms upon materialistic values

We further tested the interaction effect between earlier self-esteem stability and social norms upon later materialistic values, with age, gender, and SES, and level of self-esteem being controlled for each of the variables in each wave. An initial test of interaction between self-esteem level and self-esteem stability showed no significant effect on materialism, and therefore the interaction was not included in the model. The model showed acceptable model fit, $\chi^2(9) = 28.79, p = .001, CFI = 0.98, RMSEA = 0.09, 90\% CI = 0.05-0.13, SRMR = 0.03$. We further trimmed non-significant links from the demographic variables to arrive at the final model shown in Fig. 1. The model fit remained acceptable, $\chi^2(32) = 47.16, p = .041, CFI = 0.99, RMSEA = 0.04, 90\% CI = 0.01-0.07, SRMR = 0.04$, and was not changed significantly, $\Delta\chi^2 = 18.37, \Delta df = 23, p = .737$.

For within-time correlations, self-esteem stability (at T1, $B = -0.23, SE = 0.06, p < .001$; at T2, $B = -0.05, SE = 0.03, p = .038$) was negatively correlated with materialistic values, and social norms (at T1, $B = 0.24, SE = 0.06, p < .001$; at T2, $B = 0.07, SE = 0.03, p = .015$) were positively correlated with materialistic values at both time points. Self-esteem was also positively correlated with self-esteem stability at both T1 ($B = 0.26, SE = 0.06, p < .001$) and T2 ($B = 0.09, SE = 0.02, p < .001$). Self-esteem, self-esteem stability, social norms, and materialistic values showed significant over-time stability from T1 to T2 ($ps < .001$). Materialistic values at T1 showed a trend in predicting individuals' perceived social norms about materialism at T2 ($B = 0.10, SE = 0.05, p = .063$). In addition, the interaction of self-esteem stability and social norms at T1 showed a significant effect on materialistic values at T2 ($B = -0.08, SE = 0.04, p = .020$).

To examine the nature of the interaction, we further tested the over-time effects from self-esteem stability to materialistic values at high (+1 SD) vs. low (-1 SD) levels of social norms. Results indicated that self-esteem stability predicted materialistic values when perceived social norms were high ($B = -0.13, SE = 0.05, p = .010$), but not when they were low ($B = 0.04, SE = 0.05, p = .492$), demonstrating that the link between self-esteem stability and materialistic values was moderated by social norms about materialism.

Table 1
Means, standard deviations, and correlations between variables at T1 and T2 in Study 1.

		M	SD	1	2	3	4	5	6	7
1	SE level (T1)	2.94	0.47	-						
2	SE stability (T1)	4.02	1.11	0.26**	-					
3	SN (T1)	4.00	0.94	0.07	-0.08	-				
4	M values (T1)	4.62	0.94	-0.08	-0.25**	0.23**	-			
5	SE level (T2)	2.92	0.45	0.83**	0.27**	0.13*	-0.04	-		
6	SE stability (T2)	3.96	1.07	0.22**	0.70**	0.01	-0.20**	0.31**	-	
7	SN (T2)	4.09	0.88	0.13*	-0.09	0.56**	0.22**	0.13*	-0.08	-
8	M values (T2)	4.61	0.97	-0.03	-0.23**	0.21**	0.82**	0.03	-0.24**	0.26**

Note: SE level = self-esteem level, SE stability = self-esteem stability, SN = social norms, M values = materialistic values.

* $p \leq .05$.

** $p \leq .01$.

2.3. Study 1 discussion

In Study 1, we found that earlier self-esteem stability and social norms about materialism interacted to predict later materialistic values. Specifically, self-esteem stability was negatively linked to materialistic values when perceived social norms about materialism were higher. It is notable that this interaction effect was found, considering the relatively short time span between the two measurement points and the high longitudinal stability of materialistic values. The fact that the interaction remained significant even when controlling for level of self-esteem suggests that stability of self-esteem is an additional factor that should be considered when examining materialistic values. However, this study is not sufficient to support that social norm perceptions are causal factors that strengthen the link between self-esteem stability and materialistic values. We aimed to address this issue in Study 2 by manipulating social norms.

3. Study 2

In this study, we measured self-esteem stability and experimentally manipulated social norms about materialistic values (high vs. low). We expected that self-esteem stability would show a stronger link with materialistic values when the perceived social norms about materialism were manipulated to be high than to be low.

3.1. Method

3.1.1. Participants

A total of 236 college students from a large public university in Guangdong province in mainland China participated in the study (sample size estimation through G.Power, with medium effect size of $f^2 = 0.10$, power = 0.90, indicated a necessity of 146 participants). Sensitivity power analysis indicated 80% power to detect an effect size of $f^2 = 0.08$. This estimated sample size also pertains to Study 3. Among these participants, three skipped too many items (i.e., the entire scale of at least one key variable in the tested model was missed). Therefore, a total of 232 participants (73.7% female; $M_{age} = 20.03 \pm 1.06$; $M_{SES} = 6.30 \pm 1.25$) remained, with 113 randomly assigned to the low social norm group and 119 assigned to the high social norm group.

3.1.2. Measures

3.1.2.1. Self-esteem level. The same 10-item Rosenberg self-esteem scale as in Study 1 (Rosenberg, 1965) measured the level of self-esteem. The Cronbach's alpha was 0.81 in this study.

3.1.2.2. Self-esteem stability. The same scale as in Study 1 (Rosenberg, 1979) measured self-esteem stability. The Cronbach's alpha of the scale was 0.71 in this study.

3.1.2.3. Materialistic values. The same scale as in Study 1 (Richins,

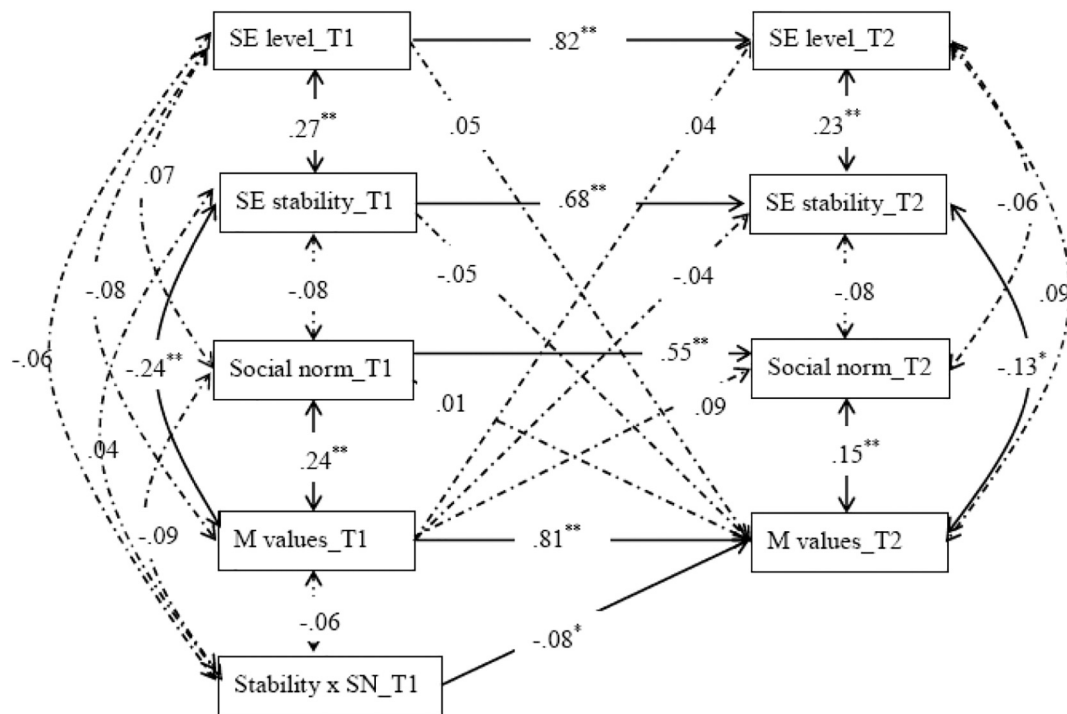


Fig. 1. Self-esteem stability and social norms at T1 interacted in predicting materialistic values in Study 1. Note: * $p \leq .05$, ** $p \leq .01$. Coefficient of each path is a standardized one in the figure; Model fit: $\chi^2(32) = 47.16, p = .041, CFI = 0.99, RMSEA = 0.04, 90\% CI = 0.01-0.07, SRMR = 0.04$; Control variables: Age \rightarrow SE_T1: -0.17^{**} ; Gender \rightarrow M values_T1: -0.34^{**} ; SES \rightarrow SE_T1: 0.15^{**} ; SES \rightarrow SE_T2: 0.11^{**} .

2004) measured materialistic values. The Cronbach's alpha was 0.77 in the current study.

3.1.2.4. *Manipulation check.* Three items measured perceived materialistic social norms in line with the three aspects in our measure of materialistic values (Richins, 2004). Participants responded on a seven-point scale (1 = strongly disagree, 7 = strongly agree). The items were: “Most of the people around me believe that a highly materialistic life could bring happiness”, “Most of the people around me believe that material and financial success is the standard of their life success”, and “Most of the people around me make material and financial success as their main life goal”. The Cronbach's alpha of the three items was 0.74 in the current study.

3.1.2.5. *Demographic information.* Participants reported age, gender, and SES as in Study 1.

3.1.3. Procedure

At beginning, participants were told a cover story that they were engaging in a memory ability study, in which personality variables would also be measured at the beginning to see whether different people would show different tendencies in memorizing information. Participants first gave consent to participate and finished the measures of self-esteem level and self-esteem stability (mixed with other irrelevant, distraction measures). They then started the formal “memory ability test” and read our priming essay of high or low materialistic norms (randomly assigned) on a computer screen. The instruction was that they needed to read the essay carefully (including the pictures inserted) and try to memorize the information.

In the high social norm condition, the main message of the essay was that the young Chinese generation was highly materialistic, more so than young people in other countries, according to a recent world-wide survey. Under the low social norm condition, the main message was that the young Chinese generation was abandoning the materialistic lifestyle, showing lower materialistic values than youth in other countries, and instead concentrating on personal development and their contributions

to society.

After reading, they finished “an interference task” before the “memory test” to avoid “an immediate perfect-memory effect” (as the instruction stated), which actually included the measures of materialistic values, manipulation check for social norms, and demographic information. Then they finished two very easy questions about the essay as “the memory test”. They were probed via a tiered debriefing for suspicions about the aim of the study, particularly the connection of the “memory test” and the “interference task”. No participants reported knowing the actual aim of the study. There were no differences in age, gender, SES, and initially measured self-esteem stability between high and low social norm groups (see supplementary results of Study 2 in Supplementary materials).

3.1.4. Data analysis

We used SPSS 19.0 to test the hypotheses via a regression procedure. Age, gender, SES, and level of self-esteem were controlled in data analysis. First, we standardized the scores of age, SES, level of self-esteem, self-esteem stability, and materialistic values, and then calculated the product of self-esteem stability and social norm of materialism ($-1 =$ low social norm, $1 =$ high social norm) to test their interaction effect. Gender was coded as $0 =$ female and $1 =$ male. In the three-step regression, age, gender, and SES were first entered as control variables, with level of self-esteem, self-esteem stability and social norm condition entered in the second step, and the product of self-esteem stability and social norm entered in the third step. We further adopted simple slope analysis to explore the predicted interaction between social norm condition and self-esteem stability on materialistic values.

3.2. Results

3.2.1. Manipulation check of social norms, and levels of materialism and self-esteem stability

The manipulation check of social norms about materialistic values was conducted with a *t*-test. The results indicated that participants in

high social norm group ($M = 5.21$, $SD = 0.97$) reported higher levels of materialistic values as a norm than those in the low social norm group ($M = 4.54$, $SD = 1.10$), $t(230) = 4.93$, $p < .001$, 95% CI for mean difference = [0.40–0.94], $d = 0.65$, power = 0.99.

Participants in high social norm group ($M = 4.72$, $SD = 0.79$) reported higher materialistic values than those in low social norm group ($M = 4.43$, $SD = 0.85$), $t(230) = 2.70$, $p = .008$, 95% CI = [0.08–0.50], $d = 0.35$, power = 0.76, but showed no difference in previously-reported self-esteem stability, $t(230) = 0.59$, $p = .558$, 95% CI = [–0.18–0.34]. Self-esteem stability and materialistic values were negatively correlated, $r = -0.21$, $p = .002$, power = 0.90.

3.2.2. Interaction between self-esteem stability and social norms on materialistic values

We adopted a three-step regression procedure (Table 2). In the first step, the model with age, gender, and SES included was not significant, $F(3, 228) = 1.67$, $p = .174$, $R = 0.15$, adjusted $R^2 = 0.02$. Gender showed effects on materialistic values, with female participants reporting higher materialism levels. There were no effects of age or SES. In the second step, we added level of self-esteem, social norms about materialism and self-esteem stability. The model was significantly improved, $F(6, 225) = 4.18$, $p = .001$, $R = 0.32$, adjusted $R^2 = 0.08$; $\Delta R^2 = 0.08$, $\Delta F(3, 225) = 6.57$, $p < .001$, $f^2 = 0.11$, power = 0.98. Both the social norms manipulation and self-esteem stability showed an effect on materialistic values, while level of self-esteem did not. In the third step, the interaction of social norms and self-esteem stability entered the model. The results indicated that the model was again significantly improved, $F(7, 224) = 4.45$, $p < .001$, $R = 0.35$, adjusted $R^2 = 0.10$; $\Delta R^2 = 0.02$, $\Delta F(1, 224) = 5.52$, $p = .020$, $f^2 = 0.13$, power = 0.99. In this step, the stability \times norms interaction showed an effect on materialistic values.

We further adopted simple slopes analysis (Aiken & West, 1991) and procedures from Hayes (2013) to examine the nature of the interaction (Fig. 2). We found that, for the high social norm group, self-esteem stability was negatively linked to materialistic values. For the low social norm group, self-esteem stability showed no relation with materialistic values. The results demonstrated that lower self-esteem stability was only associated with higher materialistic values when social norms about materialism were high.

3.3. Study 2 discussion

By measuring stability of self-esteem and manipulating social norms about materialism, Study 2 further indicates that perceived social norms about materialism can be a causal factor in whether self-esteem stability is negatively linked with materialistic values, with the model being consistent with that in Study 1. However, materialistic values are beliefs that are embedded in a person's value systems. That means people's behaviors might also be determined by the relative importance of different values, which suggests the necessity of examining the relative importance of materialistic values compared to other values (Burroughs & Rindfleisch, 2002; Schwartz, 1992). Study 3 aimed to address the issue.

4. Study 3

Study 3 aimed to replicate the interaction effect between self-esteem stability and social norms on materialistic values with the relative position of materialism within individuals' larger values system. In doing so, we aimed to show that not only do perceived norms elevate levels of materialistic values among individuals with more unstable self-esteem, but that materialistic values actually overtake other priorities including self-acceptance, affiliation, and community feeling to a greater degree.

4.1. Method

4.1.1. Participants

A total of 145 college students from a large public university in Guangxi province in mainland China participated in the study (sample size estimation with power analysis was the same as in Study 2). Among them, two skipped at least one scale, two circled extreme answers and reported a misunderstanding of the scales when asked at the end of the study, and another three skipped the priming material. A total of 138 participants (73.9% female; $M_{\text{age}} = 19.46 \pm 0.89$; $M_{\text{SES}} = 5.31 \pm 1.42$; One did not report SES) entered data analysis, with 70 randomly assigned to the low social norm group and 68 assigned to the high social norm group.

4.1.2. Measures

4.1.2.1. Self-esteem stability. The five-item self-esteem stability scale from Rosenberg (1979) measured participants' self-esteem stability, on the same scale as in Study 2 (1 = *strongly disagree*, 7 = *strongly agree*). The Cronbach's alpha of the scale was 0.68 in this study.

4.1.2.2. Materialistic values. We included two instruments to measure materialistic values. The first was the same as in Study 2, from Richins (2004). The Cronbach's alpha was 0.71 in the current study. The second instrument was Aspiration Index Items from Kasser and colleagues (e.g., Kasser & Ryan, 1993; Kasser et al., 1995), which is a frequently used measure of materialistic values in former studies (for a review, see Dittmar et al., 2014). Participants responded on a seven-point scale (0 = *not important at all*, 6 = *extremely important*) to items in four different dimensions, including self-acceptance ($\alpha = 0.60$, e.g., “*At the end of your life, you will look back on your life as meaningful and complete*”), affiliation ($\alpha = 0.75$, e.g., “*You will share your life with someone you love*”), community feeling ($\alpha = 0.72$, e.g., “*You will work for the betterment of society*.”), and financial success as the target measure of materialistic values ($\alpha = 0.73$, e.g., “*You will be financially successful*”). We used all of the five items for financial success, but only the short version of other domains in Kasser and Ryan's (1993) study. Specifically, we used three items for self-acceptance,¹ three items for affiliation, and three items for community feeling in this study.² We calculated relative importance of financial success by subtracting the score of each of the other three goals from the score of financial success³ similar to former studies (Sagiv & Schwartz, 2000; Vansteenkiste et al., 2005). In this case, we obtained three relative importance scores of financial success: importance of financial success relative to self-acceptance, affiliation, and community feeling. For both the Materialistic Values Scale and Aspiration Index, a higher score indicates higher levels of materialistic values.

4.1.2.3. Manipulation check. Three items measured perceived social norms of materialistic values as in Study 2. The Cronbach's alpha of the three items was 0.81 in the current study.

4.1.2.4. Demographic information. Participants reported age, gender, and SES. SES was measured by an abstract ladder with 10 rungs (1 = *the*

¹ The self-acceptance subscale originally included four items, one of which was removed based on the item-total correlations in this study.

² The item “*You will participate in social or political movements*” was deemed to be highly sensitive due to the general socio-political environment of mainland China, and therefore was not included.

³ The results concerning the interaction effect between self-esteem stability and social norms did not change if we used 1) only the financial success items or 2) relative importance of financial success by dividing the scores of financial success with the scores of each of other three domains as dependent variables, except that the interaction only showed a trend in predicting score of financial success divided by community feeling, with $p = .069$.

Table 2

Regression model of self-esteem stability and social norm on scores of Material Values Scales in Study 2.

	Step 1				Step 2				Step 3			
	$R^2 = 0.02$; adj. $R^2 = 0.01$; $\Delta R^2 = 0.02^*$				$R^2 = 0.10$; adj. $R^2 = 0.08$; $\Delta R^2 = 0.08^{**}$				$R^2 = 0.12$; adj. $R^2 = 0.10$; $\Delta R^2 = 0.02^*$			
	B	SE	β	95% CI for B	B	SE	β	95% CI for B	B	SE	β	95% CI for B
(Constant)	4.65	0.06		[4.52–4.77]	4.62	0.06		[4.50–4.74]	4.63	0.06		[4.51–4.75]
Age	0.04	0.06	0.05	[(-0.07)–0.15]	0.06	0.05	0.07	[(-0.05)–0.16]	0.04	0.05	0.05	[(-0.07)–0.15]
Gender	-0.26*	0.13	-0.14*	[(-0.51)–(-0.01)]	-0.18	0.12	-0.10	[(-0.42)–0.06]	-0.19	0.12	-0.10	[(-0.43)–0.05]
SES	0.04	0.06	0.05	[(-0.07)–0.15]	0.03	0.06	0.04	[(-0.08)–0.14]	0.03	0.05	0.03	[(-0.08)–0.13]
SE level					0.10	0.06	0.11	[(-0.02)–0.21]	0.09	0.06	0.11	[(-0.02)–0.21]
SN					0.15**	0.05	0.18**	[0.04–0.25]	0.15**	0.05	0.18**	[0.04–0.25]
SE stability					-0.20**	0.06	-0.24**	[(-0.31)–(-0.09)]	-0.21**	0.06	-0.25**	[(-0.32)–(-0.10)]
SN × stability									-0.12*	0.05	-0.15*	[(-0.23)–(-0.02)]

Note: SE Level = self-esteem level, SE Stability = self-esteem stability, SN = social norms about materialism.

* $p \leq .05$.
 ** $p \leq .01$.

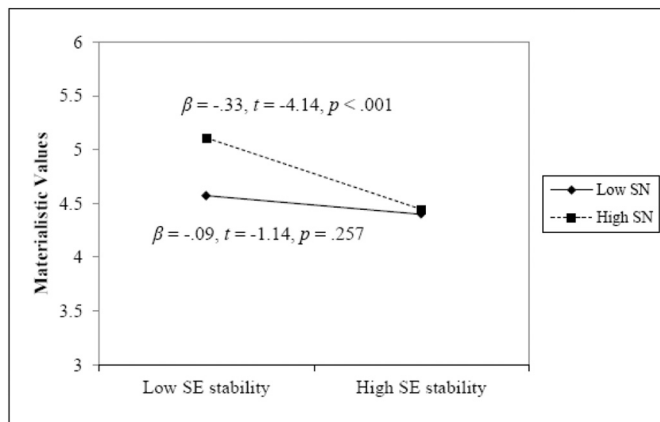


Fig. 2. Moderating effect of social norm of materialism between self-esteem stability and materialistic values in Study 2.

lowest, 10 = the highest), as in Study 2.

4.1.3. Procedure

The procedure was similar to Study 2, except that after the measure of self-esteem stability and the “memory ability test”, participants finished the relative materialism scale (i.e., Aspiration Index Items) (Kasser et al., 1995) in addition to the materialistic values scale from Richins (2004) used in Study 2. No participants reported knowing the actual aim of the study. There were no differences in age, gender, SES, or initially measured self-esteem stability between high and low social norm groups (see supplementary results of Study 3 in Supplementary materials).

4.1.4. Data analysis

The data analysis procedure using SPSS 19.0 was mostly the same as in Study 2, except that we further tested the interaction effect between self-esteem stability and social norms on relative materialism. As we constructed three separate indices of the relative importance of materialism as our dependent variables, we ran three separate regression models examining the interaction effect of social norms and self-esteem stability (cf., Vansteenkiste et al., 2006). We also conducted a path model examining all three relative scores simultaneously, which largely showed the same pattern of results as reported below. Because our sample size was not optimal for these analyses, however, we include these results in the Supplementary materials. Due to survey space/time constraints, and the non-significant effects found in Studies 1 and 2,

level of self-esteem was not included in this study.

4.2. Results

4.2.1. Manipulation check of social norms

The manipulation check of social norms about materialistic values was conducted with a *t*-test. The results indicated that participants in high social norm group ($M = 5.11, SD = 1.18$) reported higher levels of materialistic values as a norm than those in the low social norm group ($M = 4.48, SD = 1.21$), $t(136) = 3.08, p = .002, 95\% CI = [0.22–1.03], d = 0.52, power = 0.86$.

4.2.2. Means, standard deviations, and correlations between variables

Levels of self-esteem stability and each indicator of materialistic values for high vs. low social norm groups are presented in Table 3. All of the three indicators of relative importance of materialistic values were negative for the low social norms condition, while two (affiliation and community feeling) out of three scores for the relative importance index were positive for high social norms condition. In addition, the four scores of materialistic values showed positive correlations with each other. Further, we found no difference between the two social norms groups on self-esteem stability, $t(136) = 1.41, p = .160, 95\% CI = [(-0.11)–0.65]$.

4.2.3. Model based on the absolute score of materialistic values

We adopted three-step regression analysis (Table 4). In the first step, the model with age, gender, and SES included was significant, $F(3, 133) = 3.27, p = .023, R = 0.26, adjusted R^2 = 0.05$. Specifically, gender showed effects on materialistic values, with female participants reporting higher materialism levels. There was no effect from age and SES. In the second step, we added the main effects of social norms about materialism and self-esteem stability. The model was significantly improved, $F(5, 131) = 6.15, p < .001, R = 0.44, adjusted R^2 = 0.16; \Delta R^2 = 0.12, \Delta F(2, 131) = 9.81, p < .001, f^2 = 0.24, power = 0.99$. Both the social norms manipulation and self-esteem stability showed an effect on materialistic values. In the third step, the interaction of social norms and self-esteem stability entered the model. The results indicated that the model was again improved, $F(6, 130) = 6.02, p < .001, R = 0.47, adjusted R^2 = 0.18; \Delta R^2 = 0.03, \Delta F(1, 130) = 4.56, p = .035, f^2 = 0.28, power = 0.99$. In this step, the stability × norms interaction showed effects on materialistic values.

We further adopted simple slopes analysis (Aiken & West, 1991) and procedures from Hayes (2013) to examine the nature of the interaction. We found that (Fig. 3), for the high social norm group, self-esteem stability was negatively linked to materialistic values. For the low social norm group, self-esteem stability showed no relation to materialistic

Table 3
Means, standard deviations, and correlations between variables in Study 3.

Variables	Low SN		High SN		Total score		1	2	3	4
	M	SD	M	SD	M	SD				
1 M values	4.04	0.76	4.51	0.83	4.27	0.83	-			
2 Relative importance of financial success vs. SA	-0.74	1.10	-0.52	1.06	-0.63	1.08	0.47**	-		
3 vs. AFF	0.002	1.48	0.28	1.61	0.14	1.54	0.40**	0.37**	-	
4 vs. COM	-0.12	1.08	0.72	1.13	0.30	1.18	0.46**	0.49**	0.44**	-
5 SE Stability	4.52	1.13	4.25	1.12	4.39	1.13	-0.22*	-0.17*	-0.24**	-0.17*

Note: SA = self-acceptance, AFF = affiliation, COM = community feeling.

* $p \leq .05$.

** $p \leq .01$.

Table 4
Regression model of self-esteem stability and social norm on scores of Material Values Scales in Study 3.

	Step 1				Step 2				Step 3			
	$R^2 = 0.07$; adj. $R^2 = 0.05$; $\Delta R^2 = 0.07^*$				$R^2 = 0.19$; adj. $R^2 = 0.16$; $\Delta R^2 = 0.12^{**}$				$R^2 = 0.22$; adj. $R^2 = 0.18$; $\Delta R^2 = 0.03^*$			
	B	SE	β	95% CI for B	B	SE	β	95% CI for B	B	SE	β	95% CI for B
(Constant)	4.39	0.08		[4.24–4.55]	4.41	0.08		[4.26–4.56]	4.39	0.08		[4.24–4.54]
Age	-0.02	0.07	-0.03	[(-0.16)–0.12]	0.001	0.07	0.001	[(-0.13)–0.13]	0.01	0.07	0.02	[(-0.12)–0.14]
Gender	-0.48**	0.16	-0.26**	[(-0.79)–(-0.17)]	-0.51**	0.15	-0.27**	[(-0.81)–(-0.21)]	-0.50**	0.15	-0.27**	[(-0.79)–(-0.21)]
SES	0.03	0.07	0.04	[(-0.10)–0.17]	0.05	0.07	0.07	[(-0.08)–0.19]	0.06	0.07	0.07	[(-0.07)–0.18]
SN					0.24**	0.07	0.29**	[0.11–0.37]	0.24**	0.07	0.29**	[0.11–0.37]
SE stability					-0.14*	0.07	-0.17*	[(-0.27)–(-0.01)]	-0.14*	0.07	-0.17*	[(-0.27)–(-0.01)]
SN \times stability									-0.14*	0.07	-0.17*	[(-0.27)–(-0.01)]

Note: SN = social norms about materialism.

* $p \leq .05$.

** $p \leq .01$.

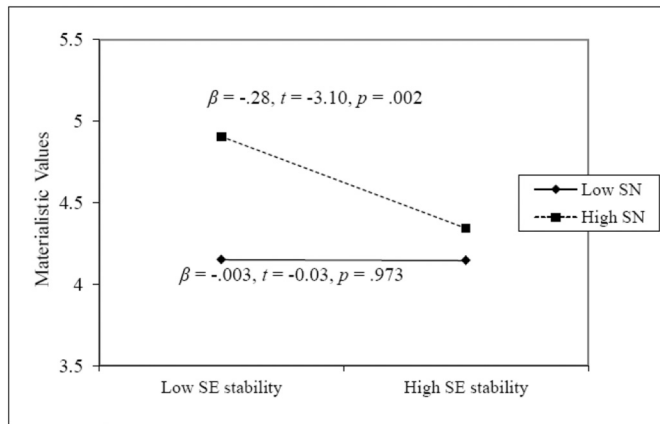


Fig. 3. Moderating effect of social norm of materialism between self-esteem stability and materialistic values (based on Richins' (2004) scale) in Study 3.

values. The results demonstrated that lower self-esteem stability was only associated with higher materialistic values when social norms about materialism were high.

4.2.4. Relative importance of financial success vs. self-acceptance

We tested the interaction model for relative importance of financial success represented by the difference between financial success and each of the other three domains. We first tested the model through three steps on relative importance of financial success vs. self-acceptance (Table 5). The first step showed no effect on the relative importance of financial success, $F(3, 133) = 0.22, p = .884, R = 0.07, \Delta R^2 = 0.01$. In the second step when both social norm condition and self-esteem stability were

entered, the model was still not significant, $F(5, 131) = 1.10, p = .363, R = 0.20$, adjusted $R^2 = 0.004; \Delta R^2 = 0.04, \Delta F(2, 131) = 2.42, p = .093, f^2 = 0.04$, power = 0.42. In the third step, the product of social norm condition and self-esteem stability was entered. The model was significantly improved, $R = 0.29$, adjusted $R^2 = 0.04; \Delta R^2 = 0.04, \Delta F(1, 130) = 5.95, p = .016, f^2 = 0.09$, power = 0.73. In this step, although social norms showed no effect and self-esteem stability only showed a trend, their interaction significantly predicted relative importance of financial success vs. self-acceptance.

Simple slopes analysis (Aiken & West, 1991) and procedures from Hayes (2013) indicated a negative effect from self-esteem stability under the high social norm condition on the relative importance of financial success vs. self-acceptance, $\beta = -0.40, t = -3.02, p = .003$, but not under low social norm condition, $\beta = 0.05, t = 0.39, p = .699$.

4.2.5. Relative importance of financial success vs. affiliation

We then tested the interaction effect on relative importance of financial success vs. affiliation through three steps (Table 6). We found that, the model was significant in the first step, $F(3, 133) = 14.07, p < .001, R = 0.49$, adjusted $R^2 = 0.22$, due to the effect of gender. The second step including social norms and self-esteem stability significantly improved the model, $F(5, 131) = 10.63, p < .001, R = 0.54$, adjusted $R^2 = 0.26; \Delta R^2 = 0.05, \Delta F(2, 131) = 4.39, p = .014, f^2 = 0.44$, power = 0.99. There was an effect from self-esteem stability, but not from social norms. In the third step, the model was further improved, $F(6, 130) = 10.86, p < .001, R = 0.58$, adjusted $R^2 = 0.30; \Delta R^2 = 0.05, \Delta F(1, 130) = 8.85, p = .003, f^2 = 0.55$, power = 1.00. Both self-esteem stability and its interaction with social norms showed effects on financial success vs. affiliation.

Simple slopes analysis (Aiken & West, 1991) and procedures from Hayes (2013) further indicated that self-esteem stability showed an effect on relative importance of financial success vs. affiliation under the

Table 5

Regression model of self-esteem stability and social norm on relative importance of financial success to self-acceptance in Study 3.

	Step 1				Step 2				Step 3			
	B	SE	β	95% CI for B	B	SE	β	95% CI for B	B	SE	β	95% CI for B
	$R^2 = 0.01$; adj. $R^2 = -0.02$; $\Delta R^2 = 0.01$				$R^2 = 0.04$; adj. $R^2 = 0.004$; $\Delta R^2 = 0.04$				$R^2 = 0.08$; adj. $R^2 = 0.04$; $\Delta R^2 = 0.04^*$			
(Constant)	-0.62	0.11		[(-0.84)-(-0.41)]	-0.63	0.11		[(-0.84)-(-0.41)]	-0.66	0.11		[(-0.87)-(-0.45)]
Age	0.07	0.09	0.07	[(-0.11)-0.26]	0.08	0.09	0.07	[(-0.11)-0.27]	0.10	0.09	0.09	[(-0.09)-0.28]
Gender	-0.05	0.21	-0.02	[(-0.47)-0.37]	-0.03	0.21	-0.01	[(-0.46)-0.39]	-0.01	0.21	-0.01	[(-0.43)-0.40]
SES	-0.004	0.09	-0.003	[(-0.19)-0.18]	0.02	0.09	0.02	[(-0.17)-0.21]	0.02	0.09	0.02	[(-0.16)-0.21]
SN					0.10	0.10	0.09	[(-0.09)-0.29]	0.10	0.09	0.09	[(-0.09)-0.28]
SE stability					-0.17	0.10	-0.16	[(-0.36)-0.02]	-0.17	0.09	-0.16	[(-0.36)-0.01]
SN \times stability									-0.22*	0.09	-0.21*	[(-0.41)-(-0.04)]

Note: SN = social norms about materialism.

* $p \leq .05$.

Table 6

Regression model of self-esteem stability and social norm on relative importance of financial success to affiliation in Study 3.

	Step 1				Step 2				Step 3			
	B	SE	β	95% CI for B	B	SE	β	95% CI for B	B	SE	β	95% CI for B
	$R^2 = 0.24$; adj. $R^2 = 0.22$; $\Delta R^2 = 0.24^{**}$				$R^2 = 0.29$; adj. $R^2 = 0.26$; $\Delta R^2 = 0.05^*$				$R^2 = 0.33$; adj. $R^2 = 0.30$; $\Delta R^2 = 0.05^{**}$			
(Constant)	0.58	0.14		[0.31-0.84]	0.58	0.13		[0.31-0.84]	0.53	0.13		[0.27-0.78]
Age	-0.03	0.12	-0.02	[(-0.26)-0.20]	-0.02	0.12	-0.01	[(-0.25)-0.21]	0.01	0.11	0.01	[(-0.21)-0.23]
Gender	-1.71**	0.26	-0.49**	[(-2.23)-(-1.19)]	-1.69**	0.26	-0.48**	[(-2.21)-(-1.17)]	-1.66**	0.25	-0.48**	[(-2.16)-(-1.16)]
SES	-0.07	0.12	-0.05	[(-0.30)-0.16]	-0.03	0.12	-0.02	[(-0.26)-0.20]	-0.03	0.11	-0.02	[(-0.25)-0.19]
SN					0.18	0.12	0.12	[(-0.05)-0.41]	0.18	0.11	0.11	[(-0.05)-0.40]
SE stability					-0.27*	0.12	-0.17*	[(-0.50)-(-0.04)]	-0.28*	0.11	-0.18*	[(-0.50)-(-0.05)]
SN \times stability									-0.33**	0.11	-0.21**	[(-0.55)-(-0.11)]

Note: SN = social norms about materialism.

* $p \leq .05$.

** $p \leq .01$.

high social norm condition, $\beta = -0.61$, $t = -3.80$, $p < .001$, but there was no effect when the norm about materialism was low, $\beta = 0.06$, $t = 0.35$, $p = .725$.

4.2.6. Relative importance of financial success vs. community feeling

Finally, we tested whether self-esteem stability showed different effects on relative importance of financial success vs. community feeling under high vs. low social norm conditions (Table 7). The model was not significant in the first step, $F(3, 133) = 0.15$, $p = .998$, $R = 0.02$, adjusted $R^2 = -0.02$. The model was improved after self-esteem stability and social norms were entered in the second step, $F(5, 131) = 4.44$, $p = .001$, $R = 0.38$, adjusted $R^2 = 0.11$; $\Delta R^2 = 0.15$, $\Delta F(2, 131) = 11.09$, $p < .001$, $f^2 = 0.18$, power = 0.98. There was an effect from social norms but not from self-esteem stability. In the third step, the model was further improved after the product of self-esteem stability and social norms was

entered, $F(6, 130) = 4.47$, $p < .001$, $R = 0.41$, adjusted $R^2 = 0.13$; $\Delta R^2 = 0.03$, $\Delta F(1, 130) = 4.08$, $p = .045$, $f^2 = 0.22$, power = 0.99. Both social norms and its interaction with self-esteem stability showed effects on the relative importance of financial success vs. community feeling.

Simple slopes analysis (Aiken & West, 1991) and procedures from Hayes (2013) showed that self-esteem stability was negatively linked to relative importance of financial success vs. community feeling under high social norm condition, $\beta = -0.35$, $t = -2.55$, $p = .012$, but not when the norms about materialism was low, $\beta = 0.04$, $t = 0.30$, $p = .768$.

4.3. Study 3 discussion

Study 3 found a significant interaction effect of self-esteem stability and social norms on materialistic values, thus replicating the results of Studies 1 and 2. Moreover, this study also showed that this interaction

Table 7

Regression model of self-esteem stability and social norms on relative importance of financial success to community feeling in Study 3.

	Step 1				Step 2				Step 3			
	B	SE	β	95% CI for B	B	SE	β	95% CI for B	B	SE	β	95% CI for B
	$R^2 = 0.00$; adj. $R^2 = -0.02$; $\Delta R^2 = 0.00$				$R^2 = 0.15$; adj. $R^2 = 0.11$; $\Delta R^2 = 0.15^{**}$				$R^2 = 0.17$; adj. $R^2 = 0.13$; $\Delta R^2 = 0.03^*$			
(Constant)	0.30	0.12		[0.06-0.53]	0.32	0.11		[0.10-0.54]	0.29	0.11		[0.07-0.51]
Age	-0.01	0.10	-0.01	[(-0.22)-0.19]	0.03	0.10	0.02	[(-0.16)-0.22]	0.04	0.10	0.04	[(-0.15)-0.24]
Gender	0.00	0.23	0.00	[(-0.46)-0.46]	-0.07	0.22	-0.03	[(-0.51)-0.36]	-0.05	0.22	-0.02	[(-0.48)-0.38]
SES	-0.02	0.10	-0.01	[(-0.22)-0.19]	0.01	0.10	0.01	[(-0.18)-0.20]	0.01	0.10	0.01	[(-0.18)-0.20]
SN					0.41**	0.10	0.35**	[0.22-0.60]	0.41**	0.10	0.35**	[0.22-0.60]
SE stability					-0.15	0.10	-0.13	[(-0.34)-0.05]	-0.15	0.10	-0.13	[(-0.35)-0.04]
SN \times stability									-0.19*	0.10	-0.16*	[(-0.38)-(-0.004)]

Note: SN = social norms about materialism.

* $p \leq .05$.

** $p \leq .01$.

persisted when considering the relative importance of materialistic values in comparison to other life goals such as self-acceptance, affiliation, and community feeling, suggesting the robustness of the interaction effect.

5. General discussion

This research consistently observed a negative association between trait self-esteem stability and materialistic values when the perceived social norms about materialism in the environment were high. This effect was demonstrated in a longitudinal design in Study 1, even with the level of self-esteem being controlled. This social norm moderation was further demonstrated in two experiments, in which we manipulated norms about materialism to be high or low (Studies 2 and 3). Participants with lower self-esteem stability endorsed materialistic values more strongly when social norms about materialism were manipulated to be higher. We observed these effects on both absolute levels of materialism, and the relative priority of materialism within individuals' large value system, suggesting a more systemic change.

5.1. Interaction between self-esteem stability and social norms on materialistic values

The findings supported the notion that both personal traits (self-esteem stability) and contextual factors (social norms) contributed to individuals' endorsement of materialistic values. This interaction effect is in line with prior research demonstrating that unstable self-esteem is associated with greater tendencies toward attitudinal and behavioral conformity (Foster et al., 2007; Kernis et al., 2000). When materialism is widespread in the environment, deviation from such behavior could bring social consequences like isolation. Being different from others might be risky in social interaction, resulting in being adversely judged, excluded, or losing needed support or resources. People with unstable self-esteem also show little trust in their personal autonomy (Deci & Ryan, 1995; Schoel et al., 2011), and therefore are more likely to follow others, both in terms of beliefs and behaviors.

In this case, adopting highly normative materialistic values might be a strategy for individuals with unstable self-esteem to obtain social acceptance. Such an interpretation suggests the existence of "instrumental" materialism (Csikszentmihalyi & Rochberg-Halton, 1981) that individuals use as a way to achieve short-term goals, such as belongingness. Nevertheless, using materialism for short-term boosts to social acceptance and self-esteem might undermine low-stability individuals' well-being, in the long run (Dittmar et al., 2014). The moderating role of social norms in the current study implies that materialistic values stemming from unstable self-esteem might be sensitive to environmental changes, and not purely based on the basic functions (e.g., utility) that material possessions might bring. On the contrary, individuals with stable self-esteem are less likely to fluctuate along with external factors (Greenier et al., 1999), and their preferences might be more robust to others' endorsement of materialistic values.

5.2. Contributions and implications

This research suggests that personality traits or contextual factors, alone, are not sufficient for predicting individuals' endorsement of materialism. By demonstrating that earlier self-esteem stability and social norms interacted to predict later materialistic values in Study 1, the research provided evidence for a temporal order that aligns with views of materialism as a compensatory mechanism. Beyond merely considering high versus low levels of self-esteem (e.g., Chaplin & John, 2007, 2010), the study suggests that it is also important to consider whether self-esteem levels fluctuate. The study further indicates that unstable individuals are susceptible to environmental cues in whether or not to adopt materialism as a coping strategy. This model highlights the importance of a more integrated perspective that simultaneously

considers both individual and contextual contributions to materialism.

The notion of person-environment effects upon materialism also holds implications for practice. The marketing and consumer goods industries has extensively utilized manipulations of social norm perceptions and individuals' self-esteem in order to evoke greater consumption behavior, and our results suggest that targeting the fluctuating nature of self-esteem might further enhance the effectiveness of these approaches. However, this study also provides important insights into how to protect certain vulnerable groups from becoming too materialistic. For example, parents and educators who are concerned about children's materialistic values should pay special attention to youths with unstable self-esteem who must frequently operate in highly materialistic contexts. Programs aiming to decrease the importance of materialism in youths' value systems, by encouraging a consideration of life goals, have been shown to be effective for several months (e.g., Kasser et al., 2014). However, the long-term effects of such programs are not clear, especially in a society that strongly emphasizes materialism. Efforts to promote a stable sense of self-worth might buffer the impacts of a highly materialistic context. Additionally, reducing contact with positive depictions of materialism could potentially decrease the perception of such behavior as highly normative (Oprea et al., 2014).

5.3. Strengths, limitations, and future directions

The research held several methodological strengths. In particular, our use of both longitudinal and experimental methods demonstrated the robustness of the results, and allowed for inferences of temporal sequence and causal effects. Considering the difficulty of experimentally manipulating self-esteem stability, the longitudinal approach can be viewed as an extension of studies that only demonstrated correlations between personality traits and materialistic values at one time point (e.g., Richins & Dawson, 1992). Furthermore, our experimental manipulations of social norms in Studies 2 and 3 build upon prior studies examining correlations between environmental influences and materialism (e.g., Isaksen & Roper, 2012; Oprea et al., 2014). By controlling for level of self-esteem in Studies 1 and 2, we also demonstrated the unique effects of self-esteem stability in this process. Including different measures of materialistic values in Study 3 also addressed prior suggestions that research must consider both people's values and the relative positions of those values within a larger system (e.g., Burroughs & Rindfleisch, 2002; Schwartz, 1992). The consistent presence of the interaction under these different measurement approaches suggests replicable effects.

The study also holds limitations that suggest several important directions for future research. First, although we experimentally primed the prevalence of materialism (i.e., descriptive social norms) in Studies 2 and 3, participants might also perceive a certain legitimacy to materialism (i.e., injunctive social norms). Future studies could extend these results by examining how individuals' attitudes might shift when participants are exposed to conflicting descriptive vs. injunctive norms about materialism. Meanwhile, widespread materialistic norms also seem to promise social acceptance if individuals conform, and therefore, low-stability individuals' adoption of materialism could stem either from motivations to gain acceptance or motivations to boost self-esteem. The different underlying motivations that drive this instability-social norm effect therefore require further examination.

Second, the current research did not manipulate the stability of self-esteem, and therefore cannot offer a causal interpretation of unstable self-esteem effects upon materialistic values. Although the longitudinal results in Study 1 might be suggestive of this temporal order, future studies might develop means to manipulate self-esteem stability.

Third, we utilized a self-report measure of perceived self-esteem stability, which might differ from a more objective score calculated from repeated assessments (i.e., statistical index of self-esteem stability). It would be interesting to explore whether a more objective measure of stability has similar or additional predictive value in conjunction with

social norm perceptions, in order to overcome potential self-report biases such as memory distortion, self-promotion, or social desirability. This extension would be especially useful considering the somewhat lower reliability for this scale in Study 3, as has been found with other validated self-report measures of self-esteem stability (cf. Roth & Altmann, 2020). Additionally, we also did not measure individuals' actual consumer behaviors in conjunction with their materialistic values, which could provide further, concrete results for use in both marketing and intervention practice.

Finally, our findings were obtained using Chinese participants, and the generalization of the results to other cultures requires more study. In collectivistic societies, people show higher orientations toward conformity (Markus & Kitayama, 1991). The fact that China is currently relatively high in materialism also raises questions of generalizability. It remains to be seen whether these effects extend to individualistic and/or lower materialistic contexts. Moreover, the three studies consistently found that women scored higher in materialism than men. This result has been found in other research conducted with participants from different regions of Asia, such as India (Handa & Khare, 2013) and Korea (Cho et al., 2016). Some scholars have suggested that females in Eastern societies place greater emphasis upon personal appearance than men (Handa & Khare, 2013), and that they invest more resources like time and money on consumption behaviors meant to enhance physical attractiveness. These investments, in turn, might lead them to believe that related possessions are more important (Workman & Lee, 2011). However, the inconsistent findings regarding gender differences across the broader literature, and whether certain cultural values underlie these disparate results, should be addressed in future research.

In conclusion, this research builds upon prior findings on the separate effects of personality traits and contextual factors upon materialism. Our findings suggest that the adoption of materialistic values is a more complicated process that involves the interaction of both trait and environmental factors. Unstable self-esteem triggers individuals to become more materialistic when they notice high materialism in their social environments. In essence, individuals experiencing unstable self-esteem might rely upon material possessions in an attempt to “buy stability”, when they perceive themselves to live in a “buying world”.

CRediT authorship contribution statement

Yan Zhang: Conceptualization, Methodology, Data curation, Writing – original draft. **Skyler T. Hawk:** Methodology, Writing – review & editing, Supervision.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.paid.2021.111184>.

References

Adler, N. E., Epel, E. S., Castellazzo, G., & Ickovics, J. R. (2000). Relationship of subjective and objective social status with psychological and physiological functioning: Preliminary data in healthy, White women. *Health Psychology, 19*(6), 586–592. <https://doi.org/10.1037/0278-6133.19.6.586>.

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. London, Sage: Newbury Park.

Altmann, T., & Roth, M. (2018). The Self-esteem Stability Scale (SESS) for cross-sectional direct assessment of self-esteem stability. *Frontiers in Psychology, 9*, 91. <https://doi.org/10.3389/fpsyg.2018.00091>.

Ames, D. R., Rose, P., & Anderson, C. P. (2006). The NPI-16 as a short measure of narcissism. *Journal of Research in Personality, 40*(4), 440–450. <https://doi.org/10.1016/j.jrp.2005.03.002>.

Braun, O. L., & Wicklund, R. A. (1989). Psychological antecedents of conspicuous consumption. *Journal of Economic Psychology, 10*(2), 161–187. [https://doi.org/10.1016/0167-4870\(89\)90018-4](https://doi.org/10.1016/0167-4870(89)90018-4).

Broadwater, K., Curtin, L., Martz, D. M., & Zrull, M. C. (2006). College student drinking: Perception of the norm and behavioral intentions. *Addictive Behaviors, 31*(4), 632–640. <https://doi.org/10.1016/j.addbeh.2005.05.041>.

Browne, B. A., & Kaldenberg, D. O. (1997). Conceptualizing self-monitoring: Links to materialism and product involvement. *Journal of Consumer Marketing, 14*, 31–44. <https://doi.org/10.1108/07363769710155848>.

Brunstein, J. C., & Gollwitzer, P. M. (1996). Effects of failure on subsequent performance: The importance of self-defining goals. *Journal of Personality and Social Psychology, 70*(2), 395–407. <https://doi.org/10.1037/0022-3514.70.2.395>.

Burroughs, J. E., & Rindfleisch, A. (2002). Materialism and well-being: A conflicting values perspective. *Journal of Consumer Research, 29*(3), 348–370. <https://doi.org/10.1086/344429>.

Chaplin, L. N., & John, D. R. (2007). Growing up in a material world: Age differences in materialism in children and adolescents. *Journal of Consumer Research, 34*(4), 480–493. <https://doi.org/10.1086/518546>.

Chaplin, L. N., & John, D. R. (2010). Interpersonal influences on adolescent materialism: A new look at the role of parents and peers. *Journal of Consumer Psychology, 20*(2), 176–184. <https://doi.org/10.1016/j.jcps.2010.02.002>.

Chia, S. C. (2010). How social influence mediates media effects on adolescents' materialism. *Communication Research, 37*(3), 400–419. <https://doi.org/10.1177/0093650210362463>.

Cho, H. J., Jin, B., & Watchravesringkan, K. T. (2016). A cross-cultural comparison of materialism in emerging and newly developed Asian markets. *International Journal of Business, Humanities and Technology, 6*(1), 1–10.

Christopher, A. N., & Schlenker, B. R. (2004). Materialism and affect: The role of self-presentational concerns. *Journal of Social and Clinical Psychology, 23*(2), 260–272. <https://doi.org/10.1521/jscp.23.2.260.31022>.

Csikszentmihalyi, M., & Rochberg-Halton, E. (1981). *The meaning of things: Domestic symbols and the self*. Cambridge University Press.

D'arpizio, C., Levato, F., Zito, D., Kamel, M., & de Montgolfier, J. (2017). *Luxury goods worldwide market study, Fall-Winter 2017*. Bain & Company, Inc.

Deci, E. L., & Ryan, R. M. (1995). Human autonomy. In *Efficacy, agency, and self-esteem* (pp. 31–49). Springer US.

DeYoung, C. G., Peterson, J. B., & Higgins, D. M. (2002). Higher-order factors of the Big Five predict conformity: Are there neuroses of health? *Personality and Individual Differences, 33*(4), 533–552. [https://doi.org/10.1016/S0191-8869\(01\)00171-4](https://doi.org/10.1016/S0191-8869(01)00171-4).

Dittmar, H., Bond, R., Hurst, M., & Kasser, T. (2014). The relationship between materialism and personal well-being: A meta-analysis. *Journal of Personality and Social Psychology, 107*(5), 879–924. <https://doi.org/10.1037/a0037409>.

Flynn, L. R., Goldsmith, R. E., & Pollitte, W. (2016). Materialism, status consumption, and market involved consumers. *Psychology & Marketing, 33*(9), 761–776. <https://doi.org/10.1002/mar.20915>.

Foster, J. D., Kernis, M. H., & Goldman, B. M. (2007). Linking adult attachment to self-esteem stability. *Self and Identity, 6*(1), 64–73. <https://doi.org/10.1080/15298860600832139>.

Gil, L. A., Kwon, K. N., Good, L. K., & Johnson, L. W. (2012). Impact of self on attitudes toward luxury brands among teens. *Journal of Business Research, 65*(10), 1425–1433. <https://doi.org/10.1016/j.jbusres.2011.10.008>.

Goldberg, M. E., Gorn, G. J., Peracchio, L. A., & Bamossy, G. (2003). Understanding materialism among youth. *Journal of Consumer Psychology, 13*(3), 278–288. https://doi.org/10.1207/S15327663JCP1303_09.

Goodman, E., Adler, N. E., Kawachi, I., Frazier, A. L., Huang, B., & Colditz, G. A. (2001). Adolescents' perceptions of social status: Development and evaluation of a new indicator. *Pediatrics, 108*(2), 31.

Greenier, K. D., Kernis, M. H., McNamara, C. W., Waschull, S. B., Berry, A. J., Herlocker, C. E., & Abend, T. A. (1999). Individual differences in reactivity to daily events: Examining the roles of stability and level of self-esteem. *Journal of Personality, 67*(1), 187–208. <https://doi.org/10.1111/1467-6494.00052>.

Handa, M., & Khare, A. (2013). Gender as a moderator of the relationship between materialism and fashion clothing involvement among Indian youth. *International Journal of Consumer Studies, 37*(1), 112–120. <https://doi.org/10.1111/j.1470-6431.2011.01057.x>.

Hanley, A., & Wilhelm, M. S. (1992). Compulsive buying: An exploration into self-esteem and money attitudes. *Journal of Economic Psychology, 13*(1), 5–18. [https://doi.org/10.1016/0167-4870\(92\)90049-D](https://doi.org/10.1016/0167-4870(92)90049-D).

Haug, S., Ulbricht, S., Hanke, M., Meyer, C., & John, U. (2011). Overestimation of drinking norms and its association with alcohol consumption in apprentices. *Alcohol and Alcoholism, 46*(2), 204–209. <https://doi.org/10.1093/alcalc/agg103>.

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis*. Guilford Press.

IPSOS. (2013, December 13). Global attitudes on materialism, finances and family. <https://www.ipsos.com/en-us/global-attitudes-materialism-finances-and-family>. (Accessed 21 April 2021).

Isaksen, K. J., & Roper, S. (2012). The commodification of self-esteem: Branding and British teenagers. *Psychology & Marketing, 29*(3), 117–135. <https://doi.org/10.1002/mar.20509>.

- Jaspers, E. D., & Pieters, R. G. (2016). Materialism across the life span: An age-period-cohort analysis. *Journal of Personality and Social Psychology*, 111(3), 451–473. <https://doi.org/10.1037/pspp0000092>.
- Jiang, J., Zhang, Y., Ke, Y., 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. <https://doi.org/10.1016/j.jesp.2015.01.001>.
- Kasser, T. (2002). *The high price of materialism*. MIT press.
- Kasser, T. (2005). Frugality, generosity, and materialism in children and adolescents. In *What do children need to flourish?* (pp. 357–373). Boston, MA: Springer.
- Kasser, T., Ryan, R. M., Zax, M., & Sameroff, A. J. (1995). The relations of maternal and social environments to late adolescents' materialistic and prosocial values. *Developmental Psychology*, 31(6), 907–914. <https://doi.org/10.1037/0012-1649.31.6.907>.
- 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), 1–22. <https://doi.org/10.1007/s11031-013-9371-4>.
- Kasser, T., & Ryan, R. M. (1993). A dark side of the American dream: Correlates of financial success as a central life aspiration. *Journal of Personality and Social Psychology*, 65(2), 410–422.
- Kernis, M. H., Cornell, D. P., Sun, C.-R., Berry, A., & Harlow, T. (1993). There's more to self-esteem than whether it is high or low: The importance of stability of self-esteem. *Journal of Personality and Social Psychology*, 65(6), 1190–1204.
- Kernis, M. H., & Goldman, B. M. (2006). Assessing stability of self-esteem and contingent self-esteem. In *Self-esteem issues and answers: A sourcebook of current perspectives* (pp. 77–85).
- Kernis, M. H., Grannemann, B. D., & Barclay, L. C. (1989). Stability and level of self-esteem as predictors of anger arousal and hostility. *Journal of Personality and Social Psychology*, 56(6), 1013–1022.
- Kernis, M. H., Grannemann, B. D., & Barclay, L. C. (1992). Stability of self-esteem: Assessment, correlates, and excuse making. *Journal of Personality*, 60(3), 621–644. <https://doi.org/10.1111/j.1467-6494.1992.tb00923.x>.
- Kernis, M. H., Grannemann, B. D., & Mathis, L. C. (1991). Stability of self-esteem as a moderator of the relation between level of self-esteem and depression. *Journal of Personality and Social Psychology*, 61(1), 80–84.
- Kernis, M. H., Greenier, K. D., Herlocker, C. E., Whisenhunt, C. R., & Abend, T. A. (1997). Self-perceptions of reactions to doing well or poorly: The roles of stability and level of self-esteem. *Personality and Individual Differences*, 22(6), 845–854. [https://doi.org/10.1016/S0191-8869\(96\)00263-2](https://doi.org/10.1016/S0191-8869(96)00263-2).
- Kernis, M. H., & Paradise, A. W. (2002). Distinguishing between secure and fragile forms of high self-esteem. In E. L. Deci, & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 339–360). Rochester, NY: University of Rochester Press.
- Kernis, M. H., Paradise, A. W., Whitaker, D. J., Wheatman, S. R., & Goldman, B. N. (2000). Master of one's psychological domain? Not likely if one's self-esteem is unstable. *Personality and Social Psychology Bulletin*, 26(10), 1297–1305. <https://doi.org/10.1177/0146167200262010>.
- Kish-Gephart, J. J., Harrison, D. A., & Treviño, L. K. (2010). Bad apples, bad cases, and bad barrels: Meta-analytic evidence about sources of unethical decisions at work. *Journal of Applied Psychology*, 95(1), 1–31. <https://doi.org/10.1037/a0017103>.
- Kline, R. B. (2010). *Principles and practice of structural equation modeling* (3rd ed.). New York City: Guilford Press.
- Lerman, D., & Maxwell, S. (2006). Joining a consumer society: Russian immigrant versus American materialism. *Journal of Consumer Behaviour*, 5(6), 479–490. <https://doi.org/10.1002/cb.197>.
- Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, 98(2), 224–253.
- Morris, M. W., Hong, Y. Y., Chiu, C. Y., & Liu, Z. (2015). Normology: Integrating insights about social norms to understand cultural dynamics. *Organizational Behavior and Human Decision Processes*, 129, 1–13. <https://doi.org/10.1016/j.obhdp.2015.03.001>.
- Moschis, G. P., Mathur, A., & Fatt, C. K. (2013). Effects of family structure on materialism and compulsive consumption: A life course study in Brazil. *Journal of Research for Consumers*, 23(3), 15–20.
- Müller, A., Mitchell, J. E., Crosby, R. D., Cao, L., Johnson, J., Claes, L., ... de Zwaan, M. (2012). Mood states preceding and following compulsive buying episodes: An ecological momentary assessment study. *Psychiatry Research*, 200(2-3), 575–580. <https://doi.org/10.1016/j.psychres.2012.04.015>.
- Muthén, L. K., & Muthén, B. O. (1998). *Mplus user's guide* (6th ed.). Los Angeles, CA: Muthén & Muthén.
- Norris, J. I., Lambert, N. M., Nathan DeWall, C., & Fincham, F. D. (2012). Can't buy me love?: Anxious attachment and materialistic values. *Personality and Individual Differences*, 53, 666–669. <https://doi.org/10.1016/j.paid.2012.05.009>.
- Oprea, S. J., Buijzen, M., van Reijmersdal, E. A., & Valkenburg, P. M. (2014). Children's advertising exposure, advertised product desire, and materialism: A longitudinal study. *Communication Research*, 41(5), 717–735. <https://doi.org/10.1177/0093650213479129>.
- Park, J. K., & John, D. R. (2011). More than meets the eye: The influence of implicit and explicit self-esteem on materialism. *Journal of Consumer Psychology*, 21(1), 73–87. <https://doi.org/10.1016/j.jcps.2010.09.001>.
- Richins, M. L. (2004). The material values scale: Measurement properties and development of a short form. *Journal of Consumer Research*, 31(1), 209–219. <https://doi.org/10.1086/383436>.
- Richins, M. L., & Dawson, S. (1992). A consumer values orientation for materialism and its measurement: Scale development and validation. *Journal of Consumer Research*, 19(3), 303–316. <https://doi.org/10.1086/209304>.
- Ridout, B., & Campbell, A. (2014). Using Facebook to deliver a social norm intervention to reduce problem drinking at university. *Drug and Alcohol Review*, 33(6), 667–673. <https://doi.org/10.1111/dar.12141>.
- Rose, P. (2007). Mediators of the association between narcissism and compulsive buying: The roles of materialism and impulse control. *Psychology of Addictive Behaviors*, 21(4), 576–581. <https://doi.org/10.1037/0893-164X.21.4.576>.
- Rosenberg, M. (1965). *Society and adolescent self-image*. Princeton, NJ: Princeton University.
- Rosenberg, M. (1979). *Conceiving the self*. New York: Basic Books.
- Roth, M., & Altmann, T. (2020). A comparison of the predictive validity of self-esteem level and directly measured self-esteem stability in the temporal prediction of psychological distress. *Frontiers in Psychology*, 11, 1770. <https://doi.org/10.3389/fpsyg.2020.01770>.
- Sagiv, L., & Schwartz, S. H. (2000). Value priorities and subjective well-being: Direct relations and congruity effects. *European Journal of Social Psychology*, 30(2), 177–198. [https://doi.org/10.1002/\(SICI\)1099-0992\(200003/04\)30:2<177::AID-EJSP982>3.0.CO;2-Z](https://doi.org/10.1002/(SICI)1099-0992(200003/04)30:2<177::AID-EJSP982>3.0.CO;2-Z).
- Schoel, C., Bluemke, M., Mueller, P., & Stahlberg, D. (2011). When autocratic leaders become an option—Uncertainty and self-esteem predict implicit leadership preferences. *Journal of Personality and Social Psychology*, 101(3), 521–540. <https://doi.org/10.1037/a0023393>.
- Schroeder, J. E., & Dugal, S. S. (1995). Psychological correlates of the materialism construct. *Journal of Social Behavior and Personality*, 10(1), 243–253.
- Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. In Vol. 25. *Advances in experimental social psychology* (pp. 1–65). Academic Press.
- Sedikides, C., Gregg, A. P., Cisek, S., & Hart, C. M. (2007). The I that buys: Narcissists as consumers. *Journal of Consumer Psychology*, 17(4), 254–257. [https://doi.org/10.1016/S1057-7408\(07\)70035-9](https://doi.org/10.1016/S1057-7408(07)70035-9).
- Seery, M. D., Blascovich, J., Weisbuch, M., & Vick, S. B. (2004). The relationship between self-esteem level, self-esteem stability, and cardiovascular reactions to performance feedback. *Journal of Personality and Social Psychology*, 87(1), 133–145. <https://doi.org/10.1037/0022-3514.87.1.133>.
- Selig, J., & Little, T. D. (2012). Autoregressive and cross-lagged panel analysis for longitudinal data. In B. Laursen, T. D. Little, & N. A. Card (Eds.), *Handbook of developmental research methods* (pp. 265–278). New York, NY: The Guilford Press.
- Solberg, E. C., Diener, E., & Robinson, M. (2004). Why are materialists less satisfied? In T. Kasser, & A. D. Kanner (Eds.), *Psychology and consumer culture: The struggle for a good life in a materialistic world* (pp. 29–48). Washington, DC: American Psychological Association.
- Song, Y., Jiang, J., & Liang, J. (2014). Why do people chase luxuries, a matter of popularity or quality? An examination of materialism, luxury consumption and public self-consciousness. In 15th Annual Meeting of the Society for Personality and Social Psychology, Austin, Texas, February 13–15.
- Tevendale, H. D., DuBois, D. L., Lopez, C., & Prindiville, S. L. (1997). Self-esteem stability and early adolescent adjustment: An exploratory study. *The Journal of Early Adolescence*, 17(2), 216–237. <https://doi.org/10.1177/0272431697017002006>.
- Trevino, L. K. (1986). Ethical decision making in organizations: A person-situation interactionist model. *Academy of Management Review*, 11(3), 601–617. <https://doi.org/10.5465/amr.1986.4306235>.
- Vansteenkiste, M., Duriez, B., Simons, J., & Soenens, B. (2006). Materialistic values and well-being among business students: Further evidence of their detrimental effect. *Journal of Applied Social Psychology*, 36(12), 2892–2908. <https://doi.org/10.1111/j.0021-9029.2006.00134.x>.
- Vansteenkiste, M., Simons, J., Lens, W., Soenens, B., & Matos, L. (2005). Examining the motivational impact of intrinsic versus extrinsic goal framing and autonomy-supportive versus internally controlling communication style on early adolescents' academic achievement. *Child Development*, 76(2), 483–501. <https://doi.org/10.1111/j.1467-8624.2005.00858.x>.
- Velov, B., Gokjovic, V., & Đurić, V. (2014). Materialism, narcissism and the attitude towards conspicuous consumption. *Psihologija*, 47(1), 113–129. <https://doi.org/10.2298/PSI1401113V>.
- Wang, R., Liu, H., & Jiang, J. (2020). Does socioeconomic status matter? Materialism and self-esteem: Longitudinal evidence from China. *Current Psychology*, 1–10. <https://doi.org/10.1007/s12144-020-00695-3>.
- Waschull, S. B., & Kernis, M. H. (1996). Level and stability of self-esteem as predictors of children's intrinsic motivation and reasons for anger. *Personality and Social Psychology Bulletin*, 22(1), 4–13. <https://doi.org/10.1177/0146167296221001>.
- Werch, C. E., Pappas, D. M., Carlson, J. M., DiClemente, C. C., Chally, P. S., & Sinder, J. A. (2000). Results of a social norm intervention to prevent binge drinking among first-year residential college students. *Journal of American College Health*, 49(2), 85–92. <https://doi.org/10.1080/07448480009596288>.
- Wicklund, R. A., & Gollwitzer, P. M. (1981). Symbolic self-completion, attempted influence, and self-deprecation. *Basic and Applied Social Psychology*, 2(2), 89–114. https://doi.org/10.1207/s15324834basps0202_2.
- Workman, J. E., & Lee, S. H. (2011). Materialism, fashion consumers and gender: A cross-cultural study. *International Journal of Consumer Studies*, 35(1), 50–57. <https://doi.org/10.1111/j.1470-6431.2010.00935.x>.
- Zeigler-Hill, V. (2006). Discrepancies between implicit and explicit self-esteem: Implications for narcissism and self-esteem instability. *Journal of Personality*, 74(1), 119–144. <https://doi.org/10.1111/j.1467-6494.2005.00371.x>.
- Zhang, Y., Hawk, S. T., Oprea, S. J., de Vries, D. A., & Branje, S. (2020). “Me”, “we”, and materialism: Associations between contingent self-worth and materialistic values across cultures. *The Journal of Psychology*, 154(5), 386–410. <https://doi.org/10.1080/00223980.2020.1759496>.