



Material values are largely in the family: A twin study of genetic and environmental contributions to materialism

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ABSTRACT

Research on materialism has been conducted from numerous theoretical perspectives. Of particular interest has been an examination of environmental factors and situational paradigms that promote materialistic values. Conversely, empirical behavior genetic studies exploring possible genetic contributions to materialism are nonexistent in the literature. The purpose of this study was to examine genetic and environmental contributions to individual differences in materialism using the material values scale [Richins, 2004]. A twin study paradigm employing 240 pairs of same-sex adult twins was used. Previous research has suggested a 40–45% heritable component for a wide variety of personality traits, with similar results reported for attitudes [Olson, Vernon, Harris, & Jang, 2001]. Unexpectedly, in the current study, individual differences in overall materialism and two of its three components were found to be entirely attributable to environmental factors shared and unshared between siblings. Only materialistic-happiness showed any genetic influence. It is proposed that future research focus on trying to identify those environmental factors that contribute to materialistic values.

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1. Introduction

Materialism has often been thought of as a phenomenon caused by capitalist ideologies and in particular contemporary advertising practices (Buijzen & Valkenburg, 2003). In Western society, advertisements and their exposure have grown rapidly over time. The average male in 1972 was exposed to 117–285 advertisements per day, whereas females at this time were exposed to 161–484 advertisements per day (Henderson, Adams, & Miller, 1972). Since the 1970s, and until the 21st century, the average number of daily advertisements seen by an individual has increased to over 3000 (Kalkbrenner, 1997; Poh, Yao, & Jašić, 1998). Despite the rising number of advertisements, what has remained constant is the message being promoted – purchasing an item will increase a consumer's positive internal evaluation of him/herself. Advertising also promotes a relationship between success, attractiveness, and happiness through the attainment of possessions (Pollay, 1986). Moreover, the media implies that individuals who do not purchase these products will not be able to reach an ideal level of self-satisfaction (Wulfemeyer & Mueller, 1992).

The possibility that consumerism can have detrimental effects on the well-being of individuals has attracted substantial interest among psychologists and others (Buijzen & Valkenburg, 2003; Die-

ner & Biswas-Diener, 2002; Hirsh & Dolderman, 2007; Kasser, 2002; Pollay, 1986; Wulfemeyer & Mueller, 1992). Consequently, research on materialism has focused on environmental contributions to creating materialistic ideologies. In contrast to the popularity of research on environmental aspects of materialism, the possibility of its having a genetic component has not been explored. The present study is designed to investigate both genetic and environmental contributions to individual differences in materialism.

1.1. Materialism operationally defined

Materialism has been referred to as “[t]he importance ascribed to the ownership and acquisition of material goods in achieving major life goals or desired state” (Richins & Dawson, 1992). In their research, Richins and Dawson (1992) and Richins, Mick, and Monroe (2004) proposed that individuals differ in the extent to which they display three different material values: success, centrality, and happiness. The definition of *success* is based on the assumption that people define both their own accomplishments, and the accomplishments of others, in terms of their possessions. Consequently, a failure to acquire possessions is seen as a failure to meet this ideal of success. Secondly, individuals who are low in materialism have an internal sense of self and *central* to their character may include meeting goals, pursuing hobbies, and building relationships with others. In contrast, those who are rated high in

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materialism define what is central to their life based on their possessions. The last domain of materialism, *happiness*, refers to the belief that possessions and their acquisition lead to happiness and life satisfaction (Richins & Dawson, 1992).

1.2. Behavior genetics

In order to examine genetic and environmental contributions to individual differences, twins are the most commonly used population in the study of human behavior (Plomin, DeFries, McClearn, & McGuffin, 2008). Behavioral genetic studies using twins and other kinships have revealed that approximately 40% of the variance exhibited in a wide variety of personality characteristics and in attitudes is attributable to genetics (Johnson, Vernon, & Feiler, 2008; Olson et al., 2001). Materialism has been shown to be a correlate of personality traits (Troisi, Christopher, & Marek, 2006), attitudes (Christopher, Marek, & Carroll, 2004), and values (Ahuvia & Wong, 2002), yet research on the role of genes in contributing to individual differences in materialism has not yet been conducted.

1.3. Environmental contributors to materialism

A critical aspect in assessing the role of environmental factors on materialism is whether advertisements have an effect on shaping values. In conjunction with the notion that advertisements have an effect on consumerism, recent studies have investigated the correlation between materialistic values and exposure to advertisements and television. Interestingly, the finding that advertising enhances materialism has been demonstrated both in children and adults (Buijzen & Valkenburg, 2003; Greenberg & Brand, 1993; Vega & Roberts, 2005; Wulfemeyer & Mueller, 1992).

An inherent limitation of several of these studies, however, has been their methodology. Because these studies tend to be correlational in nature, it is unclear whether exposure to advertisements contributes to a greater internalization of consumer values (Roedder, 1999), or whether the consumer initially has intrinsic materialistic values and, as a result, is drawn to more advertisements. The latter possibility proposes that there may be a genetic component to materialism. In contrast, the former possibility suggests that materialistic motivations are primarily a result of environmental factors.

1.4. Environmental and genetic debate

Consumer researchers have become increasingly interested in further examining the origins and causes of materialistic values (Brodie, 1989; D'Astous, 1990; Pollay, 1986). In conjunction with the possibility that advertising has played an important role in shaping materialistic ideals, O'Shaughnessy and O'Shaughnessy (2002) have articulated the broader need to identify genetic and historical factors. They have suggested that marketing cannot be the cause of materialism because, "materialism became part of the human condition long before the first advertising executive" (O'Shaughnessy & O'Shaughnessy, 2002, p. 545). Despite evidence of the relationship between consumerism and marketing techniques, O'Shaughnessy and O'Shaughnessy (2002) have continued to argue that materialism is innate to human existence, and that this innate behavior has created the drive for material possessions and prosperity. This drive in turn has allowed marketing companies to further exploit individuals' urges for materialistic goods.

A strong relationship has been reported between the growth in consumerism and a parallel increase in the sophistication of marketing techniques. As a result, critics have argued that the assertion made by O'Shaughnessy and O'Shaughnessy cannot be substantiated due to the dramatic changes of marketing techniques over the past 30 years (Pollay, 1986). As well, the claims made by

O'Shaughnessy and O'Shaughnessy (2002) are not based on empirical evidence. Their views do not take into account the notion that materialism may have multiple sources of causation that may include both environmental and genetic factors.

1.5. Present study

The purpose of the current study is to examine the extent to which genetic and environmental influences contribute to materialistic values. This study is unique, as it is the first behavioral genetic study to examine a possible genetic component of materialism. Given that materialism may be conceived as an aspect of personality and/or attitudes, both of which have been shown to be influenced by genetic and non-shared environmental factors, it is expected that these factors will also contribute to individual differences in materialism.

2. Method

2.1. Participants

The sample consisted of a total of 480 adult same-sex twins who were recruited from a pre-existing pool of twins from Canada and the United States. The sample comprised 30 pairs of male MZ twins, 149 pairs of female MZ twins, six pairs of male DZ twins, and 55 pairs of female DZ twins pairs. The participants ranged in age from 18 to 50 years ($M = 23.88$, $SD = 6.20$) and there were no significant age differences between the twins based on their sex or their zygosity.

2.2. Measures

The material values scale (MVS) was used to assess the level of materialistic dispositions the participants possessed (Richins, 2004; Richins et al., 2004). This scale contains 15 questions that participants answer on a five-point scale from 1 – "strongly disagree" to 5 – "strongly agree." The participants were instructed to circle the answer that best applied to them. Example items include: "Buying things gives me a lot of pleasure" and "The things I own say a lot about how well I'm doing in life."

As mentioned, the MVS provides an overall material values score as well as scores on three components of materialism: centrality, success and happiness. The scale was chosen for the present study due to its high reliability (Cronbach's alpha $>.80$ for overall materialism score and, across 15 data sets, averaging .76 for success, .67 for centrality, and .78 for happiness [Richins, 2004]) and low social desirability (correlations with social desirability all negative and very low). Moreover, Richins (2004) reports that whereas the hypothesized dimensionality of the original 18-item version of the MVS was not always evident across 15 data sets that she reviewed, the shorter 15-item scale used in the current study showed better psychometric properties and dimensionality. Specifically, confirmatory factor analyses of the 15-item MVS in which overall materialism was the higher-order factor and success, centrality, and happiness were first-order factors represented by the items comprising their specific subscales, yielded good fit indices. Across 15 data sets, Tucker–Lewis Indices ranged from .85 to .96; Comparative Fit Indices ranged from .88 to .97; and root mean square errors of approximation ranged from .04 to .08.

2.3. Procedure

The twin pairs were recruited as part of an ongoing study at the University of Western Ontario. They were contacted by phone or e-mail to confirm their willingness to participate in the current study

and were then sent the MVS and a number of other questionnaires which are not pertinent to this report. Their zygosity had been determined earlier using a 16-item zygosity questionnaire (Nichols & Bilbro, 1966) which asks questions about the twins' physical similarity (e.g., height, eye color, and general appearance) and the frequency with which they are mistaken for one another by other family members and friends. This questionnaire has been shown to be at least 93% as accurate as red blood cell polymorphism analyses for determining zygosity (Kasriel & Eaves, 1976). Participants were asked to complete the questionnaires at their homes and to not discuss their responses with their twin until the questionnaires had been returned in a stamped, addressed envelope that they were provided with. Once the participants had completed and returned the questionnaires they were mailed \$20.00 to compensate them for their time.

3. Results

Because the MVS scales were measured as continuous variables it is important to determine whether any significant differences exist between the MZ and DZ twins. Shown in Table 1 are the means and standard deviations of the MVS scales, separately for MZs and DZs, as well as the results of *t* tests (for means) and *F* tests (for variances). There are no significant differences between MZs and DZs in means or variances for any of the variables.

Intercorrelations among overall materialism, success, centrality, and happiness are reported in Table 2. The values in the main diagonal of the correlation matrix are the variables' coefficient alpha internal consistency reliabilities, which are all satisfactory. As can be seen, all the variables correlate positively and quite highly with one another and success, centrality, and happiness all contribute approximately equally to the overall materialism score. Correlations among success, centrality, and happiness are, however, not so large as to indicate that they do not each tap something unique and distinct from one another so further analyses on them as well as on overall materialism were considered warranted. A confirmatory factor analysis, moreover, revealed that a 3-factor model provided a significantly better fit to the data than did a 1-factor model.

To investigate the effects of genetic and environmental factors on materialism, intraclass correlations on overall materialism scores and success, centrality, and happiness were obtained separately from the MZ and DZ twin pairs and are reported in Table 3. Also reported in Table 3 are the results of univariate behavior genetic analyses which were run with the software Mx (Neale, Boker, Xie, & Maes, 2006). In these analyses, individual differences in variables are attributed to additive genetic effects (a^2), shared environmental effects (c^2), and non-shared environmental effects (e^2). In a full ACE model, such as is reported in Table 3, estimates of all three of these parameters will be made. Although reduced models (for example AE, CE, and E only) can also be fit, Sullivan and Eaves (2002) argue that such reduced models result in oversimplification of the models rather than providing a more accurate representation of the data.

Contrary to expectations, MZ correlations were not greater than DZ correlations for any of the variables with the exception of hap-

Table 2
Correlations among MVS variables.

| | Success | Centrality | Happiness | Materialism |
|-------------|---------|------------|-----------|-------------|
| Success | .77 | .64** | .58** | .87** |
| Centrality | | .75 | .52** | .84** |
| Happiness | | | .82 | .84** |
| Materialism | | | | .89 |

** Correlation is significant at the .001 level (2-tailed); values in the main diagonal are the variable's coefficient alpha internal consistency reliabilities.

piness, and individual differences in all variables except happiness were entirely attributable to environmental factors. Interestingly, happiness from the MVS, showing a heritability of .46, was found to be significantly correlated with the happiness facet from the trait emotional intelligence questionnaire (TEIQue), which the twins in this sample had completed as part of another study and which itself has a heritability of .44 (Vernon, Petrides, Bratko, & Schermer, 2008). In contrast, neither success nor centrality from the MVS correlated significantly with TEIQue happiness (both r 's < .10). Moreover, partialling out the variance that MVS happiness has in common with the TEIQue happiness facet reduced the former's heritable component close to zero.

4. Discussion

Much of the previous empirical research on materialism has been limited to inferring from related constructs the degree to which materialistic values exist. In early studies on personality, Dickins and Ferguson (1957) examined children's job aspirations and their future wishes in an attempt to determine their materialistic attitudes. More recently, Belk (1984), Belk (1985) developed the Belk Scale as a measure designed to assess personality traits that are related to materialism, such as non-generosity and possessiveness of goods. However, a major limitation of the Belk Scale is its low scale reliability (Richins & Dawson, 1992). As a result, to provide a valid and reliable measurement of materialism Richins (2004) developed the material values scale. This scale was based on a model that views materialism as comprising three distinct (albeit correlated) factors: success, centrality, and happiness (Richins & Dawson, 1992).

The current study was designed to investigate the extent to which genetic and environmental factors contribute to individual differences in materialism. Previous research in the personality and attitudes domains has revealed that these have a strong heritable component (Johnson et al., 2008), with an average heritability of .45. In contrast, the results of the current study showed that individual differences in overall materialism and its components of success and centrality have no genetic basis but are instead entirely attributable to shared and non-shared environmental factors. Only happiness showed the expected pattern of results: individual differences in happiness being attributable to genetic and non-shared environmental factors. This result, however, appears to

Table 3
MZ and DZ twin correlations and results of univariate ACE model-fitting analyses.

| | MZr | DZr | a^2 (95% CI) | c^2 (95% CI) | e^2 (95% CI) |
|-------------|-----|-----|----------------|----------------|----------------|
| Success | .39 | .48 | .00 (.00–.40) | .42 (.04–.53) | .58 (.47–.70) |
| Centrality | .54 | .51 | .00 (.00–.42) | .53 (.12–.62) | .47 (.38–.58) |
| Happiness | .46 | .22 | .46 (.36–.57) | .00 (.00–.44) | .54 (.43–.67) |
| Materialism | .51 | .56 | .00 (.00–.38) | .52 (.16–.62) | .48 (.38–.58) |

Note: Any parameter estimate whose confidence interval does not include zero is significant at the .05 level.

Table 1
MZ and DZ means (and standard deviations) and *t* and *F* test results for the MVS variables.

| | MZ mean (SD) | DZ mean (SD) | <i>t</i> | <i>F</i> |
|-------------|--------------|--------------|----------|----------|
| Success | 2.35 (.72) | 2.38 (.82) | -.38 | 1.30 |
| Centrality | 2.86 (.72) | 2.82 (.70) | .53 | 1.06 |
| Happiness | 2.59 (.82) | 2.58 (.77) | .12 | 1.13 |
| Materialism | 2.60 (.64) | 2.59 (.69) | .15 | 1.16 |

reflect the fact that the MVS happiness dimension correlated significantly with the happiness facet of the TEIQue, which is itself moderately heritable.

Because only happiness revealed a genetic effect, the positive correlations between it and centrality and success, and the strong positive correlations between each of these and overall materialism, cannot be attributed to correlated genetic factors. Rather, it appears that common environmental factors contribute to the correlations between these components of materialism. These environmental factors may include the media (Greenberg & Brand, 1993; Wulfemeyer & Mueller, 1992); peer influence (Archenreiner, 1997); personal incidents and experiences (Kasser, Ryan, Couchman, & Sheldon, 2004); and personal experiences of family disruption such as divorce, where it has been shown that young adults (ages 20–32) whose parents were separated or divorced displayed higher levels of materialism than young adults whose nuclear family was intact (Rindfleisch, Burroughs, & Denton, 1997). Further research should focus on the identification of other environmental antecedents to materialistic values, which may include both psychological and physical factors. For example, factors such as perceived relationship closeness, self-monitoring, physical appearance, educational level, and intelligence may be related to materialism, but little research has been conducted on them to date.

O'Shaughnessy and O'Shaughnessy (2002) had previously posulated that materialism is an innate human condition but the results of our study provide little evidence supporting this view. It is hoped that the current research will promote a continued interest in the field of materialism and will encourage a further assessment of those environmental factors that contribute to materialistic values.

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