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Opening up on consumer materialism

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Opening up on Consumer Materialism

PROEFSCHRIFT

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Chapter 1

Roadmap

Values are universal ideas about what is important in life. They are enduring beliefs that guide our actions and judgments (Rokeach 1973). Values exist at different levels of abstraction. At the highest level of abstraction are global values that form the core of an individual's value system (Vinson, Scott, and Lamont 1977). These are different from domain-specific values which are less abstract and apply to particular areas of activity. This dissertation focuses on consumer materialism which reflects the importance that consumers attach to possessions as a source of satisfaction (Belk 1985; Richins and Dawson 1992). Materialism as domain-specific value may underlie more abstract, global values. For instance, materialism is positively associated with hedonism, achievement, stimulation, and power values, and negatively associated with conformity, universalism, and benevolence values (Burroughs and Rindfleisch 2002).

There is a substantial literature on materialism, with a majority of research focusing on the relationship between materialism and subjective well-being (Ahuvia and Wong 1995; Burroughs and Rindfleisch 2002; Hudders and Pandelaere 2012; Karabati and Cemalcilar 2010; Kasser et al. 2014; Roberts and Clement 2007). The combined evidence from 175 studies is consistent with the popular notion that higher levels of materialism are associated with reduced subjective well-being (Dittmar et al. 2014). In other words, placing a high importance on material possessions as a source of satisfaction is ironically associated with reduced life satisfaction. Furthermore, materialism has been found to be associated with increased loneliness (Pieters 2013), low self-esteem (Chaplin, Hill, and Roedder John 2014; Chaplin and Roedder John 2007), feelings of self-doubt (Chang and Arkin 2002), poor

financial management (Donnelly, Iyer, and Howell 2012; Garðarsdóttir and Dittmar 2012), credit overuse (Richins 2011), and compulsive buying (Dittmar 2005).

Various researchers have acknowledged that materialism may have positive effects as well, both at the individual and societal level. For instance, Richins and Rudmin (1994) suggested that materialistic values may lead consumers to work harder or longer to enhance their standard of living. Moreover, materialism is assumed to be associated with higher levels of consumption, thereby contributing to economic growth and innovation. Shrum et al. (2014) discuss the value of materialism for individuals as a means of coping with feelings of low self-esteem or self-doubt, giving consumers a sense of power and control. Yet, to date, empirical work has largely overlooked the possibility of positive outcomes of materialism. As such, the common perception of materialism among researchers as well as lay people is that it is predominantly "bad".

What is more, even though the most widely used conceptualizations of materialism acknowledge its multidimensional nature (Belk 1985; Richins and Dawson 1992), it is typically treated as a unidimensional construct. Recently, researchers have underlined the role of motives underlying materialism, as well as the a priori assumption that materialism is detrimental for consumer well-being (Pandelaere 2016; Pieters 2013; Shrum et al. 2014). This dissertation addresses these two issues. Building on previous work by Pieters (2013), it aims to show that materialism is not inherently and uniformly bad. It builds on the conceptualization by Richins and Dawson (1992) which recognizes three dimensions of materialism: acquisition as the pursuit of happiness, acquisition centrality, and possession-defined success. Acquisition as the pursuit of happiness represents consumers' belief that buying more and better possessions will lead to increased life satisfaction. Acquisition centrality represents the pleasure and enjoyment consumers experience from buying and

owning possessions. Possession-defined success is the use of possessions as a measure of one's own and other's success. These dimensions are conceptually and empirically distinct.

This dissertation shows that the three materialism dimensions have vastly different relationships with related variables, and even have positive consequences for consumers. Specifically, chapter 2 focuses on the development of materialistic values with age. Using a large representative longitudinal database spanning eight years from CentERdata at Tilburg University, we are able to control for cohort and period effects, allowing us to make more accurate inferences regarding the true relationships between age and materialism. The chapter also includes a meta-analysis and cross-sectional survey data to demonstrate that both previous research and lay people assumed that materialism decreases approximately linearly with age.

Chapter 3 examines the relationships between materialism and financial savings. Materialism, as a consumption value, should influence consumers' allocation of important resources such as time and money, yet empirical research on the issue is scarce (Nepomuceno and Laroche 2015; Watson 1998, 2003). Combining data from the CentERpanel with data from the DNB Household Survey (DHS), another longitudinal database collected from the same panel, we study the associations between materialism and actual consumer savings. Materialism is typically assumed to be the cause rather than the consequence of (poor) financial decision-making (Donnelly et al. 2012; Garðarsdóttir and Dittmar 2012). This chapter examines the distinct relationships between the three materialism dimensions and savings, which are not necessarily negative or unidirectional.

Chapter 4 builds on the large stream of existing research on materialism and subjective well-being. Again, materialism is often considered the cause, and not the consequence, of reduced subjective well-being, even though materialism has been proposed

to be a coping mechanism to reduce loneliness (Pieters 2013), anxiety and insecurity (Rindfleisch, Burroughs, and Wong 2009), or other feelings of powerlessness (Richins 2017). The longitudinal data used in this study come from a different, large representative panel also managed by CentERdata, namely the LISS panel. Similar to chapter 3, this chapter emphasizes that the relationships between materialism and subjective well-being are not uniform, may not be negative, and may not be unidirectional. Moreover, chapter 4 specifically addresses three common sources of endogeneity that appear to have biased results from previous studies, namely measurement error, simultaneity, and omitted variables.

Finally, chapter 5 summarizes and integrates the empirical findings. It further addresses three questions that were not addressed in the preceding chapters. First, the DHS data used in chapter 3 does not contain consumption data. We could therefore not examine the influence of materialism on consumption patterns. Information about housing wealth and mortgage debts was available however. Housing wealth was excluded from total savings in chapter 3 mainly due to its dual role as an investment and a consumption good. Chapter 5 therefore examines the associations between overall materialism, its three dimensions, and housing wealth .Second, it has been suggested that more materialistic consumers may work harder or longer to enhance their incomes and standard of living, which has positive effects on the economy (Richins and Dawson 1992; Richins and Rudmin 1994). Chapter 5 discusses the results of a survey that examined if more materialistic consumers were willing to pursue a higher income at the expense of more intrinsic needs such as leisure time and job fulfilment. Third, chapter 5 elaborates on how the findings presented in the dissertation interrelate. Finally, directions for future research are provided.

Chapter 2

Materialism across the Lifespan: An Age-Period-Cohort Analysis[1]

Individual values represent guiding principles that shape attitudes and behavior over the course of people's lives. Despite the importance of individual values, little is known about how they change with age. This study examines changes in materialistic values across the lifespan, because these have important consequences for consumption behavior and well-being. Materialism has been defined as a consumer value which reflects "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 and Dawson 1992, p. 307). People high in materialism place possessions and their acquisition at the center of their lives. They judge their own and others' success by the number and worth of their possessions, and they view possessions and their acquisition as essential to their happiness.

Materialism is part of people's broader value systems (Burroughs and Rindfleisch 2002; Kilbourne and LaForge 2010). For instance, materialism is positively associated with hedonism, achievement, stimulation, and power values, and negatively associated with conformity, universalism, and benevolence values (Burroughs and Rindfleisch 2002). Having a materialistic value orientation is associated with various negative consequences, such as compulsive buying (Dittmar 2005), credit overuse (Richins 2011), increased loneliness (Pieters 2013), depression and anxiety (Kasser and Ryan 1993), and reduced subjective well-being (Dittmar et al. 2014; Richins and Dawson 1992; Roberts and Clement 2007). Even though materialism is often viewed as the dark side of consumer behavior, some researchers have speculated about potential positive consequences of materialism. Materialism may, for

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[1] This chapter is based on Jaspers, Esther D.T. and Rik G.M. Pieters (2016), "Materialism across the Life Span: An Age-Period-Cohort Analysis," *Journal of Personality and Social Psychology*, 111 (3), 451-73.

instance, raise work motivation and contribute to economic growth by stimulating demand for goods (Kilbourne and LaForge 2010; Richins and Dawson 1992; Sirgy et al. 2013; Watson 2003). For all these reasons, it is important to understand the determinants of materialism.

Lifespan research has made great strides in understanding mean-level change in personality and motivations (Caspi 1987; Caspi and Roberts 2001; Heckhausen, Wrosch, and Schulz 2010; Helson, Jones, and Kwan 2002; Roberts, Walton, and Viechtbauer 2006a). Mean-level change refers to increases or decreases in the average level of a trait or value for a group of people over time, for instance from young adulthood to late adulthood (Bardi and Goodwin 2011). The effects of age on value orientations such as materialism have however received far less attention (Gouveia et al. 2015; Sheldon and Kasser 2001), and we are not aware of lifespan studies on materialism.

In order to make valid inferences about the mean-level trajectory of materialism across the lifespan, it is important to disentangle the influence of age (A), birth cohort (C), and period effects (P) on materialism. Whereas age effects represent aging-related developmental changes across the lifespan, cohort effects reflect the effects of successive age groups having different formative experiences (Ryder 1965). For instance, the cohort of people who grew up during the Great Depression is known to value economic security and frugality more than cohorts who grew up under better economic circumstances (Schewe and Noble 2000). Period effects represent changes over time due to environmental influences or important events such as wars, regime or policy changes, and economic expansions or contractions (Brangule-Vlagsma, Pieters, and Wedel 2002; Yang and Land 2008). For instance, events such as the recent global economic downturn might increase people's materialistic values due to increased economic insecurity (Kasser 2002). The current research

aims to examine age effects on materialism, while controlling for period and birth cohort effects.

Some studies on antecedents or consequences of materialism have used age as a control variable but the prime interest of those studies was somewhere else. More importantly, those studies rely on cross-sectional analyses, which confound age and birth cohort effects, and preclude investigating period effects. To separate age effects from time period and birth cohort effects, dedicated statistical models and longitudinal data about people from different age and birth cohorts, across longer time periods are needed, and these are rare. The challenge in identifying age, period, and birth cohort effects, is that any of the three factors is completely defined by the other two factors. This is referred to as the APC identification problem (Fienberg 2013). If date of birth (i.e. birth cohort) and time of measurement are known, then age is also known. In cross-sectional data on people varying in age, period effects can of course not be estimated, and age and cohort effects are confounded (Fienberg 2013; Glenn 2005; Yang and Land 2013): $A_j = P - C_j$, where j are different birth years. In single-cohort longitudinal data, where people of the same initial age are observed over a longer time period, cohort effects cannot be estimated, and age and period are confounded, because in each time period all people have the same age: $A_i = P_i - C$, where i are different observation years.

To separately identify age, birth cohort, and period effects, ideally longitudinal data would comprise multiple birth cohorts observed for their complete lifespan (Glenn 2005). Such extremely large data sets are not available for materialism, or similar individual values of people. As a compromise, accelerated longitudinal or cohort-sequential designs combined with multilevel models have been developed to identify age, period, and birth cohort effects (Fienberg 2013; Miyazaki and Raudenbush 2000; Yang and Land 2013). In cohort-sequential designs, information from several overlapping age groups is combined to form a single

developmental growth curve. In this way, inferences can be made about age changes at all points of the age range covered and about birth cohort differences at all ages, even with relatively short time periods (Meredith and Tisak 1990; Schaie 1965). The main study of the present research builds on this cohort-sequential approach to examine mean-level change in materialism across the lifespan, while controlling for period, and birth cohort effects.

There have been persistent calls for longitudinal research with multiple cohorts across a broad age range, and with large sample sizes in order to understand how people's goal and value orientations, such as materialism, change throughout the lifespan (Dittmar et al. 2014; Grouzet et al. 2005; Sheldon and Kasser 2001; Wrosch, Heckhausen, and Lachman 2000). These calls have not yet led to a flurry of research, which is due to the major challenges in data collection and analysis (Orth, Robins, and Widaman 2012; Yang and Land 2013). The current study addresses these challenges by applying a multilevel latent growth model to a longitudinal database from the Netherlands of over 4,200 people aged 16 to 90, with eight annual measurements of materialism, spanning a period of nine years (2005-2013) including the global economic downturn.

In addition to disentangling age effects from birth cohort and period effects, this study aims to contribute to the lifespan and materialism literature in other ways too. First, it examines common lay beliefs about the relationship between age and materialism (Study 1a) and reviews initial evidence for these lay beliefs with a small meta-analysis of prior studies that report on the relationship between age and materialism based on cross-sectional analyses (Study 1b). Second, the main analysis (Study 2) examines non-linear relationships that can exist between materialism and age but that have not yet been tested. Previous studies on value change suggest that values may be non-linearly related to age (Gouveia et al. 2015; Robinson 2013), and this may hold for materialism as well.

Third, the main study takes the broader perspective on materialism that has recently been called for (Dittmar et al. 2014). It examines overall materialism, three dimensions in materialism, and more materialistic versus more non-materialistic desires, as described later. It relies on the Material Values Scale (MVS, Richins and Dawson 1992) which is the dominant measurement instrument for materialism. Previous research has typically treated materialism as a single, overall construct. However, the MVS captures three related, but different dimensions in materialism. Acquisition centrality is the extent to which one places possessions and acquisition at the center of their lives. Possession-defined success refers to using possessions as indicators of success. Acquisition as the pursuit of happiness describes the belief that possessions are essential to satisfaction in life. These dimensions may develop differently across the lifespan. As Dittmar et al. (2014, p. 912; see also Kasser, 2002) point out, "... materialism may be best conceived as a cluster of beliefs and values ... rather than a mere desire for money and material goods. Assessing this broader set of beliefs and values appears to provide a better understanding, and consequent operationalization, of the underlying construct of materialism, thereby increasing the size of observed relations with well-being." We believe that the same holds for its relationships with age. Using a single, aggregate measure may miss the potential intricate relationships between age and the materialism construct. The main study examines overall materialism, the three materialism dimensions, as well as materialistic versus non-materialistic desires to provide further insight into the development of materialism across the lifespan.

The next section provides the theoretical background, followed by two initial studies that examine lay beliefs about the development of materialism across the lifespan (Study 1a), and initial empirical evidence for these lay beliefs from cross-sectional analyses (Study 1b), respectively. Then, the data, model, and results of the main study (Study 2) are described.

Although the primary focus of the study is age effects on materialism, birth cohort and period effects are of interest in and of themselves, and are therefore also considered.

Materialism across the Lifespan

A specific theory about the development of materialism across the lifespan has not been articulated yet, but general lifespan theories provide clues to it. Such theories suggest value changes as a function of distinct developmental priorities that people at different ages have (Gouveia et al. 2015). Erikson (1950) proposed an influential theory of eight psychosocial stages across the lifespan, and the relevant goals and values that people have in each life stage. According to the theory, the main developmental task of adolescence is building an identity (identity vs. role confusion). Young adulthood typically concerns self-oriented and resource-related tasks such as studying, finding a job, and developing meaningful relations with others (intimacy vs. isolation). When people enter middle adulthood their concerns become increasingly other-oriented, as people care for their children or practice other forms of altruistic concern (generativity vs. stagnation). During late adulthood, people reflect on past achievements and regrets, and try to make peace with themselves and others (integrity vs. despair) (Cohen and Cohen 1996; McAdams, de St Aubin, and Logan 1993; Nurmi 1991). Since developmental priorities and specific values associated with these are embedded in people's broader value systems, changes in values are interrelated. That is, when the importance attributed to a certain value increases with age, similar values also increase in importance, whereas opposing values decrease in importance (Schwartz 1992).

Erikson's developmental theory suggests that materialistic values play a major role in the processes of identity formation in adolescence. Indeed, Chang et al. (2006) found that

after education, occupation, and family, materialistic goals were highly prioritized by adolescents. Common reasons mentioned by adolescents for their attachment to possessions are enjoyment, the social ties associated with them and the aspects of self that the possessions express (Kamptner 1991). This is consistent with the major task of adolescence to establish a clear sense of identity and role in life in relation to others. Moreover, the early focus in life on education and occupation is motivated, in part, by a desire to build material resources and the means to acquire them. Adolescents use possessions to plan for the future and to demonstrate ability, control, and power (Belk 1988; Csikszentmihalyi and Rochberg-Halton 1981; Kamptner 1991).

The transition from young adulthood to middle adulthood then entails an increasing focus on the welfare of the family, suggesting a decrease in comparatively self-centered values such as materialism (Kasser and Ryan 1996). Once people have families of their own and attain stable positions in the occupational world, they tend to become less preoccupied with their own strivings and more concerned with the welfare of others (Veroff, Reuman, and Feld 1984). Indeed, in a study on psychological maturity among 108 U.S. adults, Sheldon and Kasser (2001) found that middle aged adults pursued intrinsic values concerning self-acceptance, emotional intimacy and community contribution as opposed to extrinsic values concerning money, physical attractiveness, and popularity.

Thus, it is reasonable to expect a decrease from early adolescence to middle adulthood in materialism. It is less obvious whether the decrease in materialism continues into late adulthood. Whereas some theories and evidence suggest such a further decrease, other theories and evidence suggest that materialism might actually increase in late adulthood. We describe these two disparate directions here.

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On the one hand, materialism might decrease further in late adulthood because this stage of life entails a more spiritual worldview (Tornstam 1997) and an increased focus on emotionally meaningful goals and activities (Carstensen 1995; Carstensen, Isaacowitz, and Charles 1999). As a case in point, Tornstam's (1997) gerotranscendence theory predicts a shift from a materialistic and pragmatic worldview to more transcendent and cosmic concerns as people age. Socioemotional selectivity theory (SST) does not make specific predictions about value change but specifies that people focus more on emotionally meaningful goals and activities as they perceive time as more and more limited (Carstensen, Mikels, and Mather 2006). There is some empirical support for the prediction that late adulthood is associated with an increased focus on intrinsic and emotionally meaningful goals. In a cross-section of 480 German adults between the ages of 20 and 90 years, Lang and Carstensen (2002) found that among individuals who perceived their future time as limited, emotionally meaningful goals such as generativity and emotion-regulatory goals were prioritized. Moreover, a study on age differences in the aspirations of 2,557 adults from the U.S. and the U.K. between young, midlife, and older adults, found that the relative importance of extrinsic to intrinsic aspirations decreased with age (Morgan and Robinson 2013). Also, self-transcendence values such as benevolence and universalism, which tend to conflict with materialism (Burroughs and Rindfleisch 2002), have been shown to increase with age (Schwartz 2007). To the extent that materialism is antithetical to intrinsic pursuits such as self-transcendence, generativity and emotion-related goals, these findings suggest a decrease in materialism in late adulthood.

On the other hand, there are also reasons to expect materialistic values to increase from middle to late adulthood. For one, old age is characterized by negative events such as death of spouse and friends, decline of physical health and physical functioning, loss of social status and prestige, and sometimes financial insecurity (Staudinger, Marsiske, and Baltes 1995). Such age-related unfavorable changes in income, health, and employment status are

associated with increased stress and neuroticism (Wagner et al. 2016), and decreased control (Heckhausen, Dixon, and Baltes 1989; Heckhausen et al. 2010; Kamptner 1989) and self-esteem (Orth, Trzesniewski, and Robins 2010). Feelings of purpose in life and sense of personal growth are lower in late than middle adulthood as well (Ryff 1989). Materialism is one way to cope with stress and low self-esteem (Chang and Arkin 2002; Chaplin and Roedder John 2007, 2010; Rindfleisch, Burroughs, and Denton 1997; Roberts, Manolis, and Tanner 2003). Acquiring possessions may decrease people's sense of dependence on others and can be a means to bolster feelings of competence and success (Furby 1978; Richins 2011) and to regain control (Heckhausen et al. 1989). More generally, the motivational theory of lifespan development (Heckhausen et al. 2010) specifies that older people compensate for decreased perceived control over life by anticipating and imagining success and enhancing their perceptions of personal control, which may bolster materialism. In a cross-sectional study among 36,845 participants in Brazil, values related to materialism, such as power, prestige and success, were indeed higher in late than middle adulthood (Gouveia et al. 2015).

Related to this, terror management theory (TMT; Pyszczynski, Greenberg, and Solomon 1997; Solomon, Greenberg, and Pyszczynski 1991) holds that the uniquely human awareness of our own passing and the anxiety this engenders leads people to confirm to cultural worldviews that give life meaning and enhance their self-esteem. One common worldview is that possessions are markers of status and success in life (Christopher et al. 2006), and these may become more important when one's mortality is salient. In support of this, participants gave more positive ratings for high-status products (e.g. Lexus and Rolex) when their mortality was made salient (Mandel and Heine 1999). Mortality salience also increased the desire for profit in a forest-management simulation game, leading Kasser and Sheldon (2000) to conclude: "Interestingly, the results suggested that mortality salience particularly enhanced feelings of greed, or the desire to acquire more than other people" (p.

350). Increased mortality salience from middle to late adulthood may thus raise materialism. Together, this suggests that materialism might actually increase from middle to late adulthood.

Predictions about Age, Period, and Cohort Effects on Materialism

      Age Effects. Developmental theories suggest that materialism is high in young adulthood and decreases from young to middle adulthood. Although existing theories and empirical evidence provide mixed predictions, the prior analysis suggests a potential rise in materialism from middle to late adulthood. There is insufficient basis to formulate predictions about the effect of age on the three specific materialism dimensions. Our research focuses on age effects on materialism, and considers birth cohort and period effects on materialism as well.

      Cohort Effects. There is a common belief that Western societies are becoming more materialistic over time (Kanner and Soule 2004; Pollay 1986), but systematic research on birth cohort differences in materialism is unavailable. Easterlin and Crimmins (1991) did find in two cross-sections that private materialism, defined as the pursuit of one's own material well-being, increased in importance between 1970 and 1987 among American youth. Twenge and Kasser (2013) found that among 17-18 year olds from the U.S., the importance of money and owning expensive material items increased from the mid-1970s to the late 2000s. In the annual UCLA Freshmen survey, the proportion of students who reported that it was essential or very important to be "very well-off financially," almost doubled from 44 percent in 1966 to 82 percent in 2013 (Astin, Panos, and Creager 1967; Eagan et al. 2013). Taken together, it is reasonable to predict that compared to people from older birth cohorts, people from younger birth cohorts are more materialistic.

Period effect. In the observation period of the main study (2005-2013), a global economic downturn took place. The global economic downturn is an exogenous shock specific to the time period of this study, and it could have led to changes in people's materialistic values. It has been argued that economic insecurity leads to increases in materialism (Kasser 2002). In support of this, studies have found that U.S. teenagers from less advantageous socioeconomic circumstances were more materialistic than their more affluent counterparts (Kasser et al. 1995), and that these higher levels of materialism among impoverished teenagers were associated with lower self-esteem (Chaplin et al. 2014). This suggests an increase in materialism due to the global economic downturn after 2008.

Overview of the present research

We conducted three studies to examine the relationship between age and materialistic values. Study 1a uses survey data from an online consumer panel to investigate people's lay beliefs about the materialistic values that people at different ages in their lives have. Study 1b examines initial empirical evidence for these lay beliefs by reviewing the existing literature, and conducting a meta-analysis of previous findings about the relationship between materialism and age. Finally, the main study (Study 2) uses a cohort-sequential longitudinal design and multilevel latent growth modeling to estimate the trajectory of materialism across the lifespan, while controlling for birth cohort and period effects, and relevant sociodemographic characteristics.

Study 1a: Lay Beliefs

What are people's beliefs about the relationship between age and materialism? Lay theories suggest that materialism is high in young adulthood, when people are still in search for self-identity and are accumulating resources for later life stages. Older people are

generally considered to attach less importance to extrinsic values such as materialism (Sheldon and Kasser 2001). These lay beliefs are also influenced by media headlines such as 'Today's Teens: More Materialistic, Less Willing to Work' (Langfield 2013). Even though this headline refers to birth cohort effects, lay people might interpret this more generally. To examine if people's lay beliefs are consistent with this view, we surveyed a sample of U.S. residents from an online panel (Amazon; $N = 200$, age range: 18-74, mean age = 34, 129 male). Participants were asked to judge the level of materialism of people from different age groups. We expected people to believe that materialism is highest during adolescence and early adulthood, and that it monotonically decreases to reach a minimum in late adulthood.

Method

After reading the definition of materialism by Richins and Dawson (1992), participants judged the level of materialism of people from five different age groups, respectively 12 to 18 years, 18 to 40 years, 40 to 60 years, 60 to 80 years, and 80 years and over. They indicated for each of the five age groups to what extent people from these age groups, respectively (a) "… place possessions and acquisitions at the center of their lives" (acquisition centrality), (b) "… judge their own and other's success by the number and quality of their possessions" (possession-defined success), (c) "… view possessions and their acquisition as essential to their satisfaction and well-being in life" (acquisition as the pursuit of happiness); and (d) are "overall materialistic" (overall materialism), on a 5-point scale (with 1 = least and 5 = most). Each participant thus made 20 judgments in total (four for each of the five age groups).

Results and Discussion

As predicted, people's lay beliefs were that materialism declines almost monotonically with age from young adulthood to late adulthood ($F(4, 796) = 536.37$, $p < .001$,

$\eta^2 = .66$). That is, 12 to 18 year olds ($M = 4.06$, $SD = 0.07$) and 18 to 40 year olds ($M = 4.03$, $SD = 0.05$) were believed to be overall most materialistic, and more so than 40 to 60 year olds ($M = 2.99$, $SD = 0.06$), 60 to 80 year olds ($M = 1.94$, $SD = 0.05$), and people 80 years and over ($M = 1.31$, $SD = 0.04$). The same pattern emerged for each of the three dimensions of materialism (all ps < .001; effect sizes were $\eta^2 = .63$ for acquisition centrality, $\eta^2 = .56$ for possession-defined success, and $\eta^2 = .61$ for acquisition as the pursuit of happiness). The results thus confirmed the hypothesis that people believe that materialism is highest in adolescence and young adulthood and declines with age. Study 1b examines extant empirical evidence for people's lay beliefs.

Study 1b: Meta-analysis

Age has not been a focal variable in materialism research to date. However, age has been included as a control variable in prior studies on materialism. Evaluating the findings of previous studies on age effects on materialism can give an indication of the accuracy of people's lay beliefs about the trajectory of materialism across the lifespan. Therefore, a meta-analysis was conducted on published studies that have used the Material Values Scale (MVS, Richins and Dawson 1992). This scale covers the materialism construct comprehensively, has sound psychometric qualities, and is the most widely employed measure in materialism research. It was used in 51 of the 151 studies reviewed in a recent meta-analysis about the relationship between materialism and well-being (Dittmar et al. 2014), as well as in the main study here.

Method

To identify studies for inclusion in the meta-analysis, first all publications covered in the analysis by Dittmar et al. (2014) were examined. Second, Google Scholar was searched for other publications that contained information on "age and materialism." Third, the reference lists of the publications that had been identified in the first two steps were screened. This led to an initial sample of 31 published studies that report on the statistical relationship between age and materialism. From this initial sample, 13 studies were removed because they relied only on samples of children or young adolescents ($N = 7$), did not report on overall materialism ($N = 3$), or provided insufficient information to compute an effect size ($N = 3$). The final set contained 18 studies providing 23 separate samples with a total sample size of 10,701 and an average age of the participants of 43 years. Correlation coefficients were used as effect size measures. When studies reported regression coefficients or cross-tabulations, these were converted into correlation coefficients (Lipsey and Wilson 2001; Peterson and Brown 2005). In order to give more weight to more precise estimates, effect sizes were weighted by the estimated inverse of their variance ($N - 3$) before averaging them into an overall effect size measure. Table 2.1 provides a summary. It is important to note that all studies relied on cross-sectional rather than longitudinal comparisons. Moreover, 17 out of 18 studies only considered linear effects of age, and in none of the studies was age the main focus.

Results and Discussion

The mean size of the correlation across the 23 samples was -.16 ($SE = 0.01$) with a 95% confidence interval of -.14 to -.18, indicating a modest, negative linear relationship between age and materialism. That is, older people tended to be overall less materialistic than younger people. There was significant heterogeneity between studies ($Q_r = 92.15$, $df = 22$, $p <$

.001 and $I^2 = .76$). The I^2 indicates that 76% of the variability was due to heterogeneity rather than sampling error (Higgins and Thompson 2002). The notable heterogeneity between studies indicates that it is useful to delve deeper in the relationship between age and materialism.

Table 2.1

Summary of Studies Reporting on the Relationship between Age and Materialism

Study	Sample	Author(s) (year)	Sample origin	Sample size	Mean age	Age range	Nr. items	r	p
1	1	Burroughs and Rindfleisch (2002)	US	373	47	21-74	18	-.23	< .001
2	2	Christopher et al. (2006)	US	204	25	17-57	18	-.20	.002
3	3	Christopher, Saliba, and Deadmarsh (2009)	US	440	39	18-73	18	-.19	< .001
4	4	Dittmar (2005)	UK	330	40	15-87	11	-.18	.001
4	5	Dittmar (2005)	UK	250	34	-	11	-.16	.006
5	6	Flouri (2007)	UK	635	41	28-70	5	-.04	.157
5	7	Flouri (2007)	UK	452	45	28-74	5	.01	.416
6	8	Good (2007)	US	295	56	-	18	-.26	< .001
6	9	Good (2007)	US	482	63	-	18	-.11	.008
7	10	Pepper, Jackson, and Uzzell (2009)	UK	260	50	-	15	-.13	.018
8	11	Pieters (2013)	NL	1,721	48	16-90	18	-.08	< .001
9	12	Ponchio and Aranha (2008)	Brazil	436	-	-	9	-.09	.030
10	13	Richins (1994)	US	263	-	-	18	-.05	.210
11	14	Richins and Dawson (1992)	US	690	-	-	18	-.19	< .001
12	15	Rindfleisch et al. (2009)	US	314	49	18-82	9	-.16	.002
13	16	Roberts and Clement (2007)	US	402	-	18+	15	-.25	< .001
14	17	Ruvio, Somer, and Rindfleisch (2014)	Israel	309	37	-	9	-.25	< .001
14	18	Ruvio et al. (2014)	US	855	36	18-65	9	-.27	< .001
15	19	Shrum, Burroughs, and Rindfleisch (2005)	US	314	-	-	15	-.23	< .001
16	20	Unanue et al. (2014)	UK	958	45	20-77	9	-.28	< .001
16	21	Unanue et al. (2014)	Chile	257	35	19-71	9	-.12	.027
17	22	Watson (1998)	US	289	-	-	18	.03	.306
18	23	Watson (2003)	NZ	172	-	18+	18	-.19	.006

Note. r is correlation coefficient, and p is significance level in the original study. Sample origin indicates country of origin of the sample: NL is Netherlands, NZ is New Zealand, UK is United Kingdom, and US is United States. Dashes indicate information that was not provided. In case regression coefficients or cross-tabulations were reported, these were converted to correlations. Included studies measured materialism with an n-item version of the Richins and Dawson (1992) scale, with number indicated in the column "nr. items." Findings for Pieters (2013) are for the initial wave in a longitudinal study, in which age effects were analyzed cross-sectionally. A squared age term was positive and significant in that study ($p < .001$).

Both lay beliefs and a meta-analysis of prior research suggest a significant effect of age on materialism which is deemed to monotonically decrease from a high during adolescence. However, the inclusion of age as a linear control variable in prior research precludes the possibilities of potential quadratic or cubic effects of age on materialism. In addition, cross-sectional research precludes identifying age effects independent of period and birth cohort effects. The main study, which is described next, examines such potential non-linear effects of age on materialism, and uses longitudinal data to disentangle age effects on materialism from period and birth cohort effects.

Study 2: Age, Period and Birth Cohort Effects

Longitudinal Data

The data for the study were obtained from the online consumer panel maintained by CentERdata of Tilburg University. The panel is based on a national probability sample representative of the population in the Netherlands over 16 years. All data collected in the panel including those for the current database are available for academic research purposes (http://www.centerdata.nl/en/databank/centerpanel-data-0). Materialism was assessed in eight annual data collection waves from 2005 to 2013, except in 2006, always in December. All available panel members were sampled in each wave, irrespective of whether they had been sampled and/or had responded in a previous wave. Panel drop-outs were replaced to retain representativeness, and the panel size as a whole was enlarged in 2012. The number of people participating in at least one of the waves was 4,297. Samples sizes were 2,219 in wave 1 (response 77%), 1,646 in wave 2 (78%), 1,599 in wave 3 (71%), 1,454 in wave 4 (75%), 1,729 in wave 5 (75%), 1,810 in wave 6 (79%), 2,232 in wave 7 (81%), and 2,012 in wave 8 (89%). To maximize statistical power and minimize validity threats, all available data were

used in the analyses. The smallest percentage of data present for any two waves (coverage) was 20% ($N = 861$) for the combination of the waves in 2007 and 2013.

A previous study (Pieters 2013) made use of the first five waves of the current database and a limited set of measures to address a different question. It used age only as a control variable in a cross-sectional rather than lifespan analysis, and did not separately identify age, birth cohort, and time period effects.

Measures

Age, cohort, and period measures. Age was measured by years since birth. The average age of participants in the first measurement wave was 43 years ($SD = 17.5$, min = 16, max = 90). Across the waves on average 12% of the participants were over 65 years, 24% were between 51 and 65 years, 25% were between 36 and 50 years, 30% were between 21 and 35 years, and 10% were between 16 and 20 years.

In addition, 13 birth cohorts were defined based on birth years, all with a five year interval except the oldest birth cohort which spans fifteen years because of the small number of people in this group (Yang 2007, 2008; Zheng, Yang, and Land 2011). Cohort sizes based on people who participated at least once in a measurement wave were, respectively, 114 for cohort 1 (1915-1929), 187 for cohort 2 (1930-1934), 263 for cohort 3 (1935-1939), 317 for cohort 4 (1940-1944), 471 for cohort 5 (1945-1949), 357 for cohort 6 (1950-1954), 432 for cohort 7 (1955-1959), 393 for cohort 8 (1960-1964), 374 for cohort 9 (1965-1969), 514 for cohort 10 (1970-1974), 524 for cohort 11 (1975-1979), 368 for cohort 12 (1980-1984), and 497 for cohort 13 (1985-1989).

During the measurement period (2005-2013) of the study, a global economic downturn took place. It started in December 2007 in the U.S. with a housing and financial crisis (Isidore 2008), and spread to the rest of the economy and to other countries by the end

of 2008. The Netherlands experienced an economic downturn after 2008, with the unemployment rate in June 2013 being at its highest level since the crisis of the 1980s (Van den Dool 2013). To capture the economic downturn, a period dummy variable indicates whether measurement took place before or during the economic downturn (1 = 2005 to 2008, and 0 = 2009 to 2013).

Additional socio-demographic information. Forty percent of the participants were female (coded 1, male = 0). Average educational level was 2.6 (range 1-5, with 1 primary school and 5 university degree), and average net monthly income was 1,585 Euros (SD = 3,120). In the analyses, the natural logarithm of net monthly income divided by 1,000 ($\ln[(\text{income}+1)/1,000)]$) was used to reduce skewness and align the scale with other variables. Work status of participants was as follows: 5% were student, 52% were employed, and 24% were retired, and the rest were not officially employed (homemaker, in-between jobs). Of the participants, 78% on average were engaged in a long-term committed relationship, and there were on average 0.78 children under 16 years of age per household.

Material values. Materialism was assessed with the 18-item Material Values Scale (MVS, Richins and Dawson 1992). The MVS distinguishes three subtypes or dimensions in materialism: acquisition centrality, possession-defined success, and acquisition as the pursuit of happiness. Acquisition centrality is the centrality, or importance, of material possessions and their acquisition in one's life. The MVS subscale for it contains seven items including "Buying things gives me lots of pleasure," "I like a lot of luxury in my life," and "I enjoy spending money on things that aren't practical." Possession-defined success is the value that material possessions have when determining how well one is doing in life. This dimension involves a social comparison between oneself and others using material possessions as a yardstick. The MVS subscale for it contains six items, including "I admire people who own expensive homes, cars and clothes," "I like to own things that impress people," and "The

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things I own say a lot about how well I'm doing in life." Acquisition as the pursuit of happiness is the value that material possessions have as means to improving one's happiness. This dimension involves a temporal comparison between a suboptimal present and a better future with more or nicer possessions, and as such taps an experienced deficit in material possessions. The MVS subscale to measure it contains 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 for the items range from 1 (*completely disagree*) to 5 (*completely agree*). After reverse scoring negatively worded items, the scores were averaged to form measures of, respectively, overall materialism (across all 18 items), acquisition centrality, possession-defined success, and acquisition as happiness. Higher scores reflect higher levels of materialism. Our study examines the lifespan trajectory of overall materialism and the three materialism dimensions. Internal consistency of the measures was established using the method described by Geldhof, Preacher, and Zyphur (2014), which corrects for non-independence due to repeated sampling of the same individuals. Internal consistency was .91 for overall materialism, .86 for acquisition centrality, .82 for possession-defined success and .93 for acquisition as the pursuit of happiness. Table 2.2 provides summary information, aggregated across the eight waves.

Materialistic and non-materialistic desires. To gain further insight into the broader set of materialistic and non-materialistic beliefs and values (Dittmar et al. 2014), CentERdata panel provided information on a nomothetic-ideographic measure of people's personal desires, that was available for the years 2005, and 2008-2012 (six waves). Like the MVS, the personal desires measure was assessed in December, but in different weeks to minimize common method and measurement bias (MVS in 1st and 2nd week, personal desires in 3rd and

4th week). Therefore, the numbers of participants and response rates differ somewhat between the measures. The number of people participating in at least one of the waves was 4,180. Samples sizes for personal desires were 2,219 in wave 1 (response 77%), 1,587 in wave 2 (71%), 1,775 in wave 3 (92%), 1,996 in wave 4 (87%), 2,038 in wave 5 (89%), and 2,546 in wave 6 (93%).

The personal desires measure aimed to tap more concrete materialistic and non-materialistic desires than the more abstract material values captured by the MVS, but it is necessarily incomplete as other categorizations are (Grouzet et al. 2005; Wrosch et al. 2000). For instance, desires relating to religion, safety, and appearance were not included because very few people mentioned those. The nomothetic part asked participants to select up to two desires from a predefined list of 12. This forced-choice part reflects the idea that people cannot act on all their desires but must choose among them (Gollwitzer 1990; Heckhausen et al. 2010). The ideographic part asked participants to indicate in their own words any additional desire not on the list. This allows inclusion of top-of-mind desires that would dominate responses if they would be listed (such as health).

Because data collection took place in December, and to stimulate a broader focus than daily wants and desires, such as for food and sleep (Hofmann et al. 2012) but a narrower focus than personal life longings, such as for peace and harmony (Scheibe et al. 2011), the task was labelled as "New Year's Wishes." The introduction read: "Everyone has certain personal wishes for the new year. Below is a list of 12 possible wishes. Please indicate from this list the two most important ones that you would want to see fulfilled for yourself in the upcoming year."

Table 2.2

Summary of Age, Material Values, and Desires, Aggregated across the Eight Measurement Waves

Construct	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
								Correlations							
1 Age	44.64	17.18	1.00												
2 Age-squared	--	--	.55	1.00											
Material values:															
3 Overall materialism	2.46	.46	-.25	-.03	1.00										
4 Acquisition centrality	2.69	.56	-.28	-.11	.79	1.00									
5 Possession-defined success	2.39	.57	-.07	.11	.78	.40	1.00								
6 Acquisition as pursuit of happiness	2.23	.68	-.23	-.05	.77	.38	.46	1.00							
Materialistic and non-material desires:															
7 Money	.79	.41	.12	.03	.07	.03	.03	.11	1.00						
8 Achievement	.31	.46	-.30	-.14	.08	.08	.05	.08	-.22	1.00					
9 Affiliation	.24	.43	-.01	.03	-.02	-.01	-.02	-.01	-.28	-.12	1.00				
10 Personal growth	.33	.47	.04	.03	-.09	-.05	-.04	-.12	-.35	-.22	-.09	1.00			
11 Health	.51	.50	.26	.11	-.09	-.06	-.05	-.09	.13	-.17	-.14	-.01	1.00		
12 Altruism	.04	.20	.09	.07	-.08	-.07	-.05	-.06	-.03	-.04	-.03	.03	-.05	1.00	
13 Happiness	.05	.22	-.06	-.04	.01	.02	-.01	.00	-.03	.00	-.01	.00	-.23	-.21	1.00

Note. Overall materialism, acquisition centrality, possession-defined success, and acquisition as the pursuit of happiness are on 5-point scales from 1 (lowest) to 5 (highest). Mean age is the mean age of all participants in 2005. In the analyses age is "mean centered and divided by 10" to have a manageable scale and meaningful intercept. Desires (constructs 7-13) are proportions based on all available data from six waves ($N = 4,180$). Means and correlations between age, age-squared, materialism and its dimensions are based on all available data from eight waves ($N = 4,297$). All correlations larger than .02 in absolute value were significant at $p < .01$.

The list followed the desires and goals literatures (Grouzet et al. 2005; Kasser and Ryan 1996; King and Broyles 1997; Novacek and Lazarus 1990), and included four desires for financial success, from now onwards labeled *money*, namely no financial worries and debts, win a large sum of money, receive an inheritance, and sell my business or house; four desires for *achievement*, namely start my own business, improve my position at work, own my own house, and succeed in life; one desire for *affiliation*, namely (re-)gain love; and three desires for *personal growth* namely no longer envy others, ban jealousy around me, and gain more self-confidence. The four categories include two more extrinsic, materialistic (money and achievement), and two more intrinsic, socio-emotive (affiliation and personal growth) desires (Grouzet et al. 2005; Kasser and Ryan 1993). For each category, a binary variable was created to indicate whether a participant selected it (1), or not (0).

After the choice task, participants could indicate any "other wishes they might have for the coming year," in their own words. Across all six waves, there were 7,017 unique responses. Based on inspection of a subset of the data and the goals and desires literature (e.g. Grouzet et al. 2005; Novacek and Lazarus 1990), three additional desire categories were added to the four categories from the choice task, namely *health*, *altruism*, and *happiness*. Participants' responses were content analyzed into one of the categories or "other" by five trained coders working independently, and were assigned to a particular desire category by majority vote. This led to seven desire categories that participants could score on (yes/no): money, achievement, affiliation, personal growth, health, altruism, and happiness.

Table 2.3 summarizes responses in each of the seven desire categories, as well as "other" and "no additional desires." Percentages add up to over 100, because participants could indicate multiple desires (across measurement waves $M = 2.1$, $SD = 0.83$). In all six waves, money was the most frequently indicated desire (ranging from 75% in 2005 to 81% in 2012), and the second most frequently indicated desire was health (ranging from 47% in 2005

to 55% in 2011). The high percentages of the desire for good health, which was not on the predefined list, attests to its top-of-mind character and supports the usefulness of the mixed-mode task.

Table 2.3

Frequencies of 'End of Year' Desires in the Six Measurement Waves

Categories of desires	2005 (N = 2,209)		2008 (N = 1,587)		2009 (N = 1,775)		2010 (N = 1,996)		2011 (N = 2,038)		2012 (N = 2,546)	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Money	1,662	75	1,263	80	1,407	79	1,556	78	1,644	81	2,069	81
Achievement	696	32	497	30	541	31	596	30	564	28	873	34
Affiliation	628	28	370	23	415	23	468	23	435	21	575	23
Personal growth	859	39	527	33	567	32	667	33	599	29	806	32
Health	986	45	753	47	906	51	1,028	52	1,126	55	1,345	53
Altruism	125	6	59	4	72	4	73	4	75	4	119	5
Happiness	131	6	94	6	102	6	89	5	81	4	112	4
Other	37	< 0.1	37	< 0.1	29	< 0.1	40	< 0.1	38	< 0.1	52	< 0.1
None	698	32	485	31	477	27	503	25	492	24	506	20

Note. 'Freq.' is Frequencies. The desire categories included the following specific pre-coded desire responses in the questionnaires: money: "no financial worries and debts," "win a large sum of money," and "receive an inheritance," achievement: "start my own business," "improve my position at work," "own my own house," "succeed in life," affiliation: "(re-)gain love," personal growth: "no longer envy others," "ban jealousy around me," "gain more self-confidence." These pre-coded responses were supplemented with people's responses to an open-ended question by means of content analysis. Altruism, health and happiness did not have pre-coded desire responses and were added based on people's responses to the open-ended question. Responses in 'other' did not fit in any of the seven categories. 'None' are people who indicated no 'additional desire.'

Multilevel Latent Growth Model

We estimated (multivariate) multilevel latent growth models (MLGMs) to describe the development of materialistic values and desires across the lifespan. Our models are multivariate to simultaneously estimate multiple latent growth curves, such as for the three materialism dimensions, and for the materialistic and non-materialistic desires. Our models are multilevel because this holds two important benefits vis-à-vis single level models when

estimating latent growth curves (Bollen and Curran 2006). First, multilevel models make it possible to capture mean-level change in materialism over time as a function of two time-varying factors—age and period—rather than one factor as in single-level models. Moreover, the multilevel framework accommodates the estimation of Age × Period interactions and the influence of covariates (Yang and Land 2013). Second, in multilevel models participants can be readily included in different measurement waves, without having to treat absence in a particular wave as missing data (Hertzog and Nesselroade 2003; Miyazaki and Raudenbush 2000). This is crucial in our data and in most longitudinal designs because people may drop-out before the final wave (e.g., due to mortality), may enter the panel in a later wave when not meeting inclusion criteria before (e.g., when being too young) or when being late refreshments for dropouts, and people may skip a wave due to temporary unavailability. Our model is a two-level model with age effects, period effects, and their interactions at level-1, and birth cohort effects at level-2.

The level-1 model for a particular construct (g = 1 to G) over time (t = 1 to T) for a person (i = 1 to I) is:

$$y_{it}^g = \eta_{0i}^g + \eta_{1i}^g Age_{it} + \eta_{2i}^g Age_{it}^2 + \eta_{3i}^g P_t + \beta_1^g Age_{it} \times P_t + \beta_2^g Age_{it}^2 \times P_t + \varepsilon_{it}^g. \tag{1}$$

Here, y_{it}^g is the observed score of person i at measurement time (wave) t on construct g. The η_{0i}^g parameter captures the intercept that can vary across people. Age_{it} is the observed mean centered age of person i at measurement time t, and Age_{it}^2 is the squared mean centered age of person i at measurement t. Mean centering of age reduces collinearity between the linear and quadratic age effects, and locates the intercept at the observed mean age of people rather than at the unobserved age of 0 years. The linear and quadratic effects of age on materialism are captured by η_{1i}^g and η_{2i}^g respectively. The quadratic term is included because

the trajectory of materialism may be non-linear. If materialism increases from middle to late

adulthood the parameter for the quadratic age effect will be positive and significant. P_t is a

time period dummy variable indicating measurement before (1 = until 2008) and during the

economic downturn (0 = after 2008). The parameter η_{3i}^g captures the period effect, which is a

change in materialism due to the economic downturn. $Age_{it} \times P_t$ and $Age_{it}^2 \times P_t$ are two

interaction variables between age and time period. The β_{1-2}^g parameters capture these age-by-

time period interaction effects. In this way, the model allows for potentially differential

effects of the economic downturn on materialistic values and desires of people at different

ages. Finally, ε_{it}^g is the error term of person i on construct g at measurement time t, assumed

to be normally distributed.

The level-1 model thus describes within-person change over time in materialism as a

function of an intercept and two time-varying factors, namely age and period, which are

allowed to vary across individuals (random-intercepts and slopes). Using a single dummy

variable for time period reduces the collinearity between age and period. The economic

downturn is an exogenous shock that enables us to separately identify age and period effects.

A similar approach has been employed to disentangle, for instance, age and test-retest effects

on cognitive abilities (Ferrer et al. 2004).

The individual growth parameters of the level-1 model (η_{ki}^g, $k = 0$ to 3) become

outcome variables in the level-2 model. The level-2 model is as follows:

$$\eta_{ki}^g = \gamma_{k0}^g + \gamma_{k1}^g Edu_i + \gamma_{k2}^g Gender_i + \gamma_{k3}^g \ln Income_{it} + \gamma_{k4}^g HHkids_{it} + \gamma_{k5}^g Partner_{it} + \gamma_{k6}^g Student_{it} +$$
$$\gamma_{k7}^g Employed_{it} + \gamma_{k8}^g Retired_{it} + a\gamma_{kj}^g \sum_{j=9}^{21} Cohort_{ji} + \xi_{ki},$$

(2)

with $a = 1$ if $k = 0$ and $a = 0$ if $k > 0$.

The level-2 model captures birth cohort as a fixed effect predictor of the intercept (η_{0i}^g), by means of 12 dummy variables for 13 cohorts, the first birth cohort being the benchmark (Bollen and Curran 2006). Thus, the model allows the means of the intercepts for the constructs g to differ between birth cohorts. In this way, it examines whether people from one birth cohort differ from the benchmark cohort in their levels of materialism across the lifespan. Birth cohorts of five year intervals were chosen to have sufficiently large group sizes (Yang 2007, 2008; Zheng et al. 2011). This ensures adequate overlap in the observed ages between cohorts (Roberts and Bengtson 1999) and precise group-dependent parameters (Snijders and Bosker 1999). The model assumes a common growth curve across all birth cohorts, and estimates differences in the intercepts (or positions) of the curves, compared to the benchmark cohort. The nine year time span of our study does not allow identification of Age × Cohort interaction effects, which would reflect differences in mean-level change across the lifespan between birth cohorts. To reliably estimate those, one would need data for multiple cohorts over their complete lifespan.

Finally, the covariates gender, education, three dummies for employment status, income, number of children in the household, and partner, enter in the level-2 equation for the intercept (η_{0i}^g), and can influence the growth parameters for age and time period η_{ki}^g (k = 1 to 3). This allows lifespan trajectories of materialism, or changes in materialism due to the economic downturn, to differ between people based on differences on key socio-demographic variables.

Three models were estimated, namely a univariate MLGM for overall materialism, a multivariate MLGM for the trajectories of the three materialism dimensions, and a generalized multivariate MLGM for the trajectories of the seven desire categories. The latter model uses a Probit formulation to accommodate the fact that desire responses were binary: 1

= selected, 0 = not selected. A three-step estimation procedure was used in all cases. First, a

baseline model was estimated (M1: equation 1 without the period and interaction effects),

then period and cohort effects were added (M2), and finally the effects of covariates were

included in the full model (M3). In this way, the influence of birth cohort, time period, and

socio-demographic factors on the lifespan trajectories of materialism can be gauged. To

accommodate the data and model structure, a hierarchical Bayesian (MCMC) estimation

approach was used with the Gibbs sampler in Mplus 7.2 (Muthén and Muthén 1998-2012).

Models were estimated with 100,000 draws, with 50% burn-in. Model convergence was

assessed from the potential scale reduction (PSR) being below 1.1 (Gelman et al. 2004). All

models converged well before the burn-in period. One-tailed Bayesian *p*-values of estimates

are reported. For a positive estimate, the *p*-value is the proportion of the posterior distribution

that is below zero. For a negative estimate, the *p*-value is the proportion of the posterior

distribution that is above zero (Muthén 2010). Appendix A contains the Mplus code for the

univariate MLGM for overall materialism.

Results

Figure 2.1 displays the observed raw data on materialism and its three dimensions for

different ages (aggregated across waves). In line with our predictions, materialism was high

in young adulthood and decreased to middle adulthood. Yet, a slight increase in materialism

from middle to late adulthood was also clearly discernible, in support of our speculation.

Table 2.4 summarizes the estimated age effects for overall materialism, the three materialism

dimensions, and the desires. The baseline model (M1) revealed a significant curvilinear

relationship between age and overall materialism and between age and the three materialism

dimensions (all linear and quadratic effects significant at *p* < .001). Higher-order polynomials

did not describe the lifespan trajectories better: cubic terms in a model which included the

linear and quadratic effects were insignificant. Adding cohort and period effects (M2) did not

affect the estimates for overall materialism considerably. Yet, age effects on acquisition

centrality became insignificant and the quadratic effect for acquisition as the pursuit of

happiness remained only marginally significant. In the full model (M3), which controlled for

other socio-demographic characteristics, linear and quadratic age effects on overall

materialism, acquisition centrality and possession-defined success surfaced, but age effects

on acquisition as the pursuit of happiness became insignificant. This demonstrates the

importance of controlling for period and cohort effects, and for socio-demographic

characteristics when aiming to identify age effects. Results for the full model (M3) are

discussed in more detail.

Figure 2.1

Observed Trajectories of Overall Materialism and its Three Core Dimensions across

the Lifespan
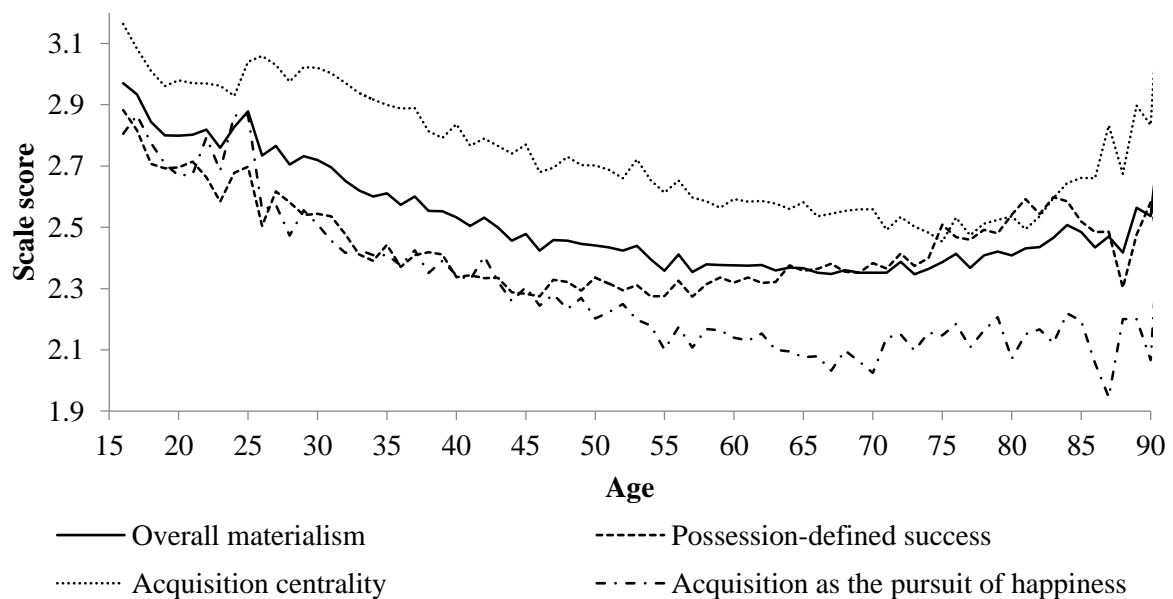
Note. The trajectories are based on the average levels of materialism and its three dimensions for each age in the raw data. $N = 4,297$.

Table 2.4

Age Effects on Materialism (M1), While Controlling for Period and Cohort Effects (M2),

and for Socio-demographic Covariates (M3)

		M1		M2		M3	
		Estimate	p	Estimate	p	Estimate	p
Material values:							
Overall materialism	Intercept	2.50	<.001	2.41	<.001	2.40	<.001
	Age linear	-0.10	<.001	-0.07	<.001	-0.05	.014
	Age squared	0.02	<.001	0.02	<.001	0.02	<.001
Acquisition centrality	Intercept	2.76	<.001	2.55	<.001	2.60	<.001
	Age linear	-0.10	<.001	-0.03	.132	-0.06	.008
	Age squared	0.01	<.001	0.01	.093	0.03	<.001
Possession-defined success	Intercept	2.36	<.001	2.31	<.001	2.37	<.001
	Age linear	-0.07	<.001	-0.10	<.001	-0.17	<.001
	Age squared	0.03	<.001	0.04	<.001	0.04	<.001
Acquisition as the pursuit of happiness	Intercept	2.30	<.001	2.22	<.001	2.21	<.001
	Age linear	-0.12	<.001	-0.05	.022	0.05	.154
	Age squared	0.02	<.001	0.01	.061	-0.01	.140
Materialistic and non-materialistic desires:							
Money	Intercept	1.29	<.001	-0.09	.426	0.17	.376
	Age linear	0.28	<.001	0.56	<.001	0.49	.015
	Age squared	0.01	.256	0.06	.060	0.06	.134
Achievement	Intercept	-0.41	<.001	-0.24	.290	-0.87	.038
	Age linear	-0.38	<.001	-0.28	<.001	-0.11	.200
	Age squared	-0.03	.001	-0.07	.009	-0.08	.018
Affiliation	Intercept	-1.24	<.001	0.07	.434	0.39	.199
	Age linear	-0.08	<.001	-0.16	.048	-0.39	.004
	Age squared	0.03	.012	-0.07	.006	-0.01	.368
Personal growth	Intercept	-0.76	<.001	-0.05	.452	-0.19	.337
	Age linear	0.06	.005	-0.18	.040	-0.06	.329
	Age squared	0.00	.380	0.00	.467	-0.03	.274
Health	Intercept	-0.19	<.001	-0.24	.276	-0.66	.061
	Age linear	0.35	<.001	0.68	<.001	0.79	<.001
	Age squared	-0.01	.064	-0.07	.002	-0.15	<.001
Altruism	Intercept	-2.24	<.001	-1.50	<.001	-1.31	.012
	Age linear	0.30	<.001	0.30	.018	0.08	.385
	Age squared	-0.15	<.001	-0.25	<.001	-0.12	.063
Happiness	Intercept	-1.80	<.001	-1.62	<.001	-1.98	<.001
	Age linear	-0.12	.007	-0.43	<.001	-0.14	.267
	Age squared	-0.14	<.001	-0.09	.008	-0.14	.005

Note. M1 includes only (linear and quadratic) age effects. M2 adds period and cohort effects and age × period interactions. M3 is the full model including the effects of age, period, cohort, age × period, and the covariates gender, net monthly income, education level, relationship status, employment status, and number of children in the household. Intercept represents the average predicted value at the mean age for the baseline cohort (cohort 1). P-values are one-tailed based on the posterior distribution.

Age Effects

Material values and three dimensions. Table 2.5 summarizes the results for the full models (M3: including period and cohort effects and other socio-demographic characteristics) for overall materialism and the three materialism dimensions. Importantly and in line with people's lay beliefs (Study 1a) and the results from the meta-analysis (Study 1b), the linear effect was negative and significant for overall materialism ($p = .014$), acquisition centrality ($p = .008$), and possession-defined success ($p < .001$). Yet in contrast to people's lay beliefs (Study 1a) and to what prior studies could detect (Study 1b), age had a significant and positive quadratic effect on overall materialism, acquisition centrality and possession-defined success (all ps $< .001$). Jointly, this shows that materialism decreased overall from young to older age (negative linear effect) but increased towards the end again (positive quadratic effect) in this sample. Acquisition centrality decreased from young adulthood to middle adulthood and reached a minimum at about 55 years ($d = - 0.75$; d represents the standardized mean difference), and then increased again from middle adulthood to old age ($d = 0.63$). The decrease in possession-defined success from young to middle adulthood was stronger and also continued somewhat longer; here the minimum was reached at about 63 years ($d = -1.70$), just before the retirement age of 65. From age 63, possession-defined success increased again into old age ($d = 0.56$). In contrast to the centrality and success dimensions, age effects on acquisition as the pursuit of happiness were not significant. Jointly, the trajectories of the three materialism dimensions revealed a U-shaped relationship between age and overall materialism. Overall materialism decreased from young to middle adulthood with a minimum at about 56 years ($d = - 0.60$), and then slightly increased again from middle to late adulthood ($d = 0.42$). Figure 2.2 presents the model-estimated trajectories of overall materialism and the three dimensions.

Table 2.5

Age, Period and Cohort Effects on Material Values (M3)

| | | | | Materialism dimensions | | | | | | | | |
| Parameter | Overall materialism | | | Acquisition centrality | | | Possession-defined success | | | Acquisition as the pursuit of happiness | | |
	Est.	*SD*	*p*	Est.	*SD*	*p*	Est.	*SD*	*p*	Est.	*SD*	*p*
Baseline cohort 1: 1915-1929	2.40	0.08	<.001	2.60	0.10	<.001	2.37	0.10	<.001	2.21	0.13	<.001
Age	-0.05	0.02	.014	-0.06	0.03	.008	-0.17	0.03	<.001	0.05	0.04	.154
Age squared	0.02	0.01	<.001	0.03	0.01	<.001	0.04	0.01	<.001	-0.01	0.01	.140
Cohort effects:												
Cohort 2: 1930-1934	-0.01	0.05	.414	-0.07	0.06	.128	0.14	0.06	.010	-0.05	0.07	.234
Cohort 3: 1935-1939	0.00	0.05	.493	-0.03	0.07	.318	0.13	0.07	.023	-0.05	0.08	.273
Cohort 4: 1940-1944	0.02	0.06	.385	0.03	0.07	.366	0.17	0.08	.014	-0.10	0.09	.141
Cohort 5: 1945-1949	0.01	0.06	.422	0.02	0.08	.386	0.16	0.08	.027	-0.10	0.10	.161
Cohort 6: 1950-1954	-0.01	0.07	.426	0.04	0.09	.354	0.09	0.09	.162	-0.14	0.12	.117
Cohort 7: 1955-1959	-0.02	0.07	.411	0.09	0.10	.187	0.06	0.10	.253	-0.18	0.13	.069
Cohort 8: 1960-1964	0.05	0.08	.251	0.16	0.10	.057	0.09	0.11	.199	-0.06	0.14	.325
Cohort 9: 1965-1969	0.01	0.08	.457	0.15	0.11	.079	-0.03	0.11	.393	-0.08	0.14	.291
Cohort 10: 1970-1974	0.09	0.08	.139	0.24	0.11	.015	0.01	0.11	.483	0.02	0.15	.436
Cohort 11: 1975-1979	0.10	0.08	.136	0.21	0.11	.031	-0.05	0.12	.331	0.13	0.15	.204
Cohort 12: 1980-1984	0.14	0.09	.064	0.25	0.12	.018	-0.02	0.12	.426	0.22	0.16	.097
Cohort 13: 1985-1989	0.17	0.10	.035	0.28	0.13	.011	-0.03	0.14	.405	0.29	0.18	.058
Period effect	0.01	0.01	.192	0.01	0.01	.355	-0.02	0.02	.062	0.04	0.02	.039
Age × Period interaction	0.01	0.01	.067	0.02	0.01	.016	0.02	0.01	.028	-0.00	0.01	.428
Age^2 × Period interaction	-0.00	0.00	.094	-0.01	0.00	.050	0.00	0.00	.268	-0.01	0.01	.089

Note. P-values are one-tailed based on the posterior distribution. Estimates for the covariates are in appendix B, table B1.

Figure 2.2

Estimated Trajectories of Materialism and its Three Dimensions across the Lifespan
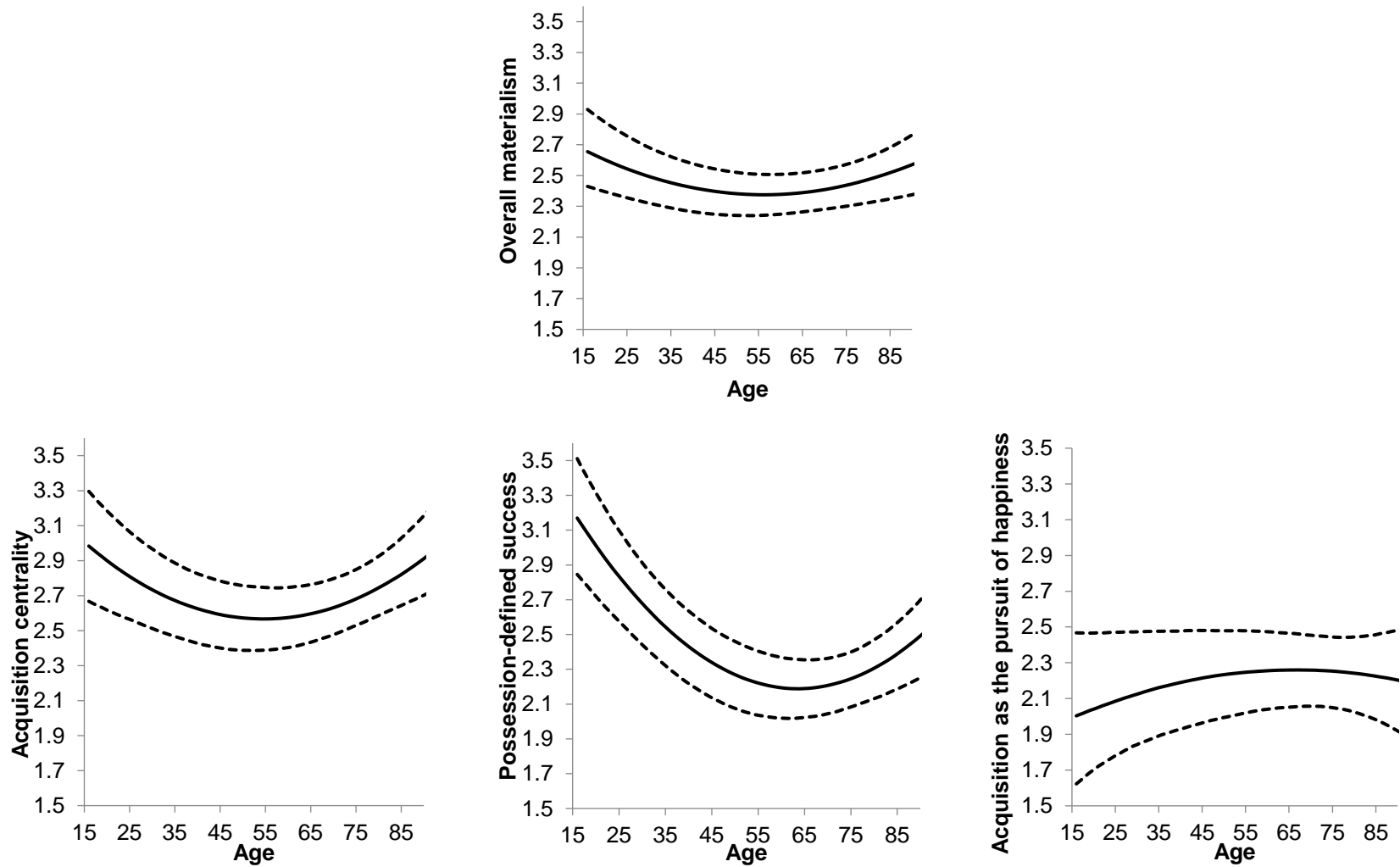
Note. Solid lines represent mean trajectories, and dashed lines represent 95% credible intervals.

To examine if the lifespan trajectories of acquisition centrality, possession-defined success and overall materialism are truly U-shaped, we used the Lind and Mehlum (2010) approach. For the presence of a U-shape, the quadratic coefficient should be significant and positive. This condition held for all three trajectories, and is necessary but not sufficient. In addition, the slope at the minimum (maximum) should be negative (positive) and significantly different from zero. These conditions held too. The Sasabuchi (1980) t-test indicated that the slope of overall materialism at the left extreme point was significantly negative (-0.14, $p < .001$), whereas the slope at the right extreme point was significantly positive (0.11, $p < .001$). The slope of acquisition centrality at the left extreme point was significantly negative (-0.22, $p < .001$), whereas the slope at the right extreme point was significantly positive (0.20, $p < .001$). Similarly, the slope of possession-defined success at the left extreme point was significantly negative (-0.41, $p < .001$), whereas the slope at the right extreme point was significantly positive (0.24, $p < .001$). These results confirm the characteristics of a U-shape. Birth cohort and period effects are described later. Results for socio-demographic variables are in Appendix B.

Materialistic and non-materialistic desires. Table 2.6 reports the model estimates for materialistic and non-materialistic desires. Figure 2.3 plots the results. The results complement those for materialism as measured by the MVS. Three results stand out: money, affiliation, and health desires. Consistent with the increase in overall materialism, acquisition centrality and possession-defined success in late adulthood, desires for money also increased from young to old age ($d = 1.95$), although the magnitude of the increase was unanticipated (Figure 3). The increase was not due to falling income at older ages, because income was controlled for in the analysis. The trajectory for affiliation desires showed almost the complete opposite pattern. Affiliation desires were highest during young adulthood and consistently dropped from there onwards, reaching a low at old age ($d = -2.03$). These results

were not due to changes in job or family status because these were controlled for. Finally, health-related desires increased with age up to a maximum attained at about 70 years ($d = 1.25$), after which they decreased again somewhat ($d = -0.48$). The increase in money desires jointly with desires of a good health when people become older was also reflected in the positive correlation between the two (.13, $p < .001$). The other desires were less dominant and changed less strongly across the lifespan. The importance of affiliation at a younger age and of physical health at later age seems fundamental and is consistent with earlier work (e.g., Grouzet et al. 2005; Wrosch et al. 2000). The increasing importance of money over the lifespan is new.

Taken together, the importance of acquisition-centrality, possession-defined success and affiliation desires during adolescence and early adulthood and the importance of acquisition-centrality, possession-defined success, money and health desires during late adulthood are striking. They paint a different picture than the uniform downward slope in materialism across the lifespan expressed in people's lay beliefs and as assumed in prior materialism research.

Birth Cohort and Time Period Effects

Independent of the age effects, birth cohort effects emerged for the acquisition-centrality and possession-define success dimensions, but not for acquisition as the pursuit of happiness (Table 2.5). Younger cohorts scored somewhat higher on acquisition centrality (in particular cohorts born after 1969). Yet, older cohorts scored somewhat higher on the possession-defined success dimension (in particular cohorts born before 1950). Cohort effects were also found for affiliation and in particular for money desires (Table 2.6). Consistent with Twenge and Kasser (2013) and Twenge, Campbell, and Freeman (2012), recent birth cohorts were more likely to express money desires (in particular cohorts born after 1959) and

less likely to express affiliation desires (in particular cohorts born after 1949) than older cohorts were. A follow-up analysis showed that a linear trend of birth cohort was significant and positive for money desires (0.39, $p < .001$), and negative for affiliation desires (-0.57, $p < .001$). This demonstrates that, counter to common belief and our own speculations, younger birth cohorts are not universally more materialistic than older birth cohorts are, at least in the current sample. To younger birth cohorts, acquisition centrality and money were more important, but possession-defined success was less important than it is for older birth cohorts, and acquisition as the pursuit of happiness and overall materialism were equally important. This supports the importance of taking a broader perspective on materialism.

The economic downturn also influenced material values (MVS) and desires. Acquisition as the pursuit of happiness was somewhat lower during and after the economic downturn (0.04, $p = .039$; Table 2.5)[2], as well as desires for money (0.21, $p = .049$, Table 2.6) and for personal growth (0.21, $p = .009$). In contrast, desires for achievement were higher during and after the economic downturn as compared to before (-0.22, $p = .007$). There also were significant Age × Period interaction effects. Younger adults, who were threatened more by the economic downturn (e.g. due to lower wages and higher unemployment rates), were somewhat higher on acquisition centrality (0.02, $p = .016$) and possession-defined success (0.02, $p = .028$) during and after the economic downturn.

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[2] A different way of coding the period dummy is to code every year in which there were at least two successive quarters of negative change in GDP as a recession year (period dummy = 1, and 0 otherwise). Using the alternative coding, we found a significant period effect on overall materialism such that during the recession consumers were on average less overall materialistic (-.013, $p = .026$). Acquisition as the pursuit of happiness was also significantly influenced by the recession (-.061, $p < .001$). In addition, there was a significant interaction effect of age × period (.033, $p = .006$) on acquisition as the pursuit of happiness such that younger people on average scored lower and older people on average scored higher on this materialism dimension in economic downturns. The economic downturn did not have significant effects on acquisition centrality or possession-defined success.

Table 2.6

Age, Period and Cohort Effects on Materialistic and Non-Materialistic Desires

Parameter	Money			Achievement			Affiliation			Personal growth		
	Estimate	*SD*	*p*	Estimate	*SD*	*p*	Estimate	*SD*	*p*	Estimate	*SD*	*p*
Baseline cohort 1: 1915-1929	0.17	0.54	.376	-0.87	0.48	.038	0.39	0.47	.199	-0.19	0.46	.337
Age	0.49	0.20	.015	-0.11	0.13	.200	-0.39	0.16	.004	-0.06	0.16	.329
Age squared	0.06	0.05	.134	-0.08	0.04	.018	-0.01	0.04	.368	-0.03	0.04	.274
Cohort effects												
Cohort 2: 1930-1934	0.36	0.39	.180	0.02	0.32	.475	0.02	0.31	.480	-0.33	0.30	.131
Cohort 3: 1935-1939	0.36	0.40	.183	-0.05	0.33	.437	-0.40	0.33	.111	-0.25	0.32	.215
Cohort 4: 1940-1944	0.35	0.43	.210	0.08	0.37	.411	-0.44	0.36	.114	-0.27	0.35	.224
Cohort 5: 1945-1949	0.67	0.46	.076	0.15	0.40	.354	-0.85	0.38	.015	-0.38	0.37	.158
Cohort 6: 1950-1954	0.52	0.48	.143	0.34	0.42	.206	-1.07	0.41	.004	-0.31	0.40	.223
Cohort 7: 1955-1959	0.82	0.50	.053	0.12	0.44	.387	-1.18	0.43	.003	-0.49	0.42	.123
Cohort 8: 1960-1964	1.36	0.52	.004	0.07	0.46	.441	-1.47	0.45	<.001	-0.62	0.45	.081
Cohort 9: 1965-1969	1.77	0.53	<.001	-0.09	0.47	.424	-1.49	0.47	.001	-0.85	0.46	.034
Cohort 10: 1970-1974	2.13	0.55	<.001	-0.30	0.48	.266	-1.30	0.49	.003	-0.96	0.48	.023
Cohort 11: 1975-1979	2.54	0.58	<.001	-0.44	0.49	.180	-1.30	0.52	.005	-0.99	0.50	.024
Cohort 12: 1980-1984	2.52	0.62	<.001	-0.15	0.51	.381	-1.08	0.56	.026	-0.98	0.54	.033
Cohort 13: 1985-1989	2.42	0.68	<.001	0.42	0.55	.220	-1.10	0.63	.040	-1.25	0.61	.019
Period effect	0.21	0.13	.049	-0.22	0.10	.007	0.11	0.11	.178	0.21	0.09	.009
Age × Period interaction	0.10	0.07	.084	-0.01	0.06	.447	-0.00	0.06	.494	-0.14	0.06	.013
Age^2 × Period interaction	-0.03	0.03	.143	0.04	0.02	.063	-0.03	0.02	.133	-0.00	0.02	.464

Note. P-values are one-tailed based on the posterior distribution. Estimates for the covariates are in the appendix B, table B2.

Table 2.6 (continued)

Parameter	Health			Altruism			Happiness		
	Estimate	SD	p	Estimate	SD	p	Estimate	SD	p
Baseline cohort 1: 1915-1929	-0.66	0.43	.061	-1.31	0.56	.012	-1.98	0.59	<.001
Age	0.79	0.14	<.001	0.08	0.26	.385	-0.14	0.20	.267
Age squared	-0.15	0.04	<.001	-0.12	0.08	.063	-0.14	0.06	.005
Cohort effects:									
Cohort 2: 1930-1934	-0.56	0.29	.024	0.48	0.44	.130	0.10	0.47	.412
Cohort 3: 1935-1939	-0.24	0.31	.215	-0.15	0.45	.373	0.34	0.46	.228
Cohort 4: 1940-1944	-0.32	0.34	.174	-0.45	0.49	.192	0.21	0.49	.331
Cohort 5: 1945-1949	-0.23	0.36	.262	-0.52	0.50	.159	0.08	0.51	.433
Cohort 6: 1950-1954	-0.21	0.38	.291	-0.56	0.51	.139	0.08	0.53	.441
Cohort 7: 1955-1959	-0.18	0.40	.323	-0.45	0.52	.199	0.04	0.55	.465
Cohort 8: 1960-1964	0.18	0.41	.333	-0.43	0.54	.210	-0.24	0.56	.334
Cohort 9: 1965-1969	0.33	0.43	.224	-0.46	0.55	.197	-0.33	0.57	.282
Cohort 10: 1970-1974	0.46	0.44	.148	-0.60	0.57	.146	-0.36	0.58	.259
Cohort 11: 1975-1979	0.62	0.45	.089	-0.78	0.64	.115	-0.39	0.59	.251
Cohort 12: 1980-1984	0.67	0.48	.082	-1.02	0.76	.093	-0.27	0.64	.330
Cohort 13: 1985-1989	0.95	0.53	.035	-1.69	0.97	.036	-1.01	0.74	.084
Period effect	0.02	0.08	.382	-0.24	0.18	.098	0.01	0.20	.474
Age × Period interaction	-0.08	0.06	.087	-0.04	0.14	.394	-0.08	0.09	.171
Age^2 × Period interaction	-0.02	0.02	.195	0.01	0.04	.427	0.02	0.04	.314

Note. P-values are one-tailed based on the posterior distribution. Estimates for the covariates are in the appendix B, table B2.

Figure 2.3

Trajectory of Materialistic and Nonmaterialistic Desires across the Lifespan
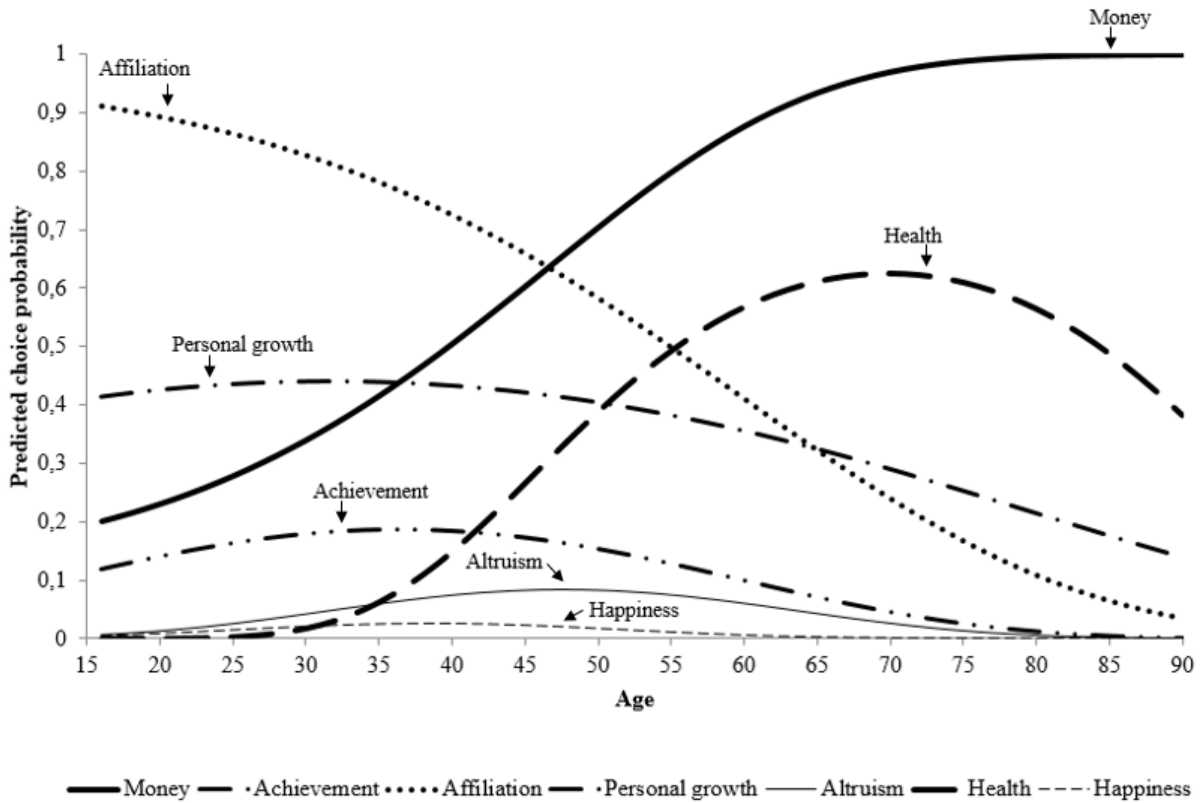
Robustness and Statistical Power

Three additional sets of analyses were performed to assess the robustness of the results to different construct operationalizations and alternative model specifications, and to assess the statistical power of testing. Perhaps our findings are due to the specific version of the MVS that was used. Although the 18-item MVS is the prime measure of materialism (Dittmar et al. 2014), some researchers prefer a reduced version 15-item scale proposed by Richins (2004), which is derived from the original 18-item scale. Out of 23 studies in our meta-analysis (Study 1b), ten used the 18-item MVS and three used the reduced 15-item MVS. To assess the robustness of the findings across different scale versions, the analyses

were repeated using the 15-item MVS. In the 15-item MVS, two items from the acquisition centrality scale, and one item from the possession-defined success scale are dropped. The results obtained with the reduced 15-item MVS were mostly consistent with those from the full 18-item MVS. The only change in results was that the linear effect of age on overall materialism remained only marginally significant (original scale -0.05, $p = .014$; reduced scale -0.04, $p = .032$), and the downward slope of acquisition centrality became insignificant at conventional levels of significance (original scale -0.06, $p = .008$; reduced scale -0.06, $p = .062$). Importantly, the quadratic terms did not change for overall materialism (0.01, $p < .001$), acquisition centrality (0.02, $p = .004$), and possession-defined success (0.05, $p = .001$), and the quadratic term for acquisition as the pursuit of happiness was not significant for both scale versions. Overall, similar lifespan trajectories were obtained with the original and reduced scale of materialism, with the latter scale revealing a somewhat stronger U-shaped pattern of materialism across the lifespan.

Although inspection of the raw data (Figure 2.1) makes this unlikely, the estimated upswing in materialism in old age could be due to a miss-specified model. To examine this issue, we tested our quadratic model against an exponential decay model. Because model fit statistics for more complex models are currently unavailable in Mplus, the baseline model (M1) was estimated and compared to an exponential decay function. In the exponential decay model, materialism decreases at a constant rate[3]. An exponential decay model would describe the data well if materialism is high in young adulthood and then decreases at a proportional rate. Testing the quadratic model against an exponential decay model thus serves as an additional test for the upswing in materialism in late adulthood. If materialism indeed

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[3] The equation for the exponential decay model is $y_{it} = \eta_{0i} \, e^{(-\eta_{1i} Age_{it})}$, where $-\eta_{1i}$ represents the constant rate of decay. We thank one of the reviewers for proposing to test the quadratic formulation against the exponential decay formulation.

increases in late adulthood, the quadratic model would outperform the exponential decay model. Indeed, although the rate of decay in the exponential decay model was negative and significant (-0.03, $p < .001$), the quadratic model outperformed the exponential decay model. Both the linear and quadratic term were significant (ps < .001), and model comparison based on the Deviance Information Criterion (DIC) showed that the quadratic model is preferred over the exponential decay model. The DIC is a Bayesian measure of model fit, penalized by model complexity (Spiegelhalter et al. 2002). Models with smaller values are preferred to models with larger values. The DIC was -7,992 for the quadratic model and -7,678 for the exponential decay model.

Perhaps some age and cohort effects on materialism did not reach statistical significance because of a low statistical power of testing for them. This might occur when small, non-zero effect sizes require larger sample sizes than were available in order to reach statistical significance. To assess the statistical power to detect age and birth cohort effects in this cohort-sequential design, Monte Carlo simulations were conducted, as proposed by Muthén and Curran (1997). The sample size was manipulated between simulations, with the coverage kept constant. Sample sizes were, respectively, (a) equal to the sample size of this study ($N = 4,297$), (b) two times ($N = 8,594$), (c) three times ($N = 12,891$), and (d) five times ($N = 21,485$) the sample size. For each of the four scenarios (a to d), 1,000 datasets were simulated based on the parameter estimates obtained in the analyses of Study 2. Then, Monte Carlo multilevel latent growth models were estimated with linear and quadratic age effects, and birth cohort effects, and the results were summarized across the 1,000 datasets for the four scenarios. The results showed that there was sufficient power in our sample to detect significant cohort effects (always > .83), except for birth cohorts 2 and 3 on possession-defined success, where power was .68 and .65, respectively. Moreover, to detect birth cohort differences as significant at the 5% level between the baseline birth cohort and birth cohorts

12 and 13 in overall materialism, with power equal to .80, the sample sizes should be at least 7,556 and 6,049 respectively. To detect significant differences between birth cohorts 10 and 11 and the baseline birth cohort, with power equal to .80, a sample size of minimally 15,000 would be needed. Power to detect age effects for overall materialism, acquisition centrality, and possession-defined success was always higher than .99. This indicates that generally power at the current sample size was sufficient to detect true non-zero age and birth cohort effects.

Discussion

The present study examined mean-level change in materialism across the lifespan in a large representative longitudinal study across nine years, with individuals between 16 and 90 years. It provided evidence against the lay belief that materialism is highest during adolescence and early adulthood, and monotonically decreases with age. Instead, it found that overall materialism was highest at young age, decreased until middle adulthood, but then increased again in late adulthood. It showed that this U-shaped trajectory of materialism across the lifespan was not due to birth cohort or time period effects, or socio-demographic characteristics that are associated with age, such as income, relationship status, and employment status, because these were controlled for. Importantly, the U-shaped trajectory of materialism across the lifespan was obtained for two of the materialism dimensions only, namely for acquisition centrality and possession-defined success. The acquisition as the pursuit of happiness dimension in materialism remained essentially stable across the lifespan. Findings about materialistic and non-materialistic desires which were measured separately from the MVS by asking respondents about their most important wishes for the next year, were consistent with the upswing of materialism in late adulthood. Whereas in particular desires for affiliation were more important in young adulthood, desires for money and health

dominated in late adulthood. The increasing importance of desires for money in late adulthood mirrored the increase in materialistic values in this life stage. The findings have implications for theory and research, and the model may have wider appeal in lifespan research.

Materialism Theory

The Material Values Scale (MVS, Richins and Dawson 1992) and the materialism theory from which it is derived capture three related but distinct dimensions in people's materialistic values: acquisition centrality, possession-defined success and acquisition as the pursuit of happiness. The overwhelming research to date has focused on overall materialism, as the aggregate of the three dimensions. That approach misses opportunities to gain deeper insights into materialism and its consequences and antecedents. The three materialism dimensions appear to be associated differently with satisfaction in various life domains (Ahuvia 2002; Ahuvia and Wong 1995; Pieters 2013; Roberts and Clement 2007). The present study found that the three dimensions also have different developmental trajectories across the lifespan. Specifically, acquisition as the pursuit of happiness was on average the least important of the three dimensions and it did not change significantly with age. In contrast, possession-defined success was highest in young adulthood but declined sharply until middle adulthood when it increased again into late adulthood, but to lower levels than initially; its trajectory mimicked the shape of a hockey stick. Acquisition centrality was highest in young and late adulthood and declined less from young to middle adulthood than possession-defined success did. These results provide strong support for the idea that "materialism may best be conceived of as a cluster of beliefs and values" (Dittmar et al. 2014), and that taking this broader perspective can lead to new insights into the various roles that material possessions and money play across the lifespan.

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The three dimensions in materialism as assessed by the MVS capture crucial but not all facets of the broad materialism construct. For instance, money desires and attitudes (Kasser and Ryan 1993, 1996) are not explicitly covered by the MVS, which is one reason why they were separately included in the present study. Other facets of materialism, such as the positive social and identity functions that possessions as stores of memories of social events and loved ones (Csikszentmihalyi and Rochberg-Halton 1981), warrant further conceptualization and measurement. That might lead to a broader and more balanced perspective on the dark and the potentially bright sides of materialism, and its consequences and antecedents.

Also, even though prior research has identified economic insecurity due to low personal income as an antecedent of increased materialistic values (Kasser 2002), the findings of the present study suggested that the economic downturn did not influence overall materialism and even led to a slight *decrease* in acquisition as the pursuit of happiness and desires for money. Our findings are in line with earlier results from a repeated cross-sectional survey among 17 and 18 year olds from the U.S. by Park, Twenge, and Greenfield (2014). These researchers found that concern for others and environmentalism increased from the prerecession period (2004-2006) to the recession period (2008-2010). This suggests that there may be important factors that influence the effect of economic insecurity on materialism, and age is one of them. Among younger adults, acquisition centrality and possession-defined success increased during the economic downturn, whereas they decreased among older adults. It might also be that the economic downturn was not deep enough to lead to an increase. Perhaps an economic downturn initially prompts a decrease in materialism and shift to more intrinsic values when the downturn is shallow, but fuels an increase in materialism when it becomes deep and critical. Future research may explore the conditions upon which financial insecurity leads to increased or decreased materialism.

Lifespan Theory

The current evidence for a U-shaped trajectory of materialism across the lifespan is consistent with the idea that individuals adapt their desires to changing opportunities and limitations across the lifespan (Heckhausen et al. 2010). Changes associated with advanced age confront people with increasing constraints and losses, forcing them to disengage from goals in the life domains of work, finances, and family, which provide less control potential in old age (Heckhausen 1997). In addition, desires that have already been fulfilled at earlier life stages or that have become unattainable are no longer relevant at older age. This may explain our finding of decreased desires for achievement and affiliation and increased desires for health and money across the lifespan.

Although the observed U-shaped trajectory of materialism goes against lay beliefs and some developmental theories that materialism monotonically decreases with age, it is surprisingly consistent with evidence about the lifespan trajectory of self-esteem, obtained from longitudinal data in the U.S. In a program of research, Orth and colleagues (Orth et al. 2012; Orth et al. 2010) found that the lifespan trajectory of self-esteem is inverted U-shaped, with the highest levels during middle adulthood and lower levels before and after that. In fact, the peak of self-esteem was around 60 years, which is the valley of materialism in the current study. Findings that materialism is, at least partly, a coping response to lowered self-esteem and feelings of insecurity (Kasser and Ryan 1993; Rindfleisch et al. 2009) are consistent with the pattern of results in the present study and in those of Orth and his colleagues. The observed U-shaped trajectory is also consistent with research that middle aged people are more intrinsically motivated than, respectively, younger and older people are (Sheldon and Kasser 2001). Taken together this suggests that the observed U-shape is rooted in more fundamental processes in lifespan development, and calls for research in which materialism, intrinsic and extrinsic motivations, and self-esteem are tracked across longer periods of time.

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Accounting for cohort effects led to new insights that cannot be easily obtained otherwise. Concerns have been raised that the current culture of consumption makes younger birth cohorts progressively more materialistic (Kanner and Soule 2004), and that eventually materialism is escalating in society as a whole. The present findings, although obtained in a single country only, paint a more balanced and less grim picture. Whereas acquisition centrality was higher among more recent birth cohorts, possession-defined success was higher among older birth cohorts. If these trends generalize to other countries and persist over time, people would grow to use the act of buying and owning possessions *more* as a means of enjoyment and luxury (acquisition centrality), and would grow to rely *less* on possessions to determine their success in life (possession-defined success). Interestingly, the acquisition centrality dimension appears to have the weakest negative association with well-being (Ahuvia 2002; Ahuvia and Wong 1995; Roberts and Clement 2007) and is associated with decreased loneliness over time (Pieters 2013). Thus, the centrality of acquiring and owning possessions in life need not decrease but might in fact increase well-being. Future research with the proposed age-period-cohort methodology can test this speculation.

Age-Period-Cohort Methodology

The increasing availability of large-scale longitudinal data sets opens up new possibilities to examine the differential contributions of age, period and cohort on materialism and related constructs. Even though APC identification remains a challenge, the combination of appropriate data and models offers new opportunities to accomplish this. Whereas multilevel latent growth models (MLGM) have been used to estimate age and cohort effects with longitudinal data, period effects are usually excluded. This is because the effects of age and period are typically confounded in longitudinal studies (Yang and Land 2013). The economic downturn that took place during our study made it possible to disentangle age effects from the effect of the economic downturn period. This points to the

more general issue of the identification of effects in APC analysis. Our model and findings demonstrate how age effects and period effects can be identified separately using longitudinal data across shorter time spans (here nine years), namely when a relevant exogenous shock occurs in the system during the study. The economic downturn during the period of nine years of this study was such a relevant shock for materialism. Future research might make use of similar exogenous shocks in the macro-environment to disentangle age from period effects in other longitudinal studies. Moreover, the multivariate MLGM estimated multiple growth trajectories simultaneously, and thus controlled for potential dependencies between the individual growth curves. Future applications might extend our model to capture the influence that the growth trajectories have on each other. Such research will provide further insight into the U-shaped trajectory of materialism across the lifespan, and its antecedents and consequences.

Limitations and Future Directions

There are several important limitations of our study that provide opportunities for further research and theorizing. One limitation is that even though it uses a large representative sample followed over nine years, the dataset covers only a single country. It could thus be that the increase in materialism in older age is specific to the Dutch population. This is not very likely as developmental changes in late adulthood are to a certain extent universal, and our findings are consistent with previous studies using datasets from other countries that show similar patterns for constructs related to materialism. Still, it is important that future research tests whether the observed increase in materialism among older Dutch people also generalizes to non-Dutch populations. Cross-national research could establish the influence of socio-economic and cultural macro conditions on lifespan trajectories in materialism.

A second limitation concerns our measure of affiliation desires. The measure available to us contained only a single item for affiliation in the mixed-mode choice task. Even though the choice data were complemented with individuals' responses to the open question, our affiliation desire measure might have been more reliable and valid when based on multiple items. With such a measure, future research could track the relationship between affiliation and materialism could be tracked better than we could here. Social values such as affiliation are often considered to be conflicting with materialism (Burroughs and Rindfleisch 2002; Nickerson et al. 2003) but they may not necessarily be (Csikszentmihalyi and Rochberg-Halton 1981). People cannot act on all their desires and often have to choose among them (Gollwitzer 1990), and these trade-offs might be more difficult in certain stages of the life cycle. For instance, affiliation desires and materialistic values are both important in young adulthood and it might be difficult for young people to choose between them, but this may be less the case in later life stages. The existence and implications of such value and desire conflicts across the lifespan is an interesting avenue for research.

A third limitation is that our study needs to rely on the assumption that all birth cohorts follow one common trajectory of materialism across the lifespan, because of the relatively short time span (nine years) of the data. However, individuals from different birth cohorts might not only differ in their baseline levels of materialism, which we observed, but may also develop differently as they age, for instance due to the timing of important events in their lives. To identify such interactions between age and birth cohort, longitudinal datasets spanning much longer time periods are required. Then, people from different birth cohorts need to be observed over longer periods of their lives. To our knowledge, such datasets do not exist yet for materialism. With such longer-ranging datasets, potential differences between birth cohorts in the lifespan trajectory of materialism (age by cohort interaction effects) could be identified.

In sum, the present research contributes to understanding the lifespan development of materialism. The findings show that, in contrast to lay beliefs and prior research findings, materialism increases in late adulthood from its low in middle adulthood. The study demonstrates how the combined use of longitudinal data and multilevel latent growth models can be used to separate age, birth cohort, and time period effects, and how these methodologies can be extended to lifespan research on other values or traits. Future studies using such data and models have the potential to answer long-standing questions about materialism and its implications for other variables, such as well-being, over time.

Appendix A: Annotated input of the Mplus Program

```
TITLE:
  Multilevel Latent Growth Model (MLGM) for Age-Period-Cohort Analysis of Materialism
DATA:
  FILE = "Long3003.dat"; ! Dataset can be obtained upon request from the first author
VARIABLE:
  NAMES = id gender edu cohort1 cohort2 cohort3 cohort4 cohort5 cohort6 cohort7
        cohort8 cohort9 cohort10 cohort11 cohort12 cohort13 time income
        hhkids mat poss centr happ age agesq student employed retired partner;
  MISSING = all(-999); ! Missing value flag for all variables in the analysis is -999
  USEVARIABLES = mat age agesq cohort2 cohort3 cohort4 cohort5 cohort6 cohort7
                 cohort8 cohort9 cohort10 cohort11 cohort12 cohort13 edu hhkids
                 retired employed student partner lnincome gender period ap ap2;
  ! Explanation of variables:
  ! mat: overall materialism ! age: age (mean centered/10) ! agesq: age (mean centered/10) squared
  ! cohort2-cohort13: cohort dummies (cohort 1 is baseline) ! edu: education level ! retired: dummy for retirement status
  ! hhkids: number of children in household ! employment: dummy for employment
  ! student: dummy for student ! partner: dummy for partner ! lnincome: personal monthly income (log-transformed)
  ! period: dummy for economic downturn ! ap: age × period interaction ! ap2: age² × period interaction
  CLUSTER = id; ! Name of the cluster variable in the dataset
  WITHIN = age agesq period ap ap2; ! Specifies level-1 variables
  BETWEEN = c2 c3 c4 c5 c6 c7 c8 c9 c10 c11 c12 c13 gender edu; ! Level-2 variables
DEFINE:
  IF(time LT 4) THEN period=1; IF(time GE 3) THEN period=0; ! Period dummy: 1 = pre-downturn, and 0 = downturn
  ap = age*period; ap2 = agesq*period; ! Interaction between age and the period dummy
  lnincome = ln(income + 1);   ! Natural logarithm of income + 1 to accommodate no own income
  gender = gender - 1;
  CENTER gender edu lnincome hhkids retired employed student partner (GRANDMEAN); ! Grand-mean center covariates
ANALYSIS:
  TYPE = TWOLEVEL RANDOM;   ! Multilevel model with random intercepts and random slopes specified
  PROCESSORS = 2;           ! Speeds up computation
  ESTIMATOR = BAYES;        ! MCMC estimation
  BITER = 100000 (50000);   ! Maximum and minimum number of iterations for each MCMC chain
MODEL:
  %WITHIN%             ! Level-1 part of the model
  s  | mat ON age;     ! Random linear growth factor for age
  q  | mat ON agesq;   ! Random quadratic growth factor for age
  s2 | mat ON period;  ! Random growth factor for the period dummy
  mat ON ap ap2;       ! Age × period interaction effects
  %BETWEEN%            ! Level-2 part of the model
  mat ON c2 c3 c4 c5 c6 c7 c8 c9 c10 c11 c12 c13; ! Intercepts for cohorts with cohort 1 as baseline
  mat s q s2 ON gender edu lnincome partner student employed retired hhkids; ! Effects of covariates on latent growth factors
  mat WITH s q s2; s q s2 WITH s q s2; ! Correlations between latent growth factors
  [gender@0]; [edu@0]; [lnincome@0]; [partner@0]; [student@0]; [employed@0]; [retired@0];
  [hhkids@0];          ! Fixes means of the covariates to zero
```

Appendix B: Additional Model Results

Table B1. Estimates for Covariates on Growth Factors of Overall Materialism and Three Materialism Dimensions

Parameter			Overall materialism			Acquisition centrality			Possession-defined success			Acquisition as the pursuit of happiness		
			Estimate	SD	p	Estimate	SD	p	Estimate	SD	p	Estimate	SD	p
Gender	→	Intercept	-0.04	0.02	.026	0.13	0.03	<.001	-0.08	0.03	.001	-0.21	0.03	<.001
Income	→		-0.01	0.01	.083	0.10	0.04	.006	0.01	0.04	.448	-0.20	0.05	<.001
Education	→		-0.03	0.01	.004	-0.01	0.01	.223	-0.03	0.01	.001	-0.04	0.01	<.001
Partner	→		0.11	0.04	.006	0.13	0.05	.011	0.06	0.05	.137	0.15	0.06	.007
No. kids in hh	→		-0.04	0.02	.012	-0.06	0.02	.001	-0.01	0.02	.273	-0.04	0.03	.073
Student	→		-0.02	0.11	.413	0.04	0.14	.371	-0.02	0.14	.452	-0.11	0.16	.244
Employed	→		0.10	0.04	.002	0.11	0.04	.003	0.10	0.04	.010	0.02	0.05	.315
Retired	→		-0.11	0.13	.175	0.17	0.16	.146	0.27	0.18	.027	-0.55	0.19	.003
Gender	→	Linear growth age	0.02	0.01	.014	0.02	0.01	.039	0.02	0.01	.056	0.01	0.01	.148
Income	→		-0.00	0.00	.133	-0.03	0.02	.084	-0.07	0.02	.002	0.01	0.03	.292
Education	→		-0.00	0.01	.194	-0.00	0.01	.274	-0.00	0.01	.247	0.00	0.01	.261
Partner	→		0.03	0.02	.109	0.00	0.03	.492	0.03	0.03	.094	0.05	0.03	.066
No. kids in hh	→		0.01	0.01	.259	0.01	0.01	.278	-0.00	0.01	.418	0.02	0.02	.115
Student	→		0.05	0.05	.150	0.13	0.06	.019	-0.04	0.06	.264	0.00	0.08	.492
Employed	→		0.01	0.02	.266	0.02	0.03	.240	0.03	0.03	.171	0.03	0.03	.118
Retired	→		0.13	0.09	.094	-0.01	0.10	.466	-0.11	0.12	.129	0.34	0.12	.006
Gender	→	Quadratic growth age	-0.00	0.00	.277	-0.01	0.01	.156	-0.01	0.01	.070	0.00	0.01	.376
Income	→		0.00	0.00	.330	0.00	0.01	.464	0.01	0.01	.035	-0.01	0.01	.065
Education	→		0.00	0.00	.152	0.00	0.00	.255	0.00	0.00	.251	0.00	0.00	.313
Partner	→		-0.00	0.01	.386	-0.00	0.01	.424	-0.00	0.01	.417	-0.00	0.02	.473
No. kids in hh	→		-0.01	0.01	.173	0.00	0.01	.400	-0.01	0.01	.051	-0.01	0.01	.171
Student	→		0.03	0.02	.034	0.06	0.02	.006	0.01	0.02	.395	0.02	0.03	.312
Employed	→		-0.01	0.01	.080	-0.00	0.01	.386	-0.03	0.01	.018	-0.02	0.01	.022
Retired	→		-0.03	0.02	.050	-0.01	0.02	.255	0.00	0.02	.462	-0.06	0.02	.009
Gender	→	Period growth	0.01	0.01	.226	0.02	0.02	.088	-0.04	0.02	.025	0.03	0.02	.047
Income	→		-0.00	0.00	.107	-0.01	0.02	.290	-0.05	0.03	.024	-0.00	0.03	.456
Education	→		0.01	0.01	.026	0.01	0.01	.014	0.02	0.01	.011	0.01	0.01	.187
Partner	→		-0.10	0.03	.002	-0.15	0.04	<.001	-0.08	0.04	.020	-0.09	0.05	.037
No. kids in hh	→		0.04	0.01	.003	0.05	0.02	<.001	0.03	0.02	.035	0.05	0.02	.013
Student	→		-0.08	0.06	.102	0.01	0.07	.452	-0.06	0.08	.235	-0.21	0.09	.016
Employed	→		-0.03	0.02	.096	-0.02	0.03	.193	-0.02	0.03	.281	-0.02	0.03	.270
Retired	→		0.00	0.02	.467	-0.04	0.03	.118	-0.03	0.04	.173	0.07	0.04	.043

Note. P-values are one-tailed based on the posterior distribution.

Table B2. Estimates for Covariates on Growth Factors of Desires

Parameter			Money			Achievement			Affiliation			Personal growth		
			Estimate	SD	p	Estimate	SD	p	Estimate	SD	p	Estimate	SD	p
Gender	→	Intercept	0.01	0.11	.465	-0.38	0.08	<.001	0.21	0.10	.016	0.53	0.10	<.001
Income	→		0.17	0.18	.176	-0.00	0.13	.496	0.14	0.16	.197	-0.44	0.16	.002
Education	→		-0.27	0.04	<.001	0.16	0.03	<.001	0.06	0.03	.026	0.14	0.03	<.001
Partner	→		0.62	0.14	<.001	0.08	0.10	.199	-2.04	0.12	<.001	0.32	0.12	.003
No. kids in hh	→		0.11	0.06	.024	-0.03	0.04	.240	0.01	0.05	.443	-0.03	0.05	.262
Student	→		-0.51	0.66	.219	1.48	0.54	.002	-0.58	0.60	.164	-1.14	0.64	.037
Employed	→		-0.08	0.19	.336	0.28	0.14	.027	0.21	0.16	.095	-0.15	0.16	.179
Retired	→		1.62	0.73	.003	-2.29	0.50	<.001	1.85	0.53	<.001	-0.11	0.62	.433
Gender	→	Linear growth age	-0.02	0.05	.335	0.02	0.04	.358	-0.11	0.05	.007	-0.05	0.05	.168
Income	→		0.03	0.11	.400	-0.09	0.09	.139	0.03	0.10	.385	0.08	0.11	.223
Education	→		0.02	0.02	.168	-0.03	0.02	.050	-0.00	0.02	.408	-0.01	0.02	.386
Partner	→		-0.04	0.07	.299	-0.06	0.05	.119	0.07	0.06	.146	0.05	0.06	.215
No. kids in hh	→		-0.05	0.04	.135	0.04	0.03	.090	0.02	0.04	.281	0.01	0.04	.420
Student	→		-0.38	0.36	.149	0.40	0.28	.074	-0.13	0.30	.333	-0.05	0.31	.433
Employed	→		-0.00	0.11	.487	0.07	0.08	.197	-0.10	0.10	.158	-0.09	0.10	.199
Retired	→		-1.27	0.54	<.001	1.72	0.36	<.001	-1.34	0.39	<.001	-0.06	0.47	.449
Gender	→	Quadratic growth age	-0.07	0.03	.016	0.03	0.02	.089	-0.00	0.03	.441	0.05	0.03	.029
Income	→		-0.08	0.05	.068	0.09	0.04	.014	-0.04	0.05	.213	0.07	0.04	.072
Education	→		0.01	0.01	.119	-0.00	0.01	.347	0.00	0.01	.464	-0.02	0.01	.029
Partner	→		0.01	0.04	.429	0.05	0.03	.051	0.10	0.03	.001	-0.02	0.03	.212
No. kids in hh	→		-0.02	0.03	.179	-0.00	0.02	.460	0.01	0.02	.417	-0.00	0.02	.472
Student	→		0.03	0.13	.418	-0.04	0.10	.351	0.10	0.12	.182	0.16	0.11	.084
Employed	→		0.18	0.07	.005	-0.08	0.05	.077	-0.01	0.06	.444	-0.08	0.06	.078
Retired	→		0.32	0.12	.002	-0.31	0.09	<.001	0.20	0.09	.012	-0.02	0.10	.441
Gender	→	Period growth	-0.11	0.12	.186	-0.09	0.10	.180	-0.13	0.10	.096	0.08	0.11	.225
Income	→		-0.26	0.18	.076	0.11	0.15	.228	-0.14	0.16	.199	0.07	0.16	.331
Education	→		-0.02	0.04	.309	-0.05	0.03	.046	0.08	0.03	.006	-0.03	0.03	.213
Partner	→		0.06	0.14	.330	0.19	0.11	.044	-0.13	0.14	.163	0.07	0.12	.295
No. kids in hh	→		0.12	0.06	.023	-0.06	0.05	.086	0.07	0.05	.114	-0.12	0.05	.009
Student	→		-1.02	0.43	.009	-0.23	0.34	.249	0.92	0.38	.009	0.05	0.41	.453
Employed	→		-0.15	0.19	.220	0.16	0.15	.142	-0.11	0.17	.257	0.03	0.16	.425
Retired	→		-0.38	0.25	.059	-0.06	0.21	.397	0.07	0.20	.352	0.44	0.19	.011

Note. P-values are one-tailed based on the posterior distribution.

Parameter			Happiness			Altruism			Health		
			Estimate	*SD*	*p*	Estimate	*SD*	*p*	Estimate	*SD*	*p*
Gender	→	Intercept	0.15	0.11	.076	0.16	0.12	.092	0.44	0.08	<.001
Income	→		-0.01	0.17	.473	0.04	0.20	.434	0.14	0.13	.129
Education	→		0.06	0.04	.048	0.07	0.04	.049	-0.04	0.03	.060
Partner	→		-0.01	0.13	.460	0.13	0.15	.180	0.31	0.09	.001
No. kids in hh	→		0.11	0.05	.010	-0.04	0.06	.241	0.01	0.04	.450
Student	→		-1.77	1.03	.037	0.85	0.87	.176	-0.49	0.60	.198
Employed	→		0.14	0.17	.203	-0.13	0.21	.284	-0.08	0.13	.261
Retired	→		-0.31	0.69	.314	2.33	0.76	.003	-1.39	0.53	.005
Gender	→	Linear growth age	-0.17	0.06	.002	-0.05	0.09	.309	0.04	0.04	.163
Income	→		-0.24	0.12	.024	-0.14	0.18	.219	0.17	0.09	.024
Education	→		0.01	0.02	.399	-0.03	0.04	.216	0.01	0.02	.314
Partner	→		-0.15	0.08	.031	-0.02	0.12	.429	0.07	0.05	.093
No. kids in hh	→		-0.04	0.04	.143	-0.02	0.05	.330	-0.08	0.03	.003
Student	→		0.22	0.49	.322	0.66	0.40	.044	-0.77	0.40	.016
Employed	→		0.29	0.11	.006	-0.08	0.18	.327	-0.09	0.08	.135
Retired	→		0.51	0.50	.095	-1.32	0.61	.013	0.95	0.40	.010
Gender	→	Quadratic growth age	0.04	0.04	.126	-0.05	0.04	.119	-0.03	0.02	.128
Income	→		0.04	0.06	.260	-0.04	0.07	.297	-0.03	0.04	.237
Education	→		0.00	0.01	.353	0.00	0.02	.430	-0.00	0.01	.300
Partner	→		0.01	0.04	.430	-0.07	0.05	.085	0.02	0.03	.265
No. kids in hh	→		-0.01	0.03	.350	0.06	0.04	.039	-0.03	0.02	.034
Student	→		0.31	0.18	.035	0.08	0.18	.326	-0.37	0.13	.001
Employed	→		-0.11	0.07	.071	0.10	0.09	.124	0.00	0.05	.497
Retired	→		-0.20	0.12	.030	0.14	0.14	.162	-0.14	0.09	.058
Gender	→	Period growth	0.05	0.14	.364	-0.01	0.16	.484	0.14	0.09	.065
Income	→		0.01	0.22	.484	0.24	0.24	.160	0.05	0.14	.366
Education	→		-0.03	0.05	.227	0.03	0.05	.295	-0.02	0.03	.283
Partner	→		0.30	0.17	.030	0.03	0.18	.433	-0.01	0.10	.465
No. kids in hh	→		-0.08	0.06	.095	0.04	0.09	.325	-0.02	0.04	.358
Student	→		-0.91	0.58	.050	0.98	0.78	.095	0.41	0.38	.136
Employed	→		0.09	0.22	.334	-0.54	0.26	.012	-0.01	0.14	.487
Retired	→		0.52	0.30	.043	-0.14	0.27	.294	0.10	0.18	.288

Note. P-values are one-tailed based on the posterior distribution.

Chapter 3

The Pursuit of Happiness and Quest for Wealth:

A Longitudinal Study of Materialism Dimensions and Financial Savings

How much money consumers save has major implications for themselves and for the economy at large. Fifty-five percent of U.S. households cannot replace a month of their income through their liquid savings (Pew Charitable Trusts 2015). Similarly, around 46% of households in the U.K. have under £1,500 in savings, equivalent to about 1,900 U.S. dollars (The Money Charity 2017). Despite a relatively high savings ratio in a country such as the Netherlands, still 33% of consumers has total savings of less than three months' salary (ING 2017). Because of the evidently negative implications of low savings to consumers and society, it is important to understand the factors that explain individual differences in savings (Dholakia et al. 2016; Fernandes, Lynch Jr., and Netemeyer 2014; Hershfield et al. 2011).

The economics literature has traditionally viewed savings as a means of smoothing lifetime consumption (Attanasio and Weber 2010; Friedman 1957; Modigliani 1986), relying on the assumptions that consumers are rational, form reasonable predictions about the future, and plan accordingly. Yet consumers may make false predictions about future spending (Hershfield et al. 2015), underestimate the impact of current consumption on future utility (Loewenstein, O'Donoghue, and Rabin 2003), or have a low propensity to plan (Lynch Jr. et al. 2010). Moreover, various broader psychological factors such as self-control (Thaler and Shefrin 1981), optimism (Puri and Robinson 2007), and personality (Brown and Taylor 2014) have been proposed to drive heterogeneity in consumer savings. Such research has emphasized the ability of consumers to save, foresee the future, plan, and exercise self-control. Despite the important insights gained, Thaler's (1994, p. 186) early call still holds:

"If we are to understand why people are saving so little and are to make helpful recommendations as to how to get people to save more, we have to incorporate more of the psychology of saving into our economic theories."

Our focus here is on the role of a fundamental consumer value as an important component of consumers' motivations to save. The financial literature has identified various cultural values that influence savings, such as the importance of social interaction (Brown et al. 2008), religion (Renneboog and Spaenjers 2012), and trust (Guiso, Sapienza, and Zingales 2004). Yet, to date empirical research on the role of fundamental consumer values such as materialism is rare. This is surprising because materialism is known to influence specific spending decisions (Brown et al. 2016), and has been speculated to lead to lower savings (Richins 2011; Schor 1998).

Despite theories and empirical evidence of its multidimensional nature, research to date has typically considered materialism as a singular construct with uniformly negative consequences for consumers. To illustrate, in a recent meta-analysis of 151 papers on the relationship between materialism and well-being worldwide (Dittmar et al. 2014), 50 used some version of the Material Values Scale (MVS, Richins 2004; Richins and Dawson 1992). Notably, all 50 papers treated materialism as singular, even though the MVS was originally developed to measure three related but distinct dimensions for materialism: the belief that possessions and their acquisition lead to increased life satisfaction (acquisition as the pursuit of happiness), the use of possessions as a measure of success (possession-defined success), and the centrality of possessions in life (acquisition centrality). Recently, there has been renewed interest into these materialism dimensions, and their antecedents (Jaspers and Pieters 2016; Richins and Chaplin 2015), and associations with life values and well-being (Kilbourne and LaForge 2010; Pieters 2013). Initial work has also reported unique associations of the materialism dimensions with money management among U.S. students and MTurkers

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(Donnelly et al. 2012), and account balances and debt among customers of a Brazilian financial institution (Nepomuceno and Laroche 2015).

Our research makes use of a unique longitudinal panel database across a period of seven years (2007-2013) of over 4,100 consumers to examine relationships between consumer materialism and financials savings over time. It makes the following three contributions. First, we do not only look at overall materialism and financial savings, but also zoom in on the three key materialism dimensions. We expect the materialism dimensions to have unique associations with financial savings. Empirical support for this assertion would show that treating materialism as a singular construct leads to the incorrect conclusion that consumer materialism uniformly leads to lower financial savings. Second, whereas prior research has typically assumed causal paths from materialism to various (undesirable) outcomes, we hypothesize a reciprocal relationship such that levels of financial savings in their turn also influence levels of consumer materialism. Our longitudinal database allows us to examine such reciprocal relationships and establish Granger causality (Granger 1988), improving over earlier cross-sectional work. Third, this research is the first to examine the relationship between materialism and financial savings using comprehensive measures of consumers' actual levels of financial savings. It improves over previous work that had to rely on attitudinal measures of savings (Donnelly et al. 2012; Watson 2003), or on a specific type of savings such as account balances (Nepomuceno and Laroche 2015).

In line with materialism theory, we predict that overall more materialistic consumers will have lower savings than less materialistic consumers, even while controlling for factors that influence financial savings such as income and age (Attanasio and Weber 2010), education (Hubbard, Skinner, and Zeldes 1995), and gender (Sunden and Surette 1998). Crucially, and as specified later, we hypothesize that only one single materialism dimension, namely acquisition as the pursuit of happiness, is uniformly associated with lower financial

savings. Finding effects of materialism on savings and of savings on materialism would constitute the first evidence of the hypothesized reciprocal relationship between this central consumer value and savings. Moreover, finding distinct effects for the materialism dimensions would reveal that a singular conceptualization of materialism would lead to the incorrect inference that consumer materialism uniformly leads to lower financial savings. The next section discusses how financial savings are related to consumer materialism.

Financial Savings and Consumer Materialism

Consumer Materialism

To the extent that materialism influences the allocation of a variety of resources, such as time and money (Richins and Dawson 1992; Richins and Rudmin 1994), it should influence consumer savings as well. In much of previous research, materialism is treated as a singular construct with uniformly negative implications for consumers' financial well-being (Donnelly, Ksendzova, and Howell 2013; Richins 2011; Watson 2003). We believe the relationships between materialism and savings are more intricate. In particular, taking into account the multidimensional nature of the materialism construct and the potential reciprocal effect of savings on materialism leads to new predictions about the relationships between consumer materialism and financial savings. These predictions are developed here.

Acquisition as the Pursuit of Happiness

Acquisition as the pursuit of happiness refers to the belief that possessions and their acquisition are essential to satisfaction and well-being in life (Richins and Dawson 1992). This dimension of materialism involves a discrepancy between a consumer's actual and desired standard of living. It is a counterfactual, which expresses discontent and a strong belief that "if only" one were able to buy and own more things this discontent would be

relieved. As such, it reflects a deficit value (Pieters 2013). Items for this measure include "My life would be better if I owned certain things I don't have" and "I'd be happier if I could afford to buy more things." Such a pursuit of happiness through acquisition is deemed ineffective because the satisfaction derived from acquisition is usually short-lived (Richins 2013; Richins and Rudmin 1994). Consequently, renewed consumption may occur (Kasser 2002), even to the extent that the acquisitive process becomes an endless cycle (Richins and Dawson 1992).

It might thus be hypothesized that consumers high in acquisition as the pursuit of happiness save less than others. Three studies among university students and Mturkers (Donnelly et al. 2012) indeed found that consumers high in acquisition as the pursuit of happiness score lower on a subjective scale of money management skills. Similarly, in a survey of 436 customers of a Brazilian financial institution, Nepomuceno and Laroche (2015) found that consumers high in acquisition as the pursuit of happiness have lower account balances and more debt. We predict that consumers high in acquisition as the pursuit of happiness have lower net savings than those low in acquisition as the pursuit of happiness. We expect that this is due both to consumers high in acquisition as the pursuit of happiness saving less, and taking on more debt. This is because consumers high in acquisition as the pursuit of happiness will prioritize spending over savings and are likely to take on debt to fulfill their material desires. Moreover, we expect that consumers with higher savings and more debt are lower in acquisition as the pursuit of happiness because consumers with higher savings and less debt should be relatively more satisfied with their standard of living. Our predictions imply negative reciprocal relationships of acquisition as the pursuit of happiness with net savings, a negative reciprocal relationship with total savings, and a positive reciprocal relationship with total debts.

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Possession-defined Success

Possession-defined success reflects the tendency to measure success by the number and quality of possessions a consumer has accumulated (Richins and Dawson 1992). It involves a social comparison between oneself and others, or between the actual and ideal self, using possessions (Pieters 2013). It relates to long-term benefits that possessions may have, in particular their ability to signal status and success. Consumers high in possession-defined success value possessions that project a desired self-image (Richins and Dawson 1992). They use possessions as a means to signal competence, mastery, or achievements (Christopher and Schlenker 2000; Dittmar and Pepper 1994; Ordabayeva and Chandon 2011). Sample items for the measure are: "The things I own say a lot about how well I am doing in life," and "I like to own things that impress people." Buying possessions to display power and prestige is associated with lavish spending (Veblen 1899), hence one might predict that consumers high in possession-defined success save less than others, even at similar levels of income.

Conversely, both lay people and theorists associate materialism with a desire for financial wealth (Fournier and Richins 1991; Kasser 2002). If consumers high in possession-defined success desire financial wealth, they should save more, not less. The effect on net savings would then depend on which of the two desires is stronger. Further, we do not expect consumers' levels of savings to influence possession-defined success since levels of savings may influence who consumers compare themselves with, but unlikely the extent to which such comparisons are based on possessions.

Acquisition Centrality

Acquisition centrality refers to feelings of pleasure when shopping for, and owning things, independent of their financial value. Richins and Dawson (1992) describe it as the centrality of possessions and their acquisition in consumers' lives. In contrast to acquisition

as the pursuit of happiness, it does not involve discontent with one's standard of living. It also does not involve comparisons with others or an ideal self, as is the case with possession-defined success. Acquisition centrality is about the satisfaction of acquiring and owning material possessions for the sheer pleasure of it (Pieters 2013). To illustrate, items from the measure include: "I enjoy spending money on things that aren't practical" and "Buying things gives me lots of pleasure."

Having such favorable attitudes towards shopping and owning possessions is not related to the amounts of money that consumers spend or save. Specifically, a recent study found that consumers high in overall materialism made discretionary purchases (i.e. purchases made for enjoyment, pleasure, stimulation, or otherwise not required) more frequently than consumers low in overall materialism, but did not spend more money on those discretionary purchases (Brown et al. 2016). Consumers high in acquisition centrality enjoy the acquisition and ownership of possessions, but do not acquire possessions to enhance their life satisfaction nor to communicate a desired self-image. The enjoyment of acquisition and possessions is independent of the monetary value of these acquisitions and possessions. Consequently, we predict that acquisition centrality is unrelated to financial savings. This holds for total savings, as well as total debts. Similarly, we do not expect consumers' levels of savings to influence their levels of acquisition centrality.

Predictions

In sum, we hypothesize that higher levels of overall materialism lead to lower levels of total savings, and in particular liquid and contractual savings. Furthermore, higher levels of savings in their turn are expected to lead to lower levels of overall materialism. Importantly, we postulate that the three key materialism dimensions have unique relationships with savings. In particular, we predict that consumers high in acquisition as the pursuit of

happiness have lower savings, and that this holds for all three types of savings. In addition, consumers with higher levels of savings are predicted to have lower levels of acquisition as the pursuit of happiness. We hypothesize that possession-defined success leads to lower levels of liquid savings, but higher levels of investment savings. We deem the negative effect on liquid savings more prominent, implying a negative relationship with total savings. Finally, we expect that acquisition centrality is unrelated to all three types of savings, and thus total savings.

Data

Data were collected from the CentER online consumer panel managed by a Dutch University. The panel is representative for the general population in the Netherlands over 16 years on key socio-economic characteristics, such as gender, age, income, and education. The data came from two surveys that were both conducted on a yearly basis. Data from the two surveys were combined using unique identifiers for panel members provided by CentER. The first survey provides data on materialism from seven measurement waves between 2007 and 2013. The second survey is the DNB Household Survey (DHS), sponsored by the Dutch National Bank (described in detail later). From the DHS, information on consumers' individual financial savings were obtained from seven measurement waves between 2007 and 2013. By combining data from the two surveys we created a new and unique longitudinal database with measures of consumers' materialism and their financial savings over time, which has not been analyzed before.

All available panel members were sampled in each wave, independent of whether they had been sampled and/or responded in a previous wave. The sample included all household heads and their partners (both married and unmarried). Children, parents (in-law),

housemates, and family members or tenants were not included in the sample, because the

relationship between materialism and savings is less straightforward for those consumers.

Panel members whose children contribute to the household income and households with more

than 2 partners ($N = 2$) were excluded. The final sample consisted of 4,180 respondents.

Samples sizes for materialism were 1,569 in wave 1, 1,515 in wave 2, 1,377 in wave 3, 1,645

in wave 4, 1,728 in wave 5, 2,135 in wave 6, and 1,924 in wave 7. Sample sizes for the DHS

were 1,926 in wave 1, 1,759 in wave 2, 1,816 in wave 3, 1,810 in wave 4, 1,828 in wave 5,

2,017 in wave 6, and 1,934 in wave 7. The smallest percentage of data present for any two

waves (coverage) was 18.4 % (N = 769) between consumer materialism in 2007 and financial

savings in 2013. To maximize statistical power and minimize validity threats, all available

data (N = 4,180) were used.

Measures

  Consumer Materialism. Materialism was measured with the 18-item Material

Values Scale (MVS) of Richins and Dawson (1992). The MVS distinguishes between three

dimensions for materialism discussed before: acquisition as the pursuit of happiness,

possession-defined success, and acquisition centrality. Acquisition as the pursuit of happiness

is measured with 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." Possession-defined success is

measured with six items, including "I admire people who own expensive homes, cars and

clothes," "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 centrality is measured by seven items including

"Buying things gives me lots of pleasure," "I like a lot of luxury in my life," and "I enjoy

spending money on things that aren't practical." Response categories for the items ranged

from 1 "completely disagree" to 5 "completely agree." After reverse scoring negatively

worded items, the scores were averaged to form measures of acquisition as the pursuit of

happiness, possession-defined success, acquisition centrality, and overall materialism (all 18

items). Higher scores reflect higher levels of materialism. Composite reliability of the

measures was established using the method described by Geldhof et al. (2014), which

corrects for non-independence due to repeated sampling of the same individuals. Internal

consistency was .938 for acquisition as the pursuit of happiness, .835 for possession-defined

success, .871 for acquisition centrality, and .918 for overall materialism. Table 3.1 provides

means and standard deviations for overall materialism and the three materialism dimensions

for all measurement waves.

Table 3.1

Descriptives Materialistic Values across Seven Waves

Year	N	Overall materialism		Acquisition as the pursuit of happiness		Possession-defined success		Acquisition centrality	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
2007	1569	2.480	.440	2.252	.645	2.398	.565	2.714	.555
2008	1515	2.480	.450	2.248	.638	2.400	.561	2.718	.574
2009	1377	2.465	.460	2.229	.666	2.376	.561	2.711	.572
2010	1645	2.473	.468	2.260	.687	2.387	.564	2.701	.572
2011	1728	2.474	.462	2.245	.678	2.389	.560	2.713	.563
2012	2135	2.471	.462	2.241	.679	2.385	.550	2.709	.559
2013	1924	2.478	.442	2.286	.671	2.384	.549	2.718	.549
Composite Reliability		.918		.938		.835		.871	

Note. Overall materialism, possession-defined success, acquisition centrality, and acquisition as the pursuit of happiness, all on a scale from 1 (lowest) to 5 (highest).

Financial Savings. The DHS collects information on 25 main asset components for

each individual panel member. For each asset component, panel members are first asked how

many assets of the asset under consideration they own. Participants then indicate what the

financial value of each of those assets is. When a participant refuses to indicate what the

financial value of an asset is, he or she is asked to select the range to which the value belongs. In this case, the middle value of the range is imputed. When the highest bracket is chosen, the lowest value of the bracket is imputed. Net savings is operationalized as total savings minus total debts. Net savings was transformed using the inverse hyperbolic sine transformation because it supports both negative and zero values (Burbidge, Magee, and Robb 1988). Total savings is operationalized as the total value of all asset components except housing, including checking accounts, savings or deposit accounts, savings certificates, mutual funds, and stock and shares. Total debt is operationalized as the total value of all asset components, including private loans, extended lines of credit, hire-purchase contracts, debts based on payment by installment, debts with mail-order firms, or other retail business, loans from family or friends, study loans, credit card debts, and checking accounts with deficit balances. Total savings and total debts were log-transformed (after adding 1) to reduce skewness. Table 3.2 provides means and standard deviations for the savings measures for all seven measurement waves.

Table 3.2

Descriptives Consumer Savings across Seven Waves

		Net savings			Total savings			Total debts	
Year	*N*	Mean	*SD*	% owns assets	Mean	*SD*	% own assets	Mean	*SD*
2007	1924	51,501	152,372	93.2%	58,454	157,138	23.3%	2,996	21,248
2008	1757	54,083	171,068	94.1%	61,215	174,923	22.9%	3,511	22,090
2009	1814	54,964	162,906	92.5%	63,832	172,627	25.0%	4,083	19,758
2010	1808	58,796	158,648	93.5%	67,444	161,672	22.8%	4,271	23,803
2011	1826	66,992	181,213	91.5%	76,747	188,060	20.3%	3,190	19,039
2012	2015	64,371	179,584	91.5%	73,727	186,115	20.5%	3,056	16,990
2013	1932	52,619	125,790	93.2%	60,076	128,665	23.1%	3,353	15,041
Average	1868	57,618	161,654	92.8%	65,928	167,029	22.6%	3,494	19,710

Note. All savings measures are in Euros. Total savings is operationalized as the total value of all asset components except housing equity, including checking accounts, savings or deposit accounts, savings certificates, mutual funds, stock and shares, and durables such as cars and motorbikes. Total debt is operationalized as the total value of all asset components, including private loans, extended lines of credit, hire-purchase contracts, debts based on payment by installment, debts with mail-order firms, or other retail business, loans from family or friends, study loans, credit card debts, and checking accounts with deficit balances.

Sociodemographics. Based on prior research about their relationship with materialism or savings, age, education (Hubbard et al. 1995), gender (Sunden and Surette 1998), relationship status, employment status, number of children in the household, net monthly household income, and total amount of outstanding debt were included as covariates in the model. A quadratic term for age was also included because materialism and savings both have curvilinear relationships with age. Whereas materialism on average decreases from young to middle adulthood, and then increases again (Jaspers and Pieters 2016), savings typically increase until retirement age and then decrease again (Attanasio and Weber 2010; Modigliani 1986). Net monthly household income was included rather than personal income, because household members typically share their incomes to a certain extent. In addition, a binary measure indicates whether a participant is the primary wage earner or not, to accommodate to the fact that household members may not contribute equally to the household income and may not use the same proportion of their income for savings. Finally, outstanding debt was included for two reasons. First, having to pay off debt may limit a consumer's ability to save. Second, the implications of a relationship between materialism and savings critically depend on how much outstanding debt consumers have simultaneously. It is the sum of different types of debt including private loans, extended lines of credit, study loans and credit cards, but excluding mortgages.

In the first wave, 49.1% of the participants were female, 21.9% were single, the average age was 47.6 years (SD = 15.9, range 12-92 years), the average educational level was 3.13 (range 0, no education to 5, university level), the average number of children was .80 (SD = 1.13), the average net monthly household income was € 2,562 (SD = 3,412), and 63.9% were the main wage earner.

Main Results

Multivariate autoregressive cross-lagged latent variable models (Curran 2000; Usami, Hayes, and McArdle 2015) were estimated in two steps. In the first step, measurement invariance across time (Little et al. 2007) was established for the materialism construct as a prerequisite to examine autoregressive cross-lagged models in the second step. In the second step, we estimated materialism and its three dimensions using single-indicator factor models to control for measurement unreliability (Finkel 1995). All models were estimated with Mplus 8 software (Muthén and Muthén 1998-2017) using full information maximum likelihood (FIML) with robust standard errors to prevent loss of statistical power and biased estimation. FIML does maximum likelihood estimation on all available data.

Measurement Invariance of Materialism

Four longitudinal confirmatory factor analysis (CFA) models with increasing constraints were estimated to establish measurement invariance for materialism over time (Little 2013; Widaman, Ferrer, and Conger 2010). Model 1 was a CFA model with configural invariance. Model 2 was the weak factorial invariance model which added invariance constraints on the factor loadings across time. Model 3 was the strong factorial invariance model, in which across-time invariance constraints on the intercepts were added. Model 4 was the strict factorial invariance model in which across-time invariance constraints on the unique variances were added. We relied on the BIC for model selection. Based on this, the strict factorial invariance model is the best model (see table 3.3). Strict factorial invariance indicates that any changes in the mean levels of the indicators are adequately captured as changes in the underlying means of the latent construct (Little 2013), which is an assumption of autoregressive cross-lagged models. This enables us to proceed.

Table 3.3

Measurement Invariance Model Comparison

Model	χ^2 (df)	$\Delta\chi^2$ (df)	RSMEA	CFI	BIC
Configural invariance	16054 (7161)		.018-.019	.909	488879
Weak factorial invariance	16202 (7251)	148 (90)	.018-.019	.908	488293
Strong factorial invariance	16486 (7359)	284 (108)	.018-.019	.907	487696
Strict factorial invariance[a]	16767 (7467)	280 (108)	.018-.019	.905	487095

[a] Selected model based on lowest BIC value.

Autoregressive Cross-Lagged Models

Multivariate autoregressive cross-lagged models (Curran 2000) were used to simultaneously estimate the reciprocal effects between materialism and savings. Autoregressive cross-lagged models are ideally suited for examining such reciprocal relationships, because they can determine if materialism influences savings, if savings influence materialism, or if they influence each other over time. Using autoregressive cross-lagged models also enables us to assess the relative strength of these effects.

Let Y denote savings and X denote materialism, then for each individual i in time period t, the observed scores are a function of true scores and measurement error as follows:

$$Y_{it} = y_{it} + e_{yit}, \text{ and} \tag{1}$$

$$X_{it} = x_{it} + e_{xit}$$

The latent variable at time t is a function of five components: (a) an intercept (α); (b) an autoregression component (β), which represents the effect of the same variable at the previous wave; (c) a cross-lagged regression component (γ), which represents the effect of the other variable at the previous wave; (d) the effects of k covariates (δ_k) and (e) a residual (d). Residuals of latent variables are allowed to correlate at the same occasion. Our model then is:

$$y_{it}^g = \alpha_{it}^g + \beta_y^g \times y_{it-1}^g + \gamma_y^g \times x_{it-1}^j + \sum_{k=1}^K \delta_k^g z_k + d_{yit}, \text{ and} \tag{2}$$

$$x_{it}^j = \alpha_{it}^h + \beta_x^j \times x_{it-1}^j + \gamma_x^j \times y_{it-1}^g + \sum_{k=1}^K \delta_k^j z_k + d_{xit}$$

with $g = 1$ for net savings or 2 for total savings and total debt, and $j = 1$ for overall

materialism or 3 for its dimensions (acquisition as the pursuit of happiness, possession-

defined success, and acquisition centrality). The autoregressive effects (β's) describe the

stability of individual differences from one year to the next. The cross-lagged effects (γ's)

represent the effects that materialism and savings have on each other in the subsequent year.

Thus, if consumers' materialism at time $t - 1$ is related to their financial savings at time t,

there will be a significant cross-lagged effect. The model assumes that prospective

relationships between materialism and savings are static (i.e. β_y^j, γ_y^j, β_x^g, and γ_x^g constrained

to be equal over time) (Ferrer and McArdle 2003).[4] The effects of time-varying covariates

(partner, number of children in the household, employment status, net household income, and

main wage earner) on materialism and savings were also assumed static.

We estimated four models (see figure 3.1 for an overview). Model 1 examines the

relationships between overall materialism and net savings (depicted figure 3.2). Model 2

examines the relationships between the three materialism dimensions and net savings. We

then decompose net savings into total savings and total debts. Model 3 examines the

relationships between overall materialism, total savings and total debts. Model 4 looks at the

three materialism dimensions and total savings and total debts. The results are discussed next.

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[4] We tested this assumption by specifying alternative models in which the autoregressive and cross-lagged
parameters were estimated freely. The results indicated that while freeing the autoregressive parameters led to
slightly improved model fit, the (cross-lagged) parameters of interest were unaffected. We therefore proceeded
with the more restrained models.
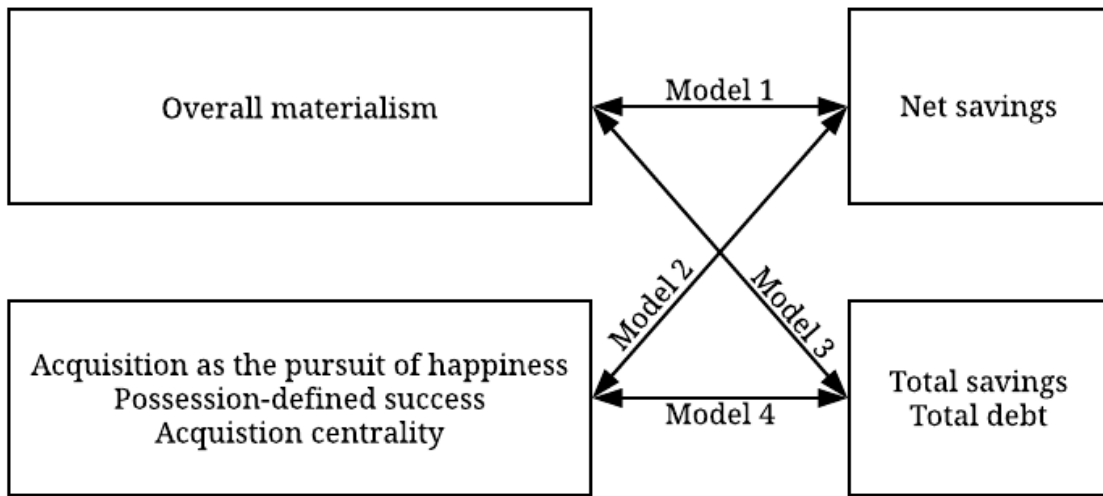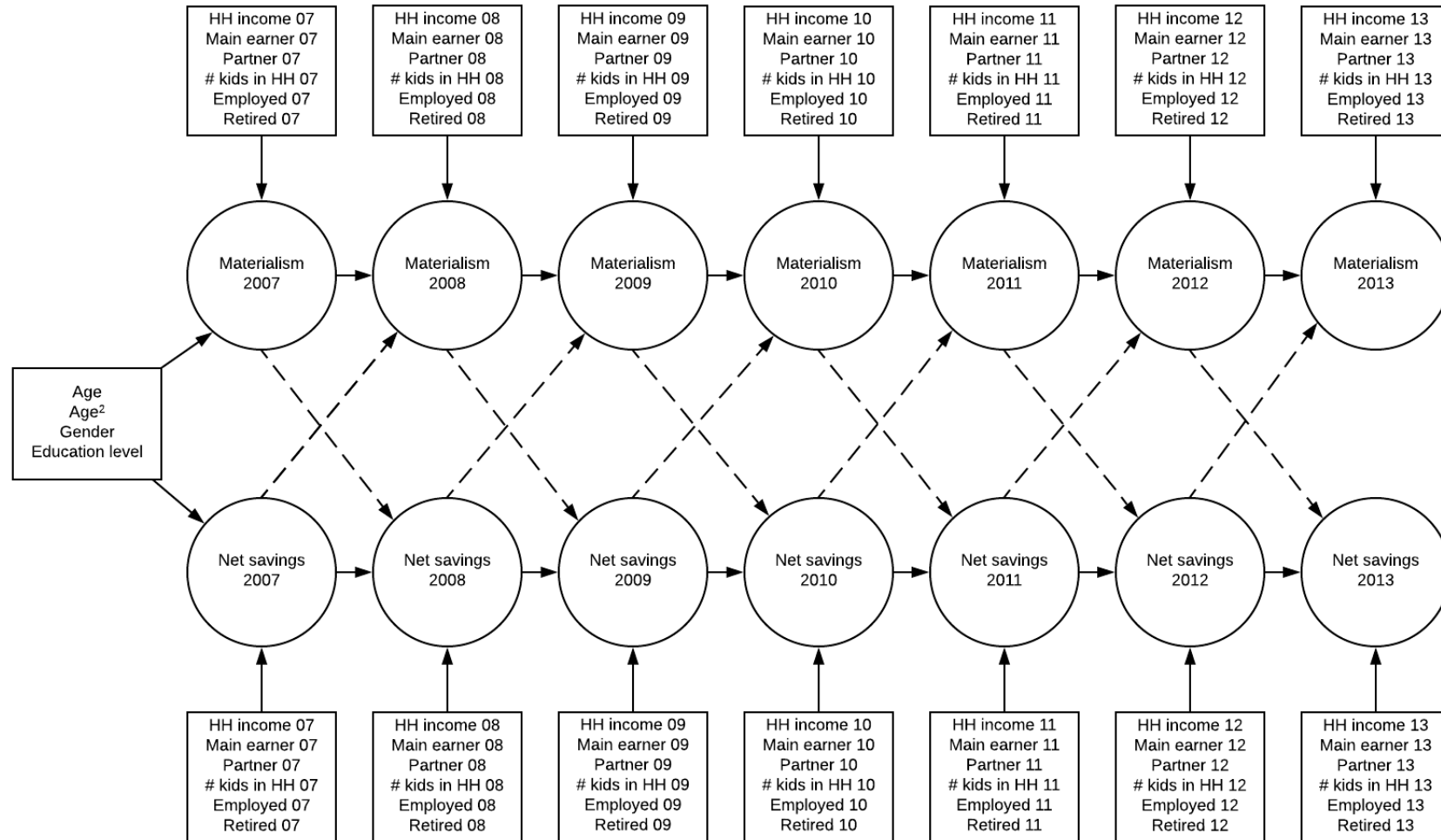
Figure 3.1

Analysis Overview

Figure 3.2

Cross-Lagged Model with Seven Assessments between Overall Materialism and Net Savings

Note. Residuals and correlations between residuals are not shown for readability purposes.

Model 1: Overall Materialism and Net Savings. Table 3.4 has the model estimates for overall materialism and net savings. As expected, overall materialism at time $t – 1$ had a negative effect on net savings at time t (-.789, $p < .001$). This indicates that, consistent with our hypothesis, consumers who were more materialistic tended to have lower net savings in the subsequent year than consumers who were less materialistic. Being high (+1 SD) rather than low (-1 SD) in overall materialism at time $t – 1$ corresponds to approximately € 1,104 less net savings at time t. The differences in net savings over the entire time period of the study are depicted on the left in figure 3.3. The effect of consumer materialism on net savings is over and above the effects of net savings in the previous year, and of important covariates such as employment status, income, and household composition, because these were controlled for. Net savings at time $t – 1$ did not have a significant effect on materialism at time t (.000, $p = .536$).[5]

Figure 3.3

Effects of Overall Materialism on Net Savings over Time
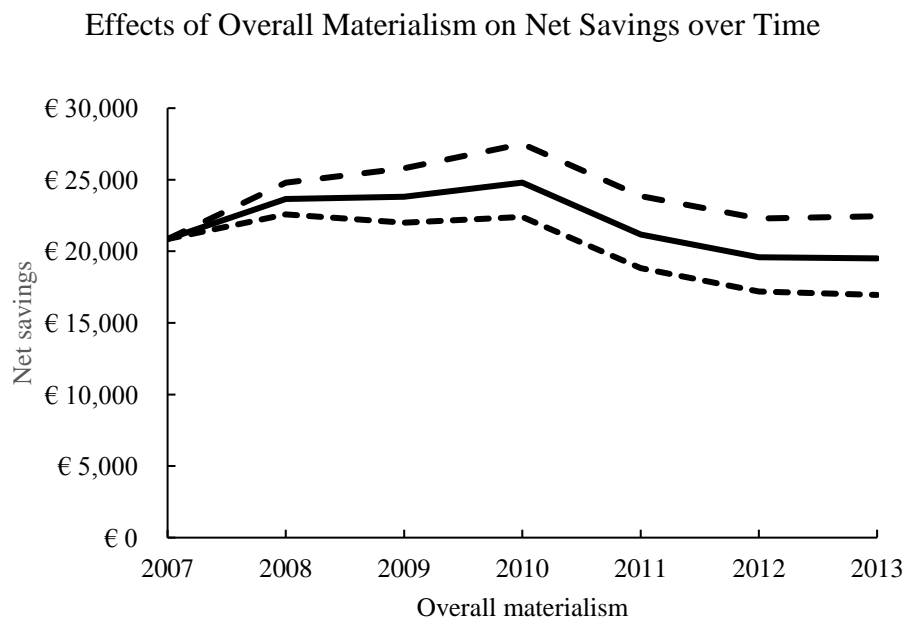
Note. Dotted line represents low overall materialism (- 1 SD), solid line mean overall materialism, and dashed line high overall materialism (+1 SD).

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[5] It could be that any effects between materialism and net savings are manifested over multiple years. To explore this possibility, we included a second lag for the cross-lagged effects in which both latent variables were accounted for by their own previous level (one lag), the previous levels of the other latent variable (two lags), and covariates. Consistent with the original findings, the results showed only a significant effect from overall materialism on later net savings t (-1.016, $p = .013$). Model comparison also favored the model with one-lag cross effects ($BIC_{restr.} = 130,634$ versus $BIC_{unrestr.} = 130,650$), supporting our original choice for one-lag effects.

Table 3.4

Autoregressive and Cross-Lagged Effects for Overall Materialism and Net Savings

	Overall materialism at t			Net savings at t		
	Estimate	SE	p	Estimate	SE	p
(Cross-)lagged effects						
Overall materialism at $t-1$	.970	.005	<.001	-.789	.118	<.001
Net savings at $t-1$	.000	.000	.536	.767	.014	<.001
Time-constant covariates						
Age	-.097	.006	<.001	1.273	.125	<.001
Age squared	.029	.003	<.001	-.330	.055	<.001
Gender (1 = Female)	-.030	.015	.046	-.955	.260	<.001
Level of education	-.043	.007	<.001	.719	.109	<.001
Time-varying covariates						
Net household income	.000	.001	.977	.021	.025	.398
Employed (1 = No)	-.003	.004	.361	-.333	.094	<.001
Retired (1 = Yes)	-.001	.004	.733	.457	.104	<.001
Main earner in household (1 = Yes)	.001	.003	.612	.241	.077	.002
Partner (1 = Yes)	.006	.003	.041	.273	.093	.003
Number of children in household	-.001	.001	.593	-.044	.036	.220

Note. Unstandardized coefficients shown. Overall materialism on a scale from 1 (lowest) to 5 (highest). Net savings are in Euros (transformed using the inverse hyperbolic sine transformation). Age measured in years divided by 10 and mean-centered. Gender is binary, with 0 = Male and 1 = Female. Level of education from 1 (no education) to 5 (university level). Net household income is monthly net household income in Euros (log-transformed). Employed is binary, with 0 = (self-) employed, and 1 = not employed. Retired is binary, with 0 = not retired and 1 = retired. Main earner in household is binary, with 0 = not main wage earner and 1 = main wage earner. Partner is binary, 0 = single, 1 = living with partner.

Model 2: Overall Materialism, Total Savings and Total Debts. Table 3.5

summarizes the results for overall materialism and total savings and total debts. Overall

materialism had a negative effect on subsequent total savings (-.218, $p < .001$), and a positive

effect on subsequent total debts (.305, $p < .001$). Again, these effects are over and above the

effects of previous levels of savings and debt ($t-1$) and important covariates such as income,

education and household composition. Total savings also had a small but significant

influence on subsequent levels of overall materialism (-.002, $p = .029$), but total debts did not

(.000, $p = .936$). As expected, total savings and total debt were negatively related.

Specifically, consumers with higher levels of total savings had lower levels of total debt in

the subsequent year (-.022, $p = .002$), and in turn, higher levels of debt were associated with

lower levels of savings in the subsequent year (-.008, $p = .065$).

Table 3.5

Autoregressive and Cross-Lagged Effects for Overall Materialism and Total Savings and

Total Debts

	Materialism at t			Total savings at t			Total debts at t		
	Est.	SE	p	Est.	SE	p	Est.	SE	p
(Cross-)lagged effects									
Materialism at $t-1$	.970	.005	<.001	-.218	.050	<.001	.305	.061	<.001
Total savings at $t-1$	-.002	.001	.029	.733	.014	<.001	-.022	.007	.002
Total debts at $t-1$	.000	.001	.936	-.008	.005	.065	.805	.009	<.001
Time-constant covariates									
Age	-.097	.006	<.001	.264	.046	<.001	-.670	.066	<.001
Age squared	.029	.003	<.001	-.070	.024	.005	.104	.031	.001
Gender (1 = Female)	-.031	.015	.043	-.919	.127	<.001	-.228	.145	.130
Level of education	-.042	.007	<.001	.619	.051	<.001	.066	.065	.302
Time-varying covariates									
Net household income	.000	.001	.864	.038	.014	.010	.025	.014	.063
Employed (1 = No)	-.005	.004	.196	-.346	.051	<.001	-.110	.049	.026
Retired (1 = Yes)	.000	.004	.971	.271	.062	<.001	-.102	.050	.043
Main earner (1 = Yes)	.004	.003	.245	.366	.045	<.001	.110	.040	.006
Partner (1 = Yes)	.002	.005	.670	.035	.037	.346	-.138	.047	.003
No. of children in hh	-.001	.001	.520	-.043	.016	.008	.003	.019	.866

Note. Unstandardized coefficients shown. Materialism is overall materialism, on a scale from 1 (lowest) to 5 (highest). Total savings and total debts are in Euros (log-transformed). Age measured in years divided by 10 and mean-centered. Gender is binary, with 0 = Male and 1 = Female. Level of education from 1 (no education) to 5 (university level). Net household income is monthly net household income in Euros (log-transformed). Employed is binary, with 0 = (self-)employed, and 1 = not employed. Retired is binary, with 0 = not retired and 1 = retired. Main earner is main earner in household, with 0 = not main wage earner and 1 = main wage earner. Partner is binary, 0 = single, 1 = living with partner. No. of children in hh is number of children in the household.

Model 3: Materialism Dimensions and Net Savings. Table 3.6 has the results for the three materialism dimensions and net savings. Notably, all three dimensions were associated with net savings. In line with our hypothesis, acquisition as the pursuit of happiness had a negative effect on net savings in the subsequent year. Those who were high in acquisition as the pursuit of happiness had lower net savings in the next year (-.956, $p <$ .001), even after controlling for net savings in the previous year and all covariates. Similarly, acquisition centrality had a negative effect on subsequent net savings (-.429, $p = .020$), although less strong. Possession-defined success had a positive effect on net savings in the next year (.850, $p = .014$).

In addition, having lower net savings was associated with higher levels of acquisition as the pursuit of happiness in the subsequent year (-.001, $p = .050$). The standardized coefficient was -.094 (SE = .018) for the effect of acquisition as the pursuit of happiness on net savings, and -.013 (SE = .007) for the effect of net savings on acquisition as the pursuit of happiness. The cross-lagged effect of acquisition as the pursuit of happiness on net savings was significantly larger than the cross-lagged effect of net savings on acquisition as the pursuit of happiness (Wald $\chi^2(1) = 20.488$, $p < .001$). Net savings did not influence later levels of possession-defined success (.000, $p = .792$) and acquisition centrality (.000, $p = .756$). The findings demonstrate that the three materialism dimensions have different relationships with net savings, both in the direction and sign of the effects, which are obscured when only overall materialism is examined.

Model 4: Materialism Dimensions, Total Savings and Total debts. Disaggregating both materialism and savings revealed further important insights. First, the findings indicate that the negative association between overall materialism and total savings is driven by the reciprocal relationships between acquisition as the pursuit of happiness and total savings, and acquisition as the pursuit of happiness and total debts, as can be seen in table 3.7.

Specifically, acquisition as the pursuit of happiness was negatively related to subsequent levels of total savings (-.358, $p < .001$) and positively to subsequent levels of total debt (.377, $p < .001$). What is more, total savings also negatively influenced later levels of acquisition as the pursuit of happiness (-.003, $p = .007$). The effect of total debts on acquisition as the pursuit of happiness was positive, but only marginally significant (.002, $p = .067$). Our findings thus imply a negative cycle from higher levels of acquisition as the pursuit of happiness to lower levels savings and higher levels of debt, and from lower levels of savings and higher levels of debt to higher levels of acquisition as the pursuit of happiness.

Possession-defined success and acquisition centrality did not influence subsequent levels of total savings (.198, $p = .224$ and .027, $p = .743$, respectively). Similarly, total savings was unrelated to later levels of possession-defined success and acquisition centrality (-.002, $p = .165$ and -.001, $p = .319$, respectively). However, even though the finding that acquisition centrality did not influence total savings supports the notion that enjoyment and pleasure from owning and acquiring possessions is not necessarily related to the amount spent on possessions, acquisition centrality was associated with higher later levels of debt (.259, $p = .007$). This suggests that a willingness to take on debt to satisfy consumption desires explains the negative association between acquisition centrality and net savings. In sharp contrast to this, higher levels of possession-defined success were associated with *lower* later levels of debt (-.431, $p = .018$).These findings are new, and once more show that treating materialism as a singular consumer value masks the more intricate associations that exist between the three materialism dimensions and debt. In addition, they show that some dimensions for materialism may have positive effects for consumers (Shrum et al. 2013), and specifically, their finances.

To summarize, we find a negative relationship between overall materialism and net savings. Higher levels of overall materialism led to lower levels of net savings in the next

year, but the effect of net savings on later levels of overall materialism was not significant. When net savings were decomposed into total savings and total debts, we found a negative reciprocal relationship between overall materialism and total savings, and a positive association between overall materialism and later levels of debt. Crucially, these associations were due to the materialism dimension acquisition as the pursuit of happiness. This dimensions for materialism had a negative and reciprocal relationship with total savings, and a positive relationship with total debts. Acquisition centrality was unrelated to total savings but associated with higher subsequent levels of total debts. Possession-defined success was positively related to net savings due to its negative effect on later levels of total debts.

Table 3.6

Cross-Lagged Results for Materialism Dimensions and Net Savings

	Acquisition as the pursuit of happiness at t			Possession-defined success at t			Acquisition centrality at t			Net savings at t		
	Est.	SE	p	Est.	SE	p	Est.	SE	p	Est.	SE	p
(Cross-)lagged effects												
Acquisition as the pursuit of happiness at $t-1$	.943	.010	<.001	--	--	--	--	--	--	-.956	.178	<.001
Possession-defined success at $t-1$	--	--	--	.935	.009	<.001	--	--	--	.850	.346	.014
Acquisition centrality at $t-1$	--	--	--	--	--	--	.921	.009	<.001	-.429	.184	.020
Net savings at $t-1$	-.001	.001	.050	.000	.001	.792	.000	.000	.747	.758	.015	<.001
Time-invariant covariates												
Age	-.139	.010	<.001	-.053	.009	<.001	-.124	.009	<.001	1.305	.125	<.001
Age squared	.037	.005	<.001	.038	.004	<.001	.027	.004	<.001	-.321	.055	<.001
Gender (1 = Female)	-.134	.023	<.001	-.122	.020	<.001	.126	.020	<.001	-.947	.260	<.001
Level of education	-.082	.011	<.001	-.057	.009	<.001	.000	.010	.990	.732	.108	<.001
Time-varying covariates												
Net household income	-.004	.002	.036	.001	.001	.448	.001	.001	.492	-.003	.025	.905
Employed (1 = No)	.011	.006	.064	-.001	.005	.892	-.023	.005	<.001	-.362	.098	<.001
Retired (1 = Yes)	-.016	.007	.018	.000	.005	.930	.002	.006	.741	.320	.109	.003
Main earner in household (1 = Yes)	.009	.005	.054	.003	.004	.529	-.006	.004	.148	.218	.084	.009
Partner (1 = Yes)	-.005	.006	.325	.015	.005	.001	.011	.005	.016	.179	.098	.069
Number of children in household	.006	.002	.014	-.004	.002	.024	-.002	.002	.268	.001	.038	.976

Note. Unstandardized coefficients shown. Acquisition as the pursuit of happiness, possession-defined success, and acquisition centrality on a scale from 1 (lowest) to 5 (highest). Net savings is in Euros (transformed using the inverse hyperbolic sine transformation)). Age measured in years divided by 10 and mean-centered. Gender is binary, with 0 = Male and 1 = Female. Level of education from 1 (no education) to 5 (university level). Net household income is monthly net household income in Euros (log-transformed). Employed is binary, with 0 = (self-)employed, and 1 = not employed. Retired is binary, with 0 = not retired and 1 = retired. Main earner in household is binary, with 0 = not main wage earner and 1 = main wage earner. Partner is binary, 0 = single, 1 = living with partner.

Table 3.7

Cross-Lagged Results for Materialism Dimensions, Total Savings, and Total Debts

	Materialism dimensions									Financial measures					
	Happiness at t			Success at t			Centrality at t			Total savings at t			Total debts at t		
	Est.	SE	p	Est.	SE	p	Est.	SE	p	Est.	SE	p	Est.	SE	p
(Cross-)lagged effects															
Happiness at $t-1$	.941	.010	<.001	--	--	--	--	--	--	-.358	.084	<.001	.377	.093	<.001
Success at $t-1$	--	--	--	.936	.008	<.001	--	--	--	.198	.169	.240	-.431	.181	.017
Centrality at $t-1$	--	--	--	--	--	--	.920	.009	<.001	.027	.083	.744	.259	.096	.007
Total savings at $t-1$	-.003	.001	.006	-.002	.001	.165	-.001	.001	.322	.726	.015	<.001	-.016	.007	.025
Total debts at $t-1$	.002	.001	.067	-.001	.001	.536	.000	.001	.629	-.004	.005	.443	.799	.010	<.001
Time-invariant covariates															
Age	-.139	.009	<.001	-.053	.009	<.001	-.124	.009	<.001	.279	.048	<.001	-.682	.066	<.001
Age squared	.036	.005	<.001	.038	.004	<.001	.027	.004	<.001	-.072	.025	.004	.097	.032	.002
Gender (1 = Female)	-.136	.025	<.001	-.119	.023	<.001	.124	.022	<.001	-.909	.124	<.001	-.232	.150	.124
Level of education	-.083	.011	<.001	-.057	.009	<.001	.001	.010	.925	.618	.051	<.001	.057	.064	.377
Time-varying covariates															
Net hh income	-.004	.002	.032	.001	.001	.321	.001	.001	.447	.026	.015	.073	.034	.015	.021
Employed (1 = No)	.010	.006	.102	-.002	.005	.628	-.023	.005	<.001	-.337	.053	<.001	-.082	.051	.109
Retired (1 = Yes)	-.014	.007	.028	.001	.006	.796	.003	.006	.637	.238	.065	<.001	-.042	.053	.428
Main earner in hh (1 = Yes)	.012	.005	.034	.005	.005	.312	-.005	.005	.253	.390	.047	<.001	.132	.046	.004
Partner (1 = Yes)	-.021	.008	.007	.015	.005	.001	.011	.005	.011	.015	.041	.713	-.091	.050	.067
Number of children in hh	.006	.002	.008	-.004	.002	.014	-.002	.002	.212	-.027	.018	.117	-.016	.019	.406

Note. Unstandardized coefficients shown. Success is "possession-defined success", Centrality is "acquisition centrality", and Happiness is "acquisition as the pursuit of happiness." All on a scale from 1 (lowest) to 5 (highest). Total savings and total debts are in Euros (log-transformed). Age measured in years divided by 10 and mean-centered. Gender is binary, with 0 = Male and 1 = Female. Level of education from 1 (no education) to 5 (university level). Net hh income is monthly net household income in Euros (log-transformed). Employed is binary, with 0 = (self-)employed, and 1 = not employed. Retired is binary, with 0 = not retired and 1 = retired. Main earner in hh is binary, with 0 = not main wage earner in household and 1 = main wage earner in household. Partner is binary, with 0 = single, 1 = living with partner. Number of children in hh is number of children in household.

Additional Findings. Relevant covariates were included in the models because of their known or hypothesized relationship with savings and/or materialism. These covariates are not the main focus of this research but we discuss their effects here because they provide additional insights and support the validity of our results. First, consistent with economic models of savings, savings were hump shaped over the life cycle. Figure 3.4 plots the predicted trajectories of total savings and overall materialism with age.

Figure 3.4

Overall Materialism and Total Savings with Age
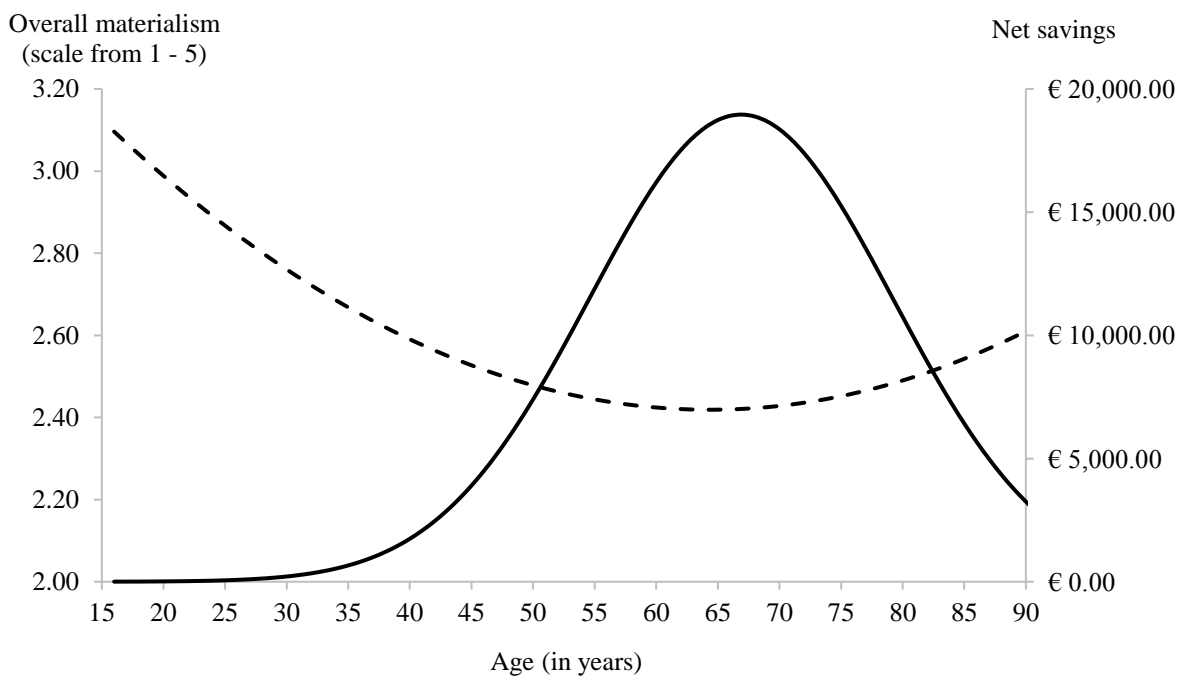
Note. Dashed line is total savings (in Euros). Solid line is overall materialism.

As would be expected, net savings increased from young to middle adulthood, peaked at about the retirement age (67 years), and then decreased in late adulthood (linear: 1.273, $p <$ .001; quadratic: -.330, $p = < .001$). On average, women had lower net savings than men (-

.955, $p < .001$). Higher educated consumers had higher levels of savings than lower educated consumers (.719, $p < .001$). This was due to the effect of education on total savings (.619, $p < .001$), education did not significantly influence total debts (.066, $p = .302$). Moreover, net household income was positively related to total savings (.038, $p = .010$) and had a marginally significant positive influence on total debts as well (.025, $p = .063$). Consumers who were unemployed had lower net savings (-.333, $p < .001$) than those who were employed. This was due to the negative effect of unemployment on total savings (-.346, $p < .001$) as being unemployed was also negatively associated with total debts (-.110, $p = .025$). Similarly, being the main earner of the household was positively associated with net savings (.241, $p = .002$) due to its positive association with total savings (.366, $p < .001$) and despite its positive association with total debts (.110, $p = .006$). Finally, having more children in the household was associated with lower total savings (-.043, $p = .008$), but not with net savings (-.044, $p = .220$) or total debts (.003, $p = .866$). Overall, the effects of covariates were consistent with economic theories of saving (e.g. Attanasio and Weber 2010; Sunden and Surette 1998). It is important that even after controlling for all these, consumer materialism still had a highly significant effect on financial savings, supporting Thaler's (1994) early call to delve deeper into psychological factors.

The effects of the covariates on consumer materialism and its three dimensions were interesting as well. In particular, overall materialism was negatively related to education level (-.042, $p < .001$). This was because higher levels of possession-defined success and acquisition as the pursuit of happiness were associated with lower levels of education (-.057, $p < .001$ and -.082, $p < .001$ respectively). Acquisition centrality was unrelated to education (.000, $p = .990$). There is a consistent pattern of results for acquisition as the pursuit of happiness that shows that consumers who are high in this dimension for materialism do not only have lower savings, but also more debt, and lower incomes (-.004, $p = .036$). What is

more, having lower savings and having more debt at time $t - 1$ are both associated with *higher* levels of acquisition as the pursuit of happiness at time t. The general discussion elaborates on the implications of these findings.

Materialism, Savings, and Income

Our results revealed a negative relationship between materialism and savings, due to the negative relationship between acquisition as the pursuit of happiness and savings. These effects are not due to differences in income, because these were statistically controlled for in the model. Even though income was not the focus of this study, it may play a more prominent role in the relationships between materialism and savings. For instance, consumers high in acquisition as the pursuit of happiness might work more or pursue higher-paying jobs, and thus earn higher incomes due to their higher desired standard of living (Richins and Dawson 1992; Richins and Rudmin 1994). Then income would be endogenous to the model. As such, there may be an indirect positive effect of materialism on savings which is not accounted for in our main model. A follow-up analyses using the multivariate autoregressive cross-lagged model was conducted to explore this issue. We estimated the multivariate autoregressive cross-lagged model but now with the three materialism dimensions, total savings and total debts, and income as endogenous variables, while controlling as before for the other covariates (including education, gender, age, and household composition).

Table 3.8

Cross-Lagged Results for Materialism Dimensions, Total Savings, Total Debts, and Income

	Materialism dimensions																	
	Happiness at t			Success at t			Centrality at t			Total savings at t			Total debts at t			Income at t		
	Est.	SE	p	Est.	SE	p	Est.	SE	p	Est.	SE	p	Est.	SE	p	Est.	SE	p
(Cross-)lagged effects																		
Happiness at $t-1$	.942	.010	<.001	--	--	--	--	--	--	-.360	.082	<.001	.372	.094	<.001	-.008	.030	.797
Success at $t-1$	--	--	--	.936	.009	<.001	--	--	--	.198	.163	.224	-.442	.183	.016	-.017	.067	.806
Centrality at $t-1$	--	--	--	--	--	--	.918	.009	<.001	.030	.082	.713	.271	.097	.005	.019	.026	.461
Total savings at $t-1$	-.003	.001	.006	-.002	.001	.195	.000	.001	.629	.726	.015	<.001	-.015	.007	.030	.000	.001	.629
Total debts at $t-1$	.001	.003	.733	.001	.003	.690	-.003	.002	.049	-.004	.005	.447	.799	.010	<.001	.001	.001	.139
Income at $t-1$	.002	.001	.046	.000	.001	.693	.001	.001	.139	.023	.016	.139	.017	.020	.383	.925	.018	<.001
Time-invariant covariates																		
Age	-.139	.010	<.001	-.052	.009	<.001	-.123	.009	<.001	.278	.046	<.001	-.680	.066	<.001	.045	.021	.031
Age squared	.036	.005	<.001	.038	.004	<.001	.026	.005	<.001	-.072	.024	.003	.096	.032	.002	-.021	.011	.057
Gender (1 = Female)	-.136	.023	<.001	-.118	.022	<.001	.124	.020	<.001	-.914	.127	<.001	-.232	.146	.110	-.057	.037	.130
Level of education	-.085	.011	<.001	-.057	.010	<.001	.002	.010	.801	.624	.050	<.001	.064	.066	.331	.185	.024	<.001
Time-varying covariates																		
Employed (1 = No)	.011	.006	.067	-.003	.005	.693	-.024	.005	<.001	-.335	.053	<.001	-.088	.051	.087	-.077	.017	<.001
Retired (1 = Yes)	-.015	.007	.028	.002	.006	.740	.003	.006	.581	.237	.064	<.001	-.036	.054	.498	.042	.019	.031
Main earner in hh (1 = Yes)	.011	.005	.021	.004	.005	.332	-.007	.004	.134	.392	.049	<.001	.133	.044	.002	-.010	.010	.353
Partner (1 = Yes)	-.021	.008	.007	.016	.005	.001	.013	.005	.004	.014	.041	.734	-.080	.050	.110	.101	.019	<.001
Number of children in hh	.006	.002	.017	-.005	.002	.019	-.003	.002	.213	-.027	.017	.110	-.016	.020	.415	-.005	.006	.368

Note. Unstandardized coefficients shown. Success is "possession-defined success", Centrality is "acquisition centrality", and Happiness is "acquisition as the pursuit of happiness." All on a scale from 1 (lowest) to 5 (highest). Savings and debts are in Euros (log-transformed). Income is monthly net household income in Euros (log-transformed). Age measured in years divided by 10 and mean-centered. Gender is binary, with 0 = Male and 1 = Female. Level of education from 1 (no education) to 5 (university level). Employed is binary, with 0 = (self-)employed, and 1 = not employed. Retired is binary, with 0 = not retired and 1 = retired. Main earner in hh is binary, with 0 = not main wage earner in household and 1 = main wage earner in household. Partner is binary, with 0 = single, 1 = living with partner. Number of children in hh is number of children in household.

Table 3.8 has the results. Importantly, the relationships the materialism dimensions and total savings and total debts were largely unaffected by including income as an endogenous variable. Acquisition as the pursuit of happiness still had a negative effect on later total savings (-.360, $p < .001$), and a positive effect on later levels of debt (.372, $p < .001$). Acquisition centrality and possession-defined success were still unrelated to later levels of total savings (.030, $p = .713$ and .198, $p = .224$, respectively). Moreover, acquisition centrality was still positively associated with later levels of total debts (.271, $p = .005$), whereas possession-defined success was still negatively associated with later levels of total debt (-.442, $p = .016$). The only change in results is that the effect of total debts on later levels of acquisition as the pursuit of happiness is no longer marginally significant.

Income positively influenced later levels of acquisition as the pursuit of happiness (-.002, $p = .046$), but there were no effects from any of the three materialism dimensions on income over time. In addition, income and savings were positively correlated in the first wave as expected, but there were no cross-lagged effects from income on total savings or total debts, or vice versa. The results support our original choice to treat income as exogenous to the system of simultaneous equations. The notion that materialism might lead consumers to work harder or more to increase their income (Richins and Rudmin 1994) thus appears not to be confirmed based on the analysis of our data. The final chapter returns to this issue. Overall, our findings on the relationships between the materialism dimensions and total savings and total debts are robust to the alternative model specification in which income is endogenous.

Discussion

This study found a negative relationship between overall materialism and net savings over time, such that higher levels of overall materialism led to lower levels of net savings. It further found that the negative association between overall materialism and net savings is due to a negative association with total savings, as well as a positive association with total debts. What is more, total savings also influenced overall materialism over time, such that higher savings were associated with lower levels of overall materialism. What is more, the three key dimensions for materialism all had vastly different relationships with financial savings. Whereas acquisition as the pursuit of happiness and acquisition centrality were negatively associated with subsequent net savings, possession-defined success was positively associated with subsequent net savings. We found that acquisition as the pursuit of happiness had a negative reciprocal relationship with total savings, and a positive effect on later levels of total debts. Moreover, the negative association between acquisition centrality and net savings was due to its positive effect on total debts over time. Similarly, the positive association between possession-defined success and net savings was driven by its negative effect on total debts over time.

These findings were obtained using a large database of 4,180 consumers across a period of seven years, and while controlling for various factors that might bias the results if unaccounted for, such as age, income, gender, education, and household composition. Thus, consumer materialism does not uniformly lead to lower financial savings, and one dimension of materialism even leads to increased financial savings. These findings have implications for materialism theory, the literature on financial decision making, and models of causal inference from observational data.

Materialism Theory

The overall relationships between materialism and financial savings were due to one specific materialism dimension only, namely acquisition as the pursuit of happiness. The negative effect of financial savings on acquisition as the pursuit of happiness implies that acquisition as the pursuit of happiness is actually exacerbated by low savings. In other words, the belief of consumers high in acquisition as the pursuit of happiness that they would be happier 'if only' they would be able to acquire and own more possessions has a real financial foundation. The findings support the idea that acquisition as the pursuit of happiness is what we term a "deficit" materialism dimension. Akin to Rindfleisch et al. (2009) we argue that consumers high in acquisition as the pursuit of happiness are not insatiable consumers who are frantically searching for the next best thing to buy and own (Kasser 2002). Rather, we find that these consumers truly have lower savings than others. The combined findings of our analyses suggest that this dimension reflects a more general material and financial resource deficit, as it is associated not only with lower savings, but also with lower income and higher debt. This is an important new finding that invites further research.

Higher levels of financial savings led to lower levels of consumer materialism over time, even while controlling for the autoregressive effect of materialism at a previous time. This finding is also new and has implications for materialism theory. The possibility that financial and personal factors can influence consumer materialism has previously been documented (Ahuvia and Wong 2002; Pieters 2013; Richins and Chaplin 2015; Rindfleisch et al. 1997). Still, materialism research seems to have emphasized the causal direction from materialism to various (undesirable) outcomes (Dittmar et al. 2014; Kasser 2002), and has only seldom considered that these relationships may be reciprocal (e.g. Pieters 2013). Our findings call for further theorizing on the directionality of associations between materialism and financial and personal factors.

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Possession-defined success was unrelated to total savings, but negatively related to total debts. The null effect on savings might be because consumers high in possession-defined success do not spend more, but allocate their spending differently than other consumers. Perhaps consumers high in possession-defined success own more luxury or status brands, but cut down on other expenses to pay for these. This type of spending behavior is not uncommon, as reflected by recent trends in retail that indicate consumers are increasingly willing to mix luxury and discount brands, for instance combining luxury designer and low-price clothing (Bolton and Shankar 2018). Unfortunately, our database did not contain information on spending, and we thus need to relegate this speculation to future research.

Public Policy

The negative reciprocal relationship between acquisition as the pursuit of happiness and total savings suggests a downwards spiral, such that being high in acquisition as the pursuit of happiness leads to lower savings, which in turn leads to higher levels of acquisition as the pursuit of happiness. Materialism is partly a learned value (Ahuvia and Wong 2002; Richins and Chaplin 2015; Rindfleisch et al. 1997; Shrum et al. 2005), and develops in response to physical and psychological insecurity (Chang and Arkin 2002; Chaplin and Roedder John 2007; Rindfleisch et al. 2009; Sheldon and Kasser 2008). Consequently, effectively encouraging self-transcendence values that oppose materialism, and helping consumers to feel more secure might reduce consumer materialism (Kasser 2016), and thus increase savings and lower debts. Education can play a prominent role in these processes. It is known that educational experiences promote self-transcendence values (Schwartz et al. 2001) and of course, education enhances consumers' ability to satisfy physical and psychological needs. Consistent with this, consumers with higher levels of education had lower levels of materialism, and in particular lower levels of acquisition as the pursuit of happiness, independent of income and other important covariates. Taken together, education has both

direct and indirect positive effects on savings. More specifically, a substantial 6.6% of the total effect of education on savings was mediated by acquisition as the pursuit of happiness, as a motivational driver. Because we controlled for income, gender, age, and household composition in these analyses, these results point to important direct and indirect benefits of education in the cycle between consumer materialism and financial savings.

Furthermore, these findings suggest that consumers most vulnerable to the negative cycle are those with low education, and this is where public policy might focus its efforts. Improving financial education is increasingly relevant (Lusardi and Mitchell 2014), now that worldwide, the responsibility and risk for financial decisions are increasingly being shifted to consumers and away from governments and employers. Because of the complexity of financial decision-making, these developments may be especially harmful for lower-educated consumers. Unfortunately, interventions aimed at improving financial literacy appear unsuccessful, explaining only 0.1% of the variance in financial behaviors (Fernandes et al. 2014). What is more, existing financial literacy programs focus on improving consumers' financial knowledge and skills (Consumer Financial Protection Bureau 2016), aiming to improve consumers' *ability* to save, but overlooking the fact that saving decisions are also largely influenced by consumers' *motivation* to save. Our results suggest that consumers with higher education levels are not only better able, but also more motivated to save because they are less materialistic. Consequently, policies aimed at helping consumers make better financial decisions might be better off focusing on broadening their scope and aiming to influence consumers' motivation to save.

Causal Inference

Enhancing causal inference using survey data can be managed through: (1) multiple respondents, (2) multiple data sources, or (3) multiple periods (Rindfleisch et al. 2008). Our

longitudinal database of over 4,100 respondents, combining two data sources, with seven measurement waves, satisfies all three criteria, and this is rare in the marketing literature (Rindfleisch et al. 2008). Combined with the multivariate autoregressive cross-lagged model, these data allowed us to establish Granger causality in the relationship between consumer materialism and financial savings.

The autoregressive crossed-lagged model provides a powerful procedure for inferring Granger causality in longitudinal studies (Usami et al. 2015). Specifically, causality is tested via the statistical significance of the causal path from materialism at an earlier point in time to financial savings at a later point in time while controlling for earlier financial savings (and the same for the causal path from savings at an earlier point in time to materialism at a later point in time). We estimated our model in the widely available Mplus program (Muthén and Muthén 1998-2017), which increases its accessibility. Autoregressive cross-lagged models are uncommon in consumer behavior but are both powerful and accessible. The increasing availability of large-scale longitudinal data opens up new possibilities to examine dynamic relationships between materialism and related constructs using these or similar models.

Limitations and Future Research

Strong evidence for causal relationships between consumer materialism and financial savings would require randomized controlled trials, where consumers are randomly assigned to high and low materialism, and high and low savings conditions, which is financially and practically impossible, and ethically unacceptable. Thus, it is possible that various omitted variables have biased the relationships of interest, and it is important to acknowledge this. We accounted for possible determinants of materialism and savings such as age, gender, education, income, employment, and household composition, to mitigate the possibility of omitted variable bias. Future research could include variables that were currently omitted,

such as consumers' propensity to plan (Lynch Jr. et al. 2010) or temporal discounting (Frederick, Loewenstein, and O'Donoghue 2002). Such research could shed more light on the reasons why consumers high in acquisition as the pursuit of happiness manage their finances less well than others. For instance, it may find that consumers high in acquisition as the pursuit of happiness have a low propensity to plan, or put higher emphasis on present versus future consumption than others.

Our data came from a representative sample from the Netherlands. Previous research has found that ownership of financial products differs between countries (Bijmolt, Paas, and Vermunt 2004). It is possible that differences in pension systems and government regulations distinguish the saving decisions of Dutch consumers from those of consumers in other countries. For instance, because the Netherlands has an extensive social safety net, Dutch consumers might find it relatively less important to save for unemployment, but still have precautionary savings for unforeseen health expenditures or other unforeseen circumstances (Alessie and Kapteyn 2001). Of course, these factors are common to all consumers in our sample and as such do not influence the established associations between materialism and savings. Yet, cross-national research is needed to establish the generalizability of our findings to different countries, and we hope that our study helps to stimulate such needed research.

In sum, this research showed that consumer materialism is negatively associated with financial savings and that the relationship is reciprocal. Importantly, the reciprocal relationship was only present for one materialism dimension only, namely acquisition as the pursuit of happiness. The two other key dimensions for materialism, possession-defined success and acquisition centrality, were essentially unrelated to financial savings. This supports the idea that materialism should not be perceived as a singular construct with uniformly negative consequences. Our results indicate that acquisition as the pursuit of happiness is not an active striving for more and better things, which reduces financial

savings. Instead it should be conceived as reflecting a consumer deficit value which is not specific to the material domain. Furthermore, additional analyses revealed systematic relationships between the three materialism dimensions and debt over time. Whereas acquisition as the pursuit of happiness and acquisition centrality were associated with higher debt, possession-defined success was actually associated with lower debt. These findings are new and respond to Thaler's (1994) call to incorporate more of the psychology of saving into economic theories.

Chapter 4

Feeling Bad by Wanting More or Wanting More by Feeling Bad:

The Materialism - Well-Being Cycle

Across the world, holding strong materialistic values is associated with reduced subjective well-being. A recent comprehensive meta-analysis of 258 independent samples (Dittmar et al. (2014) finds a mean correlation between materialism and well-being was -.15, which is modest but non-negligible and negative. The common inference then is that higher levels of consumer materialism uniformly lead to lower levels of subjective well-being (Karabati and Cemalcilar 2010; Kasser et al. 2014; Wang et al. 2017). Pope Francis formulated it as follows "Whenever material things […] become the center of our lives, they take hold of us, they possess us; we lose our very identity as human beings."[6] Our research challenges the idea that higher levels of materialism uniformly lower subjective well-being. Using a representative longitudinal database of over 5,300 Dutch consumers across three years (2013-2015) our research improves over previous, predominantly cross-sectional studies both methodologically and conceptually, showing that materialism may not be inherently bad and moreover that subjective well-being may also influence consumer materialism.

Methodologically, we address three potential sources of endogeneity which may systematically bias the size, sign and direction of the relationship between materialism and subjective well-being, namely measurement error, simultaneity, and omitted variables (Wooldridge 2002). Any of these sources of endogeneity causes a correlation between materialism or subjective well-being and the error term, leading to biased, and sometimes

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inefficient estimates. We account for these biases by decomposing the observed association between materialism and well-being into true shared variance and error.

First, we estimate a measurement model that decomposes the total variance of our measures of materialism and well-being into their true variance and measurement error components. This reduces potential attenuation bias due to unaccounted measurement error. As such, it yields more precise and efficient estimates of the relationship between materialism and well-being.

Second, we estimate a multivariate autoregressive cross-lagged model which separates the total relationship between materialism and well-being into two causal directions. This reduces bias due to unaccounted potential simultaneity of effects. The vast majority of materialism research is based on survey data collected at a single point in time, which impedes causal inferences. Even the few longitudinal studies have assumed that the causal direction runs from materialism to well-being, without allowing for the possibility of reverse causality (Wang et al. 2017). As a case in point, over varying time frames (6 months to 12 years), Kasser et al. (2014) found that over time higher levels of materialism were associated with lower levels in well-being, but did not report on the possibility of a reverse effect of well-being on materialism. We propose that the relationship between materialism and subjective well-being is reciprocal. In fact, a reciprocal relationship has been suggested previously (Burroughs and Rindfleisch 2002; Dittmar et al. 2014; Rustagi and Shrum 2017), but empirical research to address the issue is to our knowledge not yet available. Our model estimates both pathways simultaneously, and as such moves closer to the understanding the causal processes at work.

Third, we control for various potentially confounding variables based on substantive theory, reducing the possibility of bias due to omitted variables. Particularly, we include age,

income, education, and employment and marital status, which have been shown to affect materialism, subjective well-being, or both, as covariates in the model (Charles, Reynolds, and Gatz 2001; Glenn and Weaver 1981a, b; Jaspers and Pieters 2016; Pieters 2013; Richins and Dawson 1992). Failure to control for such factors would lead to biased estimates of the relationship between materialism and well-being. Of course, the possibility of omitted variables bias can never be ruled out completely in observational research. We report our analyses with and without the covariates to compare the unconditional and conditional effects that materialism and well-being have on each other.

Our research also aims to make a conceptual contribution. In addition to examining the aggregate relationship between overall materialism and subjective well-being, we also examine the disaggregate relationships for the three key materialism dimensions. We build on the leading conceptualization of materialism by Richins and Dawson (1992) as a multidimensional construct with three dimensions: acquisition as the pursuit of happiness, acquisition centrality, and possession-defined success. These dimensions are conceptually and empirically distinct and have differential relationships with related variables such as age and loneliness (Jaspers and Pieters 2016; Pieters 2013). Correspondingly, they are likely to have distinct relationships with subjective well-being.

Specifically, we propose that acquisition as the pursuit of happiness drives the negative association between overall materialism and well-being. This dimension reflects consumers' dissatisfaction due to a perceived gap between their actual and desired material states. Their dissatisfaction extends beyond the material domain, leading to reduced well-being. Acquisition centrality and possession-defined success are inherently more positive, reflecting emotional and social benefits of the acquisition and ownership of possessions. Their associations with subjective well-being are therefore expected to be neutral or even positive. Decomposing the aggregate relationships between overall materialism and well-being informs

our understanding of the mechanisms underlying them and disentangles the negative and potentially positive effects that materialism and well-being have on each other.

Taken together, our contributions move us closer to inferences about the size, sign, and direction of the relationship between materialism, its three dimensions, and subjective well-being. It answers to repeated calls for longitudinal studies to examine this vexing issue (Dittmar et al. 2014; Rustagi and Shrum 2017). We find that the relationship between materialism and well-being is reciprocal, and only negative for acquisition as the pursuit of happiness. The other two materialism dimensions are in fact positively associated with subjective well-being. The next section describes the theoretical relationships between materialism and well-being. Then, we describe our data and statistical modeling approach.

Consumer Materialism and Subjective Well-Being

Consumer materialism reflects the importance that consumers attach to acquiring and owning possessions (Richins and Dawson 1992). It is an important personal value that guides consumers' daily lives and their consumption decisions (Burroughs and Rindfleisch 2002; Richins 2017). Materialism has not only been associated with reduced well-being (Burroughs and Rindfleisch 2002; Dittmar et al. 2014; Kasser et al. 2014), but also with increased loneliness (Pieters 2013), compulsive consumption (Dittmar 2005), and credit overuse (Richins 2011). Materialism has been labelled "the dark side" of consumer behavior (Mick 1996) and, at least in the U.S., is subject to stigmatization and stereotyping (Van Boven, Campbell, and Gilovich 2010). However, materialism is multidimensional in nature and may have positive utility for consumers as well (Shrum et al. 2014; Shrum et al. 2013).

The foremost conceptualization of materialism by Richins and Dawson (1992) recognizes three dimensions of materialism. Acquisition as the pursuit of happiness reflects

the belief that possessions and their acquisition are essential to well-being. Acquisition centrality reflects the hedonic benefits associated with the acquisition and ownership of possessions. Possession-defined success refers to the tendency to use possessions as a measure of one's own and others' success, emphasizing the ability of possessions to communicate identity and convey status. We first describe the relationships between overall materialism and subjective well-being, and then zoom in on the three materialism dimensions. The section concludes with our predictions.

Overall Materialism and Subjective Well-Being

Subjective well-being (SWB) refers to consumers' emotional and cognitive evaluations of their lives, and includes what lay people call happiness, peace, fulfillment, and life satisfaction (Diener, Oishi, and Lucas 2003).The judgement of how satisfied consumers are with their life is based on a comparison with a standard, which each individual sets for him or herself (Diener et al. 1985). There are two different, but not necessarily competing, explanations as to why materialism is associated with lower well-being. First, a strong focus on the acquisition and ownership of possessions may undermine or "crowd out" the pursuit of more intrinsic goals that enhance well-being (Burroughs and Rindfleisch 2002). Materialists tend to value financial success significantly more than other life goals such as social affiliation, self-acceptance, and sense of accomplishment (Kasser and Ryan 1993; Richins and Dawson 1992). Moreover, research has found that lower fulfillment of needs for competence, relatedness, and autonomy (partially) mediated the relationship between materialism and well-being (Dittmar et al. 2014; Wang et al. 2017). Second, materialistic consumers may never be satisfied because the enjoyment of buying and owning possessions wears off quickly and instigates new desires for more and better possessions. Indeed, Richins (2013) found that consumers high in materialism showed hedonic elevation before purchase and hedonic

decline after purchase, whereas consumers low in materialism did not. This process based on hedonic adaptation is referred to as the hedonic treadmill (Brickman and Campbell 1971).

Alternatively, materialism might not be the cause, but rather the result, of low subjective well-being. Specifically, low well-being may lead to an emphasis on materialistic values because possessions can provide consumers instant (yet conceivably temporary) hedonic stimulation. Although the effect of well-being on materialism has not been examined, evidence suggests that materialism may be a coping mechanism for consumers who have self-doubt (Chang and Arkin 2002), are lonely (Pieters 2013), or experienced stressful life events such as parental divorce (Rindfleisch et al. 1997; Roberts, Manolis, and Tanner 2006b). Consumers low in well-being may focus on possessions to enhance their self-esteem, or compensate for feelings of powerlessness (Richins 2017). As such, low subjective well-being is likely to increase the importance that consumers place on possessions.

Materialism Dimensions

Acquisition as the Pursuit of Happiness. Acquisition as the pursuit of happiness reflects consumers' belief that owning more and better possessions will make them happier. It is based on a dissatisfaction caused by a discrepancy between one's actual, and desired, material possessions. As Karabati and Cemalcilar (2010, p. 630) put it: "items in the happiness sub-dimension may be triggering […] responses related to objective evaluations of material conditions or perceptions of inequality stemming from income differences, in addition to attitudinal responses." The dissatisfaction based on consumers' objective or subjective evaluations of their material conditions extends beyond the material domain. Acquisition as the pursuit of happiness is strongly associated with lower satisfaction in all life domains, including money, work, family and friends (Roberts and Clement 2007). What is more, cross-sectional studies found that of the three materialism dimensions, only acquisition

as the pursuit of happiness was negatively associated with well-being (Garðarsdóttir, Dittmar, and Aspinall 2009; Pandelaere, Pieters, and Shrum 2018; Swinyard, Kau, and Phua 2001).

Conversely, low levels of subjective well-being may also lead to increased levels of acquisition as the pursuit of happiness. In particular, consumers may use possessions as a means to cope with low well-being. Focusing on the acquisition and ownership of possessions can be attractive compared to pursuing alternative sources of happiness because gratification from material possessions is instant and relatively easy to obtain. This may foster the belief that possessions are the pathway to happiness, leading consumers to focus on materialistic values when they are dissatisfied with life. Consistent with this idea, research has found that materialism is used as a coping mechanism for self-doubt (Chang and Arkin 2002), stressful life events such as parental divorce (Rindfleisch et al. 1997; Roberts et al. 2006b), and loneliness (Pieters 2013). This dimensions of materialism in particular, was also found to be associated with childhood feelings of insecurity (Richins and Chaplin 2015).

Acquisition Centrality. Richins (2017) refers to acquisition centrality as "the extent to which possessions and acquisition are a central focus of one's life" (p. 481). Indeed, its scale items focus on the importance of possessions, but also to the enjoyment and pleasure that consumers experience from acquisition and ownership of possessions (e.g., "I enjoy spending money on thing that aren't practical"). For consumers high in acquisition centrality, material possessions do not represent a source of dissatisfaction, as for those high in acquisition as the pursuit of happiness, but rather a source of satisfaction. Pieters (2013, p. 617) describes it as follows: "possessions are part of a life of happy hedonism or material mirth."

Acquisition centrality is associated with hedonism (Karabati and Cemalcilar 2010), which is the pleasure or sensuous gratification for oneself, and is related to enjoying life

(Schwartz 1994). Moreover, acquisition centrality appeared unrelated to self-doubt and self-esteem (Chang and Arkin 2002), social anxiety (Wong 1997), and was even found to decrease loneliness (Pieters 2013), supporting the notion that acquisition centrality represents the hedonic dimension of materialism. What is more, consumers who score high on acquisition centrality view shopping as an enjoyable leisure activity, and engagement in leisure activities such as shopping contributes to subjective well-being (Brajša-Žganec, Merkaš, and Šverko 2011). Hence, acquisition centrality is expected to be positively associated with well-being.

Consumers who are more satisfied with their lives overall, are more likely to enjoy activities such as shopping, suggesting that subjective well-being is also associated with higher levels of acquisition centrality. This is consistent with a top-down approach to well-being, which assumes that consumers high in well-being have a global propensity to experience things in a positive way, and this propensity influences how they experience day-to-day activities such as shopping (Diener 1984). A meta-analysis by Kuykendall, Tay, and Ng (2015) concluded that the combined evidence of three longitudinal studies supported both bottom-up and top-down processes between leisure satisfaction and life satisfaction. That is, consumers who were more satisfied with their leisure time activities were more satisfied with life overall, and vice versa. Albeit indirect, these findings support the idea that consumers high in subjective well-being experience activities such as shopping more positively, and consequently have higher levels of acquisition centrality.

Possession-defined Success. Possession-defined success refers to the use of possessions to measure success (Richins and Dawson 1992). Material possessions function not only as symbols of status, but also of identity, personality and self-expression (Dittmar 1992; Dittmar and Pepper 1994). On the one hand, possession-defined success might be positively associated with subjective well-being. To a certain extent, possession-defined success is consistent with the valuation of possessions as a means of furthering one's goals in

a wider social context (Csikszentmihalyi and Rochberg-Halton 1981). In the context of self-determination theory (Ryan and Deci 2000), being successful in owning possessions that project a desired image leads to positive competence feedback. People described has having more expensive possessions rather than basic material goods are perceived as more successful, hard-working, and autonomous (Dittmar 1992; Dittmar and Pepper 1994). This positive competence feedback addresses consumers' competence needs which in turn has positive effects on well-being (Deckop, Jurkiewicz, and Giacalone 2010).

On the other hand, using possessions as a yardstick for success may be detrimental to subjective well-being. Even though possessions can provide a way of addressing competence needs, there are arguably more efficient ways of addressing those needs, such as through job or educational performance. In addition, scale items of possession-defined success reflect an extrinsic focus, such as wanting to own things to impress people. Such extrinsic aspirations are generally associated with reduced well-being (Kasser and Ryan 1993). Research has also found that possession-defined success is associated with increased loneliness (Pieters 2013), self-doubt and social anxiety (Chang and Arkin 2002).

Consistent with the top-down approach to subjective well-being (Diener 1984), consumers who feel that they have done well in life may also evaluate their success in terms of possessions more positively. For instance, Headey, Veenhoven, and Wearing (1991) found that satisfaction with work and standard of living was a consequences of overall life satisfaction. Consequently, consumers high in well-being may emphasize the value of possessions as a means to communicate their identity, personality, and personal success.

Predictions

In sum, we propose that the negative relationship between overall materialism and subjective well-being is reciprocal. Thus, consumers high in materialism either fail to pursue

intrinsic goals or get caught up in the hedonic treadmill, leading to reduced well-being. At the same time, consumers with low well-being may use materialism to enhance their self-esteem, or compensate for feelings of powerlessness. Therefore, we predict that higher levels of overall materialism are associated with lower levels of subjective well-being (hypothesis 1a), and that lower levels of subjective well-being is associated with higher levels of overall materialism (hypothesis 1b). We further propose that these negative associations are due to only a single materialism dimension, namely acquisition as the pursuit of happiness. Dissatisfaction with one's material conditions should impact overall life satisfaction negatively. Acquisition as the pursuit of happiness is thus associated with lower levels of subjective well-being (hypothesis 2a). Moreover, low subjective well-being encourages a focus on material goods to alleviate feelings of unhappiness. Subjective well-being is thus expected to lead to lower levels of acquisition as the pursuit of happiness (hypothesis 2b).

Importantly, we also expect positive associations between materialism and subjective well-being. In particular, acquisition centrality, which reflects the hedonic aspects of buying and owning possessions, is expected to be associated with higher levels of well-being (hypothesis 3a). Higher levels of well-being may also lead to higher levels of acquisition centrality due to tendencies of happier consumers to emphasize positive experiences and emotions in life in general, as well as in particular life domains (hypothesis 3b). Possession-defined success may positively influence well-being through positive competence feedback, or have negative effects due to its extrinsic focus. The contrasting perspectives make a theoretical prediction unjustified. Consumers who feel that they have done well in life may evaluate their success in terms of possessions more positively, leading to a positive association between subjective well-being and possession-defined success (hypothesis 4).

Data

Data were collected from the LISS internet panel administered by CentERdata at Tilburg University. The panel is representative of the adult population in the Netherlands on key demographics, such as gender, age, income, education, and marital status. Our data came from three separate questionnaires administered between 2013 and 2015 and were combined using unique identifiers for panel members. The first questionnaire provided general demographic background information about the panel members. Panel members can update this information through separate monthly questionnaires. The second questionnaire provided information on materialism. The third questionnaire provided information on subjective well-being. Between 2013 and 2015, the latter two questionnaires were administered once a year. Sample sizes for materialism were 3,212 in wave 1, 3,245 in wave 2, and 2,911 in wave 3. Sample sizes for subjective well-being were 5,163 in wave 1, 6,549 in wave 2, and 6,002 in wave 3. We selected for analysis those panel members who participated in at least two of the in total six waves ($N = 6,551$) and who had no missing data on the background variables between 2013 and 2015 ($N = 5,307$). The smallest percentage of data present for any two waves (coverage) was 25.9% ($N = 1,329$) between materialism in 2014 and 2015. To maximize statistical power and minimize validity threats, all available data were used.

Measures

Materialism. Materialism was measured with the 18-item Material Values Scale (MVS; Richins and Dawson 1992). The MVS distinguishes between three dimensions for materialism discussed before: acquisition as the pursuit of happiness, acquisition centrality, and possession-defined success. Acquisition as the pursuit of happiness represents the belief that acquiring more and better possessions is essential for one's satisfaction in life. It is measured with five items including "My life would be better if I owned certain things I do not have," and "It sometimes bothers me quite a bit that I can't afford to buy all the things I'd

like." Possession-defined success represents the belief that possessions are important indicators for success in life. Its measure contains six items, including "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 centrality represents the hedonic aspects of acquisition and ownership of possessions, and is measured by seven items including "Buying things gives me lots of pleasure," and "I enjoy spending money on things that aren't practical." Response categories for the items ranged from 1 "completely disagree" to 5 "completely agree." Higher scores reflect higher levels of materialism. Composite reliability of the measures was established using the method described by Geldhof et al. (2014) to correct for non-independence due to repeated sampling of the same individuals. Composite reliability represents the ratio of a scale's estimated true score variance relative to its total variance. It was .881 for possession-defined success, .894 for acquisition centrality, .945 for acquisition as the pursuit of happiness, and .930 for overall materialism.

Subjective Well-being. Subjective well-being was measured using the satisfaction with life scale (Diener et al. 1985). It has five items including "I am satisfied with my life" and "If I could live my life over, I would change almost nothing." Response categories for the items ranged from 1 "completely disagree" to 5 "completely agree." Higher scores reflect higher levels of subjective well-being. Composite reliability was .946.

Sociodemographics. Based on their known relationships with materialism, well-being, we included age, age squared, education, gender, employment and marital status, number of children in household, and household net monthly income as covariates in the model. For instance, age is known to affect both materialism (Jaspers and Pieters 2016), and subjective well-being (Charles et al. 2001). By including the covariates, the effects that materialism and well-being have on each other, independent of related conditions, are established.

Demographic information was available on a monthly level. Yet since our analyses are at the yearly level, we use available information on the covariates from January of each year in the analyses. In 2013, 53.5% of the participants were female, 57.5% were married, the average age was 49 years (SD = 17.6, range 14-90 years), the average educational level was 2.86 (range 0 = no education to 5 = university level), the average number of children in the household was .90 (SD = 1.17), 51% had paid work, and the average net monthly household income was € 3.005 (SD = 3,638).

Longitudinal Invariance Testing

Before investigating the structural relationships between materialism and well-being over time, we tested for longitudinal factorial invariance of the measurement models (Widaman et al. 2010). We used the Bayesian Information Criterion (BIC) for model comparison (Little et al. 2007), with lower BIC values expressing better fit while accounting for model complexity. Materialism was specified as a second-order factor with its three dimensions as first-order factors. Recent research indicates that negatively formulated items may substantially increase the error-variance of indicators in measurement models and may potentially bias substantive interpretations in factor models in general (Baumgartner and Weijters 2017), and materialism in particular (Pandelaere et al. 2018; Wong, Rindfleisch, and Burroughs 2003). First, we tested whether a factor model which included a "negative wording" method factor (on which all negatively worded items load) fit the data better than a model without such method factor (Baumgartner and Weijters 2017). This was indeed the case (BIC$_{without}$ = 377,828 compared to BIC$_{with}$ = 375,627). Therefore, the method factor was retained in the measurement model of materialism in all further analyses.

Latent variables were scaled by fixing factor variances to one. Correlations between substantive factors and the method factor were fixed to zero for identification. Correlations

across time-points and among all possible pairs of item uniqueness were estimated freely. The

longitudinal measurement model for subjective well-being is presented in Figure 1.

Figure 4.1

Longitudinal Measurement Model for Subjective Well-Being
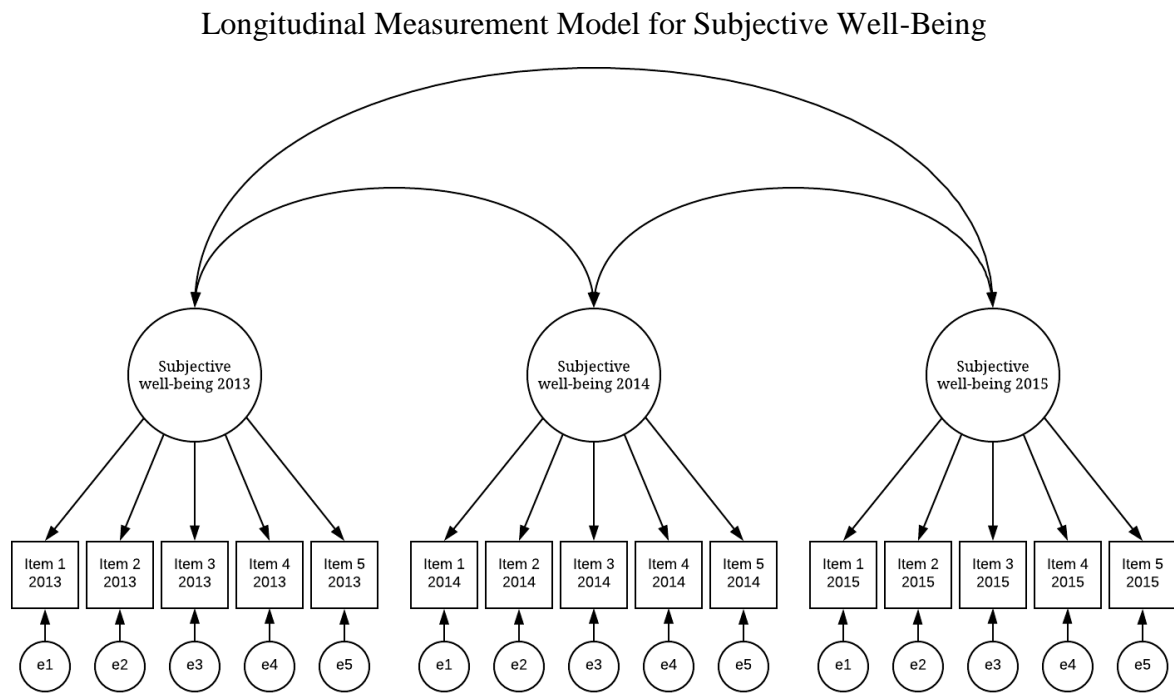
Note. Correlations among all pairs of uniqueness not depicted for readability.

Measurement invariance testing involved four models that imposed successive

restrictions on model parameters (Widaman et al. 2010). Model 1 tested the same pattern of

fixed and freed loading across time (configural invariance). Model 2 added the constraint of

equal factor loadings across time (weak factorial invariance). Model 3 added the constraint of

equal intercepts across time (strong factorial invariance). Model 4 added the constraint of

equal residuals across time (strict factorial invariance). Models were estimated in Mplus 7.11

using Full-Information Maximum Likelihood to handle missing data (Muthén and Muthén

1998-2017). Table 4.1 gives the BIC for the four models for materialism and well-being.

Based on the BIC, the strict factorial invariance model fits the data best for both constructs.

This means that mean changes in materialism and well-being over time can be attributed to true changes in the constructs, and that we can proceed with the structural analyses. The strict factorial invariance model will serve as the baseline model in all further analyses.

Table 4.1

Longitudinal Invariance Tests for Materialism and Subjective Well-being

	Materialism		Subjective well-being
	No method factor	Method factor included	
	BIC	BIC	BIC
LI 1: Configural invariance	377,828	375,627	178,763
LI 2: Weak factorial invariance		375,238	178,698
LI 3: Strong factorial invariance		375,063	178,652
LI 4: Strict factorial invariance		374,831*	178,598*

Note. * Preferred model based on lowest BIC value

Latent Multivariate Autoregressive Cross-Lagged Model

Recall that our aims are twofold: (1) to derive more precise estimates of the relationships between materialism and subjective well-being by accounting for three potential sources of endogeneity, and (2) to examine both the aggregate and disaggregate relationships between materialism and well-being. This section describes the model.

Our model is a latent variable multivariate autoregressive cross-lagged model, with a measurement component and a structural component. Overall materialism is a second-order factor with its three dimensions as first-order factors. Subjective well-being is modeled as a single, first-order factor. Let $y_{it,g}$ represent the observed variables, with i = individual (from 1 to N), t = time (from 0 to 2) and g = 1 for materialism and g = 2 for subjective well-being; $v_{it,g}$ represents the intercept; Λ_g represents the loadings of the measured variables on the first-

order factors ($\eta_{it,g}$); K represents the loadings of the lower-order factors on the higher-order factor (ξ, overall materialism); $\zeta_{it,1}$ represents the disturbances of the lower-order factors, and $\varepsilon_{it,g}$ represents the residuals. The measurement model is given by equations 1-2:

$$y_{it,g} = v_{it,g} + \Lambda_g \eta_{it,g} + \varepsilon_{it,g} \tag{1}$$

$$\eta_{it,1} = K\xi_{it} + \zeta_{it,1} \tag{2}$$

Since measurement invariance testing revealed strict factorial invariance for both latent variables, the factor loadings, intercepts, and errors are constrained to be equal over time (i.e. $\lambda_{11,g} = \lambda_{12,g} = \lambda_{13,g}$, $\kappa_{11} = \kappa_{12} = \kappa_{13}$, $v_{i1} = v_{i2} = v_{i3}$, and $\varepsilon_{i1,g} = \varepsilon_{i2,g} = \varepsilon_{i3,g}$). Latent variables were scaled by fixing factor variances to one. Equations 1-2 decompose the observed measures of materialism and well-being ($y_{it,g}$) into true scores ($\eta_{it,g}$ and ξ_{it}) and measurement errors ($\varepsilon_{it,g}$ and ζ_{it}). This allows us to estimate the relationships between materialism and well-being free from measurement error, preventing attenuation bias.

The structural model describes the relationships between materialism and well-being. The multivariate autoregressive cross-lagged formulation specifies the relationship between materialism and well-being in two directions, namely from materialism to later levels of well-being and from well-being to later levels of materialism. The structural model, excluding covariates, is given by equations 3 and 4:

$$\xi_{i0} = \alpha_{i,1} + \zeta_{i0,1} \tag{3}$$

$$\eta_{i0,2} = \alpha_{i,2} + \zeta_{i0,2}$$

$$\xi_{it} = \alpha_{i,1} + \beta_1 \xi_{it-1} + \gamma_1 \eta_{it-1,2} + \zeta_{it,1}, \text{ for } t > 0 \tag{4}$$

$$\eta_{it,2} = \alpha_{i,2} + \beta_2 \eta_{it-1,2} + \gamma_2 \xi_{it-1} + \zeta_{it,2}, \text{ for } t > 0$$

Equation 3 describes the initial level of the latent variable g (i.e. ξ_{i0} and $\eta_{i0,2}$) as a function of an intercept ($\alpha_{i,g}$) and a residual for individual i ($\zeta_{i0,g}$). Equation 4 describes the

latent variables at the second and third time point (ξ_{it} and $\eta_{it,2}$ with $t = 1, 2$) as a function of four components, namely: (a) an intercept ($\alpha_{i,g}$); (b) an autoregression effect (β_g), which represents the effect of the latent variable at the previous time point; (c) a cross-lag effect (γ_g), which represents the effect of the other latent variable at the previous time point; and (d) a residual for individual i ($\zeta_{it,g}$). We constrain autoregressive and cross-lagged effects to be equal over time (Cacioppo, Hawkley, and Thisted 2010). Including the cross-lag effects allows us to examine the direction of the relationships. To illustrate, if materialism at $t - 1$ is associated with subjective well-being at t, that implies that materialism influences well-being because causes precede their effects. Moreover, since we also control for the autoregressive effects (of the same latent construct at the previous time point), a significant association effectively establishes Granger-causality (Granger 1969). Regardless of the significance and direction of the cross-lagged effects (γ_g), simultaneity bias is precluded by the model's cross-lagged specification. The implications of simultaneity bias for estimation will be examined by comparisons with two alternative models. The first alternative model does not specify cross-lagged relationships but assumes an instantaneous and unidirectional effect from materialism on subjective well-being. This is equivalent to what previous cross-sectional studies have done. The second alternative model mirrors previous longitudinal studies by omitting the cross-lagged effect from well-being on materialism.

We compare the unconditional and conditional relationships between materialism and well-being by including a set of theoretically relevant covariates to materialism, subjective well-being, or both. By adding the potential confounders, equations 3-4 are reformulated as follows:

$$\xi_{i0} = \alpha_{i,1} + \sum_{l=1}^{s-2} \pi_{l,1} w_{li} + \sum_{m=s-1}^{s} \pi_{m,1} w_{mi0} + \zeta_{i0,1} \qquad (3.1)$$

$$\eta_{i0,2} = \alpha_{i,2} + \sum_{l=1}^{s-2} \pi_{l,2} w_{li} + \sum_{m=s-1}^{s} \pi_{m,2} w_{mi0} + \zeta_{i0,2}$$

$$\xi_{it} = \alpha_{i,1}^g + \beta_1 \xi_{it-1} + \gamma_1 \eta_{it-1,2} + \sum_{m=s-1}^{s} \pi_{m,1} w_{mi0} + \zeta_{it,1}, \text{ for } t > 0 \qquad (4.1)$$

$$\eta_{it,2} = \alpha_{i,2} + \beta_2 \eta_{it-1,2} + \gamma_2 \xi_{it-1} + \sum_{m=s-1}^{s} \pi_{m,2} w_{mit} + \zeta_{ti,2}, \text{ for } t > 0$$

Equation 3.1 is equivalent to equation 3, but with the addition of a set of s time-constant ($s-2$ time-constant $\sum_{l=1}^{s-2} \pi_{l,g} w_{li}$, and time-varying $\sum_{m=s-1}^{s} \pi_{m,g} w_{mi0}$) potential confounders. Similarly, equation 4.1 is equation 4 including the effects of the two time-varying covariates ($\sum_{m=s-1}^{s} \pi_{m,g} w_{mit}$). Time-constant covariates are age (mean-centered/10), age squared ((mean-centered/10)^2), gender (0 = male, 1 = female), education level (0 = no education, 5 = university level), marital status (0 = unmarried, 1 = married), employment status (0 = no paid work, 1 = paid work), because they either change linearly with time (age), or remain stable during our period of observation for at least 90% of participants in the sample. Time-varying covariates are the number of children in the household and personal net monthly income (categorical; 0 = no income, 12 = more than 7,500 Euros). Including these potential confounders based on theory and empirical findings aims to reduce omitted variable bias, although the presence of omitted variable bias is impossible to rule out in observational research. To the extent that including the covariates reduces omitted variable bias, the unconditional and conditional effects that materialism and well-being have on each other should differ. It cannot be predicted a priori in which direction as omitted variable bias can result in either overestimation or underestimation. Figure 2 shows the final structural model for overall materialism and subjective well-being, including the effects of the covariates.

Figure 4.2

Structural Cross-lagged Model for Overall Materialism and Subjective Well-Being
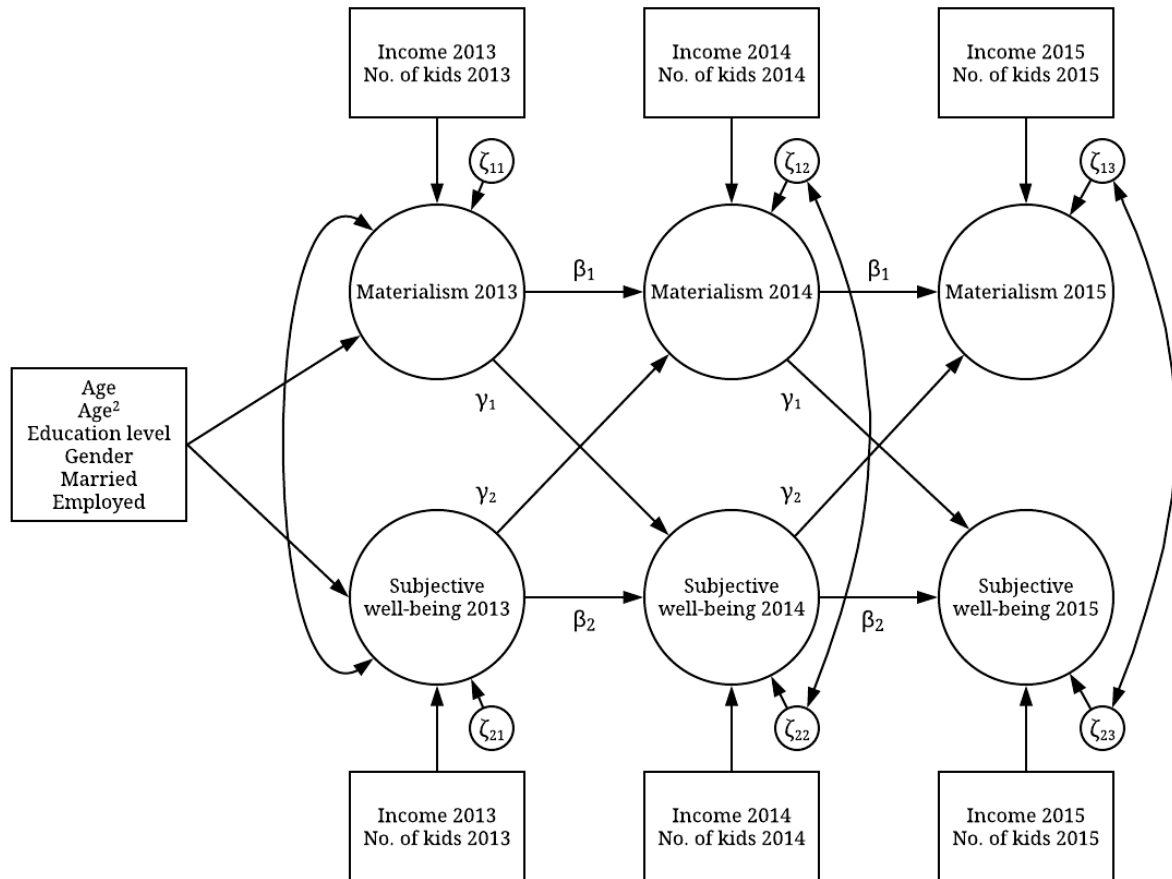
The model in equations $1 - 4.1$ addresses three sources of endogeneity which can bias model estimation. First, the measurement model corrects for error in measures of materialism and subjective well-being, such that the structural relationships between them are purged from this. Second, the longitudinal data across three years and the cross-lagged formulation prevent simultaneity bias, as imminent in cross-sectional research. Third, including potential confounders in combination with the longitudinal data reduces the likelihood that omitted variables bias the structural relationships between materialism and subjective well-being.

Finally, after analyzing the relationship between overall materialism and subjective well-being, we examine the disaggregate effects for the three materialism dimensions. The equations are the same as before, except that the second-order structure described in equation 2 is dropped. Instead, the three first-order factors for materialism become the latent variables of interest ($\eta_{it,1}$). The three materialism dimensions are simultaneously modelled. There are no cross-lagged effects between the three dimensions, but correlations between their residuals within waves are estimated freely.

Model Estimation

To assess the implications of our modeling approach, the analysis proceeded in four steps. In step one, we compare our model (in equations $1-4$) with a model that simply uses the means of the items for materialism and well-being, which ignores measurement error (assuming $\varepsilon_{it,1} = \varepsilon_{it,2} = 0$, in equation 1). This assesses the implications of accounting for measurement error. In step two, we compare our model estimates to estimates from two alternative models in which the effects of well-being on materialism are omitted. The first alternative model includes an instantaneous effect of materialism on well-being, as cross-sectional research does (substituting $\gamma_2 \xi_{it-1}$ with $\gamma_2 \xi_{it}$ and fixing γ_1 to zero in equation 4). The second alternative model is based on a longitudinal model in which the cross-lagged effect of materialism on well-being is estimated but the reversed is not (fixing γ_1 to zero in equation 4). Jointly, this allows us to assess the implications of simultaneity bias for inference making. In step three, we add the potential confounders to the model (equations $3.1 - 4.1$), to assess extent to which our model reduces potential omitted variable bias. In step four we examine the relationships between the three materialism dimensions (simultaneously) and subjective well-being (equations $3.2 - 4.2$).

Results

The correlations between materialism and subjective well-being are in table 4.2. As expected, same construct correlations over time were high for overall materialism, its three dimensions, and subjective well-being (all $r > .722$), reflecting the stability of individual differences in the constructs over time. Overall materialism, acquisition as the pursuit of happiness, and possession-defined success correlated negatively with subjective well-being. The average correlation between overall materialism and subjective well-being over time was -.187. This is close to the mean correlation of -.15 reported in the meta-analysis by Dittmar et al. (2014). Notably, correlations between acquisition as the pursuit of happiness and well-being were considerably higher (all $< -.446$) than correlations of possession-defined success with well-being (all $> -.170$). What is more, all correlations between acquisition centrality and subjective well-being were not statistically significant (note sample size $N = 5,307$). The correlations are informative of the associations between materialism and well-being, but cannot be used to make precise inferences about the size and direction of the relationships. That is what our latent multivariate autoregressive cross-lagged model aims to do.

Table 4.2

Correlations for Materialism (Dimensions) and Subjective Well-Being

		Overall materialism			Possession-defined success			Acquisition centrality			Acquisition as the pursuit of happiness			Subjective Well-being	
		2013	2014	2015	2013	2014	2015	2013	2014	2015	2013	2014	2015	2013	2014
Overall materialism	2013														
	2014	.972													
	2015	.980	.998												
Possession-defined success	2013	--	--	--											
	2014	--	--	--	.765										
	2015	--	--	--	.766	.792									
Acquisition centrality	2013	--	--	--	.587	.512	.496								
	2014	--	--	--	.457	.539	.474	.860							
	2015	--	--	--	.462	.470	.541	.856	.853						
Acquisition as the pursuit of happiness	2013	--	--	--	.619	.540	.539	.424	.352	.366					
	2014	--	--	--	.500	.631	.533	.380	.417	.359	.802				
	2015	--	--	--	.517	.543	.623	.367	.357	.408	.795	.839			
Subjective Well-being	2013	-.264	-.289	-.310	-.084	-.133	-.136	-.011	-.005	-.016	-.379	-.396	-.412		
	2014	-.263	-.317	-.317	-.070	-.141	-.136	-.008	-.008	-.016	-.388	-.437	-.425	.766	
	2015	-.282	-.311	-.332	-.108	-.139	-.155	-.010	-.015	-.008	-.392	-.421	-.438	.745	.787

Note. All correlations > .027 are significant at $\alpha = .05$

Overall Materialism and Subjective Well-Being

First, we estimated our model for overall materialism and subjective well-being without covariates. The results are in table 4.3. Materialism and well-being clearly influenced each other over time. Specifically, higher levels of materialism led to lower later levels of well-being (-.044, $p < .001$), and higher levels of well-being led to lower later levels of materialism (-.058, $p < .001$), supporting hypotheses 1a and 1b. Note that by fixing the variances of both constructs we obtain a roughly standardized metric for the latent parameters of the model (Little 1997). Importantly, the difference between the cross-lag effects is not statistically significant (.014, $p = .419$). That is, the effect of subjective well-being on materialism over time statistically does not differ from the effect of materialism on subjective well-being. The cross-lagged effects are notably smaller than the average instantaneous correlation of -.15 reported in the meta-analysis by Dittmar et al. (2014). However, the correlation of -.15 represents the total association between materialism and well-being at a single point in time, here the total association is split into two causal pathways across time (with a combined association of -.102, at $p < .001$).

Measurement. We compared the results of our model to an alternative model which ignores measurement error by using the means of the respective scale items (after reverse coding negatively worded items). The association between materialism and later levels of well-being was exactly the same, indicating that measurement error does not attenuate this relationship. However, the association between subjective well-being and later levels of materialism was attenuated by measurement error (our model: -.058, model ignoring measurement error: -.045, both $p < .001$) representing substantial attenuation bias of 22.41%.

Table 4.3

Autoregressive and Cross-lagged of Effects between Overall Materialism and Well-being

| | Model without covariates | | | | Model with covariates | | | |
| | Materialism at t | | Well-being at t | | Materialism at t | | Well-being at t | |
	Est	p	Est	p	Est	p	Est	p
Materialism at $t-1$	.864	<.001	-.044	<.001	.889	.015	-.031	.010
Well-being at $t-1$	-.058	<.001	.766	<.001	-.053	<.001	.782	.004
Age					-.357	<.001	.019	.085
Age^2					.047	<.001	.061	<.001
Education					-.073	<.001	.019	.061
Gender					-.388	<.001	.110	.001
Married					-.152	.002	.574	<.001
Employed					-.071	.171	.248	<.001
Income at t					-.017	.001	.041	<.001
No. of kids in hh at t					.014	.165	.018	.019

Note. Unstandardized estimates. Materialism is overall materialism. Well-being is subjective well-being. Age is mean-centered and divided by 10, education level is from 1 (primary school) to 5 (university level), gender is a dummy variable (0 = male, 1 = female), married is a dummy variable (0 = unmarried, 1 = married), and employed is a dummy variable (0 = does not have paid work, 1 = has paid work), income is personal net monthly income in categories from 0 (no income) to 12 (more than 7,500 Euros), no. of kids in hh is number of children in the household.

Directionality. To assess simultaneity bias, we first compare our model to an alternative model including an instantaneous and unidirectional path from materialism to well-being, similar to what cross-sectional studies have done. The estimated instantaneous effect from materialism on well-being while controlling for measurement error is high -.309, compared to our cross-lagged estimate of -.044.[7] Note that these estimates are strictly speaking not directly comparable since one is an association at the same time point and the other is an association over time. Of course, the time lag of one year in our data could be either too long or too short to find the strongest effects between materialism and subjective well-being. However, an instantaneous effect as commonly assumed in cross-sectional research is very unlikely, and specifying it leads to an overestimation of six times the cross-

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[7] A model specifying a unidirectional instantaneous path from materialism to well-being *and* not controlling for measurement error most closely mirrors previous cross-sectional studies, and yields an estimate of -.124.

lag effect. Next, we compare our model to a model that previous longitudinal studies on materialism and well-being have relied on. It specifies only the cross-lagged effect from materialism on well-being, omitting the cross-lagged effect from well-being on materialism. Of course, this model is miss-specified because it incorrectly imposes a zero-restriction on the cross-lagged effect of well-being on materialism. Moreover, it underestimates by 20% the cross-lagged effect of materialism on well-being at -.036, compared to -.045 in our model.

Confounders. In the third step of model estimation, theory-based t covariates were added, including age, gender, education level, income, and marital status. The results are on the right-hand side of table 4.3. The covariates had the expected effects on materialism (Jaspers and Pieters 2016; Pieters 2013; Richins and Dawson 1992). Age had a curvilinear relationship with materialism. In particular younger consumers were more overall materialistic. Also, consumers with higher levels of education and females were less materialistic, but scored higher on subjective well-being. Age also had a curvilinear relationship with well-being, and especially older consumers were more satisfied with life.

A comparison of the unconditional and conditional estimates of the cross-lagged effects showed that not accounting for relevant covariates led to an overestimation of 9.43% of the effect of overall materialism on later levels of well-being (from -.053 to -.058), and of 41.94% from well-being on later levels of materialism (from -.031 to -.044). Variance that should be attributed to covariates thus biased the unconditional effects up to 42% in our model. Of course, because omitted variable bias cannot be completely ruled out, the total bias is unknown. The discussion returns to this. Still, even after controlling for the confounders the difference between the two cross-lagged effects was not significant (.022. $p = .189$), which indicates that the influence of materialism on subjective well-being is not different from the influence of subjective well-being on materialism over time.

Taken together, the results consistently demonstrate a negative and reciprocal relationship between materialism and well-being, in support of hypotheses 1a and 1b. All three sources of endogeneity led to biased estimation when they were not accounted for. What is more, the effects of materialism on well-being and vice versa were statistically not significantly different, highlighting the importance of accounting for the reciprocal pathways as in our model. Accounting for relevant confounders reduced bias in estimation up to 42%.

Materialism Dimensions and Subjective Well-Being

We estimated our model in a disaggregate fashion to delve deeper into the contribution of each of the three key dimensions of overall materialism. The results are in table 4.4. In support of our predictions, the three materialism dimensions had both negative and positive effects on later levels of well-being. Specifically, acquisition as the pursuit of happiness was negatively associated with later levels of subjective well-being (-.150, p <.001), supporting hypothesis 2a. In sharp contrast, possession-defined success and acquisition centrality were both associated with higher later levels of well-being (.054, p = .001 and .047, $p < .001$, respectively). The positive effect of acquisition centrality on subjective well-being was indeed hypothesized (hypothesis 3a). For possession-defined success, the findings seem to lend support to the notion that valuing possessions as a means to feel successful and competent has positive effects on well-being, which we had not explicitly predicted.

Table 4.4

Reciprocal Relationships between Materialism Dimensions and Well-being

	Success at t		Centrality at t		Happiness at t		Well-being at t	
	Est	p	Est	p	Est	p	Est	p
Success at $t-1$	.799	<.001	--	--	--	--	.054	.001
Centrality at $t-1$	--	--	.849	<.001	--	--	.047	<.001
Happiness at $t-1$	--	--	--	--	.757	<.001	-.150	<.001
Well-being at $t-1$	-.050	<.001	.011	.373	-.110	<.001	.731	<.001
Age	-.190	<.001	-.351	<.001	-.236	<.001	.024	.027
Age^2	.082	<.001	.043	<.001	-.004	.572	.068	<.001
Education	-.056	<.001	.047	.001	-.063	<.001	.036	<.001
Gender	-.364	<.001	.302	<.001	-.448	<.001	.115	<.001
Married	-.009	.846	.012	.800	-.222	<.001	.605	<.001
Employed	.010	.839	.149	.003	-.133	.004	.292	<.001
Income at t	-.010	.044	.019	<.001	-.042	<.001	.031	<.001
No. of children in hh at t	.019	<.001	.029	.002	.031	<.001	.010	.210

Note. Unstandardized estimates. Success is possession-defined success, Centrality is acquisition centrality, and Happiness is acquisition as the pursuit of happiness. Well-being is subjective well-being. Age is mean-centered and divided by 10, education level is from 1 (primary school) to 5 (university level), gender is a dummy variable (0 = male, 1 = female), married is a dummy variable (0 = unmarried, 1 = married), and employed is a dummy variable (0 = does not have paid work, 1 = has paid work), income is personal net monthly income in categories (0 = no income, 12 = more than 7,500 Euros), no. of children in hh is number of children in the household.

In support of hypothesis 2b, well-being was also negatively associated with later levels of acquisition as the pursuit of happiness (-.110, $p < .001$). The effect of acquisition as the pursuit of happiness on well-being is significantly larger than the effect of well-being on acquisition as the pursuit of happiness (.040, $p = .047$). This indicates the net negative impact of this dimension of materialism on consumers' well-being. Hypothesis 3b was not supported, as well-being did not significantly influence later levels of acquisition centrality (.011, $p = .373$). Thus, our results do not support the idea that overall satisfaction with life extends to enjoying acquisition and valuing possessions more for their hedonic and social benefits. The relationship between acquisition centrality and subjective well-being was thus unidirectional: acquisition centrality was associated with higher levels of well-being in subsequent years, but well-being did not affect later levels of acquisition centrality. Also, contrary to hypothesis 4, well-being was not positively, but negatively associated with later

levels of possession-defined success (-.050, $p = .001$). Reduced subjective well-being led to an increased focused on possessions as a measure of success, perhaps because seeking self-validation is more easily done through possessions than through accomplishments in other domains (e.g. work or relationships). Somewhat surprisingly then, the relationship between possession-defined success and subjective well-being seems to be balanced as higher levels of possession-defined success led to higher levels of well-being, but higher levels of well-being in turn led to lower levels of possession-defined success. The sum of the two parameter estimates was statistically not significant (.004, $p = .844$), suggesting that the effects effectively cancel each other out.

Taking into account the multidimensional nature of the materialism construct revealed that the negative relationship between overall materialism and subjective well-being is largely due to only one of the three materialism dimensions, namely acquisition as the pursuit of happiness. Although the negative association between well-being and possession-defined success contributes to this as well, it is significantly smaller than the association between acquisition as the pursuit of happiness and subjective well-being (difference = -.209, $p <$ .001). Importantly, positive relationships between materialism and well-being were uncovered, not only reinforcing the notion that there are profound differences between the three dimensions, but also showing that materialism is not inherently bad for consumers. We elaborate on this in the discussion.

Discussion

The aim of our research was twofold: (1) address potential endogeneity bias in the empirical relationships between materialism and subjective well-being in order to move closer to making plausible causal inferences, and (2) provide new insights into the

materialism-well-being link by focusing on the distinct relationships between three key materialism dimensions and well-being. Consistent with our hypotheses and previous research, we found that the aggregate relationship between *overall* materialism and well-being was negative and reciprocal. Furthermore, failure to account for measurement error leads to attenuation bias (specifically of the effect of well-being on later levels of materialism) of about 22%. Not accounting for simultaneity bias by assuming a unidirectional cross-sectional effect as in previous research, led to an overestimation of the effect of materialism on well-being by a factor of six as compared to our cross-lagged effect. The effect of well-being on materialism should no longer be overlooked. The total association between materialism and well-being of -.102 was almost equally due to the pathway from materialism to well-being (-.044) and to the pathway from well-being to materialism (-.058), with the difference between the two being not statistically significant. Failure to account for potential confounding variables led to overestimating the effects of overall materialism on well-being (9%), and vice versa (42%).

Finally, the three materialism dimensions had different relationships with subjective well-being, as predicted. Our findings underline that acquisition as the pursuit of happiness is the only dimension of materialism that is harmful to consumers. As predicted, the results revealed a self-perpetuating cycle in which higher levels of acquisition as the pursuit of happiness led to lower later levels of subjective well-being (hypothesis 2a), and lower levels of subjective well-being in turn, led to higher later levels of acquisition as the pursuit of happiness (hypothesis 2b). The other two materialism dimensions, acquisition centrality and possession-defined success, were positively associated with later levels of subjective well-being (consistent with hypothesis 3a). These findings are in stark contrast with the common view that materialism is uniformly detrimental to consumers and should be considered the "dark side" of consumer behavior (Mick 1996). Subjective well-being did not influence later

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levels of acquisition centrality as predicted (hypothesis 3b) and was negatively associated with later levels of acquisition as possession-defined success (in contrast to hypothesis 4). These substantive differences between the materialism dimensions are typically overlooked as overall materialism is commonly treated as a unidimensional construct. The findings have important implications for public policy and materialism theory.

Public Policy Implications

Our findings indicate that the association between materialism and well-being is noticeably overestimated in cross-sectional studies. After accounting for the three potential sources of endogeneity, the effect of overall materialism on well-being was only -.031. This implies that focusing on reducing materialism to enhance consumers' well-being may be inefficient. Although our analyses reveal that materialism is detrimental for well-being over time, the effect is actually fairly small, which is reassuring. Moreover, consumer values such as materialism are by nature fairly stable over time (Rokeach and Ball-Rokeach 1989) and hard to modify. There might be more effective strategies to improve subjective well-being than trying to reduce consumer materialism. For instance, investing in education and reducing unemployment would benefit consumers considerably more as employment significantly influenced subjective well-being in our data (.245, $p < .001$). The quantity and quality of social relationships are also important drivers of subjective well-being. Married consumers reported significantly higher levels of subjective well-being than those who were not (.562, $p < .001$), and were also less materialistic (-.159, $p = .001$).

When interventions *are* aimed at reducing the negative consequences of materialism, our results suggest they should not try to reduce materialism, but rather mitigate the effects of the harmful dimension of materialism, and emphasize the positive dimensions of materialism. Since only acquisition as the pursuit of happiness is detrimental to consumers' well-being,

interventions should not only educate consumers that more and better possessions do not lead to increased life satisfaction, but also emphasize the hedonic and social benefits that possessions may provide. If consumers can learn to value material possessions for the "right" reasons, subjective well-being can realistically and efficiently be enhanced.

Materialism Theory

Our results provide a foundation for materialism theory to consider the potential benefits of materialism for consumers. Materialism is typically regarded to be detrimental to consumers, and despite speculations regarding potential positive outcomes (Richins and Rudmin 1994; Shrum et al. 2014; Shrum et al. 2013), little research to date has empirically examined these. Our results show that acquisition centrality and possession-defined success are beneficial to consumers' well-being. Hence, enjoying the hedonic and expressive benefits of possessions in itself has positive outcomes. Detrimental to well-being is consumers' belief that having more and better possessions makes them happier, and this holds independent of how much one earns, as this was accounted for. Thus, it is this single materialism dimension of "wanting more to feel good" that leads consumer to "feeling bad". The literature on materialism and well-being might therefore open-up and steer away from drawing general conclusions about materialism as a consumer value with uniformly negative consequences.

Furthermore, our findings suggest that possession-defined success is positively associated with well-being, possibly because it addresses consumers' competence needs. Studies found that persons described as having more expensive possessions are perceived as more intelligent, successful and hard-working (Dittmar 1992; Dittmar and Pepper 1994). These findings suggest that materialism, and in particular possession-defined success, can have positive outcomes in achievement-oriented settings such as at school or in the workplace. However, materialism research to date has largely disregarded this issue. Future

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research may explore if consumers who score high in possession-defined success are indeed perceived as more successful and hard-working by others, and how that affects important outcomes such as employment, job performance, and professional collaborations.

Life Events

A key finding is that the relationship between materialism and well-being is a negative self-perpetuating cycle, due to the dimension acquisition as the pursuit of happiness. An avenue for future research is to examine factors that lead consumers to enter this negative cycle in the first place. Richins (2017) described a reinforcement model arguing that materialists tend to possess qualities that make them more vulnerable to threats in daily events, resulting in psychological discomfort, and reinforcing materialism. The framework points to the role of exogenous factors that trigger consumers to get caught up in a negative cycle of high materialism and low well-being. In particular stressful life events may facilitate an increased focus on material possessions, a decrease in subjective well-being, or both. For instance, marital separation may lead consumers to attach more value to material possessions as a coping mechanism, while simultaneously leading to lower subjective well-being. Life events may thus play an important role. Previous research has examined childhood events such as parental divorce (Rindfleisch et al. 1997; Roberts et al. 2006b), yet the role of life events in adulthood, such as marital separation and job loss, has yet to be explored.

Material versus Experiential Purchases

A recent stream in the materialism literature centers around the "experience recommendation" (Nicolao, Irwin, and Goodman 2009), based on the finding that experiential purchases make people happier than material purchases (Van Boven and Gilovich 2003). However, as pointed out (Dunn and Weidman 2015; Gilovich, Kumar, and

Jampol 2015), the boundary between material and experiential purchases is inherently ambiguous, as many purchases possess both experiential and material properties.

Our findings point to a related issue, namely that shopping in itself is an experience. The enjoyment that consumers derive from shopping (reflected in acquisition centrality) is positively associated with subjective well-being. These findings do not contradict the experience recommendation, but rather call for a more general theory where the focus is on the role that possessions have in experiences, and vice versa. For instance, a guitar is a material purchase but provides many experiences. In contrast, shopping in itself is an experience but involves making material purchases. Following the experiential recommendation, both may enhance satisfaction when the focus is on the experience (i.e. playing the guitar and going shopping) and not the material possession (i.e. the guitar itself, and the items purchased while shopping). As stated by Schmitt, Brakus, and Zarantonello (2015, p. 170), "the key objective […] should be to understand how material and experiential values are created independently and jointly, rather than pitching the two against each other."

Causal Inference

The longitudinal data and latent multivariate cross-lagged model addressed three sources of endogeneity: measurement error, simultaneity, and omitted variables, allowing plausible causal inferences about the relationships between materialism and well-being. We found that all three sources biased estimates if not accounted for. One key finding is that the effect of well-being on materialism that is typically overlooked was not statistically different from the effect of materialism on well-being. Moreover, specifying a cross-sectional unidirectional effect, as is common in this stream of research, led to overestimation of the effect of materialism on well-being by a factor of six. Of course we recognize that true causal inferences can only be made based on true experiments. However, the use of longitudinal

observational data can aid in approximating causal inference. This is especially useful since manipulating materialism and subjective well-being is not only difficult, but also unethical.

A potential threat to our results is omitted variable bias, which can never be completely ruled out in observational studies. For instance, the fact that the cross-sectional association between materialism and well-being is larger than their association over time may be due to shared covariance with stable personality traits such as neuroticism (Burroughs and Rindfleisch 2002; Mick 1996) that were not accounted for. Assuming that omitted variables are stable traits, they do not bias our results, because the autoregressive component captures their effects. However, time-varying covariates that influence materialism, well-being, or both, could impact our results. Future research could consider exogenous stress factors such as the life events proposed earlier.

By combining theory, longitudinal data, and sophisticated modeling techniques we were able to provide more precise and efficient estimates of the relationships between materialism and well-being and make plausible causal inferences. Importantly, consumer materialism has both negative and positive associations with well-being. Returning to the statement made by Pope Francis, our research shows that materialism does not necessarily pose a threat to our human identities, but even has positive effects on consumers' well-being.

Chapter 5

Opening up Further

This chapter provides an overview of the research questions of this thesis and summarizes the key findings. In addition, this chapter discusses important issues that the findings from the three empirical essays raised.

Calling someone materialistic is generally considered to be a criticism, not a compliment. A Vox article even went so far to state that "Materialists are sad, terrible people" (Locke 2016). Materialism is often looked down upon, and viewed as inherently bad. Fifty years ago, Martin Luther King Jr. named materialism as one of three evils America must conquer, alongside racism and militarism. According to a 2012 survey, 61% of Americans indicated that American values were weakened due to "too much focus on money and material things" (The Atlantic/Aspen Institute 2012). In a survey by Fournier and Richins (1991), 82% of lay people mentioned negative and socially undesirable traits when asked to describe materialistic people. These traits included excessive status consciousness, envy, self-centeredness and insecurity. People also perceive a person who owns (rather than lacks) expensive possessions as less caring, having fewer friends, less happy, and less attractive as a potential friend (Dittmar and Pepper 1994).

Yet, are these negative connotations truly justified? Research by Van Boven et al. (2010) showed that the unfavorable impressions of materialistic people are due to people perceiving others who make material purchases (as opposed to experiential purchases) as more extrinsically motivated. Therein lies the crux. Both lay people and academics typically view materialism as a unidimensional construct, with uniformly negative outcomes. This dissertation shows however that both the development and outcomes of materialism differ for three underlying dimensions of materialism as defined by Richins and Dawson (1992): acquisition as the pursuit of happiness, acquisition centrality, and possession-defined success.

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Specifically, chapter 2 showed that the development of materialistic values is U-shaped across the adult lifespan, with especially younger consumers being more materialistic. Notably though, the U-shaped trajectory was not observed for acquisition as the pursuit of happiness, which was not significantly affected by age. Chapter 3 found that materialism and savings negatively influence each other over time. This negative association was due to the negative associations of acquisition as the pursuit of happiness and acquisition centrality with savings. In stark contrast, possession-defined success was positively associated with savings. Finally, chapter 4 showed that materialism and subjective well-being negatively influence each other over time, but again, only due to acquisition as the pursuit of happiness. Moreover, and in stark contrast with the negative views of materialism that have dominated popular opinion and academic research (Dittmar et al. 2014; Kasser 2002, 2016), acquisition centrality and possession-defined success were associated with higher later levels of well-being.

Together, the findings demonstrate that the outcomes of materialism depend on consumers' motivations for materialism (Pandelaere 2016; Pandelaere et al. 2018; Shrum et al. 2013) and underline the importance of considering the multidimensionality of materialism. It also provides a foundation for moving away from the strong emphasis currently placed on *negative* consequences of materialism, and focusing on the possibility of *positive* consequences, such as the effects of possession-defined success and acquisition centrality on subjective well-being (chapter 4).

Still, several issues remain. This final chapter addresses three of these issues. First, chapter 3 examined the relationships between materialism and savings, and included debt and income as covariates. Housing wealth was excluded from total savings in chapter 3 due to its dual role as an investment and a consumption good, and since for most consumers, the purchase of a house is also associated with a substantial loan, namely a mortgage. It is

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therefore different from other types of investment assets that were included in total savings. Homeownership is stimulated in the U.S. as well as in the Netherlands through tax incentives such as mortgage interest deductions. For the majority of consumers, the purchase of a house is the largest and most important purchase that they make in their life. This is not only due the high costs, but also due to the symbolic and social value of the home (Csikszentmihalyi and Rochberg-Halton 1981). An additional study therefore focuses on the associations between overall materialism, its three dimensions, and housing wealth.

Second, we explored the role of income in chapter 3 by making it endogenous to the system of relationships between materialism and savings. We found that income was exogenous, implying that materialism does not have significant effects on income over time. This finding may however be partly due to income being highly stable over time for most consumers. We did find a negative correlation between acquisition as the pursuit of happiness and income (-.004, p = .036). It has been suggested that more materialistic consumers may work harder or longer to enhance their incomes and standard of living, which has positive effects on the economy (Richins and Dawson 1992; Richins and Rudmin 1994). Research has not yet examined if consumers high in materialism are in fact willing to sacrifice time, or other needs, to pursue a higher income. We therefore conducted a survey to examine if more materialistic consumers are willing to pursue a higher income at the expense of more intrinsic needs such as leisure time and job fulfilment.

Third, the three essays provide new and important insights into the antecedents and consequences of materialism and its three dimensions. In a nutshell, it found that materialism is influenced by age, financial savings, and subjective well-being, and in turn, also influences financial savings and subjective well-being. But how do these findings interrelate? Do the findings suggest that as consumers go from young to middle adulthood, they become less materialistic, save more, and are happier, and then become more materialistic again upon

entering late adulthood, saving less, and becoming less happy? What knowledge did we gain about materialism, and in particular its three dimensions? The final section of this chapter elaborates on these questions.

Materialism and Housing Wealth

Previous research has found that overall materialism is negatively associated with satisfaction with housing (Ryan and Dziurawiec 2001). However, to date, no research has examined the relationship between materialism and actual housing wealth, which is somewhat surprising since the home is a primary status symbol (Packard 1959), and arguably represents the ultimate conspicuous possession (Zeckhauser 1973). Indeed, respondents in a qualitative study by Richins (2011) indicated they desired owning a house to feel successful and to be able to "show off."

Possession-defined success reflects the tendency to use possessions as a measure for success and a means of conveying status and identity to others, we therefore expected possession-defined success to be positively associated with housing wealth. Conversely, we expected acquisition as the pursuit of happiness to be negatively associated with housing wealth. Its negative relationship to savings and positive relationship to debt imply that financial decision-making for consumers who score high on this materialism dimension is more likely to be short-term oriented and not conducive to investing in housing or obtaining a mortgage.

Data and Model

From the Dutch Household Survey (used in chapter 3), information on housing and mortgages was obtained from a separate questionnaire. We used information on housing and mortgages from the final wave of our data (2013) and information on the materialism

measures and covariates from the first wave (2007). The longer lag between the outcomes

and predictor variables is more appropriate here since buying a house is typically a long-term,

planned, decision. The sample consisted of 601 respondents who provided information on

housing and mortgages in 2013. Of those 601 respondents, 71% were homeowners. The

median housing wealth was € 239,000 (SD = 199,383), the median mortgage was € 140,000

(SD = 206,881), and the average net monthly income was € 1,558 (SD = 3,391).

We estimated a multivariate model that jointly determines the probability of being a

homeowner and housing wealth. The probability of being a homeowner is determined by:

$$HO_i^* = \alpha + \sum_{j=1}^{J} C_{ij}\beta_j + X_i\gamma + Z_i\kappa + e_{1i}, \tag{1}$$

where HO^* is a latent variable that is proportional to the propensity of being a homeowner, X_i

is materialism, C_{ij} is a vector of j covariates: age, gender, education, number of children in the

household, employment status, net household income, total debts, total savings, degree of

urbanization, and year of purchase, Z_i is relationship status, and e_{1i} is the error term. Then:

$$HO_i = \begin{cases} 1 \text{ if } HO_i^* > 0, \text{ for homeowners} \\ 0 \text{ if } HO_i^* \leq 0, \text{ for non-owners} \end{cases} \tag{2}$$

Housing wealth HW_i is only observed when HO_i equals 1 (i.e. respondent is a homeowner),

and is determined by:

$$HW_i = \alpha_2 + \sum_{j=1}^{J} C_{ij}\beta_{2j} + X_i\gamma_2 + W_i\pi + e_{2i}, \tag{3}$$

where X_i and C_{ij} are defined as above, W_i is mortgage debt, and e_{2i} is the error term. A

correlation ρ is estimated through adding a latent variable L_i to both equations. For

identification, the loading of selection on the latent variable is constrained to be 1, and the

latent variable is constrained to have variance 1. The important feature of the model is that

the error terms are allowed to be correlated. This is because consumer characteristics that

explain housing wealth may also be determinants of the decision to buy a house, such as

income. The decision to buy a house is thus endogenous because it is correlated with unobserved heterogeneity in housing wealth.

Table 5.1

Materialism (Dimensions) and Housing Wealth

	Housing wealth (overall materialism)			Housing wealth (dimensions)		
	Estimate	SE	p	Estimate	SE	p
Overall materialism	.080	.025	.001	NA		
Possession-defined success	NA			.099	.051	.049
Acquisition centrality	NA			.084	.051	.096
Acquisition as the pursuit of happiness	NA			-.115	.049	.019
Age	.298	.027	<.001	.292	.061	<.001
Gender (1 = Female)	-.057	.019	.003	-.059	.047	.213
Education level	.066	.020	.001	.136	.046	<.001
Net household income	.123	.017	<.001	.073	.053	.165
Total savings	.312	.041	<.001	.227	.045	<.001
Total debts	.043	.020	.034	.058	.045	.202
Number of children in household	.254	.027	<.001	.208	.049	<.001
Degree of urbanization	.050	.019	.008	.056	.045	.215
Mortgage debt	.241	.025	<.001	.303	.048	<.001
Year house was purchased	.084	.025	.001	-.030	.053	.575

Note. Standardized coefficients are presented. Housing wealth is value of the house in Euros divided by 50,000. Income is the logarithm of net monthly household income + 1. Mortgage debt is mortgage in Euros divided by 50,000.

Results

Table 5.1 has the results. Overall materialism and acquisition centrality were not related to housing wealth, but in line with our expectations, possession-defined success had a positive effect on housing wealth ($\beta = .099$, $p = .049$) and acquisition as the pursuit of happiness had a negative effect on housing wealth ($\beta = -.115$, $p = .019$). These effects are not due to differences in age, education, household composition, income, savings, debt, or mortgage debt, because these were all controlled for. Consumers high in possession-defined

success thus had indeed more housing wealth than those low in possession-defined success, even while controlling for income, and mortgage debt.

Materialism and Trade-Offs for Money

Consumers high in materialism desire money because money is needed to satisfy their material desires. Materialism is associated not only associated with a higher desired income, but also with valuing financial security (Richins and Dawson 1992). Even though our data and analysis (chapter 3) did not support the notion that materialism is associated with higher income as proposed by Richins and Rudmin (1994), it is typically assumed that more materialistic consumers forgo intrinsic needs and goals in their attempts to enhance their standard of living (Kasser and Ryan 1993). Research indeed suggests that the association between materialism is associated with lower psychological need satisfaction (Wang et al. 2017). We examined if more materialistic consumers are indeed willing to sacrifice intrinsic needs for higher income.

Specifically, we examined how much income consumers were willing to give up (required) to work fewer (more) hours and have more (less) leisure time, and if more materialistic people were more likely to choose a job offering a higher income and lower job fulfillment and joy, or a lower-income job offering higher job fulfillment and joy. It was expected that more overall materialistic consumers were more willing to trade-off leisure time for income. We expected possession-defined success and acquisition as the pursuit of happiness to be associated with a higher willingness to trade-off leisure time for income, but the reverse for acquisition centrality. Moreover, it was expected that consumers who score high on possession-defined success and acquisition as the pursuit of happiness would attach

more importance to income than job fulfillment, but that consumers who score high on acquisition centrality would attach more importance to job fulfillment than income.

Data and Method

To test our predictions, we conducted a survey among a representative sample of 3,496 adult members (response rate 84%) of the CentERdata LISS panel of Tilburg University. Data collection took place in December 2015. Participants ranged in age from 17 to 93 years ($M = 53.5$, $SD = 17$), 53% were female, and 58% were highly educated (had schooling beyond secondary school).

Participants read two scenarios. In scenario one, participants were asked to imagine that they were working 30 hours a week for 1,000 monetary units. We used the term monetary units instead of an actual currency to avoid participants from comparing the amount to their own income or any other reference income they may have had in mind. It was stated that this income was sufficient to live a decent life. Participants were instructed that they had the possibility to work more or less hours. Working less meant more leisure time, but less income, and vice versa. They were then asked to indicate how many monetary units they would be willing to give up to work 5 hours and 10 hours less, and how many monetary units they would require to work 5 or 10 hours more.

In scenario two, participants were asked to imagine that they were looking for a new job. They then read that they had received two job offers from different companies. Job A was described to provide more fulfillment and joy but for a lower salary (25% less). Job B was described to provide less fulfillment and joy but for a higher salary (25% more). Which description was shown first (as job A) was randomized to exclude potential order effects. Then participants were asked to choose between the two jobs.

From respondents' answers to the questions in scenario one, normalized values were computed and used to specify a value function for each participant. Leisure time was expressed as a proportion of the maximum (20 work hours per week) and the relative value of income was expressed as a proportion of the nominal amount (i.e. desired income divided by the maximum desired income). These normalized values were used as x-coordinates and y-coordinates, respectively, to construct a graph of the value function. Because the x- and y-values were normalized, the area under the curve can vary between 0 (low relative value of income) and 1 (high relative value of income). Figure 5.1 presents two examples from the data.

Figure 5.1

Value Curve for Leisure Time versus Income
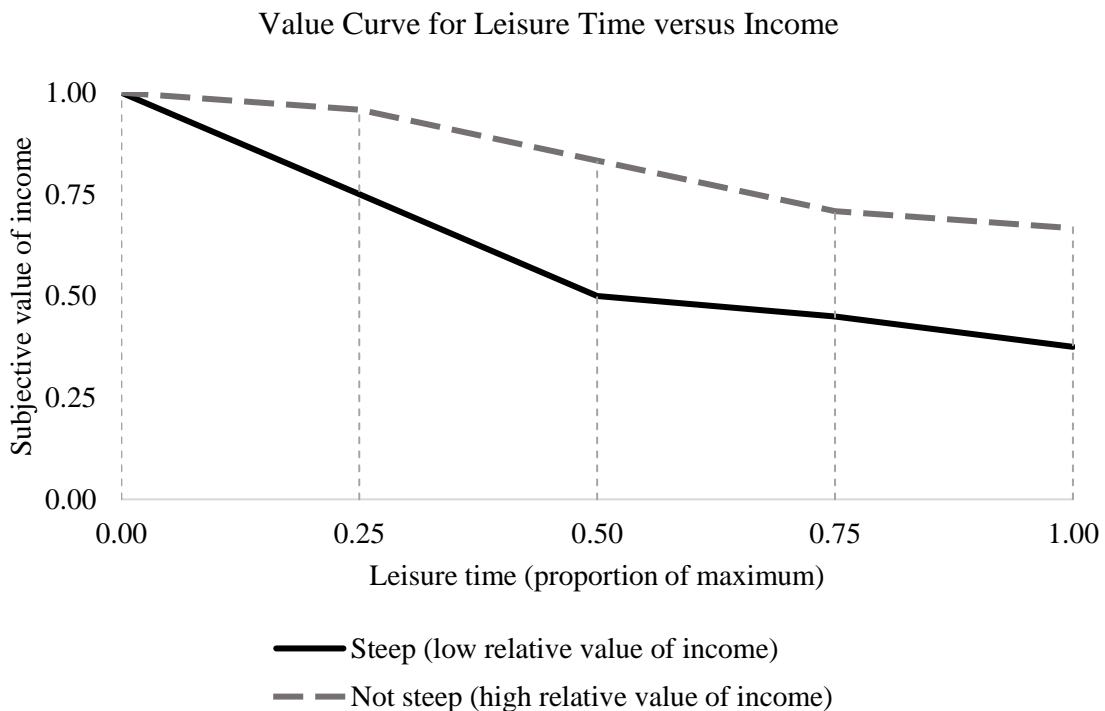
Note. Data are for participant 967 (not steep) and participant 970 (steep). Following Myerson, Green, and Warusawitharana (2001), the area of each trapezoid is equal to $(x_2 - x_1)[(y_1 - y_2)/2]$, where x_1 and x_2 are defined by extra hours of leisure time (0 for a 40 hour work week, 1 for a 20 hour work week) , and y_1 and y_2 are the subjective values of income at these hours. The area under the value curve is equal to the sum of the areas of these trapezoids.

Two multivariate regression models tested whether a materialistic value orientation is associated with: (1) the relative value of income to leisure time; and (2) the relative importance of income to job fulfillment. The dependent variables were relative value of income (as measured by area under the curve) and job preference (-1 = more fulfillment, lower income; 1 = less fulfillment, more income). The control variables were age (mean-centered and divided by 10), gender (-1 = male, 1 = female), education (1 = lowest, 6 = highest), income (natural logarithm of net monthly income plus one for those without income).

Results

The results are summarized in table 5.2. In contrast to our expectations, overall materialism, possession-defined success, and acquisition as the pursuit of happiness did not influence the relative value of income to leisure time (-.001, $p = .940$, .004, $p = .300$ and .005, $p = .094$ respectively). However, and as expected, consumers high in acquisition centrality were *less* willing to trade-off leisure time for income (-.012, $p = .002$). These results suggest that more materialistic consumers do *not* attach more importance to income than to leisure, relative to others. What is more, people with higher levels of acquisition centrality were actually more likely than those with lower levels of acquisition centrality to value leisure over income.

Overall, 78 percent of all participants preferred a job offering more fulfillment and joy with a lower salary over a job with more salary but lower fulfillment and joy. Consistent with our expectations, people higher in overall materialism were more likely to choose for the higher paying job even though it provides less fulfillment, than people lower in overall materialism (.482, $p < .001$). As expected, people high in possession-defined success and acquisition as the pursuit of happiness were more likely to choose for the higher paying job

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with low fulfillment as compared to others (.253, $p < .001$ and .365, $p < .001$ respectively). In contrast, and again in line with our expectations, people high in acquisition centrality were less likely to choose for the higher paying job and more likely to prefer the job that offered more fulfillment (-.187, $p = .003$).

In sum, people higher in acquisition centrality attached more importance to leisure time than those lower in acquisition centrality. Moreover, people high in acquisition centrality were less likely to choose for a higher paying job and more likely to prefer a job that offered more fulfillment. Materialistic values thus need not always be conflicting with more intrinsic values and needs.

Table 5.2

Effects of Materialism (Dimensions) on Trade-offs for Money

	Preference for money over time			Preference for money over fulfillment and joy		
	Estimate	SD	p	Estimate	SD	p
Intercept	.903	.027	<.001	-1.997	0.427	<.001
Overall materialism	-.001	.004	.940	.482	0.066	<.001
Age	.007	.001	<.001	-.064	0.020	.001
Gender	.003	.002	.140	-.208	0.033	<.001
Education	-.012	.001	<.001	-.123	0.023	<.001
Income	.000	.004	.927	.073	.057	.202
Materialism dimensions						
Intercept	.891	.027	<.001	-2.465	0.423	<.001
Acquisition centrality	-.012	.004	.002	-.187	0.063	.003
Possession-defined success	.004	.004	.300	.253	0.062	<.001
Acquisition as the pursuit of happiness	.005	.003	.094	.365	0.051	<.001
Age	.006	.001	<.001	-.071	0.020	<.001
Gender	.005	.002	.018	-.153	0.034	<.001
Education	-.012	.001	<.001	-.109	0.023	<.001
Income	.003	.004	.394	.158	0.055	.004

Note. Unstandardized estimates. The relative value of income is measured as area under the value curve (1 = highest relative value of income, 2 = lowest relative value of income). Job preference is binary (-1 = more fulfillment, lower salary; 1 = less fulfillment, higher salary). Overall materialism on a scale from 1 (lowest) to 5 (highest). Age is mean-centered and divided by 10. Gender is coded as -1 for men and 1 for women. Education ranges from 0 (= no education) to 6 (bachelor's or master's degree). Income is the natural logarithm of personal net monthly income plus 1.

Materialism: Three Unique Dimensions

Taken together, the findings from the three essays paint an interesting picture of materialism, savings, and subjective well-being across the lifespan. Particularly, materialism is higher among both younger and older consumers, when savings are low. Like materialism, subjective well-being is higher among younger and older consumers, but whereas the highest levels of materialism are typically in young adulthood, highest levels of subjective well-being are typically in late adulthood. These patterns are consistent with life span theories of development (Erikson 1959; Heckhausen et al. 1989; Heckhausen et al. 2010). Specifically, early and late adulthood represent developmental stages in which consumers are more self-oriented, and their goals and values center more around consumption, and in particular the use of possessions to satisfy needs for enjoyment, self-expression and status. Middle adulthood is associated with a focus on others (and in particular family and children), and the need to save for retirement. Over and above these life cycle patterns, we found associations between materialism and savings and subjective well-being over time.

Each essay provided new insights into the distinct relationships between the three materialism dimensions and their antecedents and consequences. Chapter 2 showed that acquisition centrality and possession-defined success both have a U-shaped pattern across the lifespan while acquisition as the pursuit of happiness was not significantly influenced by age. Chapter 3 showed a negative, reciprocal, relationship between acquisition as the pursuit of happiness and savings, while possession-defined success and acquisition centrality were not associated with savings. Chapter 4 found that acquisition as the pursuit of happiness was also negatively associated with subjective well-being. Again, the relationship appeared to be reciprocal with higher levels of acquisition as the pursuit of happiness leading to lower levels of subjective well-being, and lower levels of subjective well-being leading to higher levels of acquisition as the pursuit of happiness. Acquisition centrality and possession-defined success

were both associated with higher levels of subjective well-being over time, demonstrating the hedonic and social benefits of materialism to consumers. Chapter 5 further emphasized the positive effects of acquisition centrality in particular, showing that consumers who score high on acquisition centrality do not value money over intrinsic needs such as leisure and job fulfillment. Table 5.3 presents an overview of the studies and their findings. The implications of these findings for our understanding of the three materialism dimensions are discussed next.

Acquisition centrality represents both the importance of acquisition and ownership of possessions, and the enjoyment of acquisition and ownership of possessions. Consumers high in acquisition centrality seem to enjoy spending money, which is also reflected in the items for this measure which include "I enjoy spending money on things that aren't practical," and "Buying things gives me a lot of pleasure." This is also consistent with research by Hudders and Pandelaere (2012) showing that more materialistic consumers are more inclined to consume luxury goods, which leads to positive mood, diminishes negative mood, and increases satisfaction with life. Acquisition centrality thus involves "the sheer gratification of acquiring and owning material possessions" (Pieters 2013, p. 617). The pleasure and enjoyment of acquisition is associated with increased debt levels, but also to increased well-being. Interestingly, acquisition centrality is positively associated with income, even though consumers who score high on this materialism dimension prefer both job fulfillment and leisure time over earning a higher income. Acquisition centrality therefore does not reflect a strong desire for money, as money is considered to be relatively unimportant to other intrinsic needs. Acquisition represents a means of satisfying intrinsic needs for pleasure-seeking and enjoyment.

Table 5.3

Overview Studies

Chapter	Topic	Focus	Data source(s)	Method (sample size)	Key findings
2	Age, cohort, and period	Antecedents	• Amazon Mturk • Longitudinal panel CentERdata (2005 – 2013)	• Survey ($N = 200$) • Meta-analysis ($N = 23$) • Multilevel growth model ($N = 4,297$)	Overall materialism, acquisition centrality, and possession-defined success were U-shaped across the lifespan. Acquisition as the pursuit of happiness did not change with age.
3	Financial savings	Antecedent and consequence	Longitudinal panel (2007 – 2013): • CentERdata (materialism) • Dutch National Bank Household survey (savings)	Multivariate autoregressive cross-lagged model ($N = 4,180$)	Overall materialism was associated with lower savings and higher debts, due to acquisition as the pursuit of happiness. Acquisition centrality was positively associated with debt. Possession-defined success was negatively associated with debt.
4	Subjective well-being	Antecedent and consequence	LISS panel (2013 – 2015): • Tilburg consumer outlook monitor (TILCOM) • Core study	Latent multivariate autoregressive cross-lagged model ($N = 5,307$)	Overall materialism and acquisition as the pursuit of happiness were negatively related to well-being. Acquisition centrality and possession-defined success had positive effects on well-being.
5	Housing wealth	Consequence	Longitudinal panel (2007 – 2013): • CentERdata (materialism) • DHS (housing wealth)	Heckman selection model ($N = 601$)	Overall materialism and acquisition centrality were not related to housing wealth. Possession-defined success had a positive, and acquisition as the pursuit of happiness had a negative, effect on housing wealth.
5	Intrinsic needs versus income	Consequence	Cross-sectional survey (TILCOM, 2015)	Multivariate regression ($N = 2,408$)	Overall materialism, possession-defined success, and acquisition as the pursuit of happiness were not related to preferences for leisure time versus income, but were associated with a preference for income over job fulfillment. Acquisition centrality was associated with a preference for leisure time and job fulfillment over income.

Possession-defined success represents the value that consumers attach to possessions as indicators of success. Consumers who score high on possession-defined success are achievement-oriented and use possessions to communicate their identity and status. This is reflected in the measure with items such as "The things I own say a lot about how well I'm doing in life" and "I like to own things that impress people." Possession-defined success is associated with a desire for money. Indeed, consumers high in possession-defined success prefer money over job fulfilment, yet possession-defined success was not related to savings. One possibility is that money is not accumulated but rather spent on possessions that communicate one's identity and status. In this case, money is desired, but as a means to an end and not as an end in itself. Possession-defined success did not appear to lead to overspending, since it was associated with lower levels of debt, and even higher levels of housing wealth. In addition, possession-defined success is not detrimental to subjective well-being even despite its negative effects on loneliness (Pieters 2013), as it leads not to lower but higher levels of subjective well-being. Possession-defined success thus has benefits for consumers because valuing possessions for the status they confer gives consumers a sense of achievement and control, thereby addressing their need for competence, even though they may be perceived less favorably by others (Dittmar and Pepper 1994; Van Boven et al. 2010).

Acquisition as the pursuit of happiness represents a deficit. It reflects the belief that owning more and better possessions leads to happiness in life. Consumers who score high on acquisition as the pursuit of happiness essentially express that their current material conditions are below a desired level. These perceptions may be based on subjective as well as objective evaluations. To illustrate, acquisition as the pursuit of happiness is associated with lower levels of income and savings, and higher levels of debt. It is therefore not surprising that consumers who score high on this materialism dimension prefer a higher income over job fulfilment and are generally less satisfied with life. Consistent with earlier work, this

dissertation finds that acquisition as the pursuit of happiness is essentially the only materialism dimension that is truly detrimental to consumers (Jankovic and Dittmar 2006; Pandelaere et al. 2018). However, it appears that the gap between consumers' actual and desired material states is not just a perception.

Cross-Cultural Differences in Materialism

Although the dissertation uses data from different sources, the main longitudinal analyses are all based on representative samples of the Dutch adult population. Although materialism is a universal value, materialism is often viewed as being more prevalent in Western societies, exacerbated by excessive advertising (Pollay 1986) and favorable portrayals of materialism on television (Shrum et al. 2005). However, cross-cultural studies on materialism have typically found that consumers in Eastern societies are more materialistic than those in Western societies (Ogden and Cheng 2011; Webster and Beatty 1997). Cross-cultural differences in materialism may be partly explained by differences in Hofstede's culture dimensions, and in particular masculinity. Masculinity is defined as "a situation in which the dominant values in society are success, money, and things" (Hofstede and Bond 1984, p. 419-20). The Netherlands is relatively low on masculinity, implying that on average materialistic values are less dominant in our country. Nevertheless, country characteristics or cultural values and norms may influence linkages between materialism and related variables. The real question is thus if cultural or country-level variables influence the relationships that materialism has with age, financial savings, and subjective well-being.

Age

It is possible that materialism develops differently across the lifespan in other countries. However, and as described in chapter 2, developmental changes that affect the

trajectory of materialism across the lifespan are to a certain extent universal. In line with this, some studies suggest that age effects on personality and values are universal (McCrae et al. 1999; Schwartz et al. 2001). Yet, other studies find that cultural differences do influence the relationship between age and personality (Bleidorn et al. 2013; Fung and Ng 2006; Labouvie-Vief et al. 2000). Bleidorn et al. (2013) suggest that these differences are due to cultural norms regarding the timing of universal developmental tasks. For instance, cultures with an earlier onset of job-role responsibilities showed earlier onset of age trends in neuroticism, agreeableness, and conscientiousness. Similarly, materialism may decline earlier and faster in cultures with an earlier onset of family- and job-role responsibilities. Research also suggests that aging can strengthen the endorsement and expression of values that are emphasized in one's culture (You, Fung, and Isaacowitz 2009). This implies that in countries or cultures that emphasize materialistic values, the increase in materialism observed in late adulthood may be more pronounced. Using cross-cultural, and preferably longitudinal, data, future research may investigate these speculations.

Financial Savings

There are several reasons why consumers' savings behavior in the Netherlands is different from consumers' savings behavior in most other countries. For instance, retirement savings in the Netherlands is to a large extent outsourced to various centralized pension organizations. Moreover, due to the extensive social safety net in the Netherlands, Dutch consumers might find it relatively less important to save for unemployment. Consequently, psychological factors such as materialism that explain savings typically explain less variance in savings in the Netherlands than in other countries (Hershey, Henkens, and Van Dalen 2007). Associations between materialism and financial savings may therefore be more pronounced in countries that put more emphasis on individual financial responsibility.

Moreover, cultural factors may influence the relationships between materialism and financial savings, such as the extent to which certain cultures equate success with financial wealth. For instance, in accordance with the Hindu world view, Indians view wealth acquisition as necessary for the natural progression of an individual's life (Jain and Joy 1997). Whereas we did not find significant associations between possession-defined success and financial savings, positive correlations may be observed in cultures in which financial wealth is an important indicator of success. Cultural or country-specific factors may thus influence the relationships between materialism and financial savings, but there is no indication that the main negative and reciprocal relationship between acquisition as the pursuit of happiness and financial savings would not hold in other countries or cultures. If anything, this relationship should be more pronounced.

Subjective Well-Being

The negative association between materialism and subjective well-being has been established in samples from different countries, including the US (Burroughs and Rindfleisch 2002; Kasser et al. 2014; Richins and Dawson 1992), Turkey (Karabati and Cemalcilar 2010), and China (Jiang et al. 2016; Wang et al. 2017). Moreover, cross-cultural studies have found similar relationships between materialism and well-being in the US and Singapore (Swinyard et al. 2001), Russia (Ryan et al. 1999), and Iceland (Kasser et al. 2014), and in the UK and Chile (Unanue et al. 2014).

The meta-analysis by Dittmar et al. (2014) also examined potential moderating effects of cultural factors. Dittmar et al. (2014) found that the negative relationship between materialism and well-being was greater in countries with a more equal income distribution and slower economic growth. Moreover, the extent to which 'being rich and having money and expensive things' is emphasized in a certain country did not influence the association

between materialism and subjective well-being, but the association was stronger in countries that emphasize "the desirability of individuals independently pursuing affectively positive experience" (Schwartz 1999, p. 27).

Thus, although the association between materialism and well-being is consistently negative across countries, the size of the effect may be moderated to some extent by economic and cultural factors. It is however unclear whether these moderating effects hold for all three dimensions of materialism. The greater effects in countries with more equal income distributions and slower economic growth may be because the negative relationship between acquisition as the pursuit of happiness and subjective well-being is amplified, or because the positive effects of either possession-defined success or acquisition centrality are weaker. For there to be a meaningful interpretation to these findings, it is therefore imperative for future research to examine the effect of potential cultural moderators on the distinct relationships between the three materialism dimensions and subjective well-being.

Materialism Dimensions

It is clear that acquisition as the pursuit of happiness, acquisition centrality and possession-defined success represent different dimensions of materialism. Building on previous work by Pieters (2013), this dissertation demonstrated the distinct relationships of these dimensions with age, financial savings, and subjective well-being. The findings presented here contribute to our conceptual understanding of the three dimensions, and consequently, of the materialism construct. Different personality traits and values have been associated with overall materialism, but our findings suggest that the three dimensions have their own unique place in this larger nomological network. This section provides the broader

and more balanced perspective on the dark and bright sides of materialism called for in Jaspers and Pieters (2016).

Acquisition as the Pursuit of Happiness. Our findings suggest that acquisition as the pursuit of happiness reflects consumers' subjective or objective material dissatisfaction. It is associated with lower levels of income and savings, higher levels of debt, and reduced life satisfaction. With respect to the personal desires studied in chapter 2, acquisition as the pursuit of happiness was strongly associated with desires for money, and negatively associated with desires for personal growth and health. Not surprisingly, acquisition as the pursuit of happiness is the most strongly negatively related to satisfaction in all life domains, including the family, job, and health domains (Roberts and Clement 2007).

Acquisition as the pursuit of happiness is likely to be related to envy. Envy is experienced when people are not happy with their current state, and feel that others are better off (Parrott and Smith 1993; Van de Ven, Zeelenberg, and Pieters 2011). Similar to subjective well-being, associations between acquisition as the pursuit of happiness and envy may extend well beyond the material domain. That is, consumers who are dissatisfied with their material states, tend to also be dissatisfied with other life domains, and life overall, and the same may hold for feelings of envy. To a certain extent, acquisition as the pursuit of happiness reflects perceived inequality and maybe even feelings of injustice arising from comparisons with others or ideal states. It could therefore also be associated with not believing in a just world (Rubin and Peplau 1975), and an external locus of control (Rotter 1966).

Pieters (2013) proposed that acquisition as the pursuit of happiness is a result of anxious coping with loneliness. Similarly, and as suggested before, acquisition as the pursuit of happiness may develop or increase as a means of coping with a variety of negative states

and traits such as depression, stress, anxiety, and low self-esteem. Our findings from chapter 4 provide support this notion. Contextual factors such as negative life events may contribute to this, and this is an interesting avenue for future research. In terms of stable personality traits, acquisition as the pursuit of happiness has been found to be associated with low levels of agreeableness, extraversion, openness, and conscientiousness and high levels of neuroticism (Hong, Koh, and Paunonen 2012; Pilch and Górnik-Durose 2016). Acquisition as the pursuit of happiness appears to be associated with being detached, introverted, cautious, disorganized, anxious, and emotionally unstable.

Acquisition Centrality. In contrast, acquisition centrality appears to be more consistent with positive traits and states, and intrinsic rather than extrinsic motivations. It reflects the enjoyment of that possessions and their acquisition provide, also referred to as "material mirth" (Pieters 2013, p. 617). Interestingly, partial correlations of acquisition centrality with the seven personal desires (chapter 2) indicate that acquisition centrality is not associated with desires for money, but positively associated with achievement desires, and negatively with desires for altruism. Acquisition centrality may be associated with identity motives for continuity, belonging, and meaning (Shrum et al. 2013).

More abstract values that might be associated with higher levels of acquisition centrality are stimulation, self-direction and hedonism. The personality factors openness and extraversion would likely be positively associated with acquisition centrality, whereas neuroticism would more likely be negatively associated with it. The focus on pleasure and enjoyment that is inherent to acquisition centrality is consistent with being more open to experiences, more outgoing and sociable, more confident and less anxious. Previous studies have in fact reported the opposite pattern for acquisition centrality, but confounded the three materialism dimensions (Hong et al. 2012; Pilch and Górnik-Durose 2016), hindering the interpretation of their findings. Future research should therefore examine such associations

while simultaneously controlling for the correlations between the three materialism dimensions. Different patterns such as the one speculated here could then be uncovered.

Possession-Defined Success. Similar to acquisition centrality, possession-defined success was positively associated with subjective well-being (chapter 4), despite its relatively extrinsic orientation. In addition, possession-defined success was associated with personal desires for personal growth and achievement. On the other hand, consumers who scored high on possession-defined success were less likely to express desires for happiness or altruism. Moreover, possession-defined success has been found to be associated with loneliness (Pieters 2013), and in general, people seem to form less favorable opinions of others who use possessions to communicate their identity and status (Dittmar and Pepper 1994; Van Boven et al. 2010).

Possession-defined success may be related to motives for self-esteem, continuity, and efficacy (Shrum et al. 2013). Possession-defined success is about demonstrating and communicating status using possessions and reflects a focus on achievement and power. Both achievement and power values focus on social esteem (Schwartz 1992), which is consistent with the need to impress and judge others using possessions. However, possession-defined success may be more strongly associated with achievement than with power values since achievement values emphasize the active *demonstration* of successful performance, whereas power values emphasize the attainment or preservation of a dominant position within the more general social system (Schwartz 1992). Possession-defined success may also be related to needs for control, which is one potential explanation for the increase in possession-defined success in late adulthood, a developmental period in which people are typically confronted with a loss of control due to retirement, potential health issues, and a shrinking social circle.

Personality factors that may be associated with possession-defined success are high levels of conscientiousness and extraversion, and low levels of openness and agreeableness. Possession-defined success does not seem to be associated with sociability or an openness to experiences, but rather with a need for control and order and a tendency for social comparisons emphasizing status and success. Again, future research is needed to test these speculations.

In conclusion, this dissertation opened up the materialism construct, using longitudinal data, meta-analysis, and representative cross-sectional surveys to examine the relationships of overall materialism and its three dimensions with age, financial savings, and subjective well-being. The findings challenge the popular notion of materialism as being uniformly and inherently bad. The dissertation provided new perspectives to the materialism literature. First, it demonstrated that the three materialism dimensions are conceptually and empirically distinct. Second, it found that materialism is also a consequence of reduced financial savings and subjective well-being, not merely a cause. Third, it finds that both acquisition centrality and possession-defined success have positive effects on consumer well-being. The dissertation thus not only shows that materialism is not uniformly bad, but even shows that it can have positive consequences. Hopefully this dissertation serves as one step in the direction of ending the stigmatization of materialism.

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