Bidirectional Dynamics of Materialism and Loneliness: Not Just a Vicious Cycle

RIK PIETERS

This research is the first to test the hypothesis that consumers face a "material trap" in which materialism fosters social isolation which in turn reinforces materialism. It provides evidence that materialism and loneliness are engaged in bidirectional relationships over time. Importantly, it finds that loneliness contributes more to materialism than the other way around. Moreover, it finds that materialism's contribution to loneliness is not uniformly vicious but critically differs between specific subtypes of materialism. That is, valuing possessions as a happiness medicine or as a success measure increased loneliness, and these subtypes also increased most due to loneliness. Yet seeking possessions for material mirth decreased loneliness and was unaffected by it. These findings are based on longitudinal data from over 2,500 consumers across 6 years and a new latent growth model. They reveal how materialism and loneliness form a self-perpetuating vicious and virtuous cycle depending on the materialism subtype.

Loneliness is the aversive feeling of being isolated from others. It is a common and persistent experience. At any given time, about 20% of people feel sufficiently isolated to experience loneliness (Cacioppo and Patrick 2008). In a recent survey of US citizens over 44 years old, even 35% reported being lonely (Wilson and Moulton 2010). About 45% of these people indicated that their loneliness had persisted for 6 years or more. Studies with other samples and countries report comparable results (de Jong-Gierveld 1987; Jylha 2004; Tornstam 1988). Although hard statistics are absent, there is a common impression that people in modern societies are becoming even lonelier because of changing demographics, relationships, and lifestyles (Dykstra 2009; Griffin 2010; Myers 2000; Putnam 2000; Turkle 2011). Loneliness has severe implications for human functioning. It is correlated with reduced self-regulation, increased alcohol and drug consumption, sleep deprivation, stress, high blood pressure, depression, and a host of other health problems, and even premature death (Cacioppo and Patrick 2008). Given its prevalence and pervasive effects, it is pivotal to understand the factors that contribute to loneliness.

In spite of the surge in research, the determinants of loneliness, in particular the role that people's values and motivations play, are not yet well understood. Ernst and Cacioppo (1999, 17–18) point out that surprisingly little is known about "characteristics of our society . . . (that) might also be considered loneliness-provoking factors." One such potential characteristic is materialism, that is, the importance that people attach to acquiring and owning material possessions.

There is a shared belief among academics and the general public that materialism contributes to loneliness and similar social ills (Fournier and Richins 1991; Griffin 2010; Hammerslough 2001; Kasser 2002; Schwartz 2000; Wuthnow 1994). Lane (2000), for instance, speculates that the importance attached to material possessions crowds out social relationships. Kasser (2002, 64) asserts that materialistic values can damage "the quality of connectedness and decrease the ability to satisfy needs for intimacy, closeness, and connection." In a recent study of lay beliefs, "materialistic people" were judged to be more self-centered and selfish, and less well adapted (Van Boven, Campbell, and Gilovich 2010). An Internet news site declares: "This materialistic world has bred loneliness" (http://topnews.co.uk/25587-materialistic-world-has-bred-loneliness).

In spite of these prevalent beliefs, empirical evidence about the contribution of materialism to loneliness is rare. There is

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a sizable literature on the association between materialism and general subjective well-being (Burroughs and Rindfleisch 2002; Karabati and Cemalcilar 2010; Roberts and Clement 2007; Ryan and Dziurawiec 2000). However, loneliness and subjective well-being are functionally and stochastically distinct, each having their own antecedents and consequences (Cacioppo and Patrick 2008; Meifen, Russell, and Zakalik 2005; Sheldon and Schüler 2011; Wang, Zhu, and Shiv 2012). The possible influence of materialism on loneliness has never been investigated.

Moreover, there is reason to believe that the influence might also run in the opposite direction. That is, loneliness and its antecedents, such as being socially excluded or experiencing a marital break-up, might increase materialism (Lastovicka and Sirianni 2011; Rindfleisch, Burroughs, and Denton 1997; Zhou and Gao 2008). This suggests the possibility that the relationship between materialism and loneliness is bidirectional. This possibility is as yet unexplored.

There have been repeated calls for longitudinal research to unpack the "material trap" (Burroughs and Rindfleisch 2011), the "vicious cycle of materialism" (Kasser 2002), and the "loop of loneliness" (Cacioppo, Hawkley, and Thisted 2010). The present research is the first to follow up on these calls. It makes the following contributions. First, it tests the idea that materialism and loneliness reciprocally influence each other over time. Second, it explores the possibility that the influence of materialism is not uniformly vicious but that some subtypes of materialism actually reduce loneliness and, thus, are virtuous. Support for these ideas would be important evidence for the cycle of materialism and loneliness, and its vicious and virtuous sides. Third, and to accomplish this, the research uses a unique longitudinal database with five waves across a period of 6 years and a sample of over 2,500 consumers. Fourth, it applies a new latent growth model, which improves over established approaches to longitudinal data analysis, to unravel the predicted effects over time. The next section provides the theory. Then, the data, model, and findings are presented.

THE CYCLE OF MATERIALISM AND LONELINESS

Materialism is the importance that consumers attach to acquiring and owning material possessions. It is a value that guides judgments and actions across situations. For materialists, possessions and their acquisition are at the forefront of personal goals and dictate "ways of life" (Richins and Dawson 1992, 307). Although there are differences between countries and regions, materialism itself is a cross-culturally robust phenomenon independent of national affluence (Ger and Belk 1996; Karabati and Cemalcilar 2010; Ryan and Dziurawiec 2000). In the course of time, materialism and loneliness can form a self-perpetuating cycle.

Materialism: Crowding Out Social Relationships

People have a basic need for what is variously termed relatedness (Ryan and Deci 2000), human connection (Cacioppo and Patrick 2008), belongingness (Baumeister and Leary 1995), or attachment (Mikulincer and Shaver 2008). Experiencing relatedness is rewarding (Ryan and Deci 2000) and positively associated with life satisfaction (Martin and Hill 2012). People experience loneliness when their need for relatedness is frustrated. There is reason to believe that materialism can "crowd out" social relationships (Lane 2000) and thereby frustrate the need for relatedness and contribute to loneliness.

Schwartz's (1992) cross-cultural value theory offers insight. It asserts that people's values are organized in a dimensional structure, in which related values are located close to each other and conflicting values are located opposite from each other. For instance, power, achievement, and hedonism are closely related self-enhancement values. These values conflict with self-transcendence values, such as benevolence and universalism, and with social values, such as community and family orientation. According to the theory, attaching high importance to a particular value increases the importance of related values and activates the behaviors associated with these. Importantly, attaching high importance to a particular value also decreases the importance of conflicting values and deactivates the behaviors associated with those. Surveys across the world support the theory (Schwartz 1992). Maio et al. (2009) tested it in a series of controlled studies. In one study, they increased the importance that participants attached to self-enhancement values and found that this suppressed self-transcendence values, such as being forgiving and honest. In another study, triggering participants' achievement values, such as being ambitious and successful, increased performance on a search task but also decreased helping behavior.

Although materialism could well be associated with self-transcendence and social values (Wuthnow 1994), this does not seem to be the default. In a representative survey, Burroughs and Rindfleisch (2002) found that materialism was positively associated with self-enhancement values, such as power, hedonism, stimulation, achievement, and work, but negatively associated with self-transcendence values such as religiosity and benevolence and with social values such as family and community orientation. Higher levels of materialism may thus thwart social engagement and undermine relatedness. In support of this, Bauer et al. (2012) found that situational appeals to materialism (e.g., exposure to words such as buy, status, expensive) increased feelings of competitiveness toward others, decreased the proportion of free time that participants preferred spending in social activities, and decreased their trust in others. Materialistic values were also associated with more aggressive behaviors in dating relationships among students (Kasser 2002, 62–63). Students who aspired to be financially well-off were—20 years later—less satisfied with their job, but also with their friends and family, regardless of their household income (Nickerson

et al. 2003). Together this makes it likely that materialism increases loneliness over time (hypothesis 1).

Loneliness: Coping through Material Relationships

Loneliness can also contribute to materialism. When the basic need for relatedness is frustrated, people may initially intensify their efforts to reach out and reconnect with others (Cacioppo and Patrick 2008; Mead et al. 2011). According to self-determination theory (Deci and Ryan 2000), people also have a natural tendency to seek substitutes or compensations when their basic needs are frustrated. Material substitutes and compensations are often readily available, immediately rewarding, and less anxiety provoking than attempts to reconnect. Attachment theory (Mikulincer and Shaver 2008) similarly asserts that failed primary attachments to a human caretaker may steer people toward relying on material possessions as secondary attachments. Material substitutes and compensations provide immediate but only temporary or incomplete need satisfaction (Van Boven and Gilovich 2003), which may increase people's reliance on them (Schwartz 2000; Zhou and Gao 2008).

In support of this, people who imagined being socially excluded increased their priorities for money, appearance, and popularity (Sheldon and Kasser 2008). Likewise, people who recalled recent instances of being socially excluded felt more attached to their belongings for reasons of "reassurance and comfort" (Clark et al. 2011; Keefer et al. 2012). In a representative survey, tendencies to experience social insecurity were associated with higher levels of materialism (Rindfleisch, Burroughs, and Wong 2009). Young adults who came from broken rather than from intact families held stronger materialistic values (Rindfleisch et al. 1997). Together this makes it likely that loneliness increases materialism over time (hypothesis 2).

A cycle of reciprocal influence between materialism and loneliness may form over time when materialism crowds out social relationships and increases loneliness (hypothesis 1) and when loneliness prompts materialism as coping strategy (hypothesis 2). The cycle might tighten because sustained loneliness can raise social anxiety, pessimistic social expectations, hostility toward others, and active social distancing (Cacioppo and Patrick 2008; Wang et al. 2012). This further frustrates the basic need for relatedness and prompts new material compensation and substitution to cope with it (Deci and Ryan 2000, 250). This describes a vicious cycle between materialism and loneliness. The cycle might not be uniformly vicious.

SUBTYPES OF MATERIALISM

Richins and Dawson (1992) proposed an influential conceptualization of consumer materialism as a value and developed an 18-item self-report instrument to assess it. It distinguishes three subtypes of materialism: acquisition centrality, possession-defined success, and acquisition as the pursuit of happiness. Factor analyses validated the distinction between the subtypes, and test-retest reliabilities support their consistency. Most research has relied on overall measures of materialism that aggregate across the three subtypes. The three subtypes, however, reflect distinct motivations for materialism that are of interest here.

Acquisition centrality is the value that material possessions have in a lifestyle of pleasure seeking. This subtype involves the sheer gratification of acquiring and owning material possessions. Items in the measurement instrument include deriving pleasure from the process of buying things, the joy of spending money on things that are not practical, and liking a lot of luxury in life. Here, possessions are part of a life of happy hedonism or material *mirth*.

Possession-defined success is the value that material possessions have as a yardstick to determine how well one is doing in life. This subtype involves a social comparison between oneself and others using material possessions. Items in the instrument include using the amount of material objects that people own as a sign of their success, the desire to own possessions that impress others, and admiring people who own expensive possessions. Here, possessions are a status signal (Sundie et al. 2011) or material *measure* of success.

Acquisition as the pursuit of happiness is the value that material possessions have as means to improving one's happiness. According to Richins and Dawson (1992, 304), "it is the pursuit of happiness through acquisition rather than through other means (such as personal relationships, experiences, or achievements) that distinguishes materialism." This subtype involves a temporal comparison between a suboptimal present and a better future with more or nicer possessions. It reflects a deficit. Items in the instrument include not having all the things one needs to enjoy life, being bothered by not being able to buy things one likes, and the anticipated improved happiness if one would own more or nicer things. Here possessions are a drug (Schwartz 2000; Zhou and Gao 2008) or material *medicine* to improve happiness.

How might these materialism subtypes relate to loneliness? On the one hand, all three subtypes express self-enhancement values of hedonism, power, and achievement, which are antithetical to self-transcendence and social values (Maio et al. 2009; Schwartz 1992). This would suggest that their effects on loneliness are comparable. On the other hand, both possession-defined success (measure) and acquisition as the pursuit of happiness (medicine) are more extrinsically motivated than acquisition centrality (mirth) is, because they involve a comparison with an external referent, namely, "others" or "future." In the case of extrinsic motivations, people feel less autonomous and more externally controlled, which is associated with various negative well-being and relationship implications (Carver and Baird 1998; Deci and Ryan 2000; Ryan and Deci 2000). As a case in point, Srivastava, Locke, and Bartol (2001) only found a negative link between students' financial aspirations and their well-being when the aspirations were extrinsically motivated by social comparison (including "showing off" and "seeking

power") or by attempts to overcome self-doubt. This suggested that possession-defined success and acquisition as the pursuit of happiness contribute more to loneliness than acquisition centrality does.

The few studies that have examined the subtypes of materialism also suggest a stronger role for possession-defined success and acquisition as the pursuit of happiness in the vicious cycle. In an early study, possession-defined success and acquisition as happiness indeed correlated negatively with satisfaction about one's relationships with friends, whereas acquisition centrality was uncorrelated with it (Ahuvia and Wong 1995). In another study, acquisition as the pursuit of happiness correlated negatively with satisfaction about one's family, whereas acquisition centrality was uncorrelated with it, although possession-defined success was so as well (Roberts and Clement 2007). Finally, both possession-defined success and acquisition as the pursuit of happiness correlated more strongly with social anxiety than acquisition centrality did (Chang and Arkin 2002). Together, this provides some basis to predict that possession-defined success (measure) and acquisition as the pursuit of happiness (medicine) play a stronger role in the vicious cycle of materialism and loneliness. More precise predictions for each of the materialism subtypes are not appropriate, and their specific roles will be explored.

In sum, this research tests the hypotheses that higher levels of materialism increase loneliness over time (hypothesis 1) and that higher levels of loneliness increase materialism over time (hypothesis 2). Joint support for these hypotheses would be first evidence for the vicious cycle of materialism and loneliness and how it unfolds over time. The research also explores the possibility that the cycle of materialism and loneliness is not uniformly vicious and that possession-defined success (measure) and acquisition as the pursuit of happiness (medicine) are more vicious than acquisition centrality (mirth) is. The analyses are done separately for overall materialism and for the three subtypes to establish the benefits of being specific about materialism.

LONGITUDINAL DATA

Method

Data were collected from the online consumer panel managed by Tilburg University. The panel is representative of the general population in the Netherlands over 16 years old on key socioeconomic characteristics, such as gender, age, income, education, and relationship status. Prior research has shown a similar nomological net of loneliness in the country as elsewhere (Boomsma et al. 2005; de Jong-Gierveld 1987). Funding enabled five measurement waves across 6 years, namely, 2005, 2007, 2008, 2009, and 2010 for the present study. Data collection for each wave (year) was in two different weeks to minimize common method variance. Except in the first year, materialism was always measured in week 48 and loneliness in week 49. In the first year, materialism was measured in week 35. Supplementary questions were asked as part of other surveys.

In each wave all available panel members were sampled. Final sample sizes were 1,721 (96% response rate) in wave 1, 1,604 (83%) in wave 2, 1,557 (78%) in wave 3, 1,435 (80%) in wave 4, and 1,468 (76%) in wave 5. Of the 959 panel members who were sampled in all five waves, 476 participated five times (50%), 291 participated four times (30%), and 129 participated three times (13%). In total, 2,789 people participated in at least one wave, namely, 476 in all five waves, 531 in four waves, 470 in three waves, 476 in two waves, and 927 in one wave. The smallest percentage of data present for any two waves (coverage) was 26% ($N = 728$) between materialism in 2005 and loneliness in 2010. All available data ($N = 2,789$) were used, as described in the "Model" section.

Measures

Materialism was measured with the 18-item Richins and Dawson (1992) instrument. Acquisition centrality (mirth) contained seven items, including "Buying things gives me lots of pleasure," "I like a lot of luxury in my life," and "I enjoy buying things that are not practical." Possession-defined success (measure) contained six items, including "Some of the important achievements in life include acquiring material possessions," "I like to own things that impress people," and "The things I own say a lot about how well I'm doing in life." Acquisition as the pursuit of happiness (medicine) contained five items, including "My life would be better if I owned certain things I do not have," "I'd be happier if I could afford to buy more things," and "It sometimes bothers me quite a bit that I can't afford to buy all the things I'd like." Response categories of the items ranged from 1 "completely disagree" to 5 "completely agree." After reverse scoring negatively worded items, scores were averaged to form measures of, respectively, overall materialism, acquisition centrality, possession-defined success, and acquisition as the pursuit of happiness. Higher scores reflect higher levels of materialism. Composite test-retest reliabilities (CR) across the five data collection waves were, respectively, .929 for acquisition centrality, .877 for possession-defined success, .913 for acquisition as the pursuit of happiness, .934 for overall materialism, all at $p < .001$. Correlations between the three materialism subtypes across the five waves were, respectively, .544 between acquisition centrality and possession-defined success, .474 between acquisition centrality and acquisition as the pursuit of happiness, and .643 between possession-defined success and acquisition as the pursuit of happiness, all at $p < .001$. All squared correlations between materialism subtypes were smaller than their respective average variance extracted (AVE), which supports discriminant validity.

Loneliness was measured with 10 items from the R-UCLA scale (Russell, Peplau, and Cutrona 1980). The scale has excellent reliability and validity, and short-form versions with as little as three items express nomological validity (Cacioppo and Patrick 2008). The items were, respectively, "I feel in tune with the people around me," "I lack companionship," "There is no one I can turn to," "I do not feel

alone," "I am an outgoing person," "I feel left out," "I feel isolated from others," "I can find companionship when I want to," "I am unhappy being so withdrawn," and "People are around me but not with me." Response categories were 1 (never), 2 (seldom), 3 (sometimes), 4 (regularly), and 5 (often). After reverse coding the positively worded items, scores were averaged with higher scores indicating higher levels of loneliness. Composite test-retest reliability (CR) was .922 ($p < .001$).

Information about gender, age, income, education, and relationship status was included because of their known or predicted link with materialism, loneliness, or both. Gender was added because males sometimes (Kasser and Ryan 1993), although not always (Rindfleisch et al. 2009), have been found to be higher in overall materialism. Age was added (linear and curvilinear effects) because younger and older people appear to be somewhat lonelier than others (Cacioppo and Patrick 2008; Jylha 2004; Tornstam 1992) and more materialistic (Kasser 2002). Income and education were added because higher levels tend to improve subjective well-being (Martin and Hill 2012; Nickerson et al. 2003) and perhaps reduce loneliness (Cacioppo et al. 2010) and materialism (Ger and Belk 1996; Roberts and Clement 2007). Finally, relationship status, being single or not, was included as an important determinant of loneliness (Cacioppo and Patrick 2008; de Jong-Gierveld 1987) and potential factor in materialism (Lastovicka and Syrianni 2011; Rindfleisch et al. 1997). In the first wave, 53% were male, 22% were single, the average age was 47.6 years (SD = 16.4, range 16–90 years), the average educational level was 2.9 (SD = 1.20, range 0, "primary school," to 5, "university level"), and average net monthly household income was 2,471 Euros (SD = 3,829).

LATENT GROWTH MODEL

A latent growth model (LGM) was used to test the hypothesized reciprocal relationships between materialism and loneliness. Latent growth models describe interindividual differences in the changes of one or more constructs over time (Muthén and Curran 1997). The use of longitudinal research is expected to gain momentum in consumer behavior and marketing research, among others, due to rapid developments in Internet and mobile data collection methods (Das, Ester, and Kaczmirek 2011). Because latent growth models are well suited to analyze such data, it is instructive to provide some more detail.

Latent growth models improve upon traditional approaches to analyzing longitudinal data, such as repeated-measures ANOVA and cross-lagged panel regressions. The models enable inferences about the reciprocal influence that constructs have on each other over time at the individual level. Traditional analyses focus on mean changes in the sample as a whole and on average effects. The models also enable advanced treatment of missing data, which can improve the validity of the results. Latent growth models are implemented in a familiar structural equations framework, which facilitates their accessibility. Curran, Obeidat, and Losardo (2010) provide a nontechnical introduction.

The model here is a parallel process model (Cheong, MacKinnon, and Khoo 2003) in which materialism and loneliness can mutually influence each other over time. Figure 1 summarizes the overall model. The idea is that the initial level of one construct (e.g., materialism) influences the change over time in the other construct (e.g., loneliness). Both the initial level and the growth of constructs are latent variables (circles in fig. 1). The constructs are reflected in observed measures at each point in time (arrows from circles to rectangles). The initial level of a construct can influence its own growth and the growth of the other construct (solid arrows between circles). Constructs can be influenced by socioeconomic characteristics that are stable over time (dotted arrows from rectangles to circles). Observed measures of constructs can be influenced by socioeconomic characteristics that can vary over time (dotted arrows from rectangles to rectangles). The model is estimated separately for overall materialism and loneliness (fig. 1) and for the three materialism subtypes and loneliness (not shown). In the latter case, there are four parallel processes. The model has (1) a measurement part, (2) a structural part, and (3) a missing data part (not shown in fig. 1 to minimize visual clutter).

Latent Growth in Materialism and Loneliness

The measurement part describes the relationships between the observed measures collected at each point in time and the latent variables, respectively, the initial level and growth in materialism and loneliness:

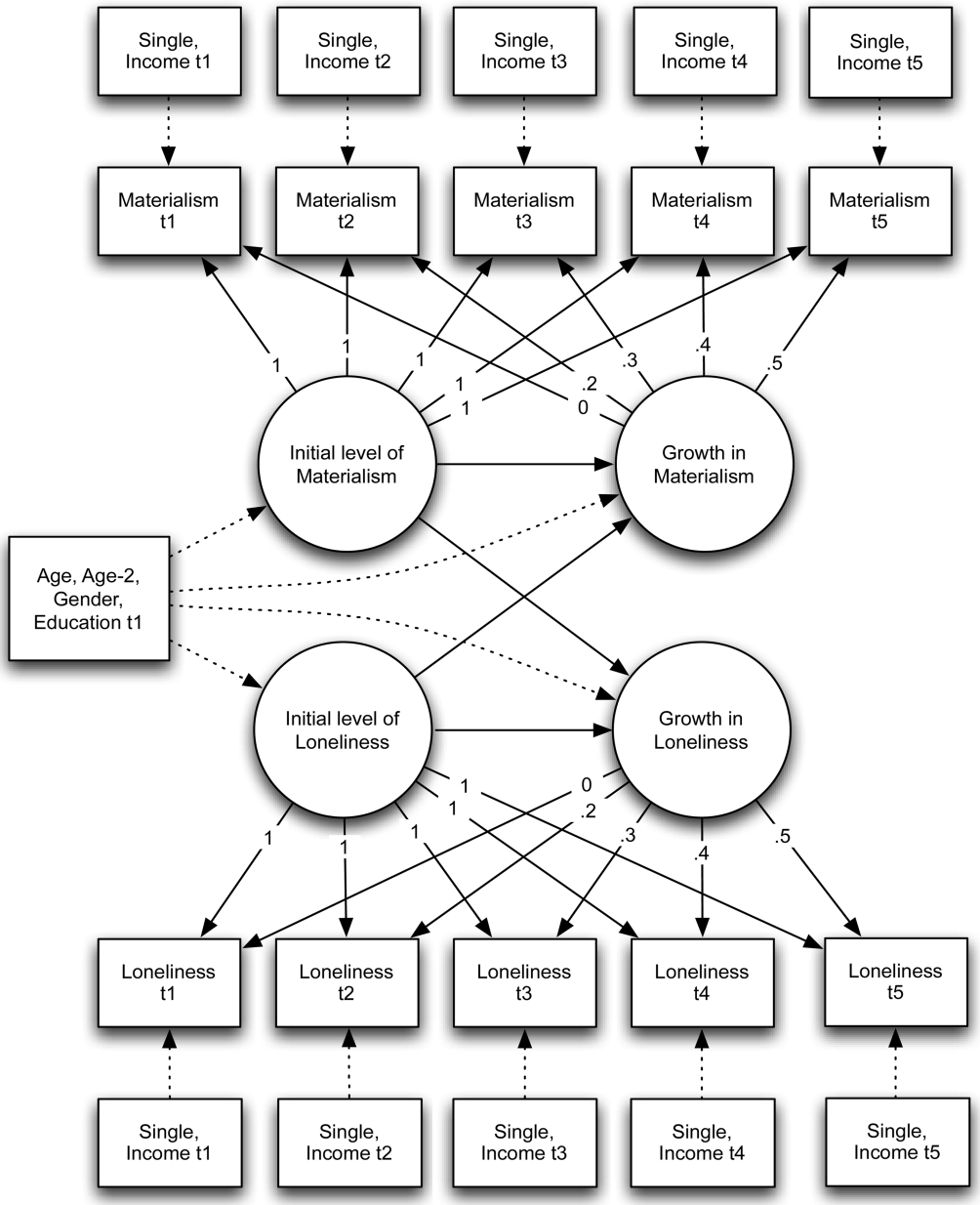
$$y_{it}^{g} = \eta_{0i}^{g} + \eta_{1i}^{g} x_t + \sum_{k=1}^{r} \beta_k^g w_{kit} + \varepsilon_{it}^{g}. \quad (1)$$

Here i = individuals, t = the time points (measurement waves) 1 to 5, k = time-varying covariates, and $g = 2$, namely, overall materialism or loneliness, or $g = 4$, namely, each of the three materialism subtypes and loneliness.

Thus y_{it}^{g} is the observed measure of the latent variable g, materialism or loneliness, for consumer i at time t. The intercept η_{0i}^{g} is the initial level of the latent variable g for individual i at time 1 (a vector of 1's), x_t is the time score of each of the five waves (respectively, 0, .2, .3, .4, .5 for 2005, 2007, 2008, 2009, 2010; the jump from 0 to .2 accounts for the 2 years between 2005 and 2007), and η_{1i}^{g} is the growth of the latent variable relative to the initial level for individual i. The term $\sum_{k=1}^{r} \beta_k^g w_{kit}$ denotes the effects of r time-varying covariates w_{kit}, namely, the relationship status (1 = single, 0 = not) and the monthly net household income of consumers. These covariates can vary between individuals and over time, but their effects on materialism and loneliness are assumed to be time-constant. Allowing the effects to be time-varying led to the same substantive results, but with more parameters to be estimated. Finally, ε_{it}^{g} is the residual for individual i at time t.

FIGURE 1

THE CYCLE OF OVERALL MATERIALISM AND LONELINESS



NOTE.—Residuals, variances, covariances, and the missing data part of the model are omitted to minimize visual clutter. Dotted arrows emanate from socioeconomic characteristics. Coding of growth reflects measurement waves in the years 2005, 2007–10.

Reciprocal Influences of Materialism and Loneliness

The structural part describes the relationships between the initial levels of materialism and loneliness and their growth curves, while accounting for covariates.

$$\eta_{0i}^{g} = \gamma_{00}^{g} + \sum_{l=1}^{s} \gamma_{0l}^{g} w_{li} + \zeta_{0i}^{g}. \quad (2)$$

$$\eta_{1i}^{g} = \gamma_{10}^{g} + \gamma_{11}^{g}\eta_{0i}^{g} + \gamma_{12}^{g}\eta_{0i}^{g} + \sum_{l=3}^{s+3} \gamma_{1l}^{g} w_{li} + \zeta_{1i}^{g}, \text{ for } g \neq h. \quad (3)$$

Equation 2 describes the initial level of the latent variable g (i.e., η_{0i}^{g}) as a function of three factors, namely, (a) an intercept (γ_{00}^{g}), (b) a set of s time-constant covariates ($\sum_{l=1}^{s} \gamma_{l}^{g} w_{it}$), and ($c$) a residual for individual i (ζ_{0i}^{g}). The time-constant covariates are age in the first wave (mean-centered/10), age in the first wave squared ((mean-centered/10)^2), gender (1 = male, 0 = female), and education (0 = lowest to 5 = highest). They are constant over time (educational level remained the same for 98.3% of the participants) or change linearly with time (each annual wave adds a year to the age of each participant).

Equation 3 describes the growth of one latent variable (η_{1i}^{g}) as a function of five factors, namely, the mean growth across all individuals (γ_{10}^{g}), the initial level of individual i at time 1 on the variable itself ($\gamma_{11}^{g}\eta_{0i}^{g}$), the initial level of individual i at time 1 on the other latent variable(s) ($\gamma_{12}^{g}\eta_{0i}^{h}$), a set of s time-constant covariates ($\sum_{l=3}^{s+3} \gamma_{l}^{g} w_{li}$), and a residual for individual i (ζ_{1i}^{g}). Residuals of latent growth variables are allowed to correlate. Equations 2 and 3 describe the reciprocal influence that materialism and loneliness have on each other, and its difference ($\gamma_{12}^{g} - \gamma_{12}^{h}$).

Accounting for Missing Data

Missing data can rapidly accumulate in longitudinal research. They reduce the statistical power of analyses and compromise the validity of inferences when missing is not at random (Little and Rubin 2002). To minimize these risks, the model uses all available data and implements a generalization of selection models to a longitudinal context (Diggle and Kenward 1994; Enders 2011). It accounts for missing data in the following way.

$$\text{logit}[p(y_{it}^{g} \text{ missing})] = \delta_{0}^{g} + \delta_{1}^{g} y_{it}^{*g} + \delta_{2}^{g} y_{it-1}^{g} + \delta_{3} mbd + \sum_{q=4}^{u} \delta_{q}^{g} w_{qi}. \quad (4)$$

The likelihood that a measure y_{it}^{g} of a latent variable at time t is missing (coded 1) or not (coded 0) is a function of an intercept (δ_{0}^{g}), the predicted value of measure y_{it}^{g} at time t (the asterisk denotes predicted), the observed value of measure y_{it}^{g} at the previous time $t - 1$ ($\delta_{2}^{g} y_{it-1}^{g}$), missing by design ($\delta_{3} mbd_{it}$), and a set of covariates ($\sum_{q=4}^{u} \delta_{q}^{g} w_{qi}$).

Equation 4 allows the conditional probability of missingness at time t to depend on the history of the measurement process up to and including time t. Data are missing by design (yes = 0, no = 1) when people cannot be sampled in a particular wave because of panel attrition (early exit), panel replacement (late entry), or similar structural reasons. Finally, the covariates age and age squared can influence the probability of missing data, as older people are expected to have higher response prevalence. Parameter estimates in equation 4 indicate whether missing measures of the latent variables are probably missing completely at random (δ_{1}^{g} to $\delta_{u}^{g} = 0$), at random ($\delta_{1}^{g} = 0$, and δ_{2}^{g} to $\delta_{u}^{g} \neq 0$) or not at random ($\delta_{1}^{g} \neq 0$).

The final model combines equations 1 to 4. It was estimated for overall materialism and loneliness ($g = 2$), and for the three materialism subtypes and loneliness ($g = 4$). The measurement model without any predictors but with the missing data component was estimated to assess the mean growth trends in materialism and loneliness over time. Models were estimated in Mplus 7.0 (Muthén and Muthén 2012) using Bayesian (MCMC) routines with the default, uninformative priors and with the potential scale reduction (PSR < 1.1) to assess convergence. Models converged in less than 50,000 iterations. One-tailed p-values of estimates are reported: the smallest proportion of the posterior distribution of a parameter overlapping zero; R^2-values indicate effect sizes.

RESULTS

Table 1 provides descriptive information about the observed measures. Table 2 presents the estimated initial levels and growth in materialism and loneliness over time, and their variability. These estimates were obtained from the measurement model without predictors, all latent variables correlated, and missing data accounted for (N = 2,879). The initial levels of overall materialism and loneliness were, respectively, 2.497 (minimum = 1, maximum = 5) and 2.105 in the sample as a whole. The initial level was somewhat higher for acquisition centrality (2.707, 95% C.I. = 2.684 − 2.729) than for possession-defined success (2.421, C.I. 95% = 2.396 − 2.444), which was somewhat higher than for acquisition as happiness (2.288, C.I. 95% = 2.260 − 2.315).

Across the 6-year period, overall materialism slightly decreased (−.063, p = .001), which was due to slight decreases in possession-defined success (−.050, p = .057) and acquisition as the pursuit of happiness (−.079, p = .014). Mean levels of acquisition centrality and loneliness remained the same (both $p \geq .466$). There are substantial individual differences in growth trends (variances range from .117 for overall materialism to .498 for acquisition as the pursuit of happiness), which makes it meaningful to examine potential determinants of these.

TABLE 1

SUMMARY INFORMATION

	Mean	SD	Correlations between constructs within and across measurement waves																								
			11	12	13	14	15	21	22	23	24	25	31	32	33	34	35	41	42	43	44	45	51	52	53	54
Materialism (wave 1–5)																											
11	2.49	.46	1.00																								
12	2.47	.45	.71	1.00																							
13	2.48	.46	.68	.77	1.00																						
14	2.43	.46	.71	.75	.78	1.00																					
15	2.44	.48	.71	.73	.78	.78	1.00																				
Acquisition centrality (wave 1–5)																											
21	2.69	.56	.79	.56	.53	.54	.56	1.00																			
22	2.69	.56	.58	.77	.60	.60	.59	.70	1.00																		
23	2.71	.58	.57	.61	.78	.63	.62	.68	.74	1.00																	
24	2.67	.56	.58	.60	.63	.78	.62	.68	.73	.76	1.00																
25	2.66	.57	.58	.61	.64	.66	.80	.68	.72	.74	.76	1.00															
Possession-defined success (wave 1–5)																											
31	2.42	.58	.78	.53	.50	.51	.50	.40	.32	.28	.30	.29	1.00														
32	2.39	.56	.48	.78	.56	.55	.51	.26	.37	.29	.31	.31	.55	1.00													
33	2.41	.57	.47	.58	.77	.57	.57	.24	.31	.37	.34	.35	.51	.64	1.00												
34	2.36	.56	.52	.58	.58	.78	.59	.27	.34	.33	.38	.39	.56	.62	.63	1.00											
35	2.37	.57	.49	.54	.60	.56	.78	.27	.32	.35	.34	.41	.52	.57	.63	.63	1.00										
Acquisition as the pursuit of happiness (wave 1–5)																											
41	2.30	.67	.75	.55	.55	.55	.55	.36	.30	.32	.30	.33	.41	.32	.34	.38	.34	1.00									
42	2.24	.65	.55	.74	.60	.57	.58	.27	.30	.30	.29	.35	.36	.44	.38	.39	.38	.66	1.00								
43	2.25	.66	.53	.57	.76	.60	.61	.26	.25	.37	.32	.35	.35	.37	.45	.40	.42	.63	.71	1.00							
44	2.20	.68	.55	.58	.63	.79	.63	.28	.29	.36	.40	.38	.35	.38	.40	.48	.39	.64	.68	.72	1.00						
45	2.22	.70	.59	.56	.62	.62	.79	.34	.32	.36	.35	.41	.37	.36	.40	.40	.47	.65	.66	.70	.74	1.00					
Loneliness (wave 1–5)																											
51	2.10	.50	.16	.19	.22	.22	.22	−.02	−.02	.03	.03	.06	.18	.21	.21	.21	.20	.24	.28	.29	.29	.28	1.00				
52	2.12	.51	.13	.18	.19	.20	.20	−.04	−.02	.02	.03	.07	.15	.22	.19	.20	.19	.21	.22	.24	.25	.24	.67	1.00			
53	2.10	.51	.09	.16	.18	.19	.20	−.06	−.03	.01	.02	.05	.11	.19	.17	.18	.16	.19	.23	.26	.27	.27	.65	.73	1.00		
54	2.10	.51	.14	.16	.18	.19	.20	−.06	−.04	.01	−.01	.04	.18	.21	.18	.21	.19	.23	.23	.26	.27	.26	.66	.70	.75	1.00	
55	2.10	.51	.19	.21	.19	.24	.18	.01	.05	.04	.06	.03	.16	.19	.17	.22	.15	.28	.27	.26	.30	.27	.67	.69	.73	.74	

NOTE.—Materialism and loneliness on 5-point scales from 1 (“lowest”) to 5 (“highest”). *N*s for waves 1–5 (at least one phase of wave responded) are: 1,721, 1,604, 1,557, 1,435, and 1,468. *N* participated in at least one wave is 2,879. Largest *N* between any two waves is 1,172 between waves 2 and 3. Smallest *N* between any two waves is 728 between waves 2 and 5. Significance at this smallest coverage: .10 = $p < .01$, .12 = $p < .001$.

TABLE 2

INITIAL LEVEL AND GROWTH IN MATERIALISM AND LONELINESS OVER TIME

Parameter	Mean			Variance		
	Estimate	SD	*p*	Estimate	SD	*p*
Initial level:						
Overall materialism	2.497	.009	< .001	.149	.007	<.001
Acquisition centrality (mirth)	2.707	.012	< .001	.245	.010	<.001
Possession-defined success (measure)	2.421	.012	< .001	.215	.012	<.001
Acquisition as the pursuit of happiness (medicine)	2.288	.014	< .001	.303	.014	<.001
Loneliness	2.105	.010	< .001	.169	.008	<.001
Growth:						
Overall materialism	−.063	.020	.001	.117	.034	<.001
Acquisition centrality (mirth)	.003	.026	.466	.318	.035	<.001
Possession-defined success (measure)	−.050	.031	.057	.420	.067	<.001
Acquisition as the pursuit of happiness (medicine)	−.079	.034	.014	.498	.079	<.001
Loneliness	<.001	.023	.502	.169	.037	<.001

NOTE.—Estimates from the measurement model without predictors, all latent variables correlated, and missing data accounted for. N = 2,879.

Overall Materialism and Loneliness

Table 3 (lower part) presents evidence for the reciprocal effects of overall materialism and loneliness. As predicted, higher initial levels of materialism increased loneliness (.111, $p = .056$) and higher initial levels of loneliness increased materialism (.287, $p < .001$). Crucially, the influence that loneliness had on materialism was larger than the corresponding influence that materialism had on loneliness (difference .175, $p = .042$). The left side of figure 2 charts these effects. The reciprocal effects account for a sizable portion of variance in the growth of materialism (R^2 increase due to loneliness: .097, $p < .001$) and loneliness (R^2 increase due to materialism: .028, $p < .001$). This supports the hypotheses that over time materialism contributes to loneliness and loneliness contributes to materialism.

The reciprocal effects were independent of socioeconomic characteristics and missing data that were controlled for by the model. The top part of table 3 summarizes these. Reassuringly, there was no evidence that missing data were not at random ($p \geq .236$) in the current database, which the model allowed us to establish. Results for socioeconomic characteristics are described later.

Materialism Subtypes and Loneliness

Table 4 (lower part) presents evidence for the vicious and virtuous sides of materialism. As expected, possession-defined success (.163, $p = .021$) and acquisition as the pursuit of happiness (.217, $p < .001$) increased loneliness over time. Notably, acquisition centrality decreased loneliness over time (−.219, $p < .001$). In turn, loneliness increased possession-defined success (.433, $p < .001$) and acquisition as the pursuit of happiness (.547, $p < .001$) but did not influence acquisition centrality (.029, $p = .355$). This reveals that the vicious cycle of materialism and loneliness mostly resides in two subtypes of materialism: possession-defined success and acquisition as the pursuit of happiness. In contrast, acquisition centrality plays a virtuous role in the cycle. The right side of figure 2 charts this.

The influence that loneliness had on possession-defined success and acquisition as the pursuit of happiness was larger than the reverse influence that these subtypes had on loneliness (difference for possession-defined success .280, $p = .013$, and for acquisition as the pursuit of happiness .330, $p = .002$). This is consistent with the results for overall materialism. However, the opposite holds for acquisition centrality. This materialism subtype had a larger virtuous effect by decreasing loneliness than the reverse effect that loneliness had on it (difference −.248, $p = .007$).

Acquisition centrality had a net virtuous contribution to the cycle (sum of effects: −.219 + .029 = −.190, $p = .026$). Conversely, possession-defined success (.606, $p < .001$) and acquisition as the pursuit of happiness (.764, $p < .001$) had a net vicious contribution to the cycle. Jointly, the materialism subtypes contribute substantially to the growth of loneliness (table 3). The variance accounted for increased from .044 for a model without the materialism effects to .198 for a model including them. Loneliness also contributed to the growth of possession-defined success (R^2 increase .046) and acquisition as the pursuit of happiness (R^2 increase .062).

To illustrate the effects, figure 3 depicts how materialism and loneliness change over time when the initial level of the other construct would be, respectively, one scale point higher or lower than the sample mean, ceteris paribus. Such higher and lower initial levels are well within the observed ranges (table 1). If the initial level of loneliness were one scale point lower (higher) than the sample mean, then possession-defined success and acquisition as the pursuit of happiness would be, respectively, .22 and .27 scale points lower (higher) at the end of the 6-year period. Acquisition centrality was not affected. Conversely, if the initial level of acquisition centrality were one scale point higher (lower), then loneliness would be .10 scale points lower (higher). An increase (decrease) of one scale point in the initial levels

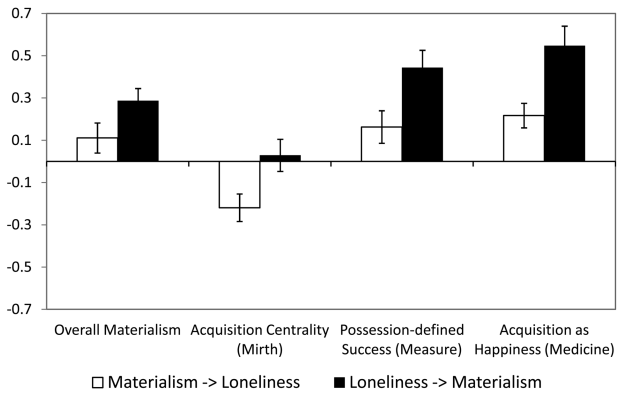
of possession-defined success and acquisition as the pursuit of happiness would increase (decrease) loneliness with, respectively, .08 and .11 scale points. The effects are notable bearing in mind the grave consequences of loneliness, their cumulative nature over time, and the fact that socioeconomic characteristics were accounted for (Prentice and Miller 1992).

Socioeconomic Characteristics

Socioeconomic characteristics were reliably related to materialism and loneliness. Males ($p = .008$, table 3), lower educated people ($p < .001$), and singles were lonelier than others ($p < .001$). Interestingly, older people were lonelier to begin with ($p = .003$) and grew more rapidly lonely over time ($p = .009$). The net effect was modest in an absolute sense but systematic: lowest and highest estimated loneliness levels due to age differed .17 of a scale point. The loneliness implications of being older are well established (Cacioppo and Patrick 2008), but the simultaneous effects that age has on the initial level and on the growth of loneliness are new. The final section returns to this. Age was also related to materialism. The initial level of overall materialism was lowest when participants were about 48 years old, and higher at younger and older ages (linear −.077, $p < .001$; quadratic .209, $p < .001$). Materialism was estimated to be, respectively, about 2.61 at 21 years, 2.44 at 48 years, and 2.65 at 81 years. Age did not influence growth in overall materialism.

FIGURE 2

RECIPROCAL RELATIONSHIPS BETWEEN MATERIALISM AND LONELINESS



NOTE.—Mean sizes of growth coefficients +/− 1 SD are shown. Positive coefficients indicate an increase and negative coefficients a decrease in the other construct. "Acquisition as Happiness" is the abbreviation of "Acquisition as the Pursuit of Happiness."

TABLE 3

RECIPROCAL RELATIONSHIPS BETWEEN OVERALL MATERIALISM AND LONELINESS

			Materialism			Loneliness		
Parameter			Estimate	SD	*p*	Estimate	SD	*p*
Missing data:								
Missing by design at *t*	→	Missing at *t*	−4.139	.177	<.001	−5.139	.117	<.001
Age	→	Missing at *t*	−.097	.010	<.001	−.096	.010	<.001
Age squared	→	Missing at *t*	.071	.056	.101	.029	.056	.308
Measure at *t* − 1	→	Missing at *t*	.180	.085	.023	−.012	.066	.432
Measure at *t*	→	Missing at *t*	−.069	.094	.236	.023	.074	.399
Socioeconomics:								
Single	→	Measure at *t*	−.032	.016	.019	.164	.018	<.001
Income	→	Measure at *t*	.003	.017	.442	−.018	.020	.183
Intercept	→	Initial level	2.499	.026	<.001	2.197	.030	<.001
Age	→	Initial level	−.077	.006	<.001	.017	.006	.003
Age squared	→	Initial level	.209	.031	<.001	.043	.036	.111
Gender	→	Initial level	.028	.018	.064	.049	.021	.008
Education	→	Initial level	−.022	.008	.002	−.055	.009	<.001
		R^2	.148	.018	<.001	.040	.010	<.001
Intercept	→	Growth	−.496	.244	.023	−.524	.252	.018
Age	→	Growth	.010	.015	.258	.037	.016	.009
Age squared	→	Growth	−.007	.078	.459	.076	.092	.192
Gender	→	Growth	−.022	.041	.305	−.020	.047	.344
Education	→	Growth	−.031	.018	.043	.044	.020	.012
Growth relationships:								
Initial level materialism	→	Growth	−.020	.088	.401	.111	.071	.056
Initial level loneliness	→	Growth	.287	.058	<.001	.047	.083	.277
		R^2	.147	.045	<.001	.074	.038	<.001

NOTE.—Gender: 1 = male, 0 = female. Single: 1 = yes, 0 = no. Age = mean centered /10. Education: 0 = lowest to 5 = highest. Net monthly income is in Euros. *p*-values are the smallest percentage of the posterior distribution that covers zero. Focal growth relationships are underlined.

TABLE 4

RECIPROCAL RELATIONSHIPS BETWEEN MATERIALISM SUBTYPES AND LONELINESS

Parameter			Acquisition centrality (mirth)			Possession-defined success (measure)			Acquisition as the pursuit of happiness (medicine)			Loneliness		
			Estimate	SD	*p*	Estimate	SD	*p*	Estimate	SD	*p*	Estimate	SD	*p*
Socioeconomics:														
Single	→	Measure at *t*	−.058	.019	.001	−.075	.019	<.001	.050	.022	.012	.165	.017	<.001
Income	→	Measure at *t*	.032	.021	.055	.014	.021	.262	−.030	.024	.107	−.012	.019	.270
Intercept	→	Initial level	2.657	.033	<.001	2.400	.036	<.001	2.379	.040	<.001	2.196	.030	<.001
Age	→	Initial level	−.099	.007	<.001	−.037	.008	<.001	−.099	.009	<.001	.017	.006	.003
Age squared	→	Initial level	.117	.038	.001	.320	.042	< .001	.217	.046	< .001	.045	.036	.101
Gender	→	Initial level	−.097	.022	< .001	.123	.024	< .001	.106	.027	< .001	.048	.020	.009
Education	→	Initial level	.028	.010	.002	−.040	.010	< .001	−.071	.011	< .001	−.056	.009	< .001
		R^2	.149	.017	< .001	.105	.018	< .001	.139	.018	< .001	.041	.010	< .001
Intercept	→	Growth	−.434	.307	.079	−1.610	.361	< .001	−2.329	.378	< .001	−.382	.286	.091
Age	→	Growth	.019	.018	.150	.086	.020	< .001	.012	.025	.308	.035	.017	.020
Age squared	→	Growth	−.090	.095	.175	−.022	.108	.403	−.144	.118	.110	.018	.091	.423
Gender	→	Growth	−.104	.053	.027	.016	.057	.386	−.008	.065	.454	−.073	.050	.072
Education	→	Growth	−.027	.023	.115	−.036	.024	.071	−.010	.028	.361	.065	.021	.001
Growth relationships:														
Acquisition centrality	→	Growth	−.214	.089	.009	.492	.072	<.001	.292	.091	<.001	<u>−.219</u>	.065	<.001
Possession-defined success	→	Growth	.292	.089	<.001	−.590	.127	<.001	.536	.122	<.001	<u>.163</u>	.077	.021
Acquisition as happiness	→	Growth	.175	.064	.005	.368	.071	<.001	−.392	.131	<.001	<u>.217</u>	.058	<.001
Loneliness	→	Growth	<u>.029</u>	.076	.355	<u>.443</u>	.083	<.001	<u>.547</u>	.093	<.001	<u>−.036</u>	.100	.371
		R^2	<u>.148</u>	.036	<.001	<u>.386</u>	.045	<.001	<u>.276</u>	.046	<.001	.198	.067	<.001

NOTE.—*p*-values are the smallest percentage of the posterior distribution that covers zero. Determinants of missing data for the specific materialism motivations were similar to the overall analysis and not shown to save space. Focal growth relationships are underlined. "Acquisition as happiness" in the lower row is the abbreviation of "Acquisition as the pursuit of happiness."

Several socioeconomic characteristics had qualitatively different associations with the materialism subtypes. This underlines the importance of being specific about materialism. To illustrate, singles were slightly less materialistic overall ($p = .019$, table 3) because they endorsed acquisition centrality and possession-defined success less (all $p < .001$, table 4), but singles endorsed acquisition as the pursuit of happiness more ($p = .012$). Likewise, males were slightly more materialistic overall ($p = .064$) because they endorsed possession-defined success and acquisition as happiness more (all $p < .001$), but they endorsed acquisition centrality less ($p < .001$). This gender difference is consistent with evidence from evolutionary psychology that men value conspicuous consumption to gain status and impress others more than females do (Sundie et al. 2011). Also, higher educated people were less materialistic overall ($p = .002$) because they endorsed possession-defined success and acquisition as the pursuit of happiness less (all $p < .001$), but they endorsed acquisition centrality more ($p = .002$). Age influenced the growth of possession-defined success ($p < .001$, table 4) but not the other two materialism subtypes and, as a consequence, did not have an effect on the growth of overall materialism. An analysis of overall materialism masks these qualitative differences between materialism subtypes.

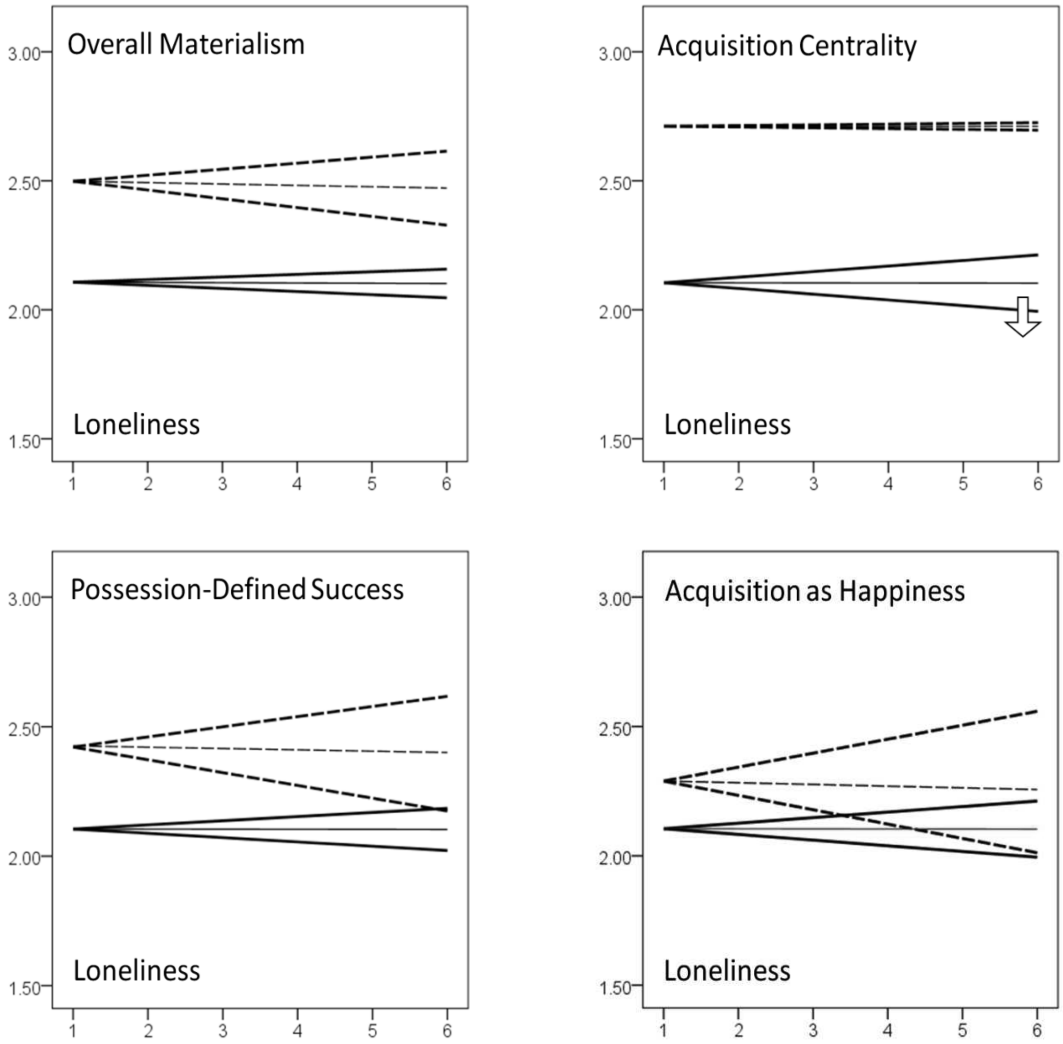
Follow-Up Analyses

Further analyses examined in more detail the role of socioeconomic characteristics and the robustness of the findings. A first alternative model was estimated without the relationship status and income variables as time-varying covariates. It rules out that estimates of the reciprocal influence between materialism and loneliness are biased by the direct effects that relationship status and income had on them. As before, overall materialism slightly increased the growth of loneliness (.102, $p = .083$) and loneliness increased the growth of materialism (.270, $p < .001$). Also, acquisition centrality again decreased the growth of loneliness (−.219, $p < .001$), and possession-defined success (.138, $p = .044$) and acquisition as the pursuit of happiness (.214, $p < .001$) increased it. Once more, loneliness was not related to the growth of acquisition centrality (.023, $p = .388$), and it increased possession-defined success (.406, $p < .001$) and acquisition as the pursuit of happiness (.598, $p < .001$).

A second alternative model was estimated with relationship status and income measured in the first wave as time-constant covariates. It rules out that these characteristics directly influence the growth of materialism and loneliness. To delve deeper and explore whether the influence of being single depends on one's age or gender, its interaction with these characteristics (after contrast coding) was added to the

FIGURE 3

MATERIALISM AND LONELINESS SCENARIOS: GROWTH WHEN OTHER CONSTRUCT IS ONE SCALE POINT HIGHER OR LOWER THAN ITS SAMPLE MEAN



NOTE.—Horizontal axis is time. Lines are growth in materialism (*broken*) and loneliness (*solid*). Thin lines are mean growth in the sample. Thick lines are growth when initial level of the other construct is plus or minus one scale point of the sample mean, ceteris paribus. Plus sign indicates influence of one scale point increase of the construct. "Acquisition as Happiness" is the abbreviation of "Acquisition as the Pursuit of Happiness."

model. As desired, being single and income in the first wave did not directly influence the growth in overall materialism, its subtypes, and loneliness (all $p > .10$). Also, the interaction between relationship status and age did not influence the initial level and growth of the constructs (all $p > .10$). However, the interaction between relationship status and gender had modest effects on the initial levels of loneliness (.026, $p = .034$), overall materialism ($-.024$, $p = .023$), acquisition centrality ($-.029$, $p = .028$), and possession-defined success ($-.035$, $p = .021$). Specifically, loneliness was somewhat higher among single males than others. Overall materialism was somewhat higher among males in a relationship, mostly because they endorsed possession-defined success somewhat more. Single males endorsed acquisition centrality (material mirth) less than others. Importantly, while controlling for the influence of these characteristics, all re-

lationships between materialism, its subtypes, and loneliness remained qualitatively the same.

A third alternative model was estimated without the own effects of the initial levels of the latent variables on their own growth. It rules out that the own effects somehow bias estimates of the reciprocal effects. All reciprocal effects remained qualitatively the same. The initial level of materialism was associated with an increase in loneliness over time (.118, $p = .041$), and the initial level of loneliness was associated with an increase in materialism over time (.278, $p < .001$). Likewise, the initial level of possession-defined success (.183, $p = .026$) and acquisition as happiness (.262, $p < .001$) increased loneliness but acquisition centrality (−.207, $p < .001$) decreased it. As before, loneliness did not influence the growth of acquisition centrality (.026, $p = .340$) but clearly increased possession-defined success (.363, $p < .001$) and acquisition as the pursuit of happiness (.509, $p < .001$). This supports the robustness of the findings.

DISCUSSION

This research is the first to provide evidence that materialism and loneliness form a self-perpetuating cycle with vicious and virtuous sides. Materialism was associated with an increase in loneliness over time, and loneliness was associated with an increase in materialism over time, and this latter effect was notably stronger. Three subtypes of materialism played qualitatively different roles in the cycle. Valuing material possessions as a measure of success and as a medicine for happiness were associated with increases in loneliness over time, and loneliness in its turn was associated with increases in these subtypes of materialism. Jointly, this forms the vicious side of the materialism-loneliness cycle, which perpetuates once it is formed. In contrast, valuing possessions as a source of material mirth in life was associated with decreases in loneliness over time, and loneliness was unrelated to the growth in this subtype of materialism. This forms the virtuous side of the materialism-loneliness cycle. Treating materialism as a single, aggregate phenomenon would have masked these qualitative differences between materialism subtypes and might have inadvertently led to the conclusion that materialism is uniformly vicious.

Several socioeconomic characteristics also had qualitatively different relationships with the materialism subtypes, which further supports the benefits of being specific about materialism. For instance, singles sought happiness by means of material possessions (medicine) more than other people did but they appeared to derive less pleasure from acquiring and owning material possessions (mirth), and they used them less as a measure of success in life (measure). These effects were independent of income, age, and other socioeconomic characteristics that were controlled for. Thus, singles endorsed items such as "I'd be happier if I could afford to buy more things" more, but they endorsed items such as "Buying things gives me lots of pleasure" and "I like to own things that impress people" less. Singles seemed to focus on material possessions as a medicine to improve happiness, which was unsuccessful; they were lonelier, and the pursuit of happiness by means of material possessions contributed to the growth of loneliness over time. These findings are new. In view of the high and rising numbers of singles in modern societies, they are important, and a focus on overall materialism would have masked them. A separate section returns to the role of people's age.

Prior literature has emphasized the unidirectional and vicious influence of materialism on subjective well-being and related constructs. The current findings reveal that the relationships between materialism and loneliness are bidirectional and that they can be vicious and virtuous depending on the subtype of materialism. This adds to recent research on potentially positive aspects of materialism (Hudders and Pandelaere 2012). The current findings begin to provide the nuanced outlook on materialism that has long been awaited (Burroughs and Rindfleisch 2011; Csikszentmihalyi and Rochberg-Halton 1981; Wuthnow 1994). The findings were obtained across a longer time frame with a large, representative sample, while controlling for relevant socioeconomic characteristics and for missing data patterns which all add confidence in their validity. The findings have implications for theory and policy making and suggest directions for follow-up research.

Lay Beliefs about Loneliness Effects on Materialism

Lay beliefs about personal processes are often miscalibrated. This research instead supported lay beliefs about the negative influence that overall materialism has on loneliness (Fournier and Richins 1991; Van Boven et al. 2010). Could it be that people also have accurate beliefs about the influence that loneliness has on materialism? A three-group follow-up study explored this idea. Paid undergraduate students ($N = 101$; mean age = 20; 44 males) judged the "other characteristics" of people who were briefly described to them. In the "lonely people" condition, the description followed the content of the UCLA-loneliness scale: "These people miss company. They feel they do not have real contact with other people, feel socially excluded, and feel that they have no one to fall back on. They feel lonely." The "sociable" condition contained the opposite description: "These people easily find company. They feel they have real contact with other people, feel socially included, and feel that they can rely on others. They feel connected to others." The "normal" condition contained a description in between the previous two: "These people have normal relationships with others, and can have contact if they want to but they do not always want this. They are not particularly excluded from or included in groups. These people just have normal contacts with others." Next, all participants indicated which other characteristics the described people would have, using the 18-item materialism instrument.

Lonely people were indeed judged to be higher in possession-defined success ($M = 3.42$) than sociable ($M = 2.99$) and normal people ($M = 2.89$; $F(2, 98) = 5.90$, $p =$

.004) were, who were judged to not differ from each other. Also, lonely people were judged to be higher in acquisition as happiness ($M = 3.47$) than sociable ($M = 2.72$) and normal people were ($M = 2.80$; $F(2, 98) = 13.07$, $p < .001$), who were judged to not differ from each other. Interestingly, lonely ($M = 3.04$), social (3.11), and normal people (3.03; $F(2, 98) = .13$, $p = .88$) were judged to be the same in acquisition centrality. The longitudinal data from a representative sample confirmed these lay beliefs. Participants in the follow-up study accurately sensed that loneliness might be associated with some but not other material coping strategies. Overall (by combining the three subtypes), lonely people were judged to be more materialistic ($M = 3.28$) than social people ($M = 2.92$) and normal people were ($M = 2.96$; $F(2, 98) = 4.35$, $p = .015$), who did not differ from each other. Treating materialism as a single, overall construct washes away the differences between subtypes of materialism in this follow-up study, as it did in the main study. Because people appear to be aware of the perils of certain materialism subtypes, it is even more pertinent to understand when and why the vicious cycle starts and how it can be stopped.

Leaving the Loop

A frequent piece of advice to improve one's social relationships and well-being is to "get off the materialistic treadmill" (Kasser 2002, 102) and dematerialize (Hammerslough 2001). The recommendation is to place less emphasis on material pursuits and perhaps even to "Put the television in the closet. Cancel your subscription to glamour and gossip magazines. Stop wandering in the mall or shopping on the Internet" (Kasser 2002, 103).

The present research suggests that a different and possibly more effective approach to dematerialize is to resocialize. Over time, loneliness contributed more to materialism than the other way around, and two subtypes of materialism played a key role. Since people appear to be aware of this, why did they not resocialize and leave the loneliness loop? Could it be that this is the result of anxious coping with loneliness (Miculincer and Shaver 2008)? In anxious coping, people still prefer to (re-)connect with others but fail to try out of fear of rejection. In response, they may cling to material possessions to avoid the pain of social isolation and rejection, and they do not approach the pleasures of a material lifestyle for their own sake. The finding that singles endorsed material pursuits more as a happiness medicine ("My life would be better if I owned certain things I do not have") and less for sheer mirth ("I like a lot of luxury in my life") is consistent with this reasoning. Research by Wang et al. (2012) points in the same direction. These authors found that when selecting a product for public consumption, lonelier people endorsed a popular product more than a unique product to prevent negative evaluation by others. Fear of rejection may thus prevent people from expressing their private preferences that could contribute to the true social connections that they desire. This suggests that improved social skills may not only reduce loneliness but also reduce the vicious side of materialism, as a bonus.

Aging, Materialism, and Loneliness

Longitudinal studies of representative samples can provide insights into the materialism-loneliness cycle and related vexing societal issues that escape experimental manipulation and random allocation to conditions. Aging effects are such an issue. According to some estimates, the number of people over the age of 60 will reach 1 billion by 2020 and almost 2 billion by 2050, representing 22% of the world's population (Bloom, Canning, and Fink 2010). This poses serious social, health, and economic challenges. Cole et al. (2008) call for more research to answer the question when various changes linked to aging are linear and when they are nonlinear, and what the influences of people's age and birth cohort are. The present study sheds light on these questions for materialism and loneliness. It found that the relationship between age and initial level of materialism was U-shaped. Both the linear and the quadratic effect of age were noteworthy, with the younger and older consumers being most materialistic, with a minimum at an age of about 48 years. These quadratic age effects occurred for all three subtypes and for overall materialism. These findings are new.

In addition to this, initial loneliness increased linearly with age although the absolute changes were modest, as observed before (Cacioppo and Patrick 2008; Dykstra 2009). There was no strong evidence for quadratic age effects on initial levels of loneliness. Yet and notably, age also had a linear effect on the growth of loneliness across the 6 years of the study. Thus, loneliness both increased with age and grew faster with age. These age effects were not due to gender, income, education, relationship status, and materialism because those were all controlled for. This study is the first to report these simultaneous level-and-growth effects of age on loneliness. It starts to answer the question by Cole et al. (2008) about cohort and age effects. Age effects on initial levels of loneliness capture cohort influences, whereas age effects on growth of loneliness capture aging effects. The proposed latent growth model made it possible to disentangle these. Future research using latent growth models holds promise in gaining deeper insights into age and cohort effects on materialism, loneliness, and similar constructs. One question, for instance, is how age and materialism influence consumption over the life cycle. This is particularly relevant in the current volatile economic era that may affect materialistic and social values but differently, depending on one's age and birth cohort. Another question is how personal and social (media) networks and loneliness evolve over the life cycle.

Inferences, Life Transitions, and Growth

While the longitudinal data go a step beyond the cross-sectional data that prior materialism research had to rely on, they are still observational. A major concern with ob-

servational data is that omitted variables bias the results. This precludes the strong causal inferences that experimental data permit. Because sustained and strong manipulations of materialism and loneliness under controlled conditions are practically impossible and ethically unacceptable, longitudinal data were chosen as the next best alternative. Using longitudinal data in combination with latent growth models mitigates omitted variable bias in two ways. First, the model separates mean growth curves from unobserved individual-level heterogeneity in these curves. By controlling for this unobserved heterogeneity, omitted variables that differ between people but are time-invariant within the observation period, such as stable personality traits, are less likely to confound the results. Moreover, the model controlled for relevant time-varying and time-invariant socioeconomic characteristics that may influence materialism, loneliness, or both. Jointly, this raises confidence in the truthfulness of the observed pathways between materialism and loneliness. Second, the latent growth model makes use of the temporal precedence that the initial levels of materialism and loneliness have over the growth curves that they presumably influence. These are two ingredients for causal inference, although not sufficient. Omitted variables that covary with the estimated individual growth curves could bias the results. Therefore, the inferences are at best about Granger or G-causality (Angrist and Pischke 2009), that is, whether the growth of a target construct can be predicted from the initial level of another construct (which precedes and correlates with it), while controlling for the initial level of the target construct and potential confounders. Future research could include variables that were currently omitted, and that may covary with the growth curves of interest, such as perhaps positive and negative affectivity, and various social skills. In view of their infinite number, strong theories are needed to select the key potential confounders. Future research may also try to exploit natural experiments. These occur when unanticipated external conditions mimic random allocation of individuals to materialism or loneliness treatments, such as in cases of unforeseen loss or gain of significant others or possessions. Such natural experiments in combination with longitudinal data might help to better understand when and why the cycle of materialism and loneliness starts and accelerates and when it decelerates and stops.

Although five measurement waves across 6 years and a sample of over 2,500 participants were available for the present research, even more measurement waves, longer time frames, and larger sample sizes would be preferable. This would ensure that the sample contains an ample number of people who go through life transitions and experience events that may influence materialism, loneliness, or both. More measurement waves would also make it possible to reliably estimate higher-order growth curves. These could provide a more realistic picture of the temporal dynamics of materialism and loneliness than was currently possible.

Materialism Theory

There are several opportunities to contribute to the next phase of materialism theory and research. First, future work may identify the mediating processes that account for the unanticipated virtuous influence of acquisition centrality on loneliness. Acquisition centrality is the more intrinsically motivated subtype of materialism; it expresses the sheer interest and joy of acquiring and owning material possessions. Intrinsic motivations provide people with a sense of autonomy and control. This stimulates creativity and spontaneity and improves mood (Deci and Ryan 2000), which can spill over to social relationships (Mikulincer and Shaver 2008). In this way, acquisition centrality could indirectly improve social relationships.

Second, new research could establish when materialism directly improves social relationships. The identified subtypes of materialism are fundamental but may not fully capture the universe of key materialism motivations. To illustrate, financial aspirations are often egocentrically motivated, for instance, to get ahead in life. But they can also be sociocentrically motivated (Carver and Baird 1998; Srivastava et al. 2001), for instance, to care for one's family or help the community. Likewise, materialism could be motivated to satisfy the need for relatedness. Possessions can be important stores of social memories (souvenirs), tools of social protection (house), connection (phone), or production (family dinner table). People can cherish particular possessions for such sociocentric motivations (Richins 1994), but they may also cherish possessions in general for these motivations, and this could directly improve their social relationships. Research on this possibility would provide new insights about the virtuous sides of materialism, and it would contribute to the nuanced outlook on people's material and social relationships that the present research pointed to.

REFERENCES

Ahuvia, Aaron, and Nancy Wong (1995), "Materialism: Origins and Implications for Personal Well-Being," *European Advances in Consumer Research*, 2, 172–78.

Angrist, Joshua D., and Jörn-Steffen Pischke (2009), *Mostly Harmless Econometrics: An Empiricist's Companion*, Princeton, NJ, and Oxford: Princeton University Press.

Bauer, Monika A., James E. B. Wilkie, Jung K. Kim, and Galen V. Bodenhausen (2012), "Cuing Consumerism: Situational Materialism Undermines Personal and Social Well-Being," *Psychological Science*, 23 (5), 517–23.

Baumeister, Roy F., and Mark R. Leary (1995), "The Need to Belong: Desire for Interpersonal Attachments as a Fundamental Human Motivation," *Psychological Bulletin*, 117 (3), 497–529.

Bloom David E., David Canning, and Günther Fink (2010), "Implications of Population Ageing for Economic Growth," *Oxford Review of Economic Policy*, 26 (4), 583–612.

Boomsma, Dorret I., Gonneke Willemsen, Conor V. Dolan, Louise C. Hawkley, and John T. Cacioppo (2005), "Genetic and Environmental Contributions to Loneliness in Adults: The Netherlands Twin Register Study," *Behavior Genetics*, 35 (6), 745–52.

Burroughs, James E., and Aric Rindfleisch (2002), "Materialism and Well-Being: A Conflicting Values Perspective," *Journal of Consumer Research*, 29 (3), 348–70.

——— (2011), "What Welfare? On the Definition and Domain of Consumer Research and the Foundational Role of Materialism," in *Transformative Consumer Research for Personal and Collective Well-Being*, ed. David G. Mick, Simon Pettigrew, Cornelia Pechmann, and Julie L. Ozanne, New York: Routledge, 249–66.

Cacioppo, John T., Louise C. Hawkley, and Ronald A. Thisted (2010), "Perceived Social Isolation Makes Me Sad: 5-Year Cross-Lagged Analyses of Loneliness and Depressive Symptomatology in the Chicago Health, Aging, and Social Relations Study," *Psychology and Aging*, 25 (2), 453–63.

Cacioppo, John T., and William Patrick (2008), *Loneliness: Human Nature and the Need for Human Connection*, New York: Norton.

Carver, Charles S., and Eryn Baird (1998), "The American Dream Revisited: Is It *What* You Want or *Why* You Want It That Matters?" *Psychological Science*, 9 (4), 289–92.

Chang, LinChiat, and Robert M. Arkin (2001), "Materialism as an Attempt to Cope with Uncertainty," *Psychology and Marketing*, 19 (5), 389–406.

Cheong, JeeWon, David P. MacKinnon, and Siek Toon Khoo (2003), "Investigation of Mediational Processes Using Parallel Process Latent Growth Curve Modeling," *Structural Equation Modeling*, 10 (2), 238–62.

Clark, Margaret S., Aaron Greenberg, Emily Hill, Edward P. Lemay, Elizabeth Clark-Polner, and David Roosth (2011), "Heightened Interpersonal Security Diminishes the Monetary Value of Possessions," *Journal of Experimental Social Psychology*, 47 (2), 359–64.

Cole, Catherine, Gilles Laurent, Aimee Drolet, Jane Ebert, and Angela Gutchess, Raphaëlle Lambert-Pandraud, Etienne Mullet, Michael I. Norton, and Ellen Peters (2008), "Decision Making and Brand Choice by Older Consumers," *Marketing Letters*, 17 (3), 17–29.

Csikszentmihalyi, Mihaly, and Eugene Rochberg-Halton (1981), *The Meaning of Things: Domestic Symbols and the Self*, Cambridge: Cambridge University Press.

Curran, Patrick J., Khawla Obeidat, and Diane Losardo (2010), "Twelve Frequently Asked Questions about Growth Curve Modeling," *Journal of Cognition and Development*, 11 (2), 121–36.

Das, Marcel, Peter Ester, and Lars Kaczmirek, eds. (2011), *Social and Behavioral Research and the Internet*, New York: Routledge.

Deci, Edward L., and Richard M. Ryan (2000), "The 'What' and 'Why' of Goal Pursuits: Human Needs and the Self-Determination of Behavior," *Psychological Inquiry*, 11 (4), 227–68.

de Jong-Gierveld, Jenny (1987), "Developing and Testing a Model of Loneliness," *Journal of Personality and Social Psychology*, 53 (1), 119–28.

Diggle, P., and M. G. Kenward (1994), "Informative Drop-out in Longitudinal Analysis," *Journal of the Royal Statistical Society C*, 43 (1), 49–73.

Dykstra, Pearl (2009), "Older Adult Loneliness: Myths and Realities," *European Journal of Aging*, 6 (2), 91–100.

Enders, Craig (2011), "Missing Not at Random Models for Latent Growth Curve Analysis," *Psychological Methods*, 16 (1), 1–16.

Ernst, John M., and John T. Cacioppo (1999), "Lonely Hearts: Psychological Perspectives on Loneliness," *Applied and Preventive Psychology*, 8 (1), 1–22.

Fournier, Susan, and Marsha L. Richins (1991), "Some Theoretical and Popular Notions Concerning Materialism," *Journal of Social Behavior and Personality*, 6 (6), 403–14.

Ger, Güliz, and Russell W. Belk (1996), "Cross-Cultural Differences in Materialism," *Journal of Economic Psychology*, 17 (1), 55–77.

Griffin, Jo (2010), *The Lonely Society?* London: Mental Health Foundation.

Hammerslough, Jane (2001), *Dematerializing: Taming the Power of Possessions*, Cambridge, MA: Perseus Publishing.

Hudders, Liselot, and Mario Pandelaere (2012), "The Silver Lining of Materialism: The Impact of Luxury Consumption on Subjective Well-Being," *Journal of Happiness Studies*, 13 (3), 411–37.

Jylha, Marja (2004), "Old Age and Loneliness: Cross-sectional and Longitudinal Analyses in the Tampere Longitudinal Study on Aging," *Canadian Journal on Aging*, 23 (2), 157–68.

Karabati, Serdar, and Zeynep Cemalcilar (2010), "Values, Materialism, and Well-Being: A Study with Turkish University Students," *Journal of Economic Psychology*, 31 (4), 624–33.

Kasser, Tim (2002), *The High Price of Materialism*, Cambridge, MA: MIT Press.

Kasser, Tim, and Richard M. Ryan (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), 410–22.

Keefer, Lucas A., Mark J. Landau, Zachary K. Rothschild, and Daniel Sullivan (2012), "Attachment to Objects as Compensation for Close Others' Perceived Unreliability," *Journal of Experimental Social Psychology*, 48 (4), 912–17.

Lane, Robert E. (2000), *The Loss of Happiness in Market Democracies*, New Haven, CT: Yale University Press.

Lastovicka, John L., and Nancy J. Syrianni (2011), "Truly, Madly, Deeply: Consumers in the Throes of Material Possession Love," *Journal of Consumer Research*, 38 (August), 323–42.

Little, Roderick J. A., and Donald B. Rubin (2002), *Statistical Analysis with Missing Data*, Hoboken, NJ: Wiley.

Maio, Gregory R., Ali Pakizeh, Wing-Yee Cheung, and Kerry J. Rees (2009), "Changing, Priming, and Acting on Values: Effects via Motivational Relations in a Circular Model," *Journal of Personality and Social Psychology*, 97 (4), 699–715.

Martin, Kelly D., and Ronald Paul Hill (2012), "Life Satisfaction, Self-Determination, and Consumption Adequacy at the Bottom of the Pyramid," *Journal of Consumer Research*, 38 (6), 1155–68.

Mead, Nicole L., Roy F. Baumeister, Tyler F. Stillman, Catherine D. Rawn, and Kathleen D. Vohs (2011), "Social Exclusion Causes People to Spend and Consume Strategically in the Service of Affiliation," *Journal of Consumer Research*, 37 (5), 902–19.

Meifen, Wei, Daniel W. Russell, and Robyn A. Zakalik (2005), "Adult Attachment, Social Self-Efficacy, Self-Disclosure, Loneliness, and Subsequent Depression for Freshmen College Students: A Longitudinal Study," *Journal of Counseling Psychology*, 52 (4), 602–14.

Mikulincer, Mario, and Phillip R. Shaver (2008), "'Can't Buy Me Love': An Attachment Perspective on Social Support and Money as Psychological Buffers," *Psychological Inquiry*, 19 (3), 167–73.

Muthén, Bengt O., and Patrick J. Curran (1997), "General Longitudinal Modeling of Individual Differences in Experimental

Designs: A Latent Variable Framework for Analysis and Power Estimation," *Psychological Methods*, 2 (4), 371–402.
Muthén, Linda K., and Bengt O. Muthén (1998–2012), *Mplus User's Guide*, 7th ed., Los Angeles: Muthen & Muthen.
Myers, David G. (2000), *The American Paradox: Spiritual Hunger in an Age of Plenty*, New Haven, CT: Yale University Press.
Nickerson, Carol, Norbert Schwarz, Ed Diener, and Daniel Kahneman (2003), "Zeroing in on the Dark Side of the American Dream: A Closer Look at the Negative Consequences of the Goal for Financial Success," *Psychological Science*, 14 (6), 531–36.
Prentice, Deborah A., and Dale T. Miller (1992), "When Small Effects Are Impressive," *Psychological Bulletin*, 112 (1), 160–64.
Putnam, Robert D. (2000), *Bowling Alone: The Collapse and Revival of American Community*, New York: Simon & Schuster.
Richins, Marsha L. (1994), "Valuing Things: The Public and Private Meanings of Possessions," *Journal of Consumer Research*, 21 (December), 504–21.
Richins, Marsha L., and Scott A. Dawson (1992), "A Consumer Values Orientation for Materialism and Its Measurement: Scale Development and Validation," *Journal of Consumer Research*, 19 (December), 303–16.
Rindfleisch, Aric, James E. Burroughs, and Frank Denton (1997), "Family Structure, Materialism, and Compulsive Consumption," *Journal of Consumer Research*, 23 (4), 312–25.
Rindfleisch, Aric, James E. Burroughs, and Nancy Wong (2009), "The Safety of Objects: Materialism, Existential Insecurity, and Brand Connection," *Journal of Consumer Research*, 36 (1), 1–16.
Roberts, James A., and Aimee Clement (2007), "Materialism and Satisfaction with Overall Quality of Life in Eight Life Domains," *Social Indicators Research*, 82 (1), 79–92.
Russell, David, Laetitia Ann Peplau, and Caroll E. Cutrona (1980), "The Revised UCLA Loneliness Scale: Concurrent and Discriminant Validity Evidence," *Journal of Personality and Social Psychology*, 39 (3), 472–80.
Ryan, Richard M., and Edward L. Deci (2000), "Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions," *Contemporary Educational Psychology*, 25 (1), 54–67.
Ryan, Lisa, and Suzanne Dziurawiec (2001), "Materialism and Its Relationship to Life Satisfaction," *Social Indicators Research*, 55 (2), 185–97.
Schwartz, Barry (2000), *The Cost of Living: How Market Freedom Erodes the Best Things in Life*, New York: Norton.
Schwartz, Shalom H. (1992), "Universals in the Content and Structure of Values: Theoretical Advances and Empirical Tests in 20 Countries," *Advances in Experimental Social Psychology*, 25, 1–65.
Sheldon, Kennon M., and Tim Kasser (2008), "Psychological Threat and Extrinsic Goal Striving," *Motivation and Emotion*, 32, 37–45.
Sheldon, Kennon M., and Julia Schüler (2011), "Wanting, Having, and Needing: Integrating Motive Disposition Theory and Self-Determination Theory," *Journal of Personality and Social Psychology*, 101 (5), 1106–23.
Srivastava, Abhishek, Edwin A. Locke, and Katryn M. Bartol (2001), "Money and Subjective Well-Being: It's Not the Money, It's the Motives," *Journal of Personality and Social Psychology*, 80 (6), 959–71.
Sundie, Jill M., Douglas T. Kenrick, Vladas Griskivicius, Joshua M. Tybur, Kathleen D. Vohs, and Daniel J. Beal (2011), "Peacocks, Porsches, and Thorsten Veblen: Conspicuous Consumption as a Sexual Signaling System," *Journal of Personality and Social Psychology*, 100 (4), 664–80.
Tornstam, Lars (1988), "Loneliness in Marriage," *Journal of Social and Personal Relationships*, 9 (2), 197–217.
——— (1992), "Loneliness in Marriage," *Journal of Social and Personal Relationships*, 9 (2), 197–217.
Turkle, Sherry (2011), *Alone Together: Why We Expect More from Technology and Less from Each Other*, Philadelphia: Basic Books.
van Boven, Leif, Margaret C. Campbell, and Thomas Gilovich (2010), "Stigmatizing Materialism: On Stereotypes and Impressions of Materialistic and Experiential Pursuits," *Personality and Social Psychology Bulletin*, 36 (4), 551–63.
van Boven, Leif, and Thomas Gilovich (2003), "To Do or to Have? That Is the Question," *Journal of Personality and Social Psychology*, 85 (6), 1193–1202.
Wang, Jing, Rui Zhu, and Baba Shiv (2012), "The Lonely Consumer: Loner or Conformer?" *Journal of Consumer Research*, 38 (6), 1116–28.
Wilson, C., and B. Moulton (2010), *Loneliness among Older Adults: A National Survey of Adults 45+*. Prepared by Knowledge Networks and Insight Policy Research. Washington, DC: AARP.
Wuthnow, Robert (1994), *God and Mammon in America*, New York: Free Press.
Zhou, Xinyue, and Ding-Guo Gao (2008), "Social Support and Money as Pain Management Mechanisms," *Psychological Inquiry*, 19 (3–4), 127–44.