Money is Essential: Ownership Intuitions Are Linked to Physical Currency

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Abstract

Due to basic processes of psychological essentialism and contagion, one particular token of monetary currency is not always interchangeable with another piece of currency of equal economic value. When money loses its physical form it is perceived as "not quite the same" money (i.e., to have partly lost the original essence that distinguished it from other monetary tokens), diminishing its intuitive link with its original owner. Participants were less likely to recommend stolen or lost money be returned when it had been subsequently deposited in an electronic bank account, as opposed to retaining its original physical form (Studies 1a and 1b). Conversely, an intuitive sense of ownership is enhanced through physical contact with a piece of hard currency. Participants felt the piece of currency a person had originally lost should be returned to him rather than another piece of currency of equivalent value, even when they did not believe he would be able to tell the difference and considered distinguishing it from other money illogical. This effect was reduced when the currency had been sterilized, wiping it clean of all physical traces of its previous owner (Studies 2a, 2b, and 3).

Keywords: Money, Essentialism, Contagion, Ownership Intuitions, Property, Fungibility

In the comedic film *Meet the Parents* Greg Focker caps a disastrous trip to visit his girlfriend's parents by losing their beloved cat, Mr. Jinx. Desperate to restore his standing with his hosts, Greg finds a similar looking stray cat and spray paints its tail in an effort to reproduce Mr. Jinx's signature stripe. When his deception is unmasked, the horrified family throws Greg out of their house. This natural sense of outrage occurs because Mr. Jinx is a non-fungible asset: a beloved family pet cannot simply be substituted for another animal, no matter how similar in appearance.

At the opposite end of the spectrum from Mr. Jinx— at least according to standard economic theories— is monetary currency. In principle and by design freely substitutable, one dollar should be treated the same as any other. Challenging this conventional wisdom, classic investigations by Thaler and colleagues demonstrates that money is often placed in different mental accounts (e.g., windfall gains as opposed to regular income) and hence not treated as fully substitutable (for reviews, see Thaler, 1985, 1990, 1999). For example, consumers would rather spend windfall gains than their regular income to finance a trip to Maui, even when both sources of income are equally available.

The present research suggests that physical monetary currency is more like Mr. Jinx (i.e., even less fungible) than previously realized. Specifically, even within a given mental account (e.g., windfall gains), one particular token of monetary currency is not necessarily interchangeable with any other. This prediction is based on theories of psychological essentialism (Haslam & Whelan, 2008; Medin & Ortony, 1989) and contagion (Nemeroff & Rozin, 1994; Rozin, Millman, & Nemeroff, 1986).

Research from a variety of fields indicates that human beings view both living organisms and physical objects as possessing a deep underlying essence that makes them what they are

(Bloom, 2004, 2010; Dar-Nimrod & Heine, 2011; Hamilton, Sherman, & Rodgers, 2004; Haslam & Whelan, 2008; Medin & Ortony, 1989; Plaks, Levy, Dweck, & Stroessner, 2004; Yzerbyt, Corneille, & Estrada, 2001). But in contrast to living organisms, which are perceived to possess essential characteristics that survive the destruction of their bodies (Bering, 2006), the essence of inanimate objects is more closely tied to their physicality. For instance, the essence of a mahogany table is not automatically assumed to survive its physical destruction and subsequently lead a non-corporeal existence in the same way that a human soul is widely believed to survive the destruction of its body. This suggests that an intuitive sense of ownership should diminish when the original physical currency is exchanged, dispersed and not physically recoverable (as occurs when it is deposited in a bank). In such cases the particular tokens of monetary currency in question are perceived to be no longer "quite the same" money as before (i.e., to have partly lost the original essence that distinguished them from other tokens of monetary currency).

Empirical investigations further indicate that essences are implicitly seen as contagious, spreading from one target to another based on physical contact (Frazer, 1890/1959; Mauss, 1902/1972; Morales & Fitzsimons, 2007; Nemeroff & Rozin, 1994). For example, college students refuse to wear a sweater that was once worn by Hitler, out of an intuitive sense that Hitler's evil has spread to the sweater and could infect them as well (Rozin et al., 1986). In addition, consumers are willing to pay premium prices for everyday objects (e.g., a tape measure) that have come into close contact with well-liked individuals (e.g., John F. Kennedy), but less so if the objects have been thoroughly sterilized (Newman, Diesendruck, & Bloom, 2011; see also Argo, Dahl, & Morales, 2006, 2008). Such contagion effects suggest that an intuitive sense of ownership should be enhanced through physical contact with a given piece of hard currency, and

reduced when all traces of such contact have been erased. Thus, it is partly through a process of psychological contagion that the underlying essence of a piece of cold, hard cash becomes linked to that of a person who has (literally) had it in her rightful possession.

Of course essentialism and contagion are far from the sole basis of ownership attributions, which prior research shows are driven by factors such as control over permission to use the object (Merrill, 1998; Neary, Friedman, & Burnstein, 2009), being the first person to possess the object (Friedman, 2008; Friedman & Neary, 2008), and being necessary for the object coming to be possessed (Friedman, 2010; Palamar, Le, & Friedman, 2012), among others. These *prima facie* more rational and logically defensible considerations likely explain the bulk of the variance in ownership judgments. However, the present studies do show that an intuitive link between owner and object based on essentialism and contagion can play a significant (albeit probably much smaller) role as well.

Notably, despite the importance and relevance of ownership judgments in everyday life, there is actually surprisingly little empirical work on the psychological underpinnings of intuitions about property and ownership (Friedman & Ross, 2011). In addition, what work does exist has typically dealt with intuitions about ownership over non-monetary objects (Berti, Bombi, & Lis, 1982; Cram & Ng, 1989, 1994; Friedman, & Ross, 2011; Gelman, Manczak, & Noles, 2012; Palamar et al., 2012; although see Oxoby & Spraggon, 2008). Thus, the present studies are rather novel investigations into some of the irrational underpinnings of ownership beliefs regarding monetary currency.

Study 1a: Money in the Bank

Studies 1a and 1b tested the idea that when a piece of monetary currency loses its physical form it also loses part of the unique essence that distinguishes it from other monetary

tokens, and can become less intuitively linked to its owner. We hypothesized that stolen or lost cash would be seen as "not quite the same" money after it had been deposited in the bank, and that participants would be less likely to recommend it be returned to the descendants of its original owner (Study 1a) or even its original owner (Study 1b).

Method

Fifty-two adults (M_{age} = 30, range = 21-64) were recruited from Amazon.com's Mechanical Turk service (for reviews regarding the use of Mechanical Turk for conducting psychological research, see Buhrmester, Kwang, & Gosling, 2011; Paolacci, Chandler, & Ipeirotis, 2010).

Participants read that forty years previous Ted's great-grandfather had stolen $1,000 from Donna's great-grandfather, money that Ted eventually inherited. In the *physical currency condition,* Ted's great-grandfather placed the cash in a box that was passed down to Ted. In the *bank account condition* Ted's great-grandfather deposited the money in a bank account that was likewise passed down to Ted. (In both conditions, the scenario indicated that the total value of Ted's inheritance from his parents was $9,000.) Years later, Donna investigates what happened to her great-grandfather's money. After discovering the truth, she asks Ted to give her $1,000.

Recommended restitution. Participants were asked "Should Ted give Donna the $1,000?" (*1 = definitely not, 7 = definitely yes*), "I feel that Donna is the rightful owner of the $1,000 she is asking for" (*1 = strongly disagree, 7 = strongly agree*), "Donna is making a reasonable request" (*1= strongly disagree, 7= strongly agree*), "I feel that Ted should give Donna the $1000 she is asking for" (*1= strongly disagree, 7= strongly agree*), and "Is Ted morally obligated to give Donna the $1,000?" (*1 = definitely not, 7 = definitely yes*). These items

were all highly correlated with one another, loaded on a single underlying factor, and were averaged into a reliable index ($\alpha = .93$).

In addition to the primary outcome measures, participants further completed items that served as manipulation and comprehension checks and to address potential alternative explanations. These items were presented on a separate page from the recommended restitution items, and the computer program ensured participants could not return to the previous pages.

Not the same money. As check on the bank account manipulation, participants were asked whether it was true or false that "Ted does not have quite the same money that was stolen from Donna's great-grandfather."

Size of inheritance. To ensure Ted was not perceived to have inherited more money in one condition than the other, an item asked how much Ted's inheritance totaled.

Perceived guilt. To examine whether participants believed possessing the original physical currency had led Ted to feel guilty (perhaps making him more willing to return the money), an item asked "How guilty does Ted feel about the money his great-grandfather stole from Donna's great-grandfather?" (*1 = not at all guilty, 7 = extremely guilty*).

Demographics. In all of the present studies participants further reported demographic information including their age, gender, and political orientation. These demographic variables did not moderate the effects of the experimental manipulations and are not discussed further.

Results and Discussion

Indicating the experimental manipulation was successful, participants were more likely to believe that Ted no longer had "quite the same" money his great-grandfather had stolen when it had been deposited in a bank account (67% agreement) as opposed to retaining its original, physical form (19% agreement), χ^2 (1, $N = 51$) = 12.16, $p < .001$. Further demonstrating that

participants had properly understood the total amount of money he received, Ted was not perceived to have inherited more money from his family in one condition than the other (*M*s = $8,520 and $8,703 in the bank account and physical currency conditions, respectively), $t < 1$. Ruling out a potential alternative explanation, Ted was not seen as any more guilty about the stolen money in the physical currency condition ($M = 3.78$, $SD = 1.78$) than in the bank account condition ($M = 3.72$, $SD = 1.54$), $t < 1$.

As expected, participants were more likely to recommend that Ted give Donna the $1,000 when he still had the original physical currency his great-grandfather had stolen ($M = 5.53$, $SD = 1.41$), relative to when the stolen currency had been passed down to him in the form of a bank account ($M = 4.64$, $SD = 1.71$), $t(50) = 2.06$, $p < .05$, $d = .58$. Thus, when cold, hard, cash became disembodied numbers in a bank computer, it was no longer perceived to be quite the same money, and was further less likely to be seen as the rightful property of a descendant of its original owner.

Study 1b

A major shortcoming of Study 1a is that it examined the return of monetary property only in the context of descendants rather than original owners. This of course limits its relevance to everyday property disputes, most of which do not occur between descendants. A second issue is that by averaging together the moral obligation and property return items, Study 1a's recommended restitution measure conflated moral and non-moral reasons for returning the money. Study 1b therefore examined whether participants perceived a greater sense of purely moral obligation to return lost money to the original owner when the currency retained its original physical form.

Method

Seventy-two adults (M_{age} = 28, range = 20-50) were recruited from Mechanical Turk. Participants read a modified version of Study 1a's scenario in which Donna accidentally dropped an envelope containing $1,000. The cash was subsequently found by Ted, who either kept the original cash (*physical currency condition*) or deposited it in a bank account (*bank account condition*). To avoid a ceiling effect in which participants overwhelmingly recommended that the lost money be returned, Donna was described as a drug addict who intended to use the money to purchase cocaine. A year later, after discovering it was Ted who found her lost money, Donna demanded he give her $1,000.

Recommended restitution. All participants were asked "Is Ted morally obligated to give Donna $1,000?" (*1= definitely not, 7= definitely yes*).

Same money. They further indicated whether they felt that the money "still seems like the same money" Donna had lost (*1= definitely not, 7= definitely yes*).

Results and Discussion

The currency was less likely to be rated as seeming like the same money in the bank account condition than in the physical currency condition (*M*s= 4.66 and 3.09, *SD*s= 2.16 and 1.91), $t(69) = 3.22$, $p = .002$. Participants were also significantly less likely to perceive a sense of moral obligation to return the money when it had lost its original physical form (*M*s= 4.77 and 3.79, *SD*s = 1.95 and 1.95), $t(70) = 2.13$, $p = .04$, $d = .51$. This suggests the effects of essentialistic thinking about monetary currency are not limited to exchanges between descendants or non-moral forms of social obligation.

Not fully explored in Studies 1a and 1b is the possibility that it is generally more difficult to assign ownership rights over immaterial than material currency. If this is indeed true, our

theoretical framework regarding essentialism and contagion suggest that part of the reason may be that past and present owners have not physically touched immaterial currency, which our subsequent studies indicate facilitates ownership claims. This is entirely speculative, however, and we leave it to future research to shed further light on intuitions regarding immaterial currency.

Study 2a: Loser's Keepers

Study 2a examined the role of psychological contagion in intuitions about ownership over physical currency. We hypothesized that participants would not treat two lost pieces of physical currency as interchangeable, and instead prefer to return a lost coin to the person who had originally possessed it. According to our theorizing, one reason this may occur is that the essence of the original owner is perceived to have spilt over to the money through physical contact, facilitating the intuition that he owns that specific coin.

If this intuitive sense of ownership results (in part) from the fact that the original owner had physical contact with the coin, it should diminish when the coin has been thoroughly cleaned. The idea here is that by wiping away all physical traces of the prior owner, his essence (which has spilled over to the object through contagion) is metaphorically erased as well. For a prior use of such a "sterilization" manipulation to demonstrate contagion, see Newman et al. (2011), who demonstrate that consumers are less willing to pay high prices for an object that has come into contact with a favorite celebrity if the object has been sterilized. We adapt the Newman et al. (2011) manipulation to examine contagion effects in the context of ownership intuitions.

Method

Forty-eight adults (M_{age} = 30, range = 19-65) were recruited from Amazon.com's Mechanical Turk service. The study employed a 2 (sterilization condition vs. control condition) x

2 (order in which the two coins were found) x 2 (counterbalancing of scale endpoints) between-subjects design, with the latter two factors constituting counterbalancing variables.

Participants read a scenario involving lost physical currency. The vignette indicated that a two euro coin (worth approximately $2.50) had fallen out of the pocket of a man named Pierre while he ate dinner at a neighborhood restaurant in Marseilles, France. To reduce any sense that Pierre was sentimentally attached to that particular coin, participants were told he had received it in change at a local gas station just that day. Participants were further told that that same evening at the same restaurant, another patron at Table 4 likewise dropped a two euro coin.

In the *sterilization condition*, participants then read that after closing time, the dining area's floor was cleaned using a machine that rolled across the floor, spraying it with a cleaning solution. In the *control condition* this sentence was omitted.

In all conditions, a restaurant worker found both lost coins the next morning. (The order in which the two coins were found was counterbalanced between-subjects, such that half of participants read that the restaurant worker first found the coin Pierre dropped, and the other half read that he found the other coin first). In the afternoon Pierre returned and asked the restaurant worker if he had come across a two euro coin near Table 6, explaining that he had dropped it the night before. The restaurant worker replied that he had indeed found it and was happy to give Pierre two euros back.

Ownership intuitions. Participants were asked "Which two euro coin should the restaurant worker give to Pierre?" (*1 = definitely the coin he found by Table 6, 6 = definitely the coin he found by Table 4*), and "Which two euro coin is Pierre's property?" (*1 = definitely the coin by Table 6, 6 = definitely the coin by Table 4*). To control for potential scale response biases, the scale endpoints were counterbalanced between-subjects, such that for half of participants

these endpoints were reversed (e.g., *1 = definitely the coin he found by Table 4, 6 = definitely the coin he found by Table 6*). All responses were recoded prior to analysis such that higher scores indicated a greater sense that the coin Pierre had originally dropped was more his property and should be returned to him. The "give back" and "property" items were averaged into a reliable ownership intuitions composite ($\alpha = .70$).

Participants further completed additional items presented on a separate page from the ownership intuitions items. As in all of the present studies, the computer program ensured participants could not return to the previous pages.

Physical traces. As a check on the sterilization manipulation, participants were asked whether they felt that "All trace that Pierre ever touched the coin he dropped is now gone" (*1 = strongly disagree, 7 = strongly agree*).

Recognizability. To assess whether participants thought Pierre could tell the difference between the two coins, an item asked "Do you think Pierre can tell whether he is getting the coin he dropped, or the other coin?" (*1 = definitely not, 6 = definitely yes*).

Results and Discussion

Since participants' judgments were made on individual six-pointed scales, the overall results for ownership intuitions and the recognizability of the original coin were analyzed using one-sample t-tests with the scale midpoint as the test value. The majority of participants felt that the coin Pierre originally dropped should be returned to him and was more his property than the other coin ($M = 4.73$, $SD = 1.32$, scale midpoint = 3.5), $t(46) = 6.42$, $p < .001$, $d = .94$. This is true even though they did not on average believe he could tell the two coins apart ($M = 3.67$, $SD = 1.73$, scale midpoint = 3.5), $t < 1$. Remarkably, even participants who did not believe that

Pierre could distinguish the two coins felt the original coin should be restored to him (*M* = 4.63, *SD* = 1.38, scale midpoint = 3.5), *t*(18) = 3.57, *p* = .002.

A 2 (sterilization condition vs. control condition) x 2 (order in which the two coins were found) x 2 (counterbalancing of scale endpoints) ANOVA examined whether coin choice was influenced by our key sterilization manipulation or either of the two counterbalancing variables. The ANOVA revealed a significant main effect of sterilization condition, *F*(1, 39) = 5.02, *p* = .03, a significant main effect of the order in which the coins were found, *F*(1, 39) = 5.40, *p* = .03, no effect of the counterbalancing of the scale endpoints, *F* < 1, and no significant interactions between these variables, *F*s < 1 (see Figure 1).

When the coins had been thoroughly cleaned, participants were significantly less likely to feel that it made a difference which coin was given to Pierre (*M*s = 4.37 and 5.08, *SD*s = 1.29 and 1.27, in the sterilization condition and control condition, respectively), *d* = .57. Suggesting the sterilization manipulation achieved its intended purpose, participants were more likely to feel that all trace that Pierre ever touched the coin he dropped was now gone when the coin had been inadvertently cleaned (*M*s = 5.13 and 3.75, *SD*s = 1.48 and 1.87), *F*(1, 40) = 4.67, *p* = .04. However, the coin was not seen as any less recognizable in the sterilization condition (*M* = 4.00, *SD* = 1.64) than in the control condition (*M* = 3.33, *SD* = 1.79); indeed the means were nonsignificantly in the opposite direction, *F*(1, 40) = 2.42, *p* = .13.

As indicated above, the order in which the coins were found by the restaurant worker also significantly impacted coin choice. When the worker found the coin Pierre dropped before the other coin, participants were significantly less likely to feel that he should give the original coin back to Pierre (*M*s = 4.41 and 5.04, *SD*s = 1.47 and 1.10), *F*(1, 39) = 5.40, *p* = .03. Although admittedly speculative, this may have occurred because the restaurant worker had been in

possession of the coin for slightly longer, facilitating the intuition that it was now his property. However, given that an effect of the order in which the coins were found was not hypothesized *a priori*, we hesitate to draw any strong conclusions. Although we wish we could claim we predicted this effect in advance, we did not. Claiming otherwise would be HARKing (hypothesizing after the results are known; Kerr, 1998), given the order in which the coins were found was intended to be a counterbalancing variable. Since the order in which the pieces of lost currency were found was left unspecified in Studies 2b and 3, only future research can confirm if possessing money for a slightly longer period facilitates the intuition the person owns it.

In summary, participants did not treat two lost coins of identical economic value as equivalent. Indeed, they felt the coin a person had originally lost should be returned to him rather than a different coin, even when they did not believe the owner would be able to tell the difference. Highlighting the role of psychological contagion in intuitions about ownership over money, this effect diminished when the coins had been sterilized, wiping them clean of all physical traces of their previous owners.

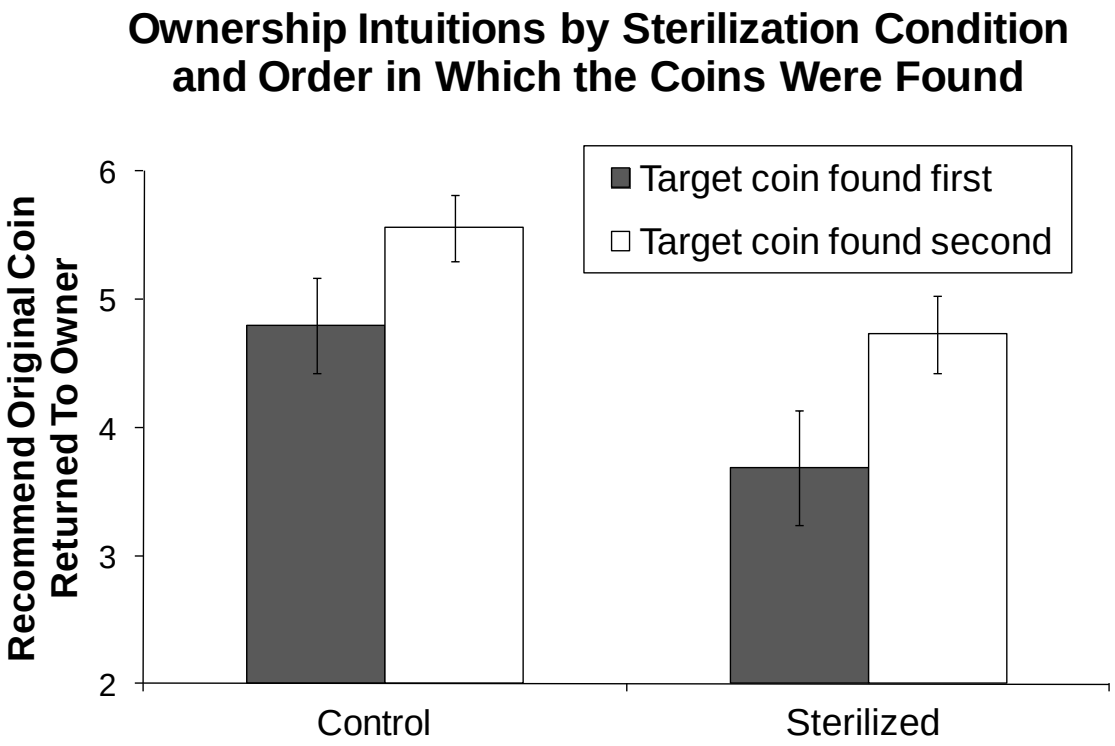

Figure 1. Ownership intuitions by sterilization condition and the order in which the coins were found. Higher scores reflect the belief that the coin he originally dropped should be returned to the customer and was more his property. Error bars represent standard errors. As shown in the figure, significant main effects of sterilization condition and the order in which the coins were found both emerged, but no interaction effect.

Study 2b

Study 2a represents an initial demonstration of the role of psychological contagion in intuitions about ownership over monetary currency. However, it possessed a number of methodological shortcomings that limit the generality of the conclusions that can be drawn from it. For one the monetary currency in question (a two euro coin) was relatively small in value. In Study 2b the value of the currency was therefore increased to $20. (Note that at higher

denominations it becomes implausible two customers would drop identical pieces of currency in the same restaurant.)

The scenario for Study 2a also left it unclear whether it was different restaurant workers or the same worker who cleaned the restaurant floor and found the coins. This is potentially problematic given that investing labor in an object increases a sense of ownership over it (Friedman, 2010; Kanngiesser, Gjersoe, & Hood, 2010; Palamar, Le, & Friedman, 2012). It is worth pointing out that even if participants in Study 2a inferred the person who cleaned the floor and found the coins were the same person, he did labor equally on both coins. However, this potential confound was still of some concern and Study 2b therefore made it absolutely clear that different restaurant workers cleaned the floor and found the money.

Another issue is that the question in Study 2a regarding which coin should be returned may have been perceived by participants as leading given that they had no opportunity to indicate neutrality. Study 2b therefore employed scale items in which indifference between the pieces of currency was an option.

Finally, to address the possibility that the sterilization effect in Study 2a merely resulted from the piece of currency being acted on in some way, Study 2b compared the effects of sterilizing the currency and sweeping it across the floor. Based on the idea that it is contagion specifically that underlies the effect, we expected that wiping the currency clean of all physical traces of its owner would have an effect above and beyond simply acting on it.

Method

Forty-nine adults (M_{age} = 29, range = 18-56) were recruited from Mechanical Turk. Study 2b's scenario paralleled that of Study 2a, except that the currency was changed to a $20 bill, and two different workers were described as having cleaned the floor and found the currency. The

location of the restaurant was further changed to the United States and the names of the individuals in the scenario to American names. To simplify the design, the order in which the two lost bills were found was left unspecified and the scale endpoints were not counterbalanced. Participants were randomly assigned either to the sterilization condition or a control condition in which the floor was swept, moving the currency.

Ownership intuitions. All participants were then asked, on seven-point scales, whether the restaurant worker should give the customer the bill he found by Table 4 vs. Table 6, and whether the bills by Table 4 vs. Table 6 still belonged to the customer ($\alpha = .81$). Note that participants could readily signal neutrality by selecting the scale midpoint of four for each item.

Recognizability. They further indicated whether they thought the customer could tell if he was getting the bill he originally dropped (*1=definitely not, 7=definitely yes*).

Results and Discussion

As in Study 2a, participants on average favored returning the specific piece of currency he had lost to its original owner and saw it as more his property ($M = 5.12$, $SD = 1.33$, scale midpoint = 4), $t(48) = 5.92$, $p < .001$, $d = .85$. This time, however, participants did on average believe the customer would be able to distinguish between the two pieces of lost currency ($M = 4.92$, $SD = 1.76$, scale midpoint = 4), $t(47) = 3.61$, $p = .001$. Two $20 bills may be perceived as more distinguishable than two coins because paper currency can be folded and crumpled in distinctive ways, and is also more likely to get stained and marked. Still, even participants who did not believe the customer would be able to tell the difference between the two $20 bills preferred to give him the piece of currency he originally dropped ($M = 4.94$, $SD = 1.35$, scale midpoint = 4), $t(16) = 2.85$, $p = .01$.

Further analyses ruled out the aforementioned alternative explanation for the sterilization effect observed in Study 2a, specifically that ownership ties are weakened when the property is acted on in some way by another agent. Sterilizing the bill, even relative to sweeping it across the floor, significantly reduced the extent to which participants felt it was still the customer's property and should be returned to him (*M*s = 5.55 and 4.78, *SD*s = 1.00 and 1.49), $t(47) = 2.07$, $p = .04$, $d = .62$.

Study 3

Our final study examined several interesting questions left unaddressed by Studies 2a and 2b. For instance, this study assessed whether participants actually found it logical to distinguish between two pieces of monetary currency of identical value. Based on the idea that psychological essentialism and contagion are intuitive in nature (Bloom, 2004; Dar-Nimrod & Heine, 2011; Nemeroff & Rozin, 1994; Rozin et al., 1986), we hypothesized that participants would logically reject any such distinction, yet still associate a given piece of currency more strongly with its original owner.

In addition, Study 3 compared the effects of sterilizing monetary and non-monetary property. Fungibility of money is the exception in ownership rather than the rule. Normally any non-monetary object that belongs to a person should not be replaced with a duplicate, a belief that is even shared by very young children (Gelman et al., 2012). Given that people prefer their property to practically identical unowned objects and readily form emotional attachments to their belongings (Beggan, 1992; Gelman et al., 2012), it is only appropriate to return their original non-monetary property to them when they have lost it. We therefore hypothesized that as there is a defensible basis for maintaining a preference for one highly similar piece of non-monetary

property over another, a sterilization manipulation would not erode a sense of moral ownership over a $20 silver ring to the same degree as for a $20 bill.

Method

One hundred and fifty seven adults (M_{age} = 29, range = 19-67) were recruited from Mechanical Turk. The scenario and outcome measures for Study 3 followed those of Study 2b, except as described below.

The study employed a 2 (sterilization vs. control condition) x 2 (monetary vs. non-monetary property) between-subjects design. In the non-monetary property conditions two identical silver rings (both worth $20, and purchased just that day) were dropped at the restaurant rather than two $20 bills. In the conditions in which the property was not sterilized it was simply left on the floor.

Ownership intuitions. All participants then indicated on separate seven-point scales the extent to which the customer and restaurant worker were the "rightful owner" of the lost pieces of property. These ownership intuitions items were designed to assess moral claims to the lost property. The items formed a reliable composite, with higher scores reflecting the intuition the customer had the stronger moral claim to the object he originally dropped (α = .68).

Recognizability. As in Study 2b, participants further indicated whether they thought the customer could tell the difference between the two lost objects.

Perceived rationality. An item asked "Logically, it does not make sense to distinguish between the two $20 bills [two $20 silver rings]" (*1 = strongly disagree, 7 = strongly agree*).

Emotional attachment. A final item asking participants whether they thought the customer was emotionally attached to his lost property (*1 = definitely not, 7 = definitely yes*).

Results and Discussion

Participants on average believed the customer had the stronger moral claim to the $20 bill he originally dropped (M = 4.80, SD = 1.55, scale midpoint = 4), $t(79) = 4.63$, $p < .001$, $d = .52$. This was likewise true for the original ring (M = 4.94, SD = 1.65, scale midpoint = 4), $t(75) = 4.93$, $p < .001$, $d = .57$. This pattern of preferences held even for participants who did not believe the customer would be able to distinguish between the two lost objects, $t_{bill}(31) = 5.10$, $p < .001$, $t_{ring}(24) = 3.94$, $p = .001$, and who believed it made no logical sense to distinguish between the two objects, $t_{bill}(45) = 2.79$, $p = .008$, $t_{ring}(33) = 2.53$, $p = .02$. As expected, participants rejected the rationality of drawing a distinction between two pieces of currency of identical value, on average agreeing that there was no logical difference (M = 4.59, SD = 1.64, scale midpoint = 4), $t(80) = 3.25$, $p = .002$. In contrast, they did not agree that it was illogical to distinguish the two rings (M = 3.97, SD = 1.77 scale midpoint = 4), $t < 1$.

The hypothesized interaction between monetary vs. non-monetary property and the sterilization manipulation was only marginally significant for ownership intuitions, $F(1, 152) = 3.05$, $p = .08$. However, examination of the simple effects revealed a pattern consistent with our hypotheses. Specifically, while the sterilization manipulation significantly influenced perceived ownership over the bill (Ms = 5.28 and 4.34, SDs = 1.47 and 1.49), $t(78) = 2.84$, $p = .006$, $d = .64$, it seemed to have no effect on perceived ownership over the ring (Ms = 4.96 and 4.90, SDs = 1.61 and 1.72), $t < 1$, $d = .04$.

Further analyses suggested potential reasons why there was no significant effect of the sterilization manipulation on moral claims to the ring. Specifically, the original owner was seen as more likely to be emotionally attached to the ring than a bill (Ms = 5.39 and 4.49, SDs = 1.45 and 1.86), $F(1, 152) = 11.23$, $p = .001$, and participants further perceived more of a logical basis

for distinguishing two $20 rings than two $20 bills (*M*s = 3.97 and 4.59, *SD*s = 1.77 and 1.64), $F(1, 153) = 5.12$, $p = .03$. There was no main effect of the sterilization manipulation on either of these variables, or interaction between sterilization condition and the type of property involved, Fs < 1. Taken together, these results suggest that removing physical traces of a person from an object may not reduce a sense of ownership over it when a strong rational basis for attributing ownership is present.

In sum, even though they admitted there was no logical basis for distinguishing between two $20 bills, participants still felt that a customer had a stronger moral claim to the $20 bill he originally dropped. However, this ownership link was significantly weakened when the currency had been sterilized, wiping it clean of all traces of its previous owner. Although sterilization influenced ownership intuitions about monetary currency, it did not do so for non-monetary property (i.e., a silver ring). Suggesting potential reasons why, participants believed it more likely the owner was emotionally attached to the ring and further perceived more of a logical basis for distinguishing it from other rings. Although only a preliminary finding, this does suggest that strong logical reasons for maintaining an ownership claim can override the intuitive (and perhaps weaker) effects of psychological contagion based on physical contact.

Given that contagion between non-monetary objects has been repeatedly shown to influence their attractiveness (Morales & Fitzsimons, 2007; Nemeroff & Rozin, 1994; Newman et al., 2011; Rozin et al., 1986), it seems premature to rule out any role for contagion in ownership judgments for objects such as jewelry. It may be the case that attractiveness is more easily influenced by irrational factors than ownership judgments (see Friedman, 2008, for evidence that the mere association between a person and toy impacts perceived liking for the toy to a greater extent than perceived ownership). Future research should further explore potential

similarities and differences in the psychological underpinnings of ownership claims to monetary and non-monetary property.

General Discussion

The five thousand year evolution of monetary currency has been a process of increasing substitutability, efficiency, and abstraction. Inefficient barter economies were eventually replaced by the use of intrinsically valuable commodities such as barley, salt, and gold as common currencies, and then by government-printed paper notes that represented fixed amounts of a valuable commodity deposited in a bank (e.g., the "gold standard" in the pre-World War II U.S.). Today, most currency is decoupled from anything of intrinsic value and holds its worth primarily because a government declares it valuable (i.e., "fiat" money). Indeed, contemporary currency relatively seldom even exists in physical form, such that only one-tenth of the money in the United States is physical currency.

The present studies suggest that the principle of an abstract and substitutable currency is not fully compatible with human intuition (see also Thaler, 1985, 1990, 1999). Indeed, due to basic processes of psychological essentialism and contagion, a particular token of physical currency is in some cases unlike any other. Because the essence of objects is tied to their physicality, stolen or lost paper currency that has been deposited in a bank is perceived to be "not quite the same" (i.e., to have lost part of the original essence that distinguished it from other monetary tokens) and is less intuitively tied to its original legal owner (Study 1b) and his descendants (Study 1a). Moreover, because the essence of both people and objects is perceived to be contagious, physical currency that has been sterilized, and thus literally wiped clean of all traces of its owner, is less likely to be perceived as owned by him or her (Study 2a, 2b, and 3). These studies are, to our knowledge, the first to show that even (in theory fully exchangeable)

pieces of currency can be perceived to have a unique and contagious essence. This highlights how basic cognitive essentialism truly is, in that it extends even to particular tokens of monetary currency, which are designed *not* to be unique.

The roles of intuition and reason in ownership judgments

It is noteworthy that when explicitly asked, participants found it illogical to make a distinction between two pieces of currency of identical value (Study 3). Yet in spite of this explicit belief, when actually forced to choose they generally preferred to return the specific piece of currency a person had originally lost. From our perspective this reflects the fact that essentialism and contagion effects on ownership attributions are intuitive in nature and something participants would be unlikely to deliberatively endorse. In other words, these effects are "subjectively irrational" (Kruglanski, 1989; Pizarro & Uhlmann, 2005). Thus, the present findings add to a long litany of interesting experimental phenomena that research participants exhibit despite the fact that when explicitly asked, they do not endorse them as logical (for a review, see Wilson & Brekke, 1994). An analogous effect is that although numerous Americans identify themselves as political independents with no party preference, their actual votes for candidates are predicted by their implicit political preferences (Hawkins & Nosek, 2012). Similarly, participants claim that it does not logically matter which (theoretically fungible) piece of currency is returned, yet do show a preference when actually forced to choose.

As further indirect evidence that contagion effects in judgments of ownership are intuitive, studies show that the role of physical factors such as touching and using the object in ownership claims diminishes over the course of development (Berti, Bombi, & Lis, 1982; Cram & Ng, 1989, 1994). However, future research should more directly examine the role of intuition and reason in ownership judgments. For instance, the effects of physical contact on ownership

claims over money may increase under cognitive load (Gilbert & Osborne, 1989), and decrease when participants adopt a deliberative mindset (Hsee & Rottenstreich, 2004). In addition, it may make less of a difference whether money retains its original form when situational accountability is high (Lerner & Tetlock, 1999), and decision makers are thus motivated to make rational and defensible judgments.

Our studies only speak to contagion *from* the owner *to* the monetary currency, and in addition to exploring the intuitive nature of such effects, future studies should examine whether the unobservable essence of monetary currency can also spill over onto its possessor. This is perhaps most likely in the case of "blood money" with an unsavory past (e.g., involvement in crimes), which may then irrationally taint an innocent new owner. Indeed, metaphors such as "dirty money" suggest such psychological spillover. It seems likely that the contagion process works both ways.

Distinguishing psychological contagion from the first possession heuristic

It is important to distinguish the role of psychological essentialism and contagion in ownership judgments from that of the first possession heuristic (Friedman, 2008; Friedman & Neary, 2008; Friedman, Neary, Defeyter, & Malcolm, 2011). This prior work demonstrates that when an object's history is unclear, first possession is used as a heuristic to infer who the likely owner might be. For example, when viewing a scenario in which one character plays with a toy followed by a second character, both children and adults assume the first possessor is the likely owner (Friedman, 2008; Friedman & Neary, 2008). On this *reconstructing history account*, first possession is used to determine ownership because it is informative about an unclear past (Friedman et al., 2011). In contrast, the present studies use scenarios in which the history of the

object is absolutely clear. Thus, reconstructing history— the commonly accepted account of first possession effects— does not apply to our scenarios.

In addition, first possession is logically relevant information that social perceivers use to infer ownership when the object's history is unknown. In contrast, essentialism and contagion represent irrational influences on ownership judgments. Participants explicitly believe it does not make logical sense to distinguish between two pieces of currency of equal value. Yet, when they actually have to choose, they still prefer to return the specific piece of monetary currency that he lost to its original owner. Although it is of course an empirical question, we doubt very much that participants would similarly rate first possession to be logically irrelevant to ownership attributions (although they might very well process such relevant information intuitively at the moment of judgment).

It is also worth noting that the roles of the currency retaining its original physical form and sterilization have never been demonstrated or predicted in the prior literature on first possession effects. Rather, we made these predictions based on the literature on psychological essentialism and contagion. Indeed, the sterilization manipulation used in Studies 2a, 2b, and 3 is borrowed from Newman et al.'s (2011) research on the role of contagion in the perceived value of objects once owned by celebrities. The idea behind their manipulation is that by wiping away all physical traces of the prior owner, her essence (which has spilled over to the object through contagion) is metaphorically removed as well.

Although the first possession heuristic and psychological contagion are (in our view) distinct psychological processes, they may often complement one another in establishing ownership over objects. For example, a first possessor is likely to have extended physical contact with an object, increasing an intuitive link between herself and the object based on the spread of

contagious essences. Of course, it is extremely unlikely first possession is reducible to contagion— one can easily imagine cases where a person becomes a first possessor without even physically touching the object. Most likely, physical touch and contagion facilitate first possession effects without being necessary for them to occur.

When small effects are meaningful

The essentialism and contagion effects we observe are often not statistically large. What is remarkable and theoretically important is that they emerge at all. The effects in our studies are contrary not only to rational logic, but also the original idea behind monetary currency, which is designed to be completely fungible and exchangeable. As noted by Prentice and Miller (1992, p. 160), "a large effect size is not the only way to demonstrate that an effect is important." One can also demonstrate an effect on an outcome that should by rights be difficult to influence using the manipulation in question. That moral claims to ownership are even somewhat eroded by removing physical traces of contact with the money demonstrates psychological contagion under extremely conservative and exacting conditions. The fact that such variables have any effect at all shows that psychological essentialism and contagion are fundamentally enough to human cognition to significantly impact even the most putatively rational economic transactions.

Conclusion

These studies make important contributions to our understanding of cognitions about money, ownership, and the contagious nature of psychological essences. Extending theories of essentialism, they suggest human beings attribute a unique underlying essence even to monetary currency, by design the most faceless and substitutable of all human artifacts. Indeed, money is even less fungible than demonstrated in previous research, such that even within a given mental account (e.g., windfall gains; Thaler, 1990), currency is not fully substitutable. At the same time,

these studies are the first to implicate psychological contagion in intuitions about ownership over monetary currency, opening the door to future avenues of research on folk theories of property.

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