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Dispositional Greed

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Greed is an important motive: it is seen as both productive (a source of ambition; the motor of the economy) and destructive (undermining social relationships; the cause of the late 2000s financial crisis). However, relatively little is known about what greed is and does. This article reports on 5 studies that develop and test the 7-item Dispositional Greed Scale (DGS). Study 1 (including 4 separate samples from 2 different countries, total $N = 6092$) provides evidence for the construct and discriminant validity of the DGS in terms of positive correlations with maximization, self-interest, envy, materialism, and impulsiveness, and negative correlations with self-control and life satisfaction. Study 2 ($N = 290$) presents further evidence for discriminant validity, finding that the DGS predicts greedy behavioral tendencies over and above materialism. Furthermore, the DGS predicts economic behavior: greedy people allocate more money to themselves in dictator games (Study 3, $N = 300$) and ultimatum games (Study 4, $N = 603$), and take more in a resource dilemma (Study 5, $N = 305$). These findings shed light on what greed is and does, how people differ in greed, and how greed can be measured. In addition, they show the importance of greed in economic behavior and provide directions for future studies.

Keywords: greed, individual differences, economic behavior, experimental games

Most people readily recognize instances of greed. For example, greedy people are always first in line for food and drinks at a party, repeatedly complain about their salaries (even after getting a pay-raise), and continuously buy more stuff they do not need. Common to such observations is that greedy people seem to be dissatisfied with their current state of affairs and that for them enough never seems to be enough. On the other hand, in our everyday lives we also encounter many people who seem anything but greedy. Such people are satisfied with what they have and who they are. They know when to be happy and to stop striving for more. In this article, we present the development of an instrument that captures such individual differences in greediness and that predicts greed-induced behaviors.

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We have recently started investigating the psychology of greed, to better understand what it is and what it does (Seuntjens, Zeelenberg, Breugelmans, & Van de Ven, 2014). Based on this initial research, we constructed a working definition of greed as the tendency to always want more and never being satisfied with what one currently has. We observed that there appears to be a shared intuition that some people are greedier than others, and that this disposition is considered to be rather stable. Should such individual differences in greed exist, then they should also manifest themselves in greedy behavior. This would be particularly interesting because greed is an important construct in economic theory and other models of behavior as we explain later. Until now, however, there has been only very little empirical research on greed. Together, these observations led to the research that we present here, on the development and test of a scale that captures individual differences in greed.

Below, we briefly review what greed is and how it is thought to influence behavior. More specifically, we look at historical perspectives on greed in philosophy, religion, and economics. Next, we propose a psychological theory of greed that is grounded in the idea that greed is dispositional, and that it differs from other, related, dispositions. We then turn to the empirical part, where we develop the Dispositional Greed Scale (DGS), and examine its reliability, its discriminant validity, and its predictive validity. In the General Discussion, we address how differences in the tendency to be greedy relate to other dispositions, as well as to behavioral phenomena in everyday life.

A Brief History of Greed

Greed has been with us since the beginning of time, and through the ages, scholars have written extensively about the topic (Goldberg, 1994; Robertson, 2001). Here, we sketch only

a limited account of these extensive attempts to understand greed, namely those parts relevant for the psychology of greed. We refer the reader to Wang and Murnighan (2011), Sutherland (2014), and Oka and Kuijt (2014), for more extensive overviews. Although much has been written about greed, very little of the work is empirical. Through our research, we hope to start filling this gap.

Greed has been a topic of discussion for as long as the acquisition of wealth and power exists. From the earliest ideas about greed, it already becomes apparent that greed can be seen as good and as bad, as a virtue and as a vice (see also, Sutherland, 2014). Thucydides (460–395 BCE) argued that greed is not necessarily negative, because it motivates progress (Zagorin, 2005), Plato (427–347 BCE) wrote how greed is the cause of war, civil conflict, and immorality and how it is part of human nature (Balot, 2001), and Aristotle (384–322 BCE) argued that greed is confusion between what we actually need and what we ideally want (see Wang & Murnighan, 2011). Later, Hume (1739/2001) argued that greed is as a double-edged sword: on the one hand it motivates people to perform better, but on the other hand it has destructive consequences for society. Greed has been related to acquisition of wealth, and is seen as productive on the one hand, and as harmful to relationships on the other hand.

Greed is discussed and condemned in virtually all world religions. In Christianity, greed is one of the seven deadly sins. Some even argue that it is the matriarch of all sins, with the other sins stemming from greed (Tickle, 2004). However, this negative stance toward greed does not mean that Christianity condemned the acquisition of wealth. In the Old Testament, the wealth of Abraham is seen as a blessing from God. In the New Testament, however, striving for more wealth is seen as a sin (Baker, 2006). Especially the teachings of Saint Paul shifted the idea of greed as something positive and productive, to greed as a sin or vice. Saint Paul saw avarice ("greed") as the "root of all evil." He also made the interesting distinction between *philargyria*, which is the love for money, and *pleonexia*, which is a general tendency to want more of everything (Newhauser, 2000; see also Tickle, 2004). This is consistent with our recent findings that greed applies not only to a desire for money, but to a general desire for more (Seuntjens et al., 2014). This is also consistent with the ideas of Calvin. He believed that life is framed to the will of God, and if one's work is done honest, one should be able to enjoy the perks associated with it. If rich people use their wealth and invest in society and others, this benefits the society as a whole. Calvin does not necessarily say that greed is good, but he argues that the desire to acquire wealth can also have positive outcomes for society (Dommen, 2011; Zinbarg, 2001).

Religions generally have a negative evaluation of greed. In Buddhism, greed is one of the three poisons creating bad karma (Nath, 1998). In Hinduism, greed is an obstruction to spiritual development (Sundararajan, 1989). According to Rafiabadi (2003), Islam as a religion is highly dependent on rewards from commercial activities and not against the accumulation of wealth. The solution for greed in Islam is making generosity and charity obligatory for righteous Muslims (Oka & Kuijt, 2014). Judaism condemns greed because taking more than one's own "share robs other people of their opportunity to get their due" (Bloch, 1984, p. 154). The various religions generally condemn greed because it is representative of a bad personality, and because greedy behavior can be harmful to others.

This last element—the potential conflict between personal wealth accumulation and the outcomes of others—was central in Adam Smith's thinking (Smith, 1776/1994) that formed the basis of capitalism and current economic theorizing. Smith did worry that wealth accumulation in an unlimited form could lead to the rich having advantages and power over the poor, but he also argued that self-interested wealth accumulation is an important force behind economic growth. According to Smith, "it is not from the benevolence of the butcher, the brewer, or the baker, that we expect our dinner, but from their regard to their own interest" (Smith, 1776/1994, p. 15). Classical economic theory assumes that people should maximize their own outcomes and that this leads to more growth and development that benefits the prosperity of society as a whole. This assumption is referred to as the axiom of greed (or axiom of maximization). It holds that "If A contains more of one good than B, and at least as much as B of all other goods, A will be preferred over B" (Lea, Tarpy, & Webley, 1987, p. 109). According to the axiom, people should always want more of a desirable good, and prefer the option that delivers on this desire.

The idea in economics is that greed is a driving force for economic growth and development (Greenfeld, 2001), and that society can benefit from greedy individuals. If people have a desire to maximize their outcomes, and hence be greedy, this ultimately leads to individuals engaging in activities that benefit society as a whole (Oka & Kuijt, 2014). Greed has been associated with positive economic outcomes such as more employment, wealth, and well-being (Melleuish, 2009). The idea of greed as a driving force is also present in the evolutionary perspective on greed. It has been argued that greed promotes self-preservation, and that people living in environments that exhibit scarcity of resources have an evolutionary advantage when feeling the tendency to gain and hoard (Cassill & Watkins, 2005; Robertson, 2001). However, greed can also have adverse economic consequences. Greed has been related to consumer debts (Livingstone & Lunt, 1992) and to lower stockholder returns (Haynes, Campbell, & Hitt, 2014). Furthermore, the news often reports on cases where greed is linked to financial scandals and bankruptcy cases (Zandi, 2008). Brummer (2014) links greed explicitly to the bad banking practices that led to the late 2000s financial crisis. Corporate fraud cases such as the Bernie Madoff scandal and Enron scandal are all partly ascribed to the greed of its top executives. According to Levine (2005), greed causes people to only focus on their own fulfillment, ignoring norms, and values. This might also explain why greed is thought to be related to other types of negative behavior, such as deception (Cohen, Gunia, Kim-Jun, & Murnighan, 2009), theft (Caudill, 1988), fraud (Smith, 2003), and corruption (Rose-Ackerman, 1999).

In summary, greed has been central in classical philosophy, religious thinking, and economic theorizing. Claims have been made about the productive side of greed, but also about its potential to harm interpersonal relations. Greed can be good (constructive) and bad (destructive). In this light, it is remarkable that psychologists have paid only little attention to greed. If they write about greed, it is usually only in post hoc explanations of behavior. Greed has not yet been the subject of theorizing and thorough empirical investigation. According to Wang and Murnighan

(2011), one of the reasons for the lack of empirical research on greed is the difficulty people have with defining greed.

Toward a Theory of Greed

Let us start by addressing what we do know about the psychology of greed. We recently performed a prototype analysis of greed, to provide a better conceptualization of how people define this motivational state (Seuntjens et al., 2014). Five studies revealed that the core experience of greed consists of both a desire to acquire more and the dissatisfaction of never having enough. Put differently, greed is an insatiable hunger for more. Specifically, we asked participants to write down what they thought greed was. Four independent coders categorized these descriptions into features of greed. Follow up studies showed these features could be divided into central (core components) and peripheral (related, but less important) features of greed. Central to greed is to always want more and to never be satisfied. Although greed often involves a hunger for money and material goods (think of Scrooge McDuck), the prototype analysis further revealed that greed is broader than this. Greed is also experienced for nonmaterial desires. For example, greed can also involve desires such as sex, food, power, and status. This is in line with the ideas of Saint Paul that we described earlier.

In addition, the prototype analysis provided valuable information about how greed is related to other constructs. We found that people associated greed most clearly with being self-interested, looking for better opportunities ("maximizing"), feeling envious, and being materialistic. We have reasons to believe that greed is a separate motive that independently influences behavioral choices over and above these related motives. Below we explain what these reasons are, and why developing a scale assessing dispositional greed can further our understanding of individual differences in (economic) behavior. Interestingly, scales to measure individual differences have been developed for all four other motives (*Maximization*: Nenkov, Morrin, Ward, Schwartz, & Hulland, 2008; *Self-interest*: Van Lange, Otten, de Bruin, & Joireman, 1997; *Envy*: Smith, Parrott, Diener, Hoyle, & Kim, 1999; *Materialism*: Richins, 2004). These scales have been applied successfully to a wide range of behaviors. In the empirical part of our article, we will relate our newly developed DGS to these scales (and others). In that way we investigate greed's nomological network and establish discriminant validity. Let us first compare greed to these four other motives on the basis of theory.

Greed is conceptually most clearly related to maximization, which is apparent from the fact that the assumption of maximization is sometimes referred to as the axiom of greed. Rational economic man, in the words of Simon (1955, p. 99), is assumed to have "a skill in computation that enables him to calculate, for the alternative courses of action that are available to him, which of these will permit him to reach the highest attainable point on his preference scale." According to Simon, maximization is not realizable in everyday life because of people's limited cognitive capacities and the complex information in the environment. Hence, people are often motivated to satisfice instead of maximize. That is, they do not strive for the optimal outcome, but for something that is good enough (i.e., just above the minimal acceptable threshold). Schwartz, Ward, Monterosso, Lyubomirsky, White, and Lehman (2002) took the ideas of Simon and developed a scale that assesses individual differences in the extent to which people are motivated to maximize or rather satisfice (see also, Nenkov et al., 2008). For maximizers, the ultimate goal is to make the best decision possible. Greedy people just want more. Wanting more does not necessarily involve a rational balancing of costs and benefits. A greedy person might go into debt to buy desired products (Livingstone & Lunt, 1992), which only under certain circumstances can be seen as rational maximizing behavior. Thus, maximization leads to a desire to acquire *the best* outcome, whereas greed leads just to the desire to acquire more (Seuntjens et al., 2014).

Greed is also clearly related to self-interest. Greedy people want more for themselves. The assumption of self-interest in economic theory refers to the fact that rational actors are believed to care only about their own outcomes and be indifferent with respect to the outcomes of others (e.g., Miller, 1999). However, people often do care about the outcomes of others (e.g., Fehr & Schmidt, 1999; Walster, Walster, & Bersheid, 1978). They may want others to have similar outcomes to themselves and strive for equality, or they prefer to have more than others and show a competitive attitude. There are stable individual differences in how self-interested people are and how much they care about the outcomes of others. These differences have been studied under the name of Social Value Orientation (SVO; Murphy, Ackermann, & Handgraaf, 2011; Van Lange et al., 1997). Some people have argued that greed and self-interest are the same (Balot, 2001), whereas others have argued that they are different (Wang & Murnighan, 2011). We share the latter viewpoint and see greed as different from self-interest. Where self-interest is rational, greed certainly does not seem to be a consistently rational drive.

Greed is one of the seven deadly sins, and so is envy. Envy is the emotion that arises when someone else is better off than oneself (e.g., Van de Ven, Zeelenberg, & Pieters, 2009). Individual differences in greed can be reliably measured (Smith et al., 1999). Greed and envy are similar in the way that they both refer to feelings of not being happy with the current state of affairs. However, they differ in their focus. People who are envious are not satisfied because they compare their own situation to that of others who are better off. In contrast, people who are greedy are not satisfied because they compare their own situation to an imaginary situation of having more. In addition, it requires two people for envy to occur (one person being envious, and the other being envied), whereas greed only requires one person. Envy is inherently more social in the sense that it stems from social comparison processes (wanting what others have), whereas greed is more individualistic (wanting more than I have now; Maijala, Munnukka, & Nikkonen, 2000). Still, both greed and envy are related to being dissatisfied and wanting more. We will examine how greed and envy are related, and also their separate relations with social comparison orientation (Gibbons & Buunk, 1999). For example, previous research has found that dispositional envy is positively correlated with individual differences in social comparison (Zeelenberg & Pieters, 2007). We believe that such a relationship for greed and social comparison will be absent.

Finally, our prototype analysis related greed to materialism. Materialism refers to the importance that people attach to worldly possessions (Belk, 1984; Pieters, 2013). For people who are materialistic, the acquisition of goods plays a central role in their life, and they believe that they need material goods to be happy and

signal their success (Richins & Dawson, 1992). People differ in the extent to which they are materialistic; whereas some people see the acquisition of goods as extremely important, others do not care as much. Although greed and materialism are related, they are not the same. Greed is the broader concept and does not only apply to material goods (Tickle, 2004). One can also be greedy for nonmaterialistic things such as food, sex, power, or success (Seuntjens et al., 2014).

Thus, we propose that greed is a distinct motive that is related to, but different from, maximization, self-interest, envy, and materialism. We will examine this proposition empirically and relate greed to a selection of other relevant constructs that have shown stable individual differences. For example, we believe that greed should be related to people's dispositions to spend money or save money. A scale that measures individual differences in the extent to which people are spendthrifty or miserly is the tightwads-spendthrifts scale (Rick, Cryder, & Loewenstein, 2008). We believe that people scoring high on dispositional greed spend their money more easily and should be more represented on the spendthrift end of the scale.

Greed should also be related to impulsiveness and self-control. When people have willpower they can resist the urge to act upon their impulses. However, when willpower is limited, people usually give in to these urges (Baumeister, 2002). Impulsiveness is the outcome of a conflict between desires and willpower (Hoch & Loewenstein, 1991). As greed is characterized by strong desires, it is likely that these desires beat willpower and lead to more impulsiveness, more temporal discounting, and less self-control. In addition, greed is often associated with increased risk taking and recklessness. For example, in the popular press it is often argued that one of the reasons for the financial crisis is that greedy bankers took too many unnecessary risks (Brummer, 2014; Papatheodorou, Rosselló, & Xiao, 2010). Therefore, dispositional greed should be related to less risk aversion (Holt & Laury, 2002).

Furthermore, our prototype analysis revealed that people often see greed as an antisocial trait (Seuntjens et al., 2014); greedy people often do not care about the consequences of their behavior for others. If this is the case, dispositional greed should be positively related to antisocial behavior, such as psychopathy (Williams, Nathanson, & Paulhus, 2003) and psychological entitlement (Campbell, Bonacci, Shelton, Exline, & Bushman, 2004), and negatively related to prosocial behavior such as empathy and perspective taking (Davis, 1983).

Lastly, because greedy people are never satisfied with their current state of affairs, it is likely that this affects their wellbeing in a negative way. This should also influence how happy they are with themselves (self-esteem: Rosenberg, 1965) and their satisfaction with life in general (Pavot & Diener, 1993). All these suggested associations are examined in Study 1.

Overview of the Current Research

The current article took the discussed theoretical insights into the psychology of greed as a starting point to construct a valid and reliable scale that measures people's dispositional tendency to be greedy. We adopted the following strategy in developing the DGS. In Study 1, we developed a 7-item scale and determined its factorial structure, reliability, internal consistency, temporal stability, and construct validity. We used four different samples from the United States and the Netherlands, with a total of more than 6,000 participants. Next, in Study 2, we took a closer look at the differences between dispositional greed and materialism, because Study 1 found that materialism appeared empirically most related to greed. Then, we related dispositional greed to a variety of behavioral decisions. We examined how dispositional greed influences choice in a dictator game (Study 3) and in an ultimatum game (Study 4). In Study 5, we related the DGS to harvesting behavior in a forest management game (a resource dilemma). Overharvesting in such a game represents the Tragedy of the Commons (Hardin, 1968) and is argued to be one of the typical manifestations of greed.

Study 1

Method

Four samples completed the DGS and a number of other questionnaires (total $N = 6092$). The first sample completed the initial 20 items that we developed for the DGS. Based on Principal components analysis that we describe below, we came to the final 7-item version of the DGS (see Tables 1 and 2). All other samples completed this 7-item scale.

Sample 1. Participants were first year Tilburg University psychology students (autumn 2011) who filled out an online questionnaire at home, in return for course credit ($N = 167$; 82.0%, female, 18.0% male; $M_{age} = 19.25$, $SD = 3.16$). They did this during an annual testing session, called the "test week." Our main aims with the first sample were to create a scale, to test its internal consistency and temporal stability, and to investigate its discriminant and construct validity. Participants completed a first questionnaire with 20 items that were constructed to capture as many individual differences in greediness as possible (see Appendix). All items were based on our prototype analysis of greed (Seuntjens et al., 2014), which revealed that "greed is the experience of desiring to acquire more and the dissatisfaction of never having enough" (p. 14). Responses were measured on a 5-point Likert-scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*. With the 7-item DGS, we also tested temporal stability with a subsample of 59 participants who completed the DGS again, 20 to 50 days after the first administration. To test for discriminant and construct validity, we looked at the relationship of greed with other measures that were administered during the test week. Table 3 presents these measures.

Sample 2. Participants were first year Tilburg University psychology students (autumn 2012) who filled out the online questionnaire in the lab in return for course credit ($N = 236$; 69.9%, female, 19.9% male, 10.2% not specified; $M_{age} = 19.55$, $SD = 2.15$). This sample was also administered during the annual test week and DGS scores were related to a variety of other measures to test the discriminant and construct validity of the scale. For an overview of these measures, see Table 3. The main goal of the second sample was to replicate the factor structure of Sample 1 and to further test the reliability, temporal stability, and construct validity of the scale. Participants in this sample completed the 7-item DGS. Again, after 2 to 3 weeks, a subsample ($N = 101$) completed the DGS a second time to investigate the temporal stability of the scale.

Table 1
The Seven Items of the Dispositional Greed Scale, Including Factor Loadings and Reliability for Samples 1 to 4 in Study 1

	Samples			
	1	2	3	4
	$N = 167$	$N = 236$	$N = 345$	$N = 5344$
Items	Dutch students	Dutch students	American MTurk	Dutch representative
1. I always want more.	.80	.69	.85	.79
2. Actually, I'm kind of greedy.	.65	.73	.80	.79
3. One can never have too much money.	.63	.56	.65	.63
4. As soon as I have acquired something. I start to think about the next thing I want.	.62	.76	.82	.83
5. It doesn't matter how much I have. I'm never completely satisfied.	.71	.71	.85	.79
6. My life motto is "more is better."	.78	.72	.84	.78
7. I can't imagine having too many things.	.67	.74	.72	.82
Eigenvalue	3.41	3.46	4.39	4.22
Explained variance	48.71%	49.44%	62.72%	60.33%
Cronbach's α	.82	.82	.90	.88

Note. Participants are asked to indicate the extent to which they agreed that these items were descriptive of themselves. Responses were measured on 5-point Likert-scales ranging from 1 = *strongly disagree* to 5 = *strongly agree*.

Sample 3. Participants were U.S. based MTurk-workers who received $0.35 in return for their participation ($N = 345$; 46.4% female, 53.6% male; $M_{age} = 33.26$, $SD = 11.85$). The main aim of Sample 3 was to replicate the findings of Samples 1 and 2 using a U.S. sample. We further investigated validity by relating the scale to other measures (see Table 3).

Sample 4. Participants were members of the LISS panel,[1] a representative panel of the Dutch population ($N = 5344$; 54.0% female, 46.0% male; $M_{age} = 50.50$, $SD = 17.63$). We wanted to investigate how greed is related to a variety of demographic variables (e.g., age, gender, income, and education) in a representative sample of the Dutch population. We further established validity by relating dispositional greed to other measures (see Table 3).

Results

Our plan for the analyses was as follows. We started with an exploratory Principal Components Analysis (PCA) on the 20 items in the first sample, which resulted in the 7-item DGS. The latter three samples were used to confirm that the seven items that we retained in Sample 1 had the same factor structure. We used all four samples to assess the reliability and internal consistency of the scale. Samples 1 and 2 filled out the DGS at two points in time, which enabled us to assess temporal stability. All four samples filled out measures for other constructs, allowing us to examine the discriminant and construct validity of the scale. In addition, we had information about several demographic variables in Sample 4 providing us the opportunity to investigate how demographic variables such as age, gender, and income predicted dispositional greed.

Principal components analysis. We conducted an exploratory PCA on the answers to the initial 20 items in Sample 1. The PCA suggested a solution with either 1 or 3 components (component 1: Eigenvalue = 4.95 with 24.72% variance explained; component 2: Eigenvalue = 2.04; 10.21%, component 3: Eigenvalue = 1.83; 9.15%). Inspection of the pattern matrix (see Appendix) shows that 8 items were uniquely loading on the first factor. There were 4 items that were uniquely loading on the second factor, 3 items uniquely loading on the third factor, and 4 items loading on more than one factor (loadings > .30).

Inspection of the scree plot and the fact that the first component consisted of the items most related to the desire to acquire more and never being satisfied (that we consider to be the core of greed), led us to select the items that loaded high on the first component. From the original 8 items we left out the one item that was reverse coded and scored lowest on this factor, which resulted in the selection of 7 items. A PCA on these 7 items resulted in a unidimensional solution with an eigenvalue of 3.41 that explained 48.71% of the variance. The reliability of this scale was good (α = .82). Samples 2, 3, and 4 were only asked to respond to these 7 items. In all these samples, the scale proved to be reliable (α ranged from .82 to .90) and retained the same factor structure (see Table 1).

Internal consistency and temporal stability. Corrected item-total correlations were computed to investigate the internal consistency of the scale (see Table 2). Across all four samples, these ranged between .43 and .78, which indicates that all items have acceptable internal consistency (ITC > .30; see Nunnally & Bernstein, 1994).

The temporal stability of the scale was assessed in Samples 1 and 2, by computing correlations between scores at Time 1 and Time 2. The correlation between Time 1 and Time 2 was $r = .66$ in the first sample, a satisfactory reliability.[2] In this sample the situation of administration was quite different (once at home and once in the university lab), which might have negatively influenced test–retest reliability. In Sample 2 the circumstances were more similar, as both measurements were administered in the same

[1] For more information about the LISS panel see www.lissdata.nl.

[2] When we controlled for the number of days between administration of the scale at Time 1 and Time 2 (ranging from 20 to 50 days) the temporal stability was .66.

Table 2
Means, Standard Deviations, Corrected Item-Total Correlations, and Factor Loadings of the Items of the Dispositional Greed Scale for Samples 1 to 4 in Study 1

	Samples											
	1			2			3			4		
	$N = 167$			$N = 236$			$N = 345$			$N = 5344$		
Item	*M*	*SD*	*ITC*	*M*	*SD*	*ITC*	*M*	*SD*	*ITC*	*M*	*SD*	*ITC*
1. I always want more.	2.35	0.98	.68	2.90	1.09	.56	3.03	1.11	.77	2.29	1.05	.71
2. Actually, I'm kind of greedy.	2.92	1.02	.52	2.67	1.04	.61	2.62	1.16	.71	2.06	0.99	.70
3. One can never have too much money.	3.28	1.14	.49	3.15	1.17	.43	3.30	1.26	.55	2.85	1.12	.53
4. As soon as I have acquired something. I start to think about the next thing I want.	2.66	1.11	.49	2.39	1.07	.63	2.76	1.20	.73	1.90	0.95	.74
5. It doesn't matter how much I have. I'm never completely satisfied.	1.98	1.04	.57	1.89	0.87	.57	2.56	1.18	.77	1.63	0.82	.69
6. My life motto is 'more is better'.	2.17	0.83	.66	1.89	0.84	.58	2.41	1.13	.78	1.72	0.86	.68
7. I can't imagine having too many things.	2.31	0.96	.53	2.14	0.98	.62	2.71	1.28	.62	1.63	0.82	.72
Total	2.53	0.70		2.43	0.71		2.77	0.93		2.01	0.73	

Note. Participants are asked to indicate the extent to which they agreed that these items were descriptive of themselves. Responses were measured on 5-point Likert-scales ranging from 1 = *strongly disagree* to 5 = *strongly agree*.

lab. For this sample we found a correlation of $r = .77$ between Time 1 and Time 2.[3]

Discriminant and construct validity. To investigate if dispositional greed is different from maximization, self-interest (measured with Social Value Orientation), envy, and materialism we conducted a series of confirmatory factor analyses (CFA). We tested whether a unidimensional model (where one factor would represent greed and the related construct) fitted the data better than a two-factor model (where greed and the other construct were represented by separate factors). If dispositional greed is different from the related constructs, the two-factor model would result in a better fit than a unidimensional model.

Maximization. Maximization and greed were measured in Samples 1, 2, and 3. In all three samples, the CFAs revealed that the two constructs were distinct. In all samples, the two-factor model fit better (had a significantly lower χ^2) than a unidimensional scale, $\Delta\chi^2(1) \geq 21.74$, $ps < .001$.

Self-interest. Self-interest was measured in Samples 1 and 2. In both samples, the two-factor model fit better than a unidimensional scale, $\Delta\chi^2(1) \geq 294.96$, $ps < .001$. CFA for both samples indicated that the measure of greed is different from the measure of self-interest.

Envy. Envy was measured in Samples 1 and 2. In both samples, the two-factor model fit better than a unidimensional scale, $\Delta\chi^2(1) \geq 218.24$, $ps < .001$. CFA for both samples indicated that the measure of greed is different from the measure of envy.

Materialism. Materialism was measured in all four samples. In all samples, the two-factor model fit better than a unidimensional scale, $\Delta\chi^2(1) \geq 33.58$, $ps < .001$). CFA for all four samples indicated that the measure of greed is different from the measure of materialism.

The results of the CFAs provide first empirical evidence for the discriminant validity of greed. In the next section we report about the construct validity of greed and further test the discriminant validity of greed. A measure has good construct validity if it correlates with other constructs that one would expect based on the theory, and if it has no relationship with constructs that one would theoretically not expect it to be related to. The further examination of the discriminant validity investigated how greed correlated differently with the other constructs compared to maximization, self-interest, envy, and materialism. To accomplish these goals, we correlated the DGS to a variety of other measures (see Table 3).

Although greed is different from maximization, self-interest, envy, and materialism (as was found in CFA), we expected that greed would correlate positively with these variables. This was indeed the case. We found that people scoring high on greed are more likely to maximize, to be self-interested, to feel envious, and to be materialistic.

Relations with other relevant constructs. Here we discuss the findings depicted in Table 3 concerning the relation of dispositional greed with a large number of constructs that are theoretically relevant. We expected dispositional greed to be associated with people's spending patterns. Some people easily spend money, whereas others are thrifty and experience pain when they have to spend (Rick et al., 2008). We expected and found that greedy individuals spend their money more easily, and more often are spendthrifts compared with tightwads.

We also included several measures related to impulsiveness, because we expected greedy individuals to be more impulsive. We found a negative correlation between dispositional greed and self-control and positive correlations between dispositional greed and impulsiveness and buying impulsiveness. This shows that greedy individuals are in general also more impulsive. Interestingly, there was no relationship between greed and temporal preferences (accepting higher future outcomes over lower current ones). This is strange as impulsiveness is a typical explanation of temporal preferences (Loewenstein & Elster, 1992).

To further differentiate between greed and maximization, we looked at the partial correlations of these constructs with (buying) impulsiveness and self-control. A difference between greed and maximization is that maximizers want to choose the best possible outcome, whereas greedy people just want more. This means that, whereas greed should correlate positively with (buying) impulsive-

[3] When we controlled for the number of days between administration of the scale at Time 1 and Time 2 (ranging from 12 to 25 days) the temporal stability was .76.

Table 3
Correlations of the Dispositional Greed Scale With Other Measures for Samples 1 to 4 in Study 1

Construct	α	Samples 1 $N = 167$	2 $N = 236$	3 $N = 345$	4 $N = 5344$
Maximization Scale (Nenkov et al., 2008)	.43; .45; .55	.29***	.25***	.35***	
Social Value Orientation (Van Lange et al., 1997)[a]	.73; .69	.21**	.17**		
Dispositional Envy Scale (Smith et al., 1999)	.84; .80	.34***	.33**		
Material Values Scale (Richins & Dawson, 1992; Richins, 2004)[b]	.71; .78; .88; .82	.56***	.64***	.72***	.69***
Tightwads-spendthrifts Scale (Rick, Cryder, & Loewenstein, 2008)[c]	.80			.36***	
Self-Control Scale (Tangney, Baumeister, & Boone, 2004)	.74; .71	−.26**	−.21**		
Impulsiveness (Eysenck, Pearson, Easting, & Allsopp, 1985)[d]	.85; .86	.24**		.32***	
Buying Impulsiveness Scale (Rook & Fisher, 1995)	.95			.46***	
Temporal preferences (Mahajan & Tarozzi, 2011)[e]	—		−.09		
Risk aversion (Holt & Laury, 2002)	—		.04		
Psychological Entitlement Scale (Campbell et al., 2004).	.76	.33***			
Self-Report Psychopathy Scale (Williams et al., 2003)	.89; .90	.32***	.23**		
Perspective taking - Interpersonal Reactivity Index (Davis, 1980)	.78	−.33***			
Emphatic Concern - Interpersonal Reactivity Index (Davis, 1980)	.66	−.21**			
Rosenberg Self-Esteem Scale (Rosenberg, 1965)	.89; .89		−.21**		−.23***
Satisfaction With Life Scale (Pavot & Diener, 1993)	.79; .89		−.18**		−.11***
Beck Depression Inventory (Beck, 1967)	.84		.09		
Iowa-Netherlands Comparison Orientation Measure (Gibbons & Buunk, 1999)	.83; .88	.11		.38***	
Social desirability (Crowne & Marlowe, 1960)	.52				−.24***
Extraversion (TIPI, Gosling et al., 2003; IPIP, Goldberg, 1992)[f]	.87	−.03	.02		−.03
Agreeableness (TIPI, Gosling et al., 2003; IPIP, Goldberg, 1992)	.78	−.11	−.13*		−.24***
Conscientiousness: TIPI (Gosling et al., 2003), IPIP (Goldberg, 1992)	.77	−.12	−.10		−.22***
Emotional Stability: TIPI (Gosling et al., 2003), IPIP (Goldberg, 1992)	.89	−.17*	−.14*		−.27***
Openness: TIPI (Gosling et al., 2003), IPIP (Goldberg, 1992)	.76	−.22**	−.10		−.02

[a] This measure consists of a sum score of the proself choices, with a higher score reflecting more proself choices. In Sample 2 we also measured social value orientation with the Social Value Orientation Slider (Murphy, Ackermann, & Handgraaf, 2011). The correlation between the two SVO measures was .53 ($p < .001$), and the correlation between the SVO slider and dispositional greed was .12 ($p = .07$). [b] In Sample 1 we used nine items that loaded highest on the three components of materialism in the original article; in the other samples we used the short version of the scale by Richins (2004). [c] Higher scores reflect more spendthrift behavior. [d] We used the nine items of the scale that loaded highest in the original article. [e] We used the first four choices used in the original article. Participants made four decisions between €100 in 1 month and €100 (or €120, or €140, or €160) in 4 months. The measure consists of a sum score of the times the participant chose the option to wait for the higher amount. A higher score reflects more patience. [f] In Samples 1 and 2 we measured the Big Five with the Ten Item Personality Inventory. In Sample 4 the Big Five was measured with the International Personality Item Pool. We only report the alphas of the IPIP. We do not report the αs for the five dimensions of the TIPI, as the αs of short scales that measure broad constructs, such as the TIPI, are not meaningful (Gosling et al., 2003).
* $p < .05$. ** $p < .01$. *** $p < .001$. When correlations are not reported, the scale was not measured in that sample.

ness, maximization should correlate negatively or not at all with impulsiveness. We found that if we controlled for dispositional greed, maximization was not associated with these constructs ($rs < .10$, $ps > .135$). More important, when we controlled for maximization, we still found significant correlations between greed and these constructs ($rs > .18$, $ps < .006$).

Unexpectedly, we did not find a relationship between dispositional greed and risk taking. This is surprising because greed is often seen as an important factor for the risky behavior of bankers that ultimately led to the financial crisis. We return to these unexpected findings in the General Discussion.

Because greed is often related to interpersonal harm and antisocial behavior, we investigated the relationship between greed and several relevant measures. We found that dispositional greed is associated with more psychopathy, psychological entitlement, and with less empathy and less concern for others.

One of the characteristics of greed is dissatisfaction with one's current position. Hence, we expected that greedy individuals would score lower on measures related to well-being. Greed correlated negatively with self-esteem and life satisfaction, but we did not find a relationship between greed and depression.

We expected that social comparison would be related to envy, but not to greed. In Sample 1, we included all three measures and found a significant relation between envy and social comparison, $r = .34$, $p < .001$, but no relation between greed and social comparison. Unexpectedly, we did find a significant correlation between greed and social comparison in Sample 3.

Lastly, there were also measures concerning general dispositions included in our dataset that had been added by other researchers for purposes other than our study. In Samples 1 and 2 the TIPI (Gosling, Rentfrow, & Swann, 2003) was included to measure the Big Five, and in Sample 4 the IPIP (Goldberg, 1992) was included to do so. We found that in all three samples dispositional greed was associated with less emotional stability, and in two out of the three samples with a lesser agreeableness. Furthermore, in Sample 1 we found that dispositional greed was associated with less openness/intellect, and in our large Sample 4 we found that greed was associated with lower conscientiousness. We did not find a relationship between greed and extraversion.

Sample 4: Demographics, desirability and financial behavior. The fact that the participants in our largest sample were members of the representative LISS panel allows for a

number of additional analyses. We conducted a two-step multiple linear regression analysis to investigate what demographics were related to dispositional greed. In the first step we entered age and gender. In the second step we added income, education, political orientation, and religiousness. The results of these analyses can be found in Table 4. Younger people, males, people with a lower level of education, and people with a right-wing political orientation tended to be greedier. Income and religiosity did not relate to dispositional greed.

Sample 4 also allowed us to relate dispositional greed to the tendency to give social desirable answers, as this data was available in the panel. We found that people that have a tendency to give desirable answers score lower on greed. This makes sense, as greed is an undesirable trait. The correlation was $r = -.24$, $p < .001$, which means that social desirability explains about 6% of the variance in the DGS.

As greed is often felt in the financial domain, we wanted to investigate how greed affects people's financial situation. Sample 4 gave us the opportunity to test how dispositional greed was related to their (perceived) financial situation. We expected and found that greedy individuals would be less satisfied with their financial situation, $r = -.17$, $p < .001$. In addition we found that they also indicated more often that they had problems with making ends meet, $r = .07$, $p < .001$.

Discussion

Using four samples, and over 6,000 participants, we developed a reliable, valid, and temporally stable 7-item scale to measure individual differences in greed. As expected, we found weak to moderate correlations between dispositional greed and the tendencies to be self-interested (SVO), to maximize, and to be envious, when we investigated the discriminant and construct validity of our scale. More remarkably were the high correlations between the DGS and MVS; we found correlations between .56 and .72, indicating that they share between 31% and 51% of the variance. Although we expected the two to be related, we did not expect the correlations to be this high. Whereas our DGS measures the general tendency to have insatiable desires to acquire more (Seuntjens et al., 2014), materialism is defined as "the importance people attach to worldly possessions" (Belk, 1985, p. 265). Materialism should only be related to the specific desire to acquire more material possessions. The greed motive is broader and should predict other behaviors as well. To test this idea, and to further differentiate between greed and materialism, we conducted Study 2. After that, we report three studies that related greed to a variety of economic behaviors.

Study 2

Study 1 found in four CFA that a model with separate factors for greed and materialism fit the data better than a one-factor model. Nevertheless, Study 1 also found substantial correlations between the DGS and the Material Values Scale (MVS; Richins, 2004). Therefore, we thought it was worthwhile to obtain more insight into how greed and materialism relate to each other. We expected greed, and not materialism, to also predict desires for nonmaterial goods such as food and sex (Seuntjens et al., 2014; Tickle, 2004). Study 2 was set up to examine this prediction.

Method

MTurk workers ($N = 290$; 57.2% male, 42.8% female;[4] $M_{age} = 30.43$, $SD = 9.29$) from the United States completed this study in return for $0.20. They were first asked to rate the four behavioral inclinations in Table 5 (1 = *strongly disagree,* to 5 = *strongly agree*). These inclinations were: (a) When I am eating a bag of chips, I don't want to stop until the bag is finished; (b) When I am single, I like to have casual sex with as many people as possible; (c) When I am using social networking sites (e.g., Facebook, LinkedIn), I want to have as many friends as possible; and (d) When I see a newer model of my phone I immediately want to have it. Next they filled out the DGS ($M = 2.71$, $SD = 0.89$; $\alpha = .88$) and the MVS ($M = 3.01$, $SD = 0.78$; $\alpha = .87$) the order of which was randomized between participants.

Results and Discussion

The findings are shown in Table 5. We first replicated the CFA and found again that a model separating the DGS and the MVS fit better than a unidimensional model, $\Delta\chi^2(1) = 210.27$, $p < .001$. Next we computed correlations and partial correlations between greed and materialism and the four behavioral inclinations. We see that the DGS correlates with all four behavioral inclinations, and MVS with three of them. The more important test for differentiating the two constructs is how dispositional greed and materialism uniquely predict these four behaviors, controlling for each other. We can see that materialism was best at predicting the desire for a material good while dispositional greed better predicted the other three behavioral intentions.

Study 2 shows that whereas materialism is mostly associated with the desire for materialistic goods, greed is also associated with the desire for nonmaterialistic goods. Note that greed also correlated with the desire for the material good, but it is no surprise that the scale for materialism predicts better than dispositional greed does. A more specialized scale is likely to predict exactly materialistic behavior better than a broader scale does. We were surprised that materialism also correlated (even when not controlling for greed) with the preference for having many sex partners and many friends on social networking sites. These preferences are theoretically unrelated to materialism, but are empirically related to it. Perhaps the strong association of the materialism scale with what we now call dispositional greed could be a reason for these correlations. Another possibility is that materialism is actually related more to a desire for status than the definition implies. In any case, we found that the DSG was better at predicting the general desire for more than materialism.

The current study corroborates our expectations and unveiled more insights into the discriminant validity of the DGS. Materialism proved to be mostly associated with the desire for material goods, whereas greed was also associated with the desire for nonmaterial goods. This indicates that greed is broader concept and involves the desire for more than just material goods, such as food, sex, and friends.

[4] We tested for dispositional greed– gender interactions in Studies 2 to 5. We only found a significant interaction between dispositional greed and gender for Proposers in Study 3, such that a higher score on greed was associated with proposing lower offers in males, but not in females ($\beta = .51$, $t(298) = 2.51$, $p = .012$).

Table 4
Regression Analyses of Demographics on Dispositional Greed in Sample 4 of Study 1 (N = 5,344)

Variable	*b*	*SE*	β	*t*	*p*
Step 1					
Age	−.02	.00	−.37	−24.09	<.001
Gender (0 = female; 1 = male)	.18	.02	.13	8.33	<.001
Step 2					
Income (net income per month in €'s)	.00	.00	−.00	−0.11	.913
Education (ranging from 1 = elementary education; 6 = university)	−.02	.01	−.05	−3.25	.001
Political orientation (0 = left; 10 = right)	.03	.01	.10	6.76	<.001
Religiosity (0 = not religious; 1 = religious)	−.04	.02	−.03	−1.87	.062

Study 3

In the final three studies in this article, we examined the predictive validity of the DGS. Therefore, we related the DGS to behavioral decisions in a variety of experimental economic games, and we predicted that greed results in choices that ensure people of larger outcomes, even at the expense of other. In Study 3, we related dispositional greed to people's offers in a dictator game (Kahneman, Knetsch, & Thaler, 1986). The dictator game is a two-player game (in a strict sense it is not a game because it involves a single, unilateral decision) where one player (the dictator) gets to split a certain amount of money (e.g., $10) between him/herself and a second player (the receiver). The receiver has no say in the decision the dictator makes and is completely dependent on what the dictator offers. The dictator is free to allocate as much to oneself as one desires (leaving nothing or only a little for the other), or opt for more fair allocations where the money is more evenly split. Typically, a dictator offers the receiver about 20% of the endowment (Camerer, 2003). Greed has been named as one of the motivations for dictators to give lower offers to the receiver (Haselhuhn & Mellers, 2005; Wang, Malhotra, & Murnighan, 2011). We examine whether dispositional greed predicts the behavior of the dictators in this game.

Method

In total, 300 MTurk workers (61.0% male, 39.0% female; M_{age} = 31.74, *SD* = 10.64) from the United States completed this study in return for $0.30. Participants first filled out the DGS (α = .88) and participated in an incentivized dictator game. Participants indicated how they would divide $10 between themselves and another person. At the end of the experiment, we randomly selected 10 participants as dictators, paired them with 10 other randomly selected participants, and paid both according to the proposed distribution. All participants knew this in advance.

Results and Discussion

The DGS had a mean score similar to our previous samples (*M* = 2.81, *SD* = 0.87; α = .88). On average the dictators kept $6.31 (*SD* = 1.97) and gave $3.69 to the receiver. As expected, a regression analysis revealed that the more greedy an individual was, the more money they allocated to themselves in the Dictator Game, β = .24, $t(299) = 4.24$, $p < .001$, thereby creating more unfair offers that left less money for the other person. An individual who scored −1 *SD* on the DGS on average kept $5.84, whereas an individual who scored 1 *SD* on the DGS kept $6.77.

Study 4

In Study 4, we related dispositional greed to people's behavioral intentions in an ultimatum game (Güth, Schmittberger, & Schwarze, 1982). Just as in the dictator game, greed is seen as one of the motivations behind proposing lower bids in the ultimatum game (e.g., Hoffman, McCabe, & Smith, 1996). The ultimatum game is similar to the dictator game, with one important difference. Whereas in the dictator game the receiver has no influence whatsoever on the outcome of the negotiation, in the ultimatum game the responder can choose either to accept or reject the proposal. If a responder rejects the offer made by the proposer, both players receive nothing. If the responder accepts the offer of

Table 5
(Partial) Correlations of Greed and Materialism With Nonmaterialistic and Materialistic Desires in Study 2 (N = 290)

	Descriptives		Correlations		Partial correlations	
	M	*SD*	Greed (DGS)	Materialism (MVS)	Greed (DGS)	Materialism (MVS)
When I am eating a bag of chips, I don't want to stop until the bag is finished.	2.89	1.21	.19***	.06	.21***	−.10
When I am single, I like to have casual sex with as many people as possible.	2.21	1.26	.28***	.15*	.24***	−.05
When I am using social networking sites (e.g. Facebook, LinkedIn), I want to have as many friends as possible.	2.24	1.03	.25***	.25***	.12*	.11
When I see a newer model of my phone I immediately want to have it.	2.49	1.21	.35***	.44***	.08	.30***

Note. Responses were measured on 5-point Likert-scales, ranging from 1 = *strongly disagree* to 5 = *strongly agree*.
* $p < .05$. *** $p < .001$.

the proposer, both players receive the offer as it was made. The average offers are typically in the regions of 30–40%, with a 50–50 split often as the mode. Offers of less then 20% are frequently rejected (for an overview, see Camerer & Thaler, 1995). The fact that the responder can reject the offer makes the ultimatum game a clear case of strategic decision making. Proposers who want to get as much money as possible have to make a tradeoff between keeping as much money to themselves and the increased risk of rejection by the responder.

The aim of Study 4 was to investigate whether and how greed was related to behavior in an ultimatum game. In this study we used a strategy method (see Brandts & Charness, 2011) for studying decisions in the ultimatum game. This entails that we asked participants to provide binding decisions for each offer they could encounter in the negotiation. Similar to our expectations for the dictator game, we expected that in the ultimatum game greedy proposers would be more likely to propose unfair distributions favoring themselves, as they are focused on getting as much as possible for themselves. We did not have clear predictions for the effect of greed on the responders. On the one hand, one could argue that greedy responders should accept any offer made by the proposer because by rejecting unequal proposals they would end up with nothing. On the other hand, one could argue that greedy responders are more likely to reject unequal offers because they are less easily satisfied with the offer of the proposer.

Method

In total, 603 MTurk workers (64.7% male, 35.3% female; M_{age} = 29.42, *SD* = 9.93) from the United States completed this study in return for $0.30. Participants were randomly assigned to either being a proposer or a responder in an ultimatum game. Participants first filled out the DGS (α = .87). Afterward they participated in an ultimatum game. Participants in the Proposer condition (*N* = 302) indicated how they would divide $10.00 between themselves and another person. Participants in the Responder condition (*N* = 301) indicated for each possible proposal (stated in terms of integers) whether they would reject or accept this proposal (a $10.00–$0.00 split, a $9.00–$1.00 split, etc.). At the end of the study, participants were asked about the motivations that played a role when making their decision. Motivations about greed were measured by "I wanted to get the most money I could" and "I did not want to end up with no money at all" and motivations about fairness were measured by "I wanted a fair division of the money" and "I wanted an equal division of the money" (all on a 5-point scale ranging from 1 = *totally unimportant* to 5 = *totally important*).

Results

Proposers. Across all proposers, the mean score on dispositional greed was 2.85 (*SD* = 0.85). On average proposers indicated that they would propose to keep $5.36 (*SD* = 0.97) to themselves, and give $4.64 to the responder. A regression analysis was conducted to investigate how greed was related to people's proposals in an ultimatum game. As expected, people scoring high on dispositional greed proposed offers in which they kept more money to themselves, β = .19, *t*(301) = 3.33, *p* = .001. A person who scored −1 *SD* on the DGS on average proposed to keep $5.18 (and give $4.82), whereas a person who scored 1 *SD* on the DGS proposed to keep $5.54 (and give $4.46).

On average, proposers scored 3.44 (*SD* = 0.94) on the greed motivation scale and 3.82 (*SD* = 1.16) on the fairness motivation scale. We conducted a mediation analysis following the bootstrapping procedure of Preacher and Hayes (2008), using bias corrected intervals and 10,000 samples. Figure 1a contains the standardized regression coefficients. The confidence intervals (CI) for both greed and fear did not include 0. This means that the effect of

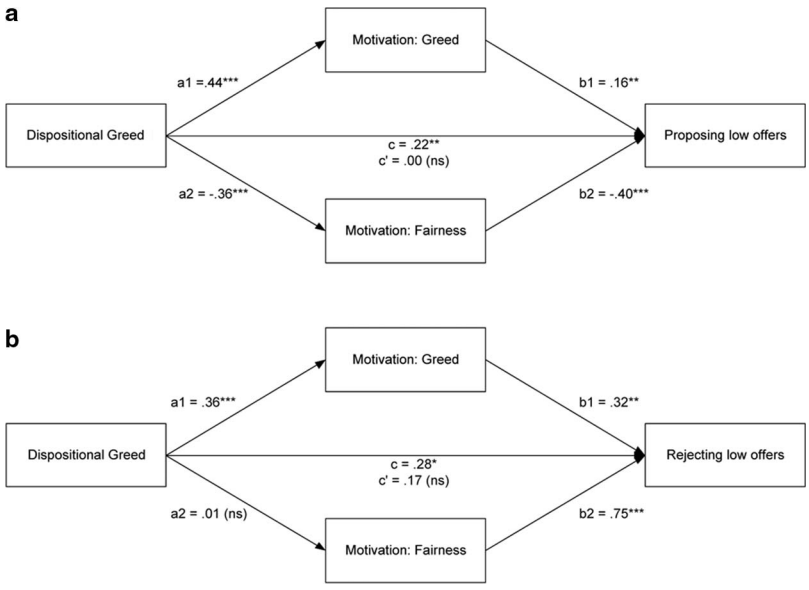

Figure 1. (a) Mediation analysis of dispositional greed on proposers in an ultimatum game in Study 4. * $p < .05$; ** $p < .01$; *** $p < .001$; *ns* = not significant. (b) Mediation analysis of dispositional greed on responders in an ultimatum game in Study 4. * $p < .05$; ** $p < .01$; *** $p < .001$; *ns* = not significant.

dispositional greed on the offer made to the responder was completely mediated by higher greed-driven motivations (95% CI: lower = .02; upper = .14) and lower fairness-driven motivations (95% CI: lower = .07; upper = .25).

Responders. Across all responders, the mean score on dispositional greed was 2.85 (*SD* = 0.84). In total, 44 responders (14.6%) gave inconsistent answers in the Ultimatum Game, such as claiming that they would accept an offer in which the proposer would get $8 and they would get only $2 split, but would reject a $7–$3 split. Because such data cannot be interpreted in terms of stable preferences for monetary divisions, these people had to be excluded from the analyses.[5]

On average, responders indicated that they would reject offers lower than $2.70 (*SD* = 1.85). A regression analysis was conducted to investigate how greed was related to people's responses in the ultimatum game. A regression analysis revealed that people who were greedier are less likely to accept low offers, $\beta = .13$, $t(256) = 2.07$, $p = .040$. A person scoring −1 *SD* on the DGS accepted offers higher than $2.44 on average, whereas a person scoring 1 *SD* on the DGS accepted only offers higher than $2.91 on average. More greedy individuals were more likely to reject lower offers.

On average, responders scored 3.60 (*SD* = 0.98) on the greed motivation scale and 3.37 (*SD* = 1.16) on the fairness motivation scale. We conducted a mediation analysis to investigate how the motivations of greed and fairness influenced people's decisions to accept or reject offers. Results showed that the effect of dispositional greed on rejecting offers could be completely mediated by motivations of greed (95% CI: lower = .03; upper = .23), but not by motivations of fairness (95% CI: lower = −.14; upper = .12). See Figure 1b for a visual representation of the mediation analysis.

Discussion

We found that greedy individuals are more likely to keep more money to themselves and make unfair (or at least more unequal) offers. It is important that such effects were also found in the ultimatum game, next to the dictator game, because the fear of rejection of unfair offers is an important additional motive for proposers, potentially suppressing the motive of greed. The amount of money proposers allocated to themselves was driven by higher greed motivations and lower fairness motivations. Similar effects were found for responders. Greedy individuals were more likely to consider an offer made by a proposer as too low, and reject it as a result (with the consequence that both ended up with nothing). Note that these responders high on dispositional greed did not reject the offer because they thought it was more unfair, but out of greed concerns. These data suggest that greed operates independently of fairness motives and that it is purely driven by the size of the pay-off. In addition, Studies 3 and 4 show that the DGS relates in meaningful ways to relevant economic behavior.

Study 5

The Tragedy of the Commons (Hardin, 1968) is perhaps the most often used example of how greedy behavior can harm a society (Wilke, 1991). This tragedy describes the behavior of medieval herders in the United Kingdom. These herders had, besides their private parcel of land, a common parcel on which they could let their livestock graze. From an individual perspective, letting one's livestock graze on these "commons" was the most rational choice. Because all herders did this, it led to overgrazing, making these commons useless in the end. Furthermore, in modern times this tragedy takes place, for example, in the form of overfishing (Kraak, 2011) and environmental pollution (Good & Beatty, 2011). These situations in which there is a common resource or common pool and one's own interest and the interest of the group are conflicting, are also referred to as resource dilemmas.

The aim of Study 5 was to investigate if dispositional greed predicts people's harvesting behavior in a resource dilemma. We know from previous research that harvesting is related to social value orientation (Van Lange et al., 1997), and we examine the effect of greed in combination with that of SVO, so that we can estimate the relative impact of both. We used the forest-management game (Sheldon & McGregor, 2000), which is modeled after the Tragedy of the Commons.

Method

Participants were 303 MTurk workers (56.9% male, 43.1% female; $M_{age} = 31.66$, *SD* = 10.03) from the United States who received $0.30 in return for filling out the DGS, the SVO scale, and a one-shot resource dilemma.

Participants first played the forest-management game (Sheldon & McGregor, 2000) and then filled out the DGS ($\alpha = .90$) and SVO scale. In this dilemma, participants imagine that they are owners of a timber company and that they bid against three other companies to harvest timber in the national forest. They receive information about both the advantages and disadvantages associated with either making small or large bids. Large bids are associated with more profit, but if the joint bids of all players are too high, this would lead to the forest being depleted (ruining future profit potential). After participants read the dilemma, they rated on a 7-point scale (1 = *not at all* to 7 = *very much*) the extent to which they would like to profit more than the other companies (referred to as *acquisitiveness* or *greed* by Sheldon & McGregor) and the extent to which they expected the other companies to cut large amounts of forest (referred to as *apprehensiveness* or *fear*). Then, participants indicated how much of the forest they wanted to cut themselves (ranging from 0 to 10 ha). If participants would harvest more than 5 ha, this would imply that they are overharvesting and are depleting the resources faster than they can regrow, causing the tragedy of the commons. For further details of the procedure, see Sheldon and McGregor (2000).

Results and Discussion

On average, participants indicated that they wanted to cut 5.63 (*SD* = 2.55) hectares of forest. The mean score for greed motivation was 5.09 (*SD* = 1.48); the mean score for fear motivation was 5.42 (*SD* = 1.56). The mean dispositional greed score was 2.79 (*SD* = 0.93). For SVO, we did not classify participants as either

[5] DGS is related to making inconsistent decisions, $b = .44$, $Wald = 4.84$, $p = .03$. There seems to be a slight tendency that individuals who score higher on dispositional greed were more likely to be inconsistent in their responding.

proself or prosocial, but rather used the number of self-interested choices made out of the possible nine answers.[6] On average, participants made 3.21 (SD = 3.91) self-interested choices.

A regression analysis in which harvesting was predicted by both the DGS and SVO revealed that the more greedy individuals were, the more forest they wanted to cut, β = .20, $t(302)$ = 3.52, $p < .001$. For SVO we found a significant effect that the more self-interested individuals would cut more forest, β = .12, $t(302)$ = 2.09, p = .04. A person scoring −1 SD on dispositional greed on average harvested 5.07 ha of forest, whereas a person scoring 1 SD on the DGS on average harvested 6.17 ha of forest (controlling for SVO).

To validate the effects of the dispositional greed measure with the idea of Sheldon and McGregor (2000) that greed is an important motive in this forest harvesting game, we related the DGS to their motivational measure of why participants overharvested. A mediation analysis revealed that the effect of dispositional greed on harvesting could be completely mediated by the motivation of acquisitiveness ("the desire to obtain as much of the resource as possible for oneself," p. 388; 95% CI: lower = .29; upper = .63) and not by the motivation of apprehension ("the expectation that others will be trying to obtain as much as possible for themselves," p. 389; 95% CI: lower = −.04; upper = .02). See Figure 2 for a visual representation of the mediation analysis.

Therefore, participants scoring high on greed take more from a common pool than less greedy individuals do. Of interest to the authors, participants in general had a tendency to overharvest (the optimal amount of hectares on should harvest is 5, but in general people harvest more) but greedy individuals tended to overharvest even more. Greedy people are more likely to deplete a common resource. Furthermore, people who have greedy dispositions are more likely to overharvest because of acquisitiveness motivations, rather than because of the expectancy that others will overharvest.

General Discussion

This article reports on the development and validation of the DGS, a 7-item measure for individual differences in greed. Five studies with in total over 7,500 participants from both the United States and The Netherlands established the reliability, construct validity, discriminant validity, and predictive validity of the DGS. Study 1 reported on four different samples. Dispositional greed was found to correlate with maximization, self-interest, envy, and materialism, all constructs that are often associated with greed. CFA showed that greed is also distinct from these four constructs. In addition, dispositional greed was associated with more spendthrift, more impulsiveness (lower self-control, higher impulsivity, and higher buying impulsivity), lower well-being (lower self-esteem, lower satisfaction with life), and having less concern for others (higher psychological entitlement, higher psychopathy, lower perspective taking, and lower empathic concern).

Because dispositional greed was highly correlated with materialism in Study 1, we further assessed the differences between the two constructs in Study 2. We found that whereas materialism was more predictive of inclinations for material goods, greed was more predictive of inclinations for nonmaterial goods such as food, sex, and friends. Studies 3, 4, and 5 demonstrated that the DGS reliably predicts greedy behavior in economic dilemmas. We obtained this predictive validity in a dictator game, in an ultimatum game, and in a resource dilemma. Taken together, these findings suggest that the DGS captures individual differences in dispositional greed in a psychologically and behaviorally valid manner. Below, we will first summarize our findings and explain what we have learned about greed. In doing so, we explain what greed is, what greed is related to, and what greed does. We also discuss the moral character of greed. Finally, we point to promising lines for future research on the basis of our findings.

The studies presented here were needed to develop the DGS. However, we believe they are also valuable beyond that purpose. These studies also teach us something about the psychology of greed. The pattern of correlations displayed in Table 3 provides insight into the nomological network of greed (Cronbach & Meehl, 1955). These correlations, especially when they are replicated in different samples, show lawful relations between greed and corresponding constructs. As such, they help us in finding out what greed precisely is and what it is not. Wang and Murnighan (2011) noted that empirical research on greed is scarce and a clear definition of greed is lacking. Seuntjens et al. (2014) provide a definition based on an extensive prototype analysis that was the basis of the current DGS. The current findings corroborate this definition: *Greed is the dissatisfaction of not having enough, combined with the desire to acquire more*.

Working from this definition, we can see how greed relates to other relevant constructs. In line with laymen's conceptions, classical economic theory, and previous theorizing (Lea et al., 1987; Seuntjens et al., 2014; Wang & Murnighan, 2011), greed was associated with higher dispositional tendencies to maximize, to behave self-interestedly, to experience envy, and to be materialistic. Therefore, our data are supportive of these earlier ideas. Let us now describe how we think greed is related to these four focal constructs.

In economic theory the axiom of greed is often referred to as the axiom of maximization (Lea et al., 1987), suggesting that people see greed and maximization as the same thing. Data from the first three samples in Study 1 revealed significant correlations between greed and maximization, but CFAs provided support for discriminant validity. The pattern of correlations of greed and maximization provides more insight in how these constructs differ. Greed was associated with more impulsiveness, while maximization was not. This makes sense; if a decision maker wants to maximize, impulsivity does not come in handy. Maximization is characterized by the motivation to make the best possible decision (Schwartz et al., 2002). Maximizers have to engage in elaborative decision processes. They have to weigh all possible alternatives and their outcomes (and take into account the associated probabilities) to find the best one. Impulsivity would stand in the way of that. Greedy people do not maximize, they just want more of things; and then impulsivity may prove its worth.

Greed is also related to self-interest. Greed results in people wanting more for themselves. As such it predicts similar tendencies as self-interest. Research on self-interest typically investigates how much value people place on their own outcomes and on the outcomes of others. Greed is unrelated to the outcomes of others because people only focus on their own need to acquire more. What did we find concerning the relation between these two constructs? Study 1 revealed significant correlations between the DGS and SVO (our mea-

[6] The results are similar if we classify SVO dichotomously.

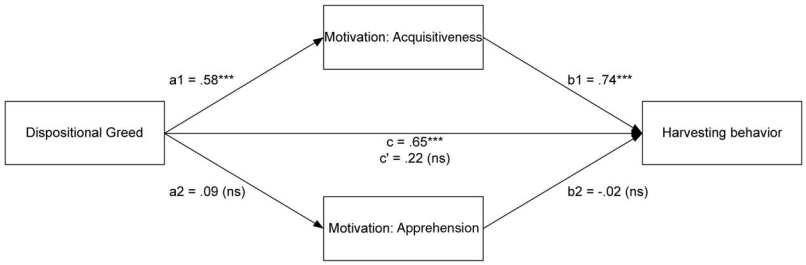

Figure 2. Mediation analysis of dispositional greed on harvesting behavior in Study 5. * $p < .05$; ** $p < .01$; *** $p < .001$; *ns* = not significant.

sure of self-interest). Note, however, that these correlations were rather low. Moreover, the CFAs demonstrated the distinctness of these constructs. More discriminant validity was found in Study 5. Participants took part in a harvesting dilemma that was modeled after the Tragedy of the Commons (Hardin, 1968). They had the role of owner of a timber company and had to decide how much to harvest in the national forest. Both greed and self-interest would lead decision makers to harvest more, creating the risk of collective overharvesting. We found that both greed and self-interest predicted this behavior independently.

The relation between envy and greed goes further than the fact that they are two of the seven deadly sins. Greed and envy both reflect dissatisfaction with one's current state, and the motivation to act on that dissatisfaction. A clear difference between the two is the intrinsically social nature of envy. Envy is felt when someone else has something valuable that I lack and want. Envy comprises an upward social comparison (Van de Ven et al., 2009). Greed in its pure form is individualistic. Greed is felt when one lacks and wants something valuable, irrespective of what others have. Our data again underscore the relation and distinctness. In Study 1 we find that dispositional tendency and the DGS correlate significantly (Samples 1 and 3), but the CFAs show that they are distinct constructs. We also find that dispositional envy is related to social comparison in Sample 1 (replicating Zeelenberg & Pieters, 2007). In that sample, the DGS did not correlate with social comparison. In Sample 3 of Study 1 we did find a correlation between the DGS and social comparison, suggesting that greedy people may sometimes use social comparison to find out what they are missing.

Of all focal constructs, materialism was most closely related to greed. Although the theoretical relation between greed and materialism was not entirely clear, the relationship is intuitively plausible given that materialism refers to the extent to which people think the acquisition of material possessions is important (Belk, 1984; Pieters, 2013). In the domain of material possessions, greed will also lead to an increased desire to acquire possessions, which is suggestive of a relationship. Our prototype analysis also clearly pointed to such a relation (Seuntjens et al., 2014). Across all samples in Study 1 and in Study 2, we found high correlations between materialism and greed. In all samples, we also found support for discriminant validity in the fact that the CFAs showed that they were separate constructs. We designed Study 2 to obtain more insight in how greed and materialism are different. Whereas materialism appeared to be more specific to the domain of possessions, the desire present in greed appeared broader, extending to the domains of food, sex, and social relations. This finding corroborates early intuitions of Saint Paul, who argued that greed is not just a desire for more money, but is a more general tendency to desire more (Newhauser, 2000).

To summarize, the findings presented in this article did not only help us to answer the question what greed is, but also what greed is related to. The data clearly show that greed is related to and distinct from maximization, self-interest, envy, and materialism. These findings provide support for important ideas that were present in the literature, but never empirically tested. The findings also point to interesting avenues for future research. Before discussing these, however, let us address the moral character of greed.

As we explained earlier in the article, there are very pronounced and contrasting views with regard to the moral nature of greed, with some philosophers and religions condemning greed's negative consequences for other people and other philosophers and economists stressing greed's positive consequences for progress and the accumulation of wealth. Rather than arguing one of these positions to be more or less true, our data and definition of greed suggest an alternative possibility. This is that greed as a motivational state is in itself not intrinsically related to morality; it is the consequences of greed that can be qualified as more or less moral. This follows from the definition of greed as the dissatisfaction of not having enough, combined with the desire to acquire more. In situations where our behavior affects the outcomes of other people, such as in the economic games that we used in this article, greedily striving for more for oneself could easily lead to worse outcomes for the people around us. Indeed, it is especially because greed may be harmful to others that many religions and philosophers have condemned greed. However, in situations where no such interdependencies exist, greed can actually be beneficial. For example, in situations where huge amounts of effort are necessary to achieve excellence, such as athletes striving to ever improve their performances, scientists striving to ever further our understanding of the world, or artists striving to achieve ever higher peaks of expression, greed may be productive. In addition, greed may lead individuals to create economic surplus because they aggregate more goods or wealth than they need. However, our definition of greed and its operationalization in the DGS are nonevaluative and remain mute with respect to the nature of the consequences, positive or negative. As such, we do not view greed as intrinsically moral or immoral.

Future Research on Greed

In the course of data collection for the development and validation of the DGS we also encountered several interesting leads for future research. The first has to do with an unexpected result, namely the

absence of a relationship between greed and risk taking in Study 1. After the financial crisis, the media often hinted at excessive greed in bankers as an explanation. The fact that we did not find that greedy people were more risk seeking could mean that these constructs are unrelated. However, it could also mean that the relationship is more complicated than typically portrayed. From the perspective of the definition of greed given above, predictions about greed and risk could go in different directions. One possibility would be that greedy people's continual striving for more would make them more sensitive to the magnitude of outcomes and less to the associated probabilities, leading to more risk taking. However, one could also argue that greed's striving for more would make people choose the option that gives the most certain outcome to (temporarily) satiate this need, leading to more risk aversion. Another explanation is that there is a relationship between greed and risk that our study was not able to pick-up. We used the Holt and Laury (2002) measure of risk attitudes, which deals with personal gains and personal risks. It could be that that greed only leads to more risk-taking in situations where the gains are for the individual, but the losses are shared with a group of people (as is the case in the example with the bankers). In cases where risk is shared, personal gains by risky behavior become more attractive, especially to greedy people. Some suggestions to this effect can be found in the results of the harvesting game, where the negative consequences of overharvesting are shared among all participants.

A second suggestion for future research follows from extensions of the positive and negative consequences of greed. One evident extension would be to study how greed affects people's financial decision making. We found in Sample 3 of Study 1 that the disposition to be greedy was associated with spendthrift and (buying) impulsiveness. We also found in Sample 4 of Study 1 that greedy people were less satisfied with their financial situation and indicated problems with making ends meet. This relates to previous research that greed is often seen as a cause of debts (Livingstone & Lunt, 1992). It would be worthwhile to see whether greed as measured by the DGS relates to decisions to save, spend, and borrow. As a case in point, in a recent study of financial behavior in high-school students, we found dispositional greed to be related to more spending and less saving (Seuntjens, Van de Ven, Zeelenberg, & Van der Schors, 2014). Another extension would be to see whether the seemingly insatiable need to acquire more in greed also relates to stronger goal striving, persistence, and enhanced performance. If feelings of greed imply that people always feel that they are below their reference point, then we could expect them to work more and harder than people who are more easily satisfied (e.g., Heath, Larrick, & Wu, 1999).

Rose-Ackerman, 1999), theft (Caudill, 1988), and fraud (Smith, 2003). As we argued before, these findings are most likely not because of any proclivity for negative behavior induced by greed, but rather by the myopic focus on wanting to acquire more. We recently started a research project exploring this possibility, finding that people high on dispositional greed had more accepting attitudes toward transgressions (e.g., lying in your own interest, and accepting bribes) and engaged more in corruption (Seuntjens, Van de Ven, Zeelenberg, & Breugelmans, 2014).

Future research could also focus on the observation that some groups of people appeared to score higher on dispositional greed than others. For example, we found that younger people were greedier than older people. This finding could have to do with the observation that younger people tend to display more egocentrism than older people (cf. Elkind, 1967). However, cohort effects could also cause it, with greed being more prevalent among those who grew up in a world where the emphasis on progress, social mobility, and personal development was larger (cf. Inglehart, 1997). We also found relationships between greed and levels of education and between greed and gender, but, interestingly, we did not find relationships with income or religiosity. The latter finding may be a bit surprising because most religions strongly condemn greed.

As a final suggestion, we think that an application of the DGS in other, preferably non-Western cultures would be interesting, not only to test for validity but also to test for potential differences in the endorsement of greed because of different economic systems. Previous studies reporting notable cross-cultural variation in behavior in economic games, like the ones we used in the current article (e.g., the ultimatum game), suggest that this is an interesting avenue for future research (Henrich et al., 2005).

Conclusion

Greed is important. It features prominently as an explanation for both economic growth and economic crises, and is a major source of concern for most religions. However, not all people are equally greedy. Like most psychological traits, individuals differ in the extent to which they are dissatisfied with what they have and in their drive to acquire more and more. This article presents the DGS, which captures those individual differences. We hope that this short, valid, and reliable scale will prove useful to other researchers, in furthering our understanding of greed and its role in human behavior.

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Appendix

Pattern Matrix of the Factor Analysis on the Initial 20-Item Pool of the Dispositional Greed Scale

	1	2	3
1. My life motto is: "more is better."	.77		
2. I always want more.	.72		
3. As soon as I have acquired something I start thinking about the next thing I want.	.68		
4. It doesn't matter how much I have, I'm never completely satisfied.	.66		
5. I can't imagine having too many things	.65		
6. One can never have too much money.	.61		
7. Actually, I'm kind of greedy.	.60		
8. If I have to choose between two products I rather buy them both.	.53	.36	
9. I'm satisfied with what I have.	−.44		
10. I think that happiness is not about the possessions that you have.			
11. I like to give.		.73	
12. I'm a generous person.		.67	
13. I prefer to spend my money on myself rather than on others.		−.59	
14. I prefer to buy too much instead of taking the risk to have not enough.	.34	.50	
15. I'm kind of stingy.		−.42	
16. As soon as I possess something, I don't want to lose it.			.72
17. What is mine stays mine.			.69
18. I think it's awful to lose my stuff.			.63
19. I like to keep everything for myself.		−.36	.57
20. I don't like sharing my possessions with others.		−.47	.55

Note. Entries are factor loadings after OBLIMIN rotation. Participants are asked to indicate the extent to which they agreed that these items were descriptive of themselves. Responses were measured on a 5-items Likert-scale, ranging from 1 = *strongly disagree* to 5 = *strongly agree*. The first seven items were selected to form the Dispositional Greed Scale.

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