

Diverging Effects of Clean Versus Dirty Money on Attitudes, Values, and Interpersonal Behavior

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Does the cue of money lead to selfish, greedy, exploitative behaviors or to fairness, exchange, and reciprocity? We found evidence for both, suggesting that people have both sets of meaningful associations, which can be differentially activated by exposure to clean versus dirty money. In a field experiment at a farmers' market, vendors who handled dirty money subsequently cheated customers, whereas those who handled clean money gave fair value (Experiment 1). In laboratory studies with economic games, participants who had previously handled and counted dirty money tended toward selfish, unfair practices—unlike those who had counted clean money or dirty paper, both of which led to fairness and reciprocity. These patterns were found with the trust game (Experiment 2), the prisoner's dilemma (Experiment 4), the ultimatum game (Experiment 5), and the dictator game (Experiment 6). Cognitive measures indicated that exposure to dirty money lowered moral standards (Experiment 3) and reduced positive attitudes toward fairness and reciprocity (Experiments 6–7), whereas exposure to clean money had the opposite effects. Thus, people apparently have 2 contradictory sets of associations (including behavioral tendencies) to money, which is a complex, powerful, and ubiquitous aspect of human social life and cultural organization.

Keywords: money, fairness, moral, exchange, greed

The secret of life is honesty and fair dealing. If you can fake that, you've got it made.

—Groucho Marx

Associations of money with selfish, antisocial actions have become commonplace if not clichéd. Some findings have confirmed that selfish, antisocial behavior is increased by exposure to

large sums of money. For instance, Gino and Pierce (2009) found that people cheated more after seeing \$7,000 worth of single dollar bills than after seeing \$24. Not all evidence indicates that money promotes immorality, however. Mazar, Amir, and Ariely (2008) found that people cheated less when their ill-gotten gains were paid directly in money than when they were paid in tokens that were to be exchanged for money moments later. Seeing money may have evoked associations that promoted honest and morally responsible behavior.

The present research began with the assumptions that money can be viewed in two different ways and that many people in fact hold both sets of associations. On one hand, money may evoke ideas of greed, exploitation, corruption, and other unsavory, anti-social patterns, especially because many such antisocial actions have been performed throughout history in order to obtain money. Money may therefore elicit immoral sentiments and selfish behavior. On the other hand, however, money facilitates culture, fair trade, philanthropy, caring for loved ones, science and art, and many other social goods, and so it may be associated in people's minds with norms of fair exchange and positive treatment of others. As a result, money may sometimes elicit morally commendable sentiments and prosocial actions.

We sought to evoke these different patterns of associations by manipulating the physical condition of money to which participants were exposed. In particular, we used the difference between

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clean and dirty money, on the assumption that clean money would evoke the positive associations (and attendant behaviors) toward fair exchange, whereas dirty money would evoke the unsavory and antisocial associations. The prediction was that money and dirt would interact to influence how people treat others. For comparison purposes, control participants handled clean or dirty sheets of blank paper.

Cleanliness and Dirt

Dirt may seem fundamentally amoral, insofar as morality involves meaningful and culturally based evaluations of intentional actions, whereas dirt is an inanimate part of physical nature. However, recent developments in moral psychology have shown that moral judgments can be influenced by such seemingly amoral, physical reactions as disgust (Schnall, Haidt, Clore, & Jordan, 2008; Wheatley & Haidt, 2005). Several findings have indicated that cues of cleanliness and filth can alter patterns of moral judgment. Pizarro, Inbar, and Helion (2011) showed that exposure to dirt engendered a motivation to be clean and pure, as reflected in moral condemnation of misdeeds by others.

Although dirt has been shown to motivate an inclination toward morality, there is also evidence that salient cleanliness can motivate people to embrace higher moral standards. Helzer and Pizarro (2011) showed that signs reminding people to wash their hands prompted people to adopt morally critical and punitive attitudes toward others who engaged in disgusting sexual acts. Zhong, Strejcek, and Sivanathan (2010) found that getting people to think of themselves as having clean hair, fresh breath, and other indicators of cleanliness led them to report harsher moral judgments across a variety of moral issues such as prostitution and recreational drug use.

Most studies that have examined the moral consequences of cleanliness have studied moral judgments about others rather than moral actions by the self. One main exception we found was work by Liljenquist, Zhong, and Galinsky (2010). They found that participants who sat in a room that smelled freshly cleaned (having the scent of citrus cleaning products) reciprocated others' trust more than those seated in a room with no particular scent.

Thus, seemingly contradictory findings have emerged from past work. Exposure to filth makes people hold higher moral standards, but so does exposure to cleanliness cues. It seems that what matters is the salience of the dimension of clean/dirty (activated either by contact with filth or by cues promoting cleanliness), which stimulates a heightening of moral values and judgmental tendencies.

The effects of dirt independent of money were assessed in the present studies by having people touch and handle sheets of paper that were either clean or dirty. Following Pizarro et al. (2011), we predicted that exposure to dirt without money (i.e., handling dirty paper) would engender a motivation to be clean and pure, so that people would treat others with a heightened appreciation of virtues. In plain terms, touching dirt should make people act more morally.

A further possible prediction was that the clean paper would have the same effects as the dirty paper, because both activate the concern with cleanliness. However, we thought it unlikely that clean paper would strongly evoke the idea of cleanliness. The study by Liljenquist et al. (2010) made cleanliness salient by collecting data in a room that had a clear, distinctive smell of

cleaning supplies. It thus departed from the norm in a saliently clean manner. By comparison, new paper is probably quite neutral. Clean paper is just paper. Hence, we conceptualized the clean paper condition, in which people simply counted a stack of blank sheets of paper, as a neutral control condition that would be unlikely to have any moral implications.

Dirty and Clean Money

Our research designs were based on the assumptions that dirty money has more meaning than dirty paper and that clean money likewise means more than just clean paper. Money itself is highly meaningful. Moreover, whereas a blank sheet of paper is commonplace and therefore not noticeably clean, the cleanliness of a freshly printed, pristine dollar bill is somewhat unusual and therefore salient. This may be especially true in China, where most of the present data were collected, because the Chinese use credit cards less often than Westerners and so the money in circulation gets handled and exchanged frequently (Kelly, 2011).

Money is often explicitly treated as amoral or even immoral (Luna-Arocas & Tang, 2004; Tang, 1995; Tang & Chiu, 2003; Tang & Gilbert, 1995; Wernimont & Fitzpatrick, 1972). In popular entertainments, for example, endless crimes and illicit conspiracies revolve around getting money. Hence, one possible hypothesis was that exposure to reminders of money would make people treat each other less morally. Dirty money has common connotations of crime and bribery, which violate virtuous notions of fairness.

Negative impressions about the morally debasing effects of money and "filthy lucre" are not, however, the full extent of conventional wisdom about money. Several scholars have observed that money can also have a positive, even sacred, connotation. As Belk and Wallendorf (1990) noted, the moral meaning of money is often linked to its perceived source and means of acquisition: "The sources and uses of money are inseparably connected in determining the sacred or profane nature of this money" (Belk & Wallendorf, 1990, p. 55; see also Levav & McGraw, 2009). Moreover, they noted that the moral meaning of money can infuse the self of its owner by association. Ill-gotten gains often transfer the evil of the money to the self. Moral debates about whether it is appropriate for Mafia gangsters to donate money to the Catholic Church, for example, revolve around whether the proceeds of criminal activity would debase the church's moral authority or whether, in contrast, the church's holiness can redeem the tainted money and thereby make it suitable for virtuous uses. By contrast, money gained by legitimate means from respectable sources can seem sacred and can elevate the self morally.

If people do reflect (even unconsciously) on the source of their money, and if these sources have different moral implications, then clean versus dirty money would produce different reactions. Clean money presumably comes straight from the government treasury or bank, and these institutions embody laws and fair economic behavior. This could activate the associated inclinations to act fairly. In contrast, dirty money may have a checkered past, such as being handled recently by shady characters whose hands were dirty because of dirty deeds. Such thoughts could activate a dirty self and inclinations to pursue selfish goals while disregarding moral scruples.

The hypothesis that positive and negative value can transfer from money to the self is consistent with recent evidence that the idea of money can activate views of self. The self-sufficiency hypothesis advanced by Vohs, Mead, and Goode (2006) proposes that money makes people rely on themselves and focus on themselves as self-contained, independent entities. Clean versus dirty money might thus activate different aspects and tendencies within the self. Dirty money could favor tendencies toward greed, exploitation, and illicit gain, making it seem more appropriate to treat others unfairly so as to benefit oneself. In contrast, clean, fresh money could activate the tendencies within the self to obey moral and legal rules and to treat others in a fair, reciprocating manner.

We cited the paper by Liljenquist et al. (2010) showing that a clean scented room prompted participants to reciprocate trust. In that work, however, the manipulations and measures involved money (i.e., the trust game from behavioral economics). Thus, their effects combined the cleanliness cue with manipulations and measures that involved money, so any effects of the idea of money would have been activated as well. Their effects may thus have reflected the morally elevating impact of combining cues of cleanliness and money. That was the focus of our research.

Present Research

The series of investigations reported here manipulated the main variables by having participants handle clean or dirty money or clean or dirty paper. (Two studies instead had participants read a fabricated news report about the cleanliness or filthiness of the nation's currency.) We then measured their behavior toward other persons, using the main interactive games favored by behavioral economists. These included the dictator game, the ultimatum game, the trust game, and the prisoner's dilemma game. (Game details are explained in the specific experiments.) These games offered multiple tests of the prediction that handling clean or dirty money would change the way people treated each other. Our main hypothesis was that exposure to clean money would highlight values of fairness, exchange, and reciprocity, thereby promoting positive and fair treatment of other persons. Exposure to dirty money would have the opposite effect. It would reduce fairness and instead promote self-serving, even selfish, behaviors. To elaborate our behavioral findings, we also collected some data about how exposure to money affected associations and attitudes.

Pretest

In Experiments 1–5, participants handled either clean or dirty banknotes. To create the dirty money and dirty paper, we stored clean banknotes in a sack with wet dirt for several days. Given that the dirt could alter the physical appearance of the notes, alternative explanations for some of our predicted effects could arise insofar as participants perceived dirty money as less valuable than clean money. To address this possibility, we conducted a pretest. Forty participants (21 female) from the same population as the main studies were randomly assigned to a dirty money or clean money group. Participants viewed clean and dirty notes, the same notes as in Experiments 1–5, and used Likert-type scales to rate the notes' value and the level of happiness participants would feel if they found these notes (0 = *not at all*, 10 = *very much*). As another check, participants reported a count of common items that they

believed could be purchased with the money. Participants reported how many eggs, steamed breads, and pencils (separate items) could be purchased with the money.

As expected, there were no differences in the perceived value of the money as a function of condition ($F < 1$). Additionally, participants said that they would be just as happy to find the dirty money as the clean, $F(1, 38) = 1.72, p > .19$. Participants' estimates of how many eggs the money could buy did not vary as a function of the money's cleanliness, $F(1, 38) = 1.24, p > .27$, and the same was true for steamed breads ($F < 1$) and pencils, $F(1, 38) = 2.55, p > .11$. These results confirmed that participants perceived the dirty notes and clean notes as being equivalent in value and usefulness.

Experiment 1

Experiment 1 was a field experiment designed to show the differential effects of clean versus dirty money on actual financial behavior. In a farmers' market in south China, experimental confederates purchased vegetables and paid initially with either clean or dirty money. The confederates then ostensibly decided to purchase an additional vegetable, so they asked for the original money back. After collecting the (second) vegetables that constituted the main dependent measure, the confederates paid for all their purchases with typical circulating money. Therefore, the clean and dirty money acted as a naturalistic prime. The dependent measure was the actual weight of the additional vegetable. In all cases, the customer ordered and paid for 500 grams of the last vegetables, and so fairness and reciprocity would dictate giving the customer precisely (or slightly more than) 500 grams. Giving the customer less than 500 grams effectively cheats the customer and illicitly benefits the vendor. (A vendor who did this regularly and systematically could benefit substantially by, essentially, selling the same items twice.) Our prediction was that vendors who had just moments earlier handled dirty money would be more prone to cheat the customer than would vendors who had handled clean money.

Method

Participants were 16 vendors at a local farmers' market. Each had a regular stall in the market for selling vegetables. The design was a two-cell within-subjects design, so that each vendor participated in both conditions, with the sequence counterbalanced (order had no effect). Half received the clean money first, and the other half received the dirty money first. At least three days passed between the two conditions, so as to avoid any suspicion.

In all cases, the confederate (blind to experimental hypotheses) approached the vendor, inquired about the prices of several items, and then ordered 500 grams of one vegetable. After the vendor weighed the vegetable and told the confederate the cost, the confederate handed the vendor a ¥10 banknote. (¥1 = US\$0.16 at the time of the experiments.) By random assignment, this was either a fresh, clean banknote or a dirty one that had been stored in a sack with wet dirt for several days. After the vendor took the bill, the confederate seemed to reconsider and asked for the money back, saying, "Wait, I need to buy one more thing, and I will pay for both items together." Then the confederate ordered 500 grams of another vegetable, and paid for the entire order with a normal ¥20 bill. Hence, the dirty and clean bills were initially given to

vendors as a prime, whereas minutes later the confederate used normal money to pay for the goods. Hence, any effect of the dirty or clean money was a carryover from the prior exposure.

The confederate paid for the items and next went to a place with a fair scale where the weight of the two items was obtained. It was not possible to debrief the vendors, but the procedure seemingly contained no risk to the vendors, and they all benefited by having made extra sales. As we next report, some benefited more than others.

Results

The confederate went to each vendor twice and bought two items, so each participant vendor sold four items to the confederate. In all cases, the order was for 500 grams, although in some cases (e.g., with vegetables that come in larger sizes) the weight was slightly more or less than 500 grams and vendors adjusted the price accordingly. We computed a fairness index for each sale by dividing the actual weight by the amount for which the vendor had charged (i.e., normally 500 grams but occasionally slightly more or less). Thus, an index above 1.00 indicates that the vendor was generous and gave more vegetables than were paid for, whereas an index below 1.00 indicates having shortchanged the customer by providing less than the quantity for which the customer had paid.

The main prediction was that, in comparison to the clean money prime, the dirty money prime would cause vendors to shortchange and thus cheat the customer. Sales made following the clean money prime were almost exactly fair, with a mean fairness index of 0.99 ($SD = 0.05$). In contrast, sales following the dirty money prime ($M = 0.94$, $SD = 0.05$) were significantly less fair, $t(15) = 3.19$, $p < .01$. There was no difference in fairness between the initial transactions, which occurred prior to the clean versus dirty money prime, $t(15) = 1.05$.

Within-subject comparisons revealed the effects of the prime. Clean money significantly boosted the fairness of the vendor, from $M = 0.96$ ($SD = 0.06$) on the initial purchase to $M = 0.99$ ($SD = 0.05$) on the final purchase, $t(15) = 2.15$, $p < .05$. The dirty money prime caused a decline in fairness, from $M = 0.98$ ($SD = 0.03$) on the initial purchase to $M = 0.94$ ($SD = 0.05$), $t(15) = 3.11$, $p < .01$.

Discussion

This study found that when sellers initially handled clean money, the goods that they later gave to customers were what the customers ordered. However, when sellers handled dirty money, there was a small but reliable shift in sellers' behavior, such that they overcharged relative to the weight of the goods purchased. This study was conducted in a farmers' market and thus outside the laboratory, which means that it has some of the strengths and weaknesses often associated with field research. On the positive side, it showed that actual behavior of modern citizens can be influenced by the difference between clean versus dirty money. The ¥10 bill has the same monetary value regardless of its cleanliness (both officially and in our pretest ratings). Yet, vendors gave slightly lesser quantities of their merchandise when they had been paid with dirty rather than with clean money.

On the negative side, the restrictions of our setting entailed that we were not able to include manipulation checks or other proce-

dures to address interpretive questions. Our reasoning was based on the assumption that clean money serves as a cue to evoke associations to reciprocity and fair exchange, whereas dirty money operates to evoke thoughts of exploitation and illicit gain. In contrast, it is possible that vendors who received the dirty money became angry and therefore sought to retaliate against the customer by giving an unfair weight. To be sure, this reaction would be immoral and presumably illegal, but it suggests a motivated pattern of goal-directed behavior rather than, as we have suggested, a behavior activated by unconscious associations. Moreover, the relatively small size of the discrepancies suggests that the results reflected slight, unconscious biases rather than a deliberate, conscious intention to commit fraud.

Nonetheless, it was important to use a more controlled environment. Hence, we moved to laboratory experiments for further tests of our hypotheses.

Experiment 2

With Experiment 2 we turned to economic games to illuminate the effect of dirt and money on moral behavior. Economic transactions require some degree of trust, insofar as each side gives something and expects to get fair value in return (Arrow, 1972).

The trust game (e.g., Berg, Dickhaut, & McCabe, 1995; Burks, Carpenter, & Verhoogen, 2003) has been used to examine people's willingness to trust others and their willingness to live up to versus exploit others' trust in them. The trust game has two distinct roles. The sender is given a certain stake of money and can send any part of it to the other person (the receiver), while keeping the rest. The sender is told that whatever money is sent will be tripled by the experimenter and given to the receiver, who then is free to divide the enriched amount between self and the sender. This means that the receiver can keep all the (tripled) money that the sender donated. Insofar as the sender trusts the receiver to divide fairly, it behooves the sender to send most or all of the money. After all, if the receiver divides the money equally, the sender will end up with 50% more than what he or she donated, which is thus clearly better than keeping it in the first place. However, if the sender lacks trust, it may be more appealing to keep most or all of the money rather than to send it off and risk getting little or nothing back.

In Experiment 2, all participants believed they were playing the role of receiver, and it was up to them to decide how to divide the money. Thus, someone else had trusted them, and they could decide whether to repay that trust by dividing the money evenly or even generously, as opposed to keeping most of the money for themselves. We predicted an interaction effect, such that participants who had handled clean money would tend toward making a fair and even division of the money, whereas those who had handled dirty money would keep more money for themselves.

The money priming manipulation in Experiment 1 involved being paid for a business transaction, which might have conjured up negative feelings about the possibility of owning dirty money. To avoid such confounds, the manipulation Experiment 2 had no pragmatic effects. Participants in Experiment 2 counted money that they did not expect to keep or own. The money also had no apparent relationship to the measure of the dependent variables, unlike in Experiment 1. To furnish control conditions that differentiated between clean and dirty stimuli but did not involve

money, we had half the participants count sheets of paper. The dirty paper had been buried in wet dirt with the dirty money, whereas the clean paper was fresh and new like the clean money.

Method

Participants. Sixty-eight undergraduates (50 female) participated in exchange for ¥5. They were randomly assigned to one of four conditions in a 2×2 between-subjects design (money vs. paper; clean vs. dirty).

Procedure. Participants entered the experiment two at a time, and the experimenter made sure that the two participants did not know each other. First, the participants stayed in the same waiting area to sign the consent form, and then they were led into separate rooms. They were told that their first task involved a finger dexterity measure. Participants in the dirty money condition or the clean money condition counted out 20 dirty or clean ¥10 bills five times from a stack provided by the experimenter, whereas participants in the dirty or clean paper condition counted out 20 pieces of dirty or clean paper five times (see Figure 1). The dirty money and dirty paper had been put in the same bag of dirt for several days beforehand.

We performed a pretest to assure that the money and paper were equally dirty. Twenty undergraduates (13 female) were randomly assigned to a dirty money or a dirty paper group. The same paper or money (depending on condition) was placed on a table in front of the participants. They were asked to rate the degree to which the material was dirty on a scale from 0 to 10 (0 = *not at all*, 10 = *very dirty*). Analyses showed that there was no difference in the dirtiness of the money and paper, $F(1, 18) = 2.50, p > .13$ (money: $M = 8.70, SD = 0.82$; paper: $M = 7.90, SD = 1.37$).

Next, in an ostensibly different task, all participants played a simplified trust game on a computer. They were led to believe that they were playing with the other participant they had met in the waiting area, but in fact they played with a preset protocol. All participants were told that they had been randomly chosen to be the receiver, and the other participant would be the sender. The experimenter explained that each sender was given ¥10, and the sender could choose whether to keep any part of this endowment

(including keeping it all), as opposed to sending it to the receiver. If the participant chose to send money to the receiver, the amount sent would automatically triple in value, and then the receiver was free to decide how to split the tripled amount between the two persons. The experimenter made sure participants understood the rules of the game.

After the rules of the game were learned, each participant received a signal from the computer that the sender had chosen to send him or her the entire ¥10 endowment. The ¥30 now belonged to the participant, and he or she had to decide how much to keep and how much to give back to the sender. The amount of money participants decided to give back to the sender was considered to be a measure of reciprocal behavior. After the participants indicated how to divide the money, the experiment was completed, and participants were debriefed, paid, and dismissed. The debriefing explained that the game had not been real, and all participants were paid the same ¥5 regardless of how they had played the game.

Results

The predictions were tested with a 2 (money vs. paper) \times 2 (clean vs. dirty) analysis of variance (ANOVA) with amount returned as the dependent measure. Neither the main effect of the money versus paper ($F < 1$), nor that of dirt, $F(1, 64) = 1.12, p > .25$, was significant. As predicted, the interaction of the two variables was significant, $F(1, 64) = 5.415, p = .02$ (see Figure 2). Simple effects indicated that the clean money group ($M = 17.78, SD = 6.08$) returned significantly more money than the dirty money group ($M = 13.69, SD = 4.36$), $F(1, 64) = 5.73, p < .03$. In contrast, the clean paper group ($M = 15.41, SD = 4.14$) and the dirty paper group ($M = 16.94, SD = 4.97$) did not differ in the amount returned ($F < 1$).

Discussion

Experiment 2 found that the effects of money on moral responses during an economic decision game were moderated by cleanliness. Participants who handled clean money were exceptionally fair and generous in rewarding the trust of the other



Figure 1. Materials (from left to right): clean paper, dirty paper, dirty money, clean money.

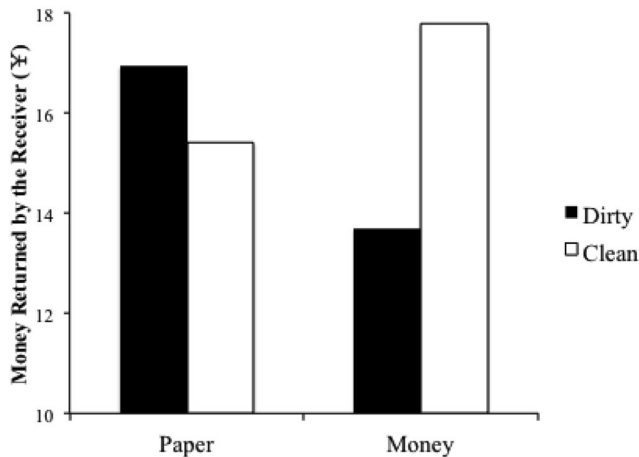


Figure 2. Average money returned as a function of money condition (money vs. paper) and dirt condition (dirty vs. clean), Experiment 2.

participant. In fact, many of them returned more than half the amount they received, on average allocating back to the sender nearly ¥18 out of the ¥30 they had received. In contrast, participants who had handled dirty money behaved in the least fair and generous manner of the four conditions, on average keeping more than half the money for themselves and returning less than ¥14 to the sender. These results provide further evidence that clean money elicits fair and generous behavior, justifying the trust and faith of the interaction partner.

Counting paper produced results in between the two money conditions. The difference between clean and dirty paper yielded only a trend in the direction opposite to the difference between clean and dirty money. Thus, dirt alone did not account for the effects of dirty money. Dirty money apparently evokes selfish inclinations, whereas dirt alone (dirty paper) had the opposite effect if anything.

One might have predicted a quite different result based on the notion that handling dirty money would make money seem less appealing, as compared to clean money. Participants in the dirty money condition might have lowered their estimate of money by virtue of associating it with dirt, which would in principle have prompted them to give more of it back to the partner. But this is not what happened. The results thus seem consistent with the view that dirty money serves as a cue to be selfish, whereas clean money elicits fairness and generosity.

Experiment 3

Our main purpose in Experiment 3 was to test the effect of money and dirt on people's thresholds for performing immoral behaviors. Building on the work of Haidt (2007) and Haidt and Graham (2007), we presented participants with a list of 20 immoral behaviors that collectively represented the five main types of values that people use to make moral judgments. The five are harm/care, fairness/reciprocity, purity/sanctity, respect/authority, and patriotism/loyalty. Participants were asked to imagine that someone was interested in paying them to perform these immoral behaviors and to report how much money they would demand for each action.

A central theme of recent work by Haidt and colleagues (Graham, Haidt, & Nosek, 2009; Haidt, 2007; Haidt & Graham, 2007; Haidt & Joseph, 2004) is that the five values have differential appeal, with political liberals mainly valuing harm/care and fairness/reciprocity. Political conservatives also value those two but also value the remaining three (loyalty to one's group, respect for authority, and purity/sanctity). Chinese culture has been officially communist for nearly a century, and so technically it embraces left-wing values. There is, however, a long Confucian tradition emphasizing respect for authority and loyalty to one's group. Therefore, it was not entirely clear which moral values would be strongest in the study population.

The main hypothesis was that clean versus dirty money would alter people's reactions to the fairness/reciprocity dimension, which would support the results of Experiments 1 and 2. We thought that dirty money would evoke notions of exploitation and unfairness, thereby making people willing to perform unfair behaviors for less money than otherwise. Clean money would evoke notions of fairness and reciprocity, so people would be less willing to do unfair things and therefore would demand a higher payment to violate those principles. Our reasoning was specific to the fairness/reciprocity dimension, and so it did not predict differences on the other four dimensions.

Admittedly, competing predictions could be made. Dirt might evoke the desire to be clean and therefore elevate the price of all the immoral behaviors. Or it might evoke views of the self as immoral and lower the price of all of them. Handling money might make people want money more, thereby lowering the price of immoral behaviors (as people would be willing to do them to get any amounts of money). Dirt might generally affect responses to the purity dimension. Or dirty money in particular could make people devalue money (which would result in their wanting to be paid more for indecent acts than after seeing clean money).

Method

Participants. Sixty undergraduate students (25 female) in a Chinese university participated in exchange for ¥5. They were randomly assigned among four conditions: counting dirty money, dirty paper, clean money, or clean paper.

Procedure and materials. First, each participant was led to a separate room to complete an ostensible finger dexterity task. Participants counted out 100 pieces of paper or hard currency, which were either dirty or clean, as in Experiment 2.

Next, in what was said to be an unrelated, different task, participants completed a moral questionnaire translated from one found at www.yourmorals.org. The instructions read, "What's your price? Choose the minimum amount that someone would have to pay you (anonymously and secretly) to convince you to do these actions. Assume there will be no social, legal, or material consequences to you afterward." Then participants read a list of 30 immoral behaviors (10 of which were filler items similar to those of Haidt and colleagues), such as "Stick a pin into the palm of a strange child" or "Cheat when playing cards with strangers." Participants selected from a preset range of eight possible amounts in renminbi (Chinese dollars) to indicate how much they would demand in order to perform that behavior: ¥0, 10, 100, 1,000, 10,000, 100,000, 1,000,000, or "not for any price."

The 20 behavior items (not counting the filler items) were chosen to represent each of the five basic types of moral values (Graham et al., 2009; Haidt & Graham, 2007; Haidt & Joseph, 2004). These five values, and an example of an item representing a potential violation of it, are as follows: harm/care (e.g., kick a dog in the head, hard); fairness/reciprocity (e.g., cheating someone); ingroup/loyalty (e.g., say something bad about your nation); authority/respect (e.g., slap your father in the face); and purity/sanctity (e.g., act like animals, such as crawling around naked and urinating on stage). After they had reported their price for each item, participants were debriefed and dismissed.

Results

We conducted 2 (money vs. paper) \times 2 (dirty vs. clean) ANOVAs to test our hypotheses. The requested prices for violating the fairness/reciprocity subscale were most relevant to our hypotheses. An ANOVA on those responses indicated a significant interaction between the two independent factors, money and dirt, $F(1, 56) = 15.15, p < .01$ (see Figure 3). Thus, the findings supported the hypothesis that money and dirt would interact to sway moral willingness and moral judgments on the dimension of fairness and reciprocity.

The significant interaction on fairness/reciprocity prompted us to conduct simple-effects analyses. The clean money group demanded more money than the dirty money group to perform unfair behaviors, $F(1, 56) = 11.03, p < .01$, whereas the clean paper group needed less money than the dirty paper group to be unfair, $F(1, 56) = 4.77, p < .05$. Simple effects of money within level of dirt indicated that the dirty money group needed less money than the dirty paper group to perform unfair behaviors, $F(1, 56) = 5.60, p < .05$, whereas the clean money group needed more money than the clean paper group to be unfair, $F(1, 56) = 9.86, p < .01$. Participants who had counted dirty money were more willing to perform unfair behaviors than participants who had counted clean money, whereas participants who had counted dirty paper were less willing to perform unfair behaviors than those who counted clean paper.

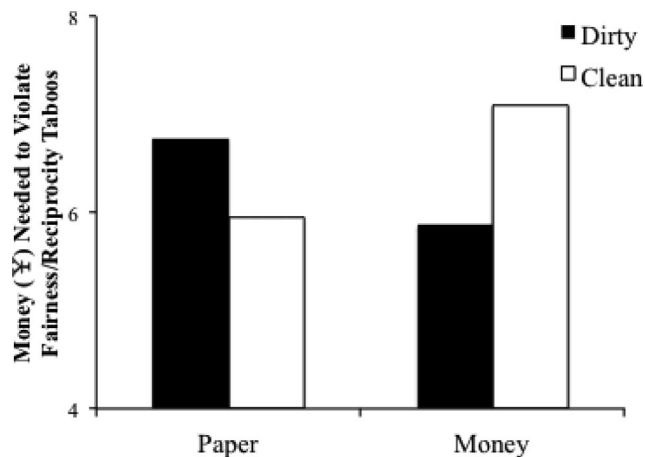


Figure 3. Amount of money that participants would need in order to violate items on the Fairness/Reciprocity subscale as a function of money condition (money vs. paper) and dirt condition (dirty vs. clean), Experiment 3.

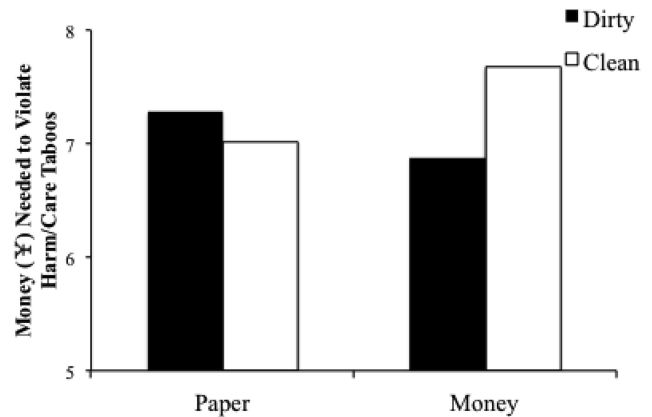


Figure 4. Amount of money that participants would need in order to perform items on the Harm/Care subscale as a function of money condition (money vs. paper) and dirt condition (dirty vs. clean), Experiment 3.

The analyses also revealed a significant interaction on the prices requested in order to violate items on the harm/care dimension, $F(1, 56) = 4.19, p < .05$ (see Figure 4). Simple effects indicated that the clean money group needed more money to perform harmful behaviors than the dirty money group, $F(1, 56) = 4.72, p < .05$. Neither the simple effect of dirt (vs. clean) within paper nor the simple effect of money (vs. paper) within dirt was significant ($F_s < 1$). There was a nonsignificant trend for the clean money group to demand more money than the clean paper group to perform harmful behaviors, $F(1, 56) = 3.11, p = .08$. The interaction terms for the other three dimensions failed to reach significance: for ingroup/loyalty, $F(1, 56) = 1.49, p = .20$; for authority/respect, $F(1, 56) = 2.07, p = .15$; and for purity/sanctity, $F = 1$. Neither the main effect of money/paper nor the main effect of dirty/clean reached significance in any of the analyses ($F_s < 1$).

We also conducted an omnibus 2 \times 2 ANOVA on the total amount of money demanded for all 20 items (i.e., all subscales combined). It too yielded a significant interaction between the two variables, $F(1, 56) = 7.19, p = .01$. Neither the main effect of money nor that of dirt was significant. Simple effects indicated that the clean money group ($M = 7.28, SD = 0.55$) demanded more money than the dirty money group ($M = 6.66, SD = 0.77$), $F(1, 56) = 6.18, p < .05$. Neither the simple effect of dirt (vs. clean) within paper nor the simple effect of money (vs. paper) within dirt was significant, $F(1, 56) = 1.71, p = .19$; $F(1, 56) = 2.50, p = .12$. The clean money group demanded more money than the clean paper group to perform harmful behaviors ($M = 6.73, SD = 0.80$), $F(1, 56) = 4.89, p < .05$.

Discussion

In analyses examining at what price people would perform immoral or unsavory acts, the effects of dirt exposure and money primes were interactive rather than independent. Our theory assumed that clean money evokes associations of fairness and reciprocity, whereas dirty money evokes notions of unfairness and exploitation. Consistent with that analysis, participants who had counted clean money showed the highest moral standards, in the sense that they said they would demand the highest prices in order

to be willing to perform unfair actions. Dirty paper likewise led to high moral standards, as reflected in demanding high prices for performing immoral acts. But dirty money produced the lowest moral standards, as reflected in a reported willingness to perform unfair actions for a relatively low amount of money.

Thus, dirt alone is quite different from dirty money. Dirt made people want to distance themselves from immoral, unfair actions, and so they reported relatively low willingness to treat others unfairly (unless paid a high price for doing so). Apparently, exposure to dirt alone (i.e., without money) caused persons to elevate their standards for reciprocity and fairness, so that they demanded a higher price to perform unfair, immoral actions.

Dirty money, however, led people to say that they would behave unfairly for relatively low rewards. This is consistent with the view that dirty money evokes unconscious associations of unfair exchange, including nonreciprocation and possibly exploiting or cheating one's trading partners, as seen in Experiments 1 and 2. Put another way, either money or dirt alone seemed to cue highly moral, fair behaviors, whereas the combination of money and dirt cued unfair, dishonest behavior. These findings also fit the view that dirty money makes people see themselves as willing to do immoral things.

We found an unpredicted interaction effect on the harm/care dimension, also. One way to interpret that finding is based on its affinity with fairness/reciprocity as the two types of values embraced by persons across the entire political spectrum. (The other three values appeal primarily to conservatives, who may be underrepresented in young adult and university samples and may be especially scarce in a country, like China, with left-wing ideology.) Thus, our findings for fairness and reciprocity, although predicted and not duplicated with three other moral values, may be part of a broad pattern by which all moral values held strongly by the individual in question are affected by cues of money and dirt. Either way, our theorizing would be confirmed insofar as clean money evoked notions of and inclinations toward fair exchange, whereas dirty money evoked notions of and inclinations toward selfish, self-serving immorality. The only difference would be whether these effects of the idea of money were specific to fairness/reciprocity values or were part of a more general pattern in which the idea of money makes people more willing to compromise all the moral values they normally espouse. That question is beyond the scope of this investigation, however. Our focus was specifically on the implication that clean and dirty money evoke opposing moral tendencies with regard to issues of fairness and reciprocal exchange.

Experiment 4

Experiment 4 assessed anticipated reciprocity in the context of the prisoner's dilemma game. This game has been widely used to measure how people choose between a cooperative strategy and a noncooperative one that combines exploiting others and protecting oneself from being exploited. The cooperative strategy requires trust, because it yields a good payoff only if both players choose it. If one player cooperates while the other defects, the cooperating player suffers a severe loss and the defector benefits.

The prisoner's dilemma game requires players to choose their move while unaware of the other player's move. This complicates the measurement of reciprocation. However, we manipulated ex-

pectancies by exposing participants to the ostensible history of each other player. Each participant played 16 trials of the game, ostensibly against 16 different other players, with the ostensible decisions by each party being announced at the same time. The records of previous plays depicted some of the players as habitual cooperators and others as chronic defectors. The prior plays could generate a reasonable expectation of how the player would act this time. Hence, we examined whether participants reciprocated the move that, based on past experience, was most likely for each player. Our prediction was that clean money would increase this indirect reciprocation, but dirty money would reduce it.

Method

Participants. One hundred fifty-six people (101 female) voluntarily participated. They were randomly assigned to one of four conditions (clean vs. dirty crossed with paper vs. money). One participant left the experiment before she finished the tasks, and therefore her data were unusable.

Procedure. First, participants completed the ostensible finger dexterity task for the experimental manipulation as in Experiments 2 and 3. They counted money or paper that was either clean or dirty.

The next part was presented as a separate, unrelated study. All participants were told that they were part of a large ongoing study in which they would be playing prisoner's dilemma games with various randomly assigned persons. The experimenter told participants about the prisoner's dilemma game, answered any questions, and ensured that all participants fully understood the game.

The experimenter went on to explain that, because this was a large ongoing study, the department of psychology had a large database containing the playing record of a number of persons playing 100 rounds of prisoner's dilemma game with others. Participants were told that they would see the number of times each person with whom they were playing has defected and cooperated and then indicate the extent to which they were willing to cooperate with that person. They were told to use a scale from 0 to 10, with 0 indicating not at all and 10 indicating totally. Numbers larger than or equal to 5 indicated a "cooperate" decision, and numbers less than 5 indicated a "defect" decision.

In reality, there was no database of other players, and prior play records were the same for all participants (with randomized order of presentation). For each session, participants viewed 16 different players: Eight players (cooperators) cooperated more than 50% of the time, and eight players (defectors) cooperated less than 50% of the time. Participants indicated their inclination to cooperate with each player or to defect.

Participants believed they were playing for real money. The expected payouts as described to the participants were as follows: If both cooperate, both would get ¥3. If one player cooperates and one defects, the defector would get ¥5 and the cooperator would get ¥0. If both players defect, both would get ¥1. The highest stake is thus ¥5. Participants were told that the computer would randomly select two out of their 16 games and would pay them what they earned in those two games. When the game was over, participants were fully debriefed and were paid ¥10 apiece.

Results and Discussion

The behaviors measured in Experiment 4 cannot technically be labeled as reciprocity per se, because participants had only one interaction with each ostensible player and could not know how the player had treated them until after they decided how to respond. But the information about each player's prior behavior offered a likely guide to how that player would be expected to act in the game. Therefore, we separated the behaviors that participants made toward habitual cooperators from those made toward habitual defectors.

Overall matching. There were eight cooperators and eight defectors presented to participants. Each participant's tendency to reciprocate the expected behavior of the other player was computed by summing his or her willingness to cooperate with cooperators and then subtracting from this number the sum of his or her willingness to cooperate with defectors. As in the previous studies, the main effects of money (vs. paper) and dirt (vs. clean) were not significant ($F_s < 1$). More important, the interaction effect was significant, $F(1, 151) = 16.59, p < .001$.

Simple effects analysis suggested that the dirty money group ($M = 11.32, SD = 5.67$) reciprocated less than the clean money group ($M = 14.90, SD = 9.24$), $F(1, 151) = 5.26, p = .023$, whereas the dirty paper group ($M = 15.28, SD = 5.11$) reciprocated more than the clean paper group ($M = 9.90, SD = 6.58$), $F(1, 151) = 12.04, p = .001$. In addition, the dirty money group reciprocated less than the dirty paper group, $F(1, 151) = 6.45, p = .01$, whereas the clean money group reciprocated more than the clean paper group, $F(1, 151) = 10.38, p = .002$. These findings fit the general pattern that clean money promotes reciprocal fairness, whereas dirty money reduces it.

Cooperating with cooperators. For an index of intent to cooperate with known cooperators, we averaged the willingness to cooperate with the eight cooperators. There was no main effect of money or main effect of dirt ($F_s < 1$) on this measure of cooperation intent. The interaction effect was significant, $F(1, 151) = 21.69, p < .001$.

The dirty money group ($M = 4.77, SD = 0.60$) cooperated less than the clean money group ($M = 5.24, SD = 0.85$), $F(1, 151) = 9.12, p = .003$, whereas the dirty paper group ($M = 5.36, SD = 0.71$) cooperated more than the clean paper group ($M = 4.82, SD = 0.47$), $F(1, 151) = 12.73, p < .001$. Simple effects analysis suggested that the dirty money group cooperated less than the dirty paper group, $F(1, 151) = 14.69, p < .001$, whereas the clean money group cooperated more than the clean paper group, $F(1, 143) = 7.56, p = .007$.

These results indicate that exposure to clean money tended to promote reciprocal cooperation. As in other studies, dirt alone (here, dirty paper) and clean money both elicited prosocial tendencies to treat others fairly and to anticipate fairness in others. Dirty money had the opposite effect of reducing reciprocal cooperation.

Cooperating with defectors. To create an index of intent to defect with defectors, we averaged the defection responses made with the eight habitual defectors. This index was smaller across all conditions than the index of cooperating with the cooperators. There was no main effect of money/paper or dirty/clean factors or the interaction effect ($F_s < 1.87, ns$).

The relative weakness of cooperation with defectors is consistent with our reasoning. Cooperation in this game is a sign of indirect reciprocity. Defection is not. Hence, insofar as our manipulations specifically affected tendencies toward fairness and reciprocity, they should have their strongest and clearest effects on reciprocation of expected cooperation.

Experiment 5

Experiment 5 used the ultimatum game to assess fairness and reciprocity. The ultimatum game is well suited to study those constructs, because it highlights the question of whether to accept an unfair share of a reward. It is in a sense a more complicated version of the dictator game (see Experiment 6). The game has two players, the proposer and the responder. The proposer is given a sum of money and may propose dividing it between self and the responder in any fashion, just as in the dictator game. In the ultimatum game, however, the second player is not powerless. The responder chooses whether to accept the offer. If the responder accepts, both players receive what was allocated to them according to the proposer's decision. If the responder refuses, both players get nothing.

Thus, the proposer delivers an ultimatum (hence the game's name), and the responder either accepts it or chooses no payoff at all, which would include no payoff for the proposer too. When the proposer allocates a relatively large share (more than half) of the money to self, the responder must decide whether to take an unfairly low amount of money or nothing. Economic rationality dictates that something is better than nothing, and so one should accept any offer above zero, but many responders decide that they would rather have nothing than acquiesce in being treated unfairly. They can also effectively punish an unfair proposer by denying that person any profit, though the punishment is costly to the self. Still, the more unfair the proposer's offer, the less costly it is for the responder to refuse it, and the more severely the responder punishes the proposer by refusing it.

In Experiment 5, all participants played the role of responder. Prior research has generally found that responders tend to reject most offers of less than 20–30% of the total stake, even though rejection entails that they get nothing (Güth, Schmittberger, & Schwarze, 1982). If clean money activates and highlights ideas of fair exchange, as we have proposed, then clean money should make responders unwilling to accept unfairly low offers. In contrast, dirty money was hypothesized to evoke notions of simple self-interest instead of fair exchange, and so participants should become willing to accept even very low offers.

Method

Participants. One hundred and twelve undergraduates (52 female) in a Chinese university participated. They were randomly assigned among conditions in a 2×2 design with the factors of paper versus money and clean versus dirty. They received a payment based on the outcome of the game they played during the experiment. Three participants were distracted by their cell phones during the experiment, so their data were omitted, leaving a final sample of 109.

Procedure. The manipulations and design were the same as in Experiments 2–4. Participants first completed the finger dexterity task, counting clean or dirty money or paper.

Next, in an ostensibly different investigation, participants played a series of ultimatum games (Crockett, Clark, Tabibnia, Lieberman, &

Robbins, 2008). Participants were told a cover story that they were part of a large ongoing study in which they would be playing the role of responder with a series of proposers who had submitted their offers previously. The experimenter explained the game and secured a verbal confirmation that participants understood the game. Participants learned that they would receive payment based on two trials that would be randomly selected at the end of the game.

Each participant played 32 games, each ostensibly with a different proposer. During each trial, participants viewed a photograph of the purported proposer, the amount of the stake (total pie to be shared), and the amount of the offer (see Figure 5).

In a pilot study, offers less than 27% were rejected by almost all participants (which is the typical response for offers less than 30%; Güth, Huck, & Müller, 2001), which meant very low variability for low percentage offers. Therefore, the lowest offer received by our participants was 27%. Following Crockett et al. (2008), we categorized offers between 40% and 50% of the stake as fair offers and categorized offers of 27–33% of the stake as unfair ones. Each participant received 16 fair offers and 16 unfair ones. We decided a priori to treat offers less than ¥2 as low offers and those above ¥2 as high offers. The amount of the stake varied from ¥1 to ¥23.

Results

The most important analysis involved responses to unfair offers, as these cases presented the participant with the difficult choice between getting money and insisting on fairness. A 2×2 ANOVA with money and dirt conditions as predictors yielded a significant interaction term, $F(1, 105) = 6.66, p = .01$ (see Figure 6). Neither the main effect of the money condition nor that of the dirt condition was significant ($F_s < 1$).

Simple effects analyses revealed that the clean money group rejected more unfair offers than the dirty money group, $F(1, 105) = 6.32, p = .01$. The paper condition yielded a nonsignificant trend in the opposite direction, $F(1, 105) = 1.28, p = .25$. Other comparisons revealed that the dirty money group accepted more unfair offers than the dirty paper group, $F(1, 105) = 4.19, p < .05$, whereas the clean money group tended to reject more

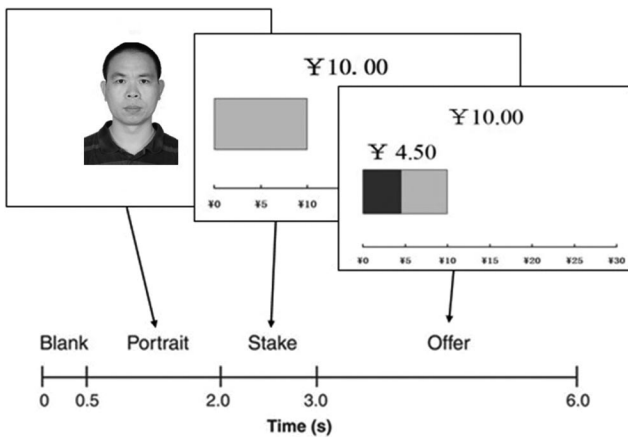


Figure 5. Diagram illustrating the structure of each one-shot ultimatum game, Experiment 5. Offers were presented onscreen, and participants indicated with a button press whether they would accept or reject each offer.

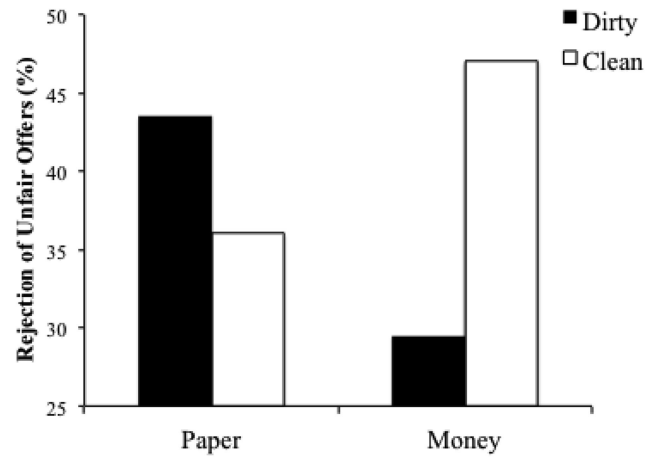


Figure 6. Rejection rate of unfair offers as a function of money condition (money vs. paper) and dirt condition (dirty vs. clean), Experiment 5.

unfair offers than the clean paper group, though this did not reach significance, $F(1, 105) = 2.58, p = .10$. Thus, the participants who had counted dirty money were the most willing to accept unfair offers, consistent with the idea that dirty money activates notions of exploitation and selfishness aimed at getting money for oneself regardless of issues of fairness. Handling clean money led to a relatively high rate of refusing unfair offers, consistent with the view that clean money activates expectations of fairness.

We also sorted the offers by their magnitude, because people may be more willing to accept an unfair offer if the amount is substantial than if it is trivial. Sure enough, an ANOVA on responses to large unfair offers (¥4.5 or more) yielded no significant effects: Both main effects and the interaction fell short of significance: main effect of money versus paper, $F < 1$; main effect of dirty versus clean, $F(1, 105) = 1.75, p = .18$; interaction, $F < 1$.

Thus, it was the low and unfair offers that contributed to the significant overall interaction. These were defined as offers of 27–33% of the stake and amounting to ¥2 or less. The likelihood of accepting these was again shaped by an interaction between the dirt and money variables, $F(1, 105) = 13.60, p < .001$. The main effects of money and dirt were not close to significant ($F_s < 1$). The pattern of means resembled that of the unfair offers overall. The dirty money group was inclined to accept these offers, more than the clean money group, $F(1, 105) = 7.49, p < .01$, and likewise more than the dirty paper group, $F(1, 105) = 8.56, p < .01$. The clean money group had the highest standards in the sense that they were exceptionally likely to refuse most offers, more than the clean paper condition, $F(1, 105) = 5.25, p = .02$, and more than the dirty money group. Dirt alone likewise seemed to elevate standards, in the sense that the dirty paper group rejected more offers than the clean paper group, $F(1, 105) = 6.14, p = .02$.

For fair offers, none of the effects reached significance. The interaction, $F(1, 105) = 1.71, p = .19$, came closer than either of the main effects: money vs. paper, $F(1, 105) = 1.23, p = .25$; dirty vs. clean, $F < 1$. Apparently, the manipulations of money and dirt failed to sway responses to fair offers, regardless of whether they were large or small.

Discussion

The ultimatum game presented participants in this study with a choice between accepting an unfair deal (and getting some money) or rejecting it (and getting nothing). It thus represented a choice between financial benefit and affirming moral standards. Handling clean money made people uphold the standards of fair exchange: These participants frequently rejected unfair, low offers. Handling dirty money had the opposite effect, shifting the balance in favor of taking the money regardless of the unfairness of the deal. Put another way, the money manipulation altered how participants handled the trade-off in deciding between money and fairness. Clean money caused people to favor fairness, whereas dirty money prompted them to prefer the money.

The lowering of standards was specific to dirty money. Dirt alone did not have that effect. Participants who counted dirty paper tended to have high standards, as indicated by relatively high rates of rejection of unfair offers.

Clearly, participants were torn between the desire to get some money and the inclination to insist on a fair division. When the amounts offered were unfair yet relatively large, the effects of handling clean or dirty money (or paper) dropped out of the significant range, and overall rates of acceptance rose. The strongest effects of the manipulation were found on the low, unfair offers. In a sense, the manipulations influenced the trade-off between moral standards and desire for money, but when the amounts of money were high, the desire for money dominated the trade-off.

The manipulations had no effect on acceptance versus rejection of fair offers. This does not appear to be a ceiling effect, insofar as people did still reject some offers in that range. But there was apparently little effect of the manipulations of money and dirt on how people responded to fair offers. One possible reason is that the fair offers did not require a trade-off of money versus moral standards, as the unfair offers did. The associations evoked by clean and dirty money are mainly relevant to how people respond to unfairness, when people must choose between fairness and getting more money for themselves.

In short, when the money was ample, people simply took it and disregarded the symbolic humiliation and the moral issue of fairness. When the money was low, participants who had handled clean money stood on principle and rejected the ultimatum. In that condition, in contrast, participants who had handled dirty money disregarded the moral principles and took the money.

Again, one could have predicted very different results. Handling dirty money might have made money seem less desirable and therefore made people affirm moral standards by rejecting unfair offers. Instead, we found that handling dirty money made people want more money. This surprising result is best explained by inferring that the dirty money primed amoral selfishness and related behavioral inclinations.

Experiment 6

Experiment 6 used the most basic of economic games, the dictator game. In fact, it is hardly a game at all. The participant is given a stake of money to divide between self and another person. The participant's decision is final, and both players get whatever that allocation is. Because the other person has no vote and no power, the participant's behavior is often taken as a sign of

generosity. Hence, it constitutes a relatively pure measure of how well the participant wishes to treat the other person, which may range from giving the other person half the stake (or more, in the cases of exceptional generosity) down to giving the other person nothing.

Moreover, Experiment 6 goes beyond the prior experiments by measuring inner responses that should reflect a bias (toward or away from) fairness and reciprocity, as this construct has been central to our interpretation of the results of Experiments 1–5. To this end, after the manipulation, participants rated the positivity and negativity of words related to business transactions and economic trade.

This study also changed the manipulation. All participants counted ordinary and thus not notably clean or dirty money (and no one counted paper). The dirt manipulation was accomplished by having participants read an ostensible news item about the cleanliness or dirtiness of the nation's money supply.

We predicted that reading about clean money would activate notions of fair exchange that would in turn lead to dividing the money close to evenly. In contrast, reading about dirty money would evoke tendencies toward self-interested greed and gain, so that participants would tend to keep much of the money for themselves by allocating relatively small shares to the other player.

Method

Participants. One hundred and twenty undergraduates (67 female) in a Chinese university participated. They received a payment based on the outcome of the dictator game they played. They were randomly assigned to one of three conditions (clean money, dirty money, control). Four participants skipped some trials during the main dependent measure, and their data were omitted from all analyses.

Procedure. First, participants read one of three articles. The clean money group read a news article about how clean the country's paper currency is these days. The dirty money group read a news article about how filthy paper currency is these days. The control group read a recent weather report. Then all the participants completed the ostensible finger dexterity task by counting ¥100 bills. The money was ordinary money in circulation and thus not extremely clean or dirty.

Next, in an ostensibly different task, participants rated 15 words in a lexical decision procedure on the computer. They were shown one word at a time, and their task was to decide as quickly as possible whether this word is a good or bad word. They pressed one key to indicate the word as "good" and another key to indicate the word as "bad." Among these 15 words, five were related to economic exchange: *reciprocity*, *trade*, *business*, *deal*, and *transaction*.

Last, they were instructed to play the dictator game, in which one player (the proposer) proposes a way to split a sum of money with another player (the receiver). The receiver simply receives the remainder of the endowment left by the proposer. Participants were told a cover story that they were part of a large ongoing study in which they would be playing the role of proposer and they would make the decision about how to divide the money for 20 different receivers. Participants learned that they would receive the financial outcomes from two trials that would be randomly se-

lected at the end of the game. The experimenter obtained a verbal confirmation that the participant understood the game.

For each trial, participants viewed a photograph of the purported receiver and the amount of the stake (total pie to be shared) on the computer. Participants then inputted how much money they would give to the receiver. Participants played the dictator game 20 times, each time ostensibly with a different receiver. In reality, the photographs and amount at stake (randomly ordered) were preprogrammed into the computer. The amount of the stake ranged from ¥5 to ¥20. We used varying amounts with each trial so that participants would be prompted to think each time about what to offer, rather than settling on a constant amount.

Results

Economic-exchange-related words. If participants rated a word as “good,” we coded that decision as 1. If participants rated a word as “bad,” this decision was coded as 0. The decisions on five reciprocity-related words were summed into a composite score. A one-way ANOVA with three levels (clean money, dirty money, or control) showed that the manipulation had a significant effect on reactions to these business-related words, $F(2, 113) = 18.94, p < .001$.

Subsequent contrast analysis showed that the clean money group ($M = 3.93, SD = 1.00$) rated the exchange-related words more positively than did the control group ($M = 3.03, SD = 1.35$), $F(1, 113) = 3.86, p < .001$. The dirty money group ($M = 2.23, SD = 1.41$) rated these words worse than did the control group, $F(1, 113) = 2.94, p < .01$. The dirty money group rated these words as worse than did the clean money group, $F(1, 113) = 37.15, p < .001$. Thus, the notion of clean money seems to have elevated the subjective appeal of economic exchange, whereas the notion of dirty money induced people to adopt more negative attitudes toward business dealings.

The dictator game. Participants indicated how much money they would give to the responder in each of the 20 trials. For each trial, we divided this amount allocated to the responder by the total amount of the stake, which furnished a fairness ratio (with .50 being perfectly fair). A composite score was formed by averaging across 20 trials. A one-way ANOVA showed that the fairness of allocations varied among the three conditions, $F(2, 113) = 11.21, p < .001$. Subsequent contrast analyses showed that the clean money group ($M = 0.49, SD = 0.09$) was significantly more generous and fairer to the others than the control group ($M = 0.43, SD = 0.08$), $F(1, 113) = 2.13, p < .05$. The dirty money group ($M = 0.36, SD = 0.17$) was less fair than the control group, $F(1, 113) = 2.44, p < .02$.

Mediation analyses. We hypothesized that the money manipulation changed participants’ evaluation of economic exchange (i.e., ratings of the words), which in turn caused participants to act more or less fair in the dictator game (i.e., division of money). To test this hypothesis, we conducted a series of mediation analyses.

Experimental condition was dummy coded so as to compare each money condition (i.e., dirty and clean) to the control condition. Consistent with results reported in the previous sections, clean money (vs. control) increased fair divisions in the dictator game ($\beta = .22, t = 2.15, p = .03$), whereas dirty money (vs. control) decreased fair divisions in the dictator game ($\beta = -.25, t = 2.54, p = .01$). Additionally, clean money (vs. control)

increased favorable evaluations of trade-related words ($\beta = .18, t = 3.26, p = .001$), whereas dirty money (vs. control) decreased favorable evaluations of those words ($\beta = -.16, t = 2.90, p = .005$).

Next, we confirmed that the putative mediator (i.e., evaluation of trade-related words) was positively related to fairness in the dictator game ($\beta = .42, t = 4.89, p < .001$). To test for mediation, we added the putative mediator (reciprocity evaluation) to the full model predicting fair divisions. In this model, the mediator remained a significant predictor ($\beta = .29, t = 3.00, p = .003$), whereas the effect of clean money (vs. control) and dirty money (vs. control) were rendered nonsignificant ($\beta = .13, t = 1.34, p = .18$; $\beta = -.17, t = 1.72, p = .09$, respectively). Bootstrapping the mediational effect of reciprocity evaluation using the method of Preacher and Hayes (2008) yielded 95% confidence intervals (bias-corrected and accelerated) not containing 0 [.0182, .0708] and [−.0760, −.0166]. This pattern of findings confirms that the ratings of words (and, by implication, attitudes toward economic exchange) mediated the effect of clean and dirty money on fairness.

Discussion

Experiment 6 provided further evidence that priming the notion of clean money prompts people to treat others fairly, whereas priming that of dirty money produces selfish and greedy behavior. Using a new manipulation different from what was used in Experiments 2–5, participants read about the cleanliness or dirtiness of money in general circulation (or about recent weather patterns, in the neutral control condition). Those who read about clean money divided their stakes relatively evenly, generally allocating close to half the money to the other player. In contrast, participants who read about dirty money tended to keep larger shares of the stake for themselves, thus allocating relatively small shares to their partner.

Experiment 6 went beyond the prior work and provided process evidence that momentary shifts in attitudes and feelings about reciprocal economic trade contributed to allocations in the dictator game. Participants reminded of clean money perceived exchange-related words more favorably than others, and this favorable attitude toward trade accounted statistically for their generous dealings with partners in the dictator game. The opposite pattern was found for participants who had been reminded of dirty money. They judged exchange-related words less favorably than the other groups, and this statistically accounted for the increase in the unfair money divisions they made.

Most people would rather have clean items, including money, than dirty ones. Hence, it seems ironic that reading about how clean the money is would prompt people to give money generously to others, whereas reading about dirty money would paradoxically cause people to decide to keep more money for themselves. Experiment 6 showed that people who read about clean money held economic trade in higher esteem than controls and certainly higher than participants who read about dirty money. These findings fit our hypothesis that clean money evokes positive attitudes about fair, reciprocal exchange, whereas dirty money evokes notions of exploitation and greed. To be sure, the ratings of words did not specifically indicate how they valued fairness per se, merely how they valued exchange. We assumed that placing a high value on

trade would imply valuing fairness also, because in the long run trade is most successful and durable when it is fair. But it was slightly possible that the responses reflected valuing all trade, including somewhat unfair deals. After all, someone may approve of business deals because they enrich the self (in which case fairness is not required) or because they benefit everyone (in which case fairness is best). Experiment 7 therefore sought mediation by items that explicitly distinguished between fair trade and self-serving, greedy deal making.

Experiment 7

Experiment 7 was designed to replicate Experiment 6 with some improvements. In Experiment 7, rather than rating words related to economic exchange, participants rated aphorisms and sayings connoting either selfishness and greed or fair exchange (see the Appendix). Rather than rating each word as good or bad (as they did in Experiment 6), participants in Experiment 7 provided ratings of each saying on an 11-point scale. Such scales offer greater statistical sensitivity than binary ratings. Also, we increased the amounts of money at stake in the task, which could increase the subjective importance of the task. Our predictions were that thinking about clean money would increase advocacy of fairness, which would mediate fair and generous treatment of partners in the dictator game. Thinking about dirty money would increase preference for selfish and greedy sayings, which would in turn mediate self-serving allocations in the game at the expense of the partners.

Method

Participants. One hundred and eight undergraduates (40 female) in a Chinese university participated. They were paid whatever they earned in the dictator games. They were randomly assigned to one of three conditions (clean money, dirty money, control).

Procedure. First, participants read one of three articles (as in Experiment 6). The clean money group read a news article about how clean the country's paper currency is these days. The dirty money group read a news article about how filthy the paper currency is these days. The control group read a recent weather report. All participants then counted ¥100 bills, which were ordinary notes in circulation (neither very clean nor dirty), as part of an ostensible finger dexterity task.

Next was a task that was described as gathering consumers' opinions on statements, which represented an assortment of aphorisms and sayings. Participants rated their agreement with 10 phrases (0 = *strongly disagree*, 10 = *strongly agree*; see the Appendix). Three were greed related (e.g., "I want it all"), three were fairness related (e.g., "Fairness is our motto"), and four were filler phrases (e.g., "Constant dripping wears away a stone"). Endorsement of greed and fairness sayings measured our proposed mediators. These two sets of items were not significantly correlated with each other ($r = -.08$, $p = .38$).

As a dependent measure, participants allocated money in several trials of the dictator game. Participants were told a cover story that they were part of a large ongoing study in which they would be playing the role of proposer and they would make the decision about how to divide money between themselves and another person, across five trials (with different partners). Participants

were told (veridically) that two of the trials would be randomly selected at the end of the game, and they would receive the payment they had allocated themselves on those trials. The experimenter obtained a verbal confirmation that the participants understood the game.

For each trial, participants viewed a photograph of the purported receiver and amount of the stake (total amount of money to be shared) on the computer. In reality, the photographs and amount at stake (randomly ordered) were preprogrammed. The amounts to be divided ranged from ¥9 to ¥89. As in Experiment 6, participants decided how to split different amounts of money each time, so that they did not figure out a split once and implement it each time. Participants recorded the amount of money (if any) they would give to the receiver.

Results

Fairness-related sayings. Ratings on three fairness-related sayings were averaged into a composite score. A one-way ANOVA indicated significant variation among conditions, $F(2, 105) = 3.60$, $p = .03$. A subsequent contrast analysis showed that the clean money group ($M = 7.76$, $SD = 1.02$) endorsed the fairness-related sayings more than the control group ($M = 7.07$, $SD = 1.44$), $F(1, 105) = 4.28$, $p = .04$. There was no difference between the dirty money group ($M = 6.92$, $SD = 1.68$) and the control group ($F < 1$). Thus, the notion of clean money seems to have elevated the subjective approval of fairness. Dirty money, however, had no effect: It did not promote unfairness for its own sake.

Greed-related sayings. Ratings on three greed-related sayings were averaged into a composite score. A one-way ANOVA with three levels (clean money, dirty money, or control) indicated significant variation among conditions, $F(2, 105) = 11.32$, $p < .001$. Subsequent contrast analyses showed that the dirty money group ($M = 6.85$, $SD = 1.38$) agreed more with greed-related sayings than the control group ($M = 6.01$, $SD = 1.52$), $F(1, 105) = 6.32$, $p = .01$. In contrast, the clean money group ($M = 5.29$, $SD = 1.37$) agreed less with these sayings than the control group, $F(1, 105) = 5.04$, $p = .03$. Thus, thinking about dirty money seems to have elevated the subjective appeal of greed. Conversely, thoughts about clean money made people reject selfishness and greed, as compared to neutral controls.

Filler sayings. The four filler sayings were averaged and combined into a composite index. As expected, condition had no significant predictive effect on ratings of the neutral phrases ($F_s < 1$).

Dictator game. Participants indicated how much money they would give to the responder in each of the five trials. For all five trials, we divided the amounts allocated to the responder by the total amount at stake, which furnished a fairness ratio (with .50 being perfectly fair). A one-way ANOVA showed that the fairness of allocations varied among the three conditions, $F(2, 105) = 9.59$, $p = .002$. Subsequent contrast analyses showed that the clean money group ($M = 0.53$, $SD = 0.15$) was significantly more generous and fairer to the others than the control group ($M = 0.46$, $SD = 0.16$), $F(1, 105) = 3.97$, $p = .05$. The dirty money group ($M = 0.38$, $SD = 0.14$) was more selfish and less fair than the control group ($M = 0.46$, $SD = 0.15$), $F(1, 105) = 5.67$, $p = .02$.

Mediation analyses. We conducted a pair of mediation analyses. One mediation model examined whether fairness mediated the effect of clean (but not dirty) money on fair allocations in the dictator game, whereas the other examined whether greed mediated the effect of dirty money on (un)fairness in the dictator game.

Fairness as mediator. We hypothesized that clean money caused participants to propose fair allocations in the dictator game because it heightened attitudes of fairness. However, we did not expect that fairness attitudes would account for the effect of dirty money on unfair allocations in the dictator game. We tested these hypotheses using a series of mediation analyses. As in Experiment 6, experimental condition was dummy coded to compare the dirty money and clean money conditions to the control condition.

As mentioned above, clean money (vs. control) increased both fair allocations of money in the dictator game ($\beta = .21, t = 2.00, p = .05$) and favorable ratings of fairness sayings ($\beta = .23, t = 2.07, p = .04$). In contrast, dirty money (vs. control) decreased fair allocations ($\beta = -.24, t = 2.38, p = .02$), and it did not affect ratings of fairness sayings ($\beta = -.05, t < 1, ns$).

To test for mediation, we confirmed that the hypothesized mediator (ratings of pro-fairness sayings) predicted monetary allocations, which it did ($\beta = .32, t = 3.51, p = .001$). When this putative mediator was added to the full model, the mediator remained significant ($\beta = .25, t = 2.74, p = .007$), whereas the clean money manipulation was no longer a significant predictor ($\beta = .15, t = 1.47, p = .14$). Consistent with predictions, dirty money (vs. control) remained significant in the full model ($\beta = -.23, t = 2.33, p = .02$). Bootstrapping the mediational effect of fairness evaluation using the method of Preacher and Hayes (2008) yielded a 95% confidence interval not containing 0 [.0039, .0544] for clean money (vs. control), confirming that positive attitudes about fairness mediated the effect of the clean money condition on behavioral fairness of dictator proposals. Additionally, the 95% confidence interval did contain 0 [-.0507, .0005] for the effect of fairness evaluation in the dirty money (vs. control) model, confirming that fairness did not mediate the effect of the dirty money manipulation on fair or unfair allocations to the partner.

Greed as mediator. We then tested whether greed (i.e., ratings of the sayings that advocated selfish and greedy sentiments) mediated the relationship between the dirty money manipulation and behavioral (un)fairness in the dictator game. As mentioned previously, the dirty money manipulation (vs. control) increased favorable ratings of greed ($\beta = .26, t = 2.51, p = .01$) and decreased fair allocations of money to the partner ($\beta = -.25, t = 2.38, p = .02$). In contrast, the clean money manipulation (vs. control) decreased favorable ratings of greed ($\beta = -.23, t = 2.25, p = .03$) and increased favorable allocations of money to the partner ($\beta = .21, t = 2.00, p = .05$).

Correlationally, the more that participants agreed with the greed sayings, the more selfish they were in the dictator game, insofar as they kept more money for themselves and gave the partner less ($\beta = -.36, t = -3.91, p < .001$). When this putative mediator, greed ratings, was added to the model predicting monetary allocations, the mediator remained significant ($\beta = -.23, t = 2.38, p = .02$), whereas the dirty money and clean money manipulations (vs. control) were rendered nonsignificant ($\beta = -.19, t = 1.79,$

$p = .08; \beta = .15, t = 1.48, p = .14$, respectively). Bootstrapping the mediational effect of greed evaluation yielded a 95% confidence interval not containing 0 [-.0718, -.0106] and [.0098, .0754]. This pattern of findings indicates that favorable attitudes about greed mediated the effect of dirty money condition on (un)fairness and that rejection of greed accounted for the effect of clean money on fairness.

Discussion

Experiment 7 replicated our effect once again. This time, handling money after reading about clean money was sufficient to make people divide money evenly between themselves and a partner. Handling money after reading about dirty money made them selfish, in the sense that they divided money in self-serving ways, allocating relatively more to themselves and less to the partner. Thus, the physical exposure to dirt was the same in the clean and dirty money conditions, and the only difference was the idea planted in their minds about the cleanliness versus filth of the nation's currency in general. Still, these manipulations were sufficient to alter attitudes and behavior.

One novel contribution of Experiment 7 was to provide separate measures of attitudes about greed and attitudes about fairness. Clean money changed both attitudes. Clean money made people endorse fairness more and reject greed more, as compared to neutral controls. Dirty money made people embrace greed more, but it did not make them reject or dislike fairness. Dirty money thus apparently promotes selfishness and a willingness to be unfair so as to benefit the self. Dirty money does not, however, foster downright malicious or evil intent. The implication is that if people act unfairly after thinking about dirty money, the unfairness is a means to promote selfish ends, rather than something that is sought for its own sake.

The most important novel contribution of Experiment 7 was to show that attitudes about fairness and greed mediated the effect of the money manipulation on allocations of money in a dictator game. The dirty money condition promoted favorable attitudes about greed, which in turn led to keeping more money for oneself. The clean money condition promoted approval of fairness and dislike of greed, both of which led to giving others a fair share of the money instead of keeping it for oneself.

The mediators were thus somewhat different by condition. Attitudes about fairness mediated the effects of clean money but not of dirty money. Attitudes about greed mediated the effects of both clean and dirty money. Thus, the idea of clean money increased fairness toward others by way of enhancing attitudes about fairness and lowering the appeal of selfish, greedy sentiments. The idea of dirty money decreased fairness by way of enhancing the appeal of greed.

General Discussion

Money is a pervasive aspect of modern life, and the idea of money crosses the average person's mind many times every day. Recent work has begun to explore how people's thoughts, feelings, and actions change as a result of thinking of money (Vohs et al., 2006; Zhou & Gao, 2008; Zhou, Vohs, & Baumeister, 2009). The present findings suggest that there may be more than one set of behavioral tendencies associated with money. In particular, we

found that clean money and dirty money had radically different effects.

Our results were quite consistent across seven studies, despite substantial variations in settings and procedure. Clean money seemed to elicit thoughts and actions consistent with a high standard for fairness. In contrast, dirty money elicited the opposite reaction: It led people to respond in ways suggesting assumptions of selfishness, greed, exploitation, and other self-serving attitudes. These patterns were found in laboratory studies and in a field study, thus both with student participants playing games (for real or hypothetical money) and with real vendors selling actual products. They showed up in questionnaire responses (both in terms of rating of values and in hypothetical willingness to violate values), in treatment of customers, and in multiple economic game plays. They were elicited by manipulations that included (temporarily) receiving clean versus dirty money in payment, simply counting clean versus dirty money (or paper), and reading about the cleanliness or dirtiness of the nation's supply of money currently in circulation. Also, and crucially, they involved both the tendency to be fair to other persons and the expectation or insistence that oneself be treated fairly. Clean money promoted fairness consistently, whereas dirty money promoted selfish behavior and generally reduced fairness.

Dirt alone (i.e., counting dirty paper rather than dirty or clean money) tended to move people toward high standards, a conclusion supported by the results of a meta-analysis of the effects of clean versus dirty paper in Experiments 2–5. This analysis confirmed that there was a robust effect (in the medium to large range) of dirty paper relative to clean paper on prosocial responses, Hedges's $g = 0.598$, 95% CI [0.341, 0.855], $Z = 4.566$, $p < .001$. We note that the effect of dirty paper on prosocial responses may be an effect not of dirt per se but of activating the clean–dirty dimension. The clean paper condition probably did not make people think of that dimension at all.

The effects of dirty money were not a simple combination of the effects of money and dirt. The differences between dirt and dirty money thus suggest very different symbolic meanings and associative networks—all of which may coexist comfortably in the average person's mind. Exposure to dirt alone seems to have elicited a contrary desire for symbolic cleanliness, as reflected in high moral standards. Participants in the dirty paper condition generally acted quite fairly and expected the same from others. In contrast, dirty money elicited the least fair and reciprocal responses.

One might have thought that handling dirty money would make people less enamored of money, because people do not want to have dirty things. We consistently found the opposite: The dirty money participants were most prone to make decisions that brought them the most money, regardless of interpersonal considerations of fairness and reciprocity. We assume this is not because dirt made money more desirable. (Indeed, our pilot data showed that people perceive dirty and clean money to have the same value and purchasing power.) Rather, our findings suggest that dirty money reduced the subjective appeal and relative power of the values of fairness and reciprocity, evoking instead selfish notions of exploitation and greed. Dirty money did not make people actually dislike fairness, but when it came to trading off fairness against greed, people who had handled dirty money tended to choose greed.

All these results are consistent with the assumption that many people have ambivalent attitudes toward money, characterized by two different sets of associations. Clean money evokes the positive benefits of money for facilitating fair trade, cultural progress, and the capacity to marshal resources to tackle personal and social problems. In contrast, dirty money may evoke the many crimes, abuses, and shady dealings that have throughout history marked the often illicit pursuit of personal financial gain at the expense of others.

The idea that people associate money separately with fair trade and with selfish, exploitative greed meshes well with Lea and Webley's (2006) theory that people treat money as both a tool and a drug. To say that people behave as if money were a drug means that money activates motivational systems. Lea and Webley proposed that money activates a motivational system that they labeled a trade instinct, which they thought emerged early in human evolution. The idea is that money, through its ability to facilitate trade, activates parts of the human psyche that respond to opportunities to trade, much like artificial sweeteners activate people's natural inclination toward sweetness.

Although psychological theorists are understandably reluctant to postulate new instincts, it is plausible that humans have evolved some predispositions toward trade. A host of work suggests that trade was partially responsible for the successful propagation of modern humans (*Homo sapiens*), who at one point competed with *Homo neanderthalensis* for scarce resources. *H. neanderthalensis* had 10% bigger brains than *H. sapiens* and was present on earth long before the Cro-Magnon ancestors of modern humans appeared, which ought to have conferred an advantage. Yet, scholars believe that *H. sapiens* had a decisive advantage because they discovered trade, whereas *H. neanderthalensis* did not, and that the economic advantage may have accounted for why one species flourished and the other went extinct (Horan, Bulté, & Shogren, 2005). Lea and Webley's (2006) theory that money activates a human trade instinct fits these observations—as well as those of the current experiments in showing that the mere handling of money that was clean or dirty was enough to alter people's attitudes, values, and behaviors relating to economic exchange. Throughout human economic history, many have benefited by means of fair trade, whereas others have achieved at least short-term gains by behaving in unfair and exploitative ways. Both patterns would emerge from associations between money and a deeply ingrained motive to trade.

Our findings may suggest implications for societal benefit. Actual cash in circulation is handled by many people and may become dirty relatively fast. The average American 20-dollar bill, for example, is in circulation for only about two years, whereupon it is replaced by a new one (Anonymous, 2012). The present results suggest the intriguing possibility that a higher frequency of replacement might improve the prosocial fairness and reciprocity of interactions throughout the society. The increasing use of credit cards and other noncash transactions may likewise improve social life by reducing the frequency with which people handle dirty money.

It is perhaps remarkable that one symbol (money) can have opposite effects, not only on ratings of values and stimulus words but even on actual behavior. Whether other symbols have similarly multivalent power remains for further research, but we suspect that money is in a relatively small class. The presence of both positive associations (to clean money) and negative ones (to dirty money) may attest to the extensive and complicated role money has played

in many lives and in the culture generally. In particular, the effects of dirty money were not a simple combination of dirt and money but rather differed starkly from the presentation of either dirt or money without the other. The checkered history of money, including the unsavory and dishonest means people have used to get it, seems to have left a rich residue of negative associations triggered by dirty money. When those ideas are activated, people seem neither inclined to expect fairness nor inclined to treat others fairly. Fortunately for the capacity of economic exchange to serve as an engine of cultural progress, clean money has quite different effects. Despite the negative associations that money can evoke, the idea of clean money can actually improve people's tendencies to behave in positive, prosocial, culturally beneficial ways and to treat each other fairly.

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Appendix

Ten Phrases Used in Experiment 7

Greed

I want it all
People go for fortune as birds do for food
Selfish is the nature of human

Fairness

Fairness is our motto
Fair trade
Fairness is more important than profit

Filler

Constant dripping wears away a stone
There are always higher mountains and more intelligent persons
The small house sparrow is fully equipped
Everything is possible

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