

1 Running head: Dirty Money

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12 A dollar is a dollar is a dollar, or is it?

13 Insights from children’s reasoning about “dirty money”

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Abstract

1
2
3 Money can take many forms—a coin or a bill, a payment for an automobile or a prize for an
4 award, a piece from the 1989 series or the 2019 series, and so on—but despite this, money is
5 designed to represent an amount and only that. Thus, a dollar is a dollar, in the sense that money
6 is fungible. But when adults ordinarily think about money, they think about it in terms of its
7 source, and in particular, its *moral* source (e.g., *dirty* money). Here we investigate the
8 development of the belief that money carries traces of its moral history. We study children ages
9 5-6 and 8-9, who are sensitive to both object history and morality, and thus possess the
10 component pieces needed to think that a dollar may not be like any other. Across three principal
11 studies (and three additional studies in the Supplementary Materials; $N = 327$; 219 five- and six-
12 year-olds; 108 eight- and nine-year-olds), we find that children are less likely to want money
13 with negative moral history, a pattern that was stronger and more consistent among 8- and 9-
14 year-olds than 5- and 6-year-olds. These findings highlight pressing directions for future research
15 that could help shed light on the mechanisms that contribute to the belief that money carries
16 traces of its moral history.
17

1. Introduction

Years ago, a woman stole money from a dying old man. Rather than keep the money all to herself, she decided to give some of it to her son and daughter-in-law. The couple knew that the old man did not need the money—he had no family and was on his deathbed, after all—yet they refused to accept it. According to the daughter-in-law, who reported this event to us in an experimental investigation (see Tasimi & Gelman, 2017, Study 8), she and her husband rejected the money because it was “dirty.”

What this example brings to light is what a growing body of research converges on—the idea that an object’s *history* guides people’s understanding of, and reasoning about, the material world (e.g., Bloom, 2010; Friedman, Neary, Defeyter, & Malcolm, 2011; Fuchs, Schreier, & van Osselaer, 2015; Gelman, 2013; Gelman & Echelbarger, 2019; Huang, Ackerman, & Newman, 2017; Nemeroff & Rozin, 1994, 2000; Newman & Bloom, 2014; Newman, Diesendruck, & Bloom, 2011; Rozin, Millman, & Nemeroff, 1986; Rozin, Nemeroff, Wane, & Sherrod, 1989). Thus, in the example above, the stolen money was rejected not due to its physical appearance, functional value, or ability to harm. Rather, it was rejected because it was judged to be tainted by its morally suspect origins.

In the current investigation, we provided a critical test of the proposal that objects are evaluated in terms of their history by studying children’s reasoning about money with differing moral histories. The remainder of this introduction discusses how money serves as a particularly revealing window onto the idea that objects are imbued with history, and then reviews why children—and their attention to moral history, in particular—may offer unique insights onto this issue. Following this, we report findings from three principal studies (as well as three additional

1 studies in the Supplementary Materials). The General Discussion considers potential
2 mechanisms and implications of the current work.

3 *1.1. Adults' reasoning about money in terms of its (moral) history*

4 From a purely economic perspective, the only important quality of money is its amount,
5 not what it looks like or where it has been (Coulborn, 1950; see Thaler, 1990, for discussion).
6 The assumption that money is fungible seems to underlie many everyday behaviors, from
7 making change (e.g., a one-dollar bill is equivalent to four quarters) to using bank accounts (e.g.,
8 if you put \$100 into your bank account on Monday and then withdraw \$100 on Friday, you do
9 not expect to receive the same bills that you deposited). The fungibility of money stands in stark
10 contrast to perhaps all other material items, which cannot be freely interchanged (e.g., Gelman,
11 Manczak, & Noles, 2012; Hood & Bloom, 2008; McEwan, Pesowski, & Friedman, 2016). For
12 example, if someone lends you a \$20 bill you may give them a different \$20 bill in return, but if
13 someone lends you their umbrella you may hesitate to give them a different, yet identical,
14 umbrella back (see McEwan et al., 2016).

15 There are, however, clues from both inside and outside the laboratory suggesting that the
16 psychology of money deviates from the strict notion of fungibility assumed by classic economic
17 models. Several studies indicate that adults are sensitive to the physical attributes of money (e.g.,
18 Di Muro & Noseworthy, 2013; Galoni & Noseworthy, 2015; Uhlmann & Zhu, 2013) as well as
19 how money is earned (e.g., Chen, Chen, & He, 2017; Crockett, Siegel, Kurth-Nelson, Dayan, &
20 Dolan, 2017; Hoigard & Finstad, 1992; Kardos & Castano, 2012; Levav & McGraw, 2009;
21 Stellar & Willer, 2014). In fact, when people ordinarily think about money, they think about it in
22 terms of its source and, in particular, its *moral source* (e.g., Bandelj, Wherry, & Zelizer, 2017;
23 Gasiorowska, 2017; Shipton, 1989; Tasimi & Gross, 2020; Zelizer, 1994). For example, read an

1 ethnography and get to know Marty, who refused to give the money he earned from his gang's
2 robberies to his church, preferring instead to donate his mother's hard-earned, "honest" money
3 (Nightingale, 1993). Switch over to a television series like *The Sopranos* and enter the life of the
4 mobster Tony Soprano and his wife, Carmela, whose therapist once denied her payment for a
5 session because he could not accept "blood money" (Feidelson, 2019). Or check out an issue of
6 *The New York Times* and read about organizations that stage protests at museums that have
7 accepted monetary gifts from people who have inherited their wealth through unsavory means
8 (Moynihan, 2019). Taken together, these examples highlight the possibility that money is
9 thought to carry traces of its moral history.

10 Confirming this impression, empirical work indicates that adults believe that moral
11 history clings to physical currency (Tasimi & Gelman, 2017). In this research, participants were
12 asked to imagine a morally neutral individual offering them a stolen dollar (e.g., "Frank found a
13 stolen dollar in his desk. Frank says you can have the dollar, if you want.") as well as a morally
14 negative individual offering them a non-stolen dollar (e.g., "Paul stole a dollar from another
15 person. The dollar that he stole is in his pocket. Paul has another dollar that he did not steal, in
16 his desk. Paul says you can have the dollar in his desk, if you want."). Adults consistently
17 reported that they would rather accept a non-stolen dollar offered to them by a morally negative
18 individual than a stolen dollar offered to them by a morally neutral individual. This effect was
19 evident when the amount on offer increased to \$100, and even when it was stipulated that there
20 was no way that one could get into trouble for accepting the proffered money.

21 An important next step is to understand whether the belief that money carries traces of its
22 moral history represents a foundational way of thinking. One way to explore this question is to
23 study children, who have less cultural knowledge and experience with money. Although children

1 care about object history as well as morality (as will become evident in the next section, in which
2 we review these two parallel lines of research), an open question is whether they connect these
3 component pieces and think that moral history clings to money. On the one hand, children may
4 not at first construe money as carrying traces of its moral history. After all, moral judgments
5 concern the actions of agents (e.g., someone is “bad” because they stole a dollar), and thus moral
6 consequences (e.g., rejection) may at first attach only to those who engage in the bad behaviors.
7 On the other hand, it is possible that even children treat moral history as persisting in money,
8 given that they are sensitive to both object history and morality.

9 *1.2. Children’s reasoning about object history and morality*

10 Adults are not unique when it comes to reasoning about unobservable history—a variety
11 of work illustrates the power of object history in children’s everyday thinking (e.g., Friedman,
12 Van de Vondervoort, Defeyter, & Neary, 2013; Gelman & Davidson, 2016; Gelman, Frazier,
13 Noles, Manczak, & Stilwell, 2015; Gelman, Manczak, & Noles, 2012; Gelman, Manczak, Was,
14 & Noles, 2016; Hood & Bloom, 2008; Nancekivell, Van de Vondervoort, & Friedman, 2013).
15 For example, 5- and 6-year-olds prefer items that they made themselves compared to identical
16 items made by someone else (DeJesus, Gelman, Herald, & Lumeng, 2019; Marsh, Kanngiesser,
17 & Hood, 2018), and even preschoolers find it unacceptable when an individual takes one of two
18 identical objects that is not their own (McEwan et al., 2016). These findings, in combination with
19 other work suggesting that children reliably show contamination sensitivity by age five (e.g.,
20 Diesendruck & Perez, 2015; Hejmadi, Rozin, & Siegal, 2005; Legare, Wellman, & Gelman,
21 2009), suggest the possibility that children, like adults (Tasimi & Gelman, 2017), may believe
22 that money carries traces of its moral history.

1 Another reason to suspect that children may imbue money with moral history comes from
2 a consistent finding in contemporary developmental psychology: children—even infants—wish
3 to avoid individuals who engage in negative actions (e.g., Buon, Jacob, Margules, Brunet, Dutat,
4 Cabrol, & Dupoux, 2014; Hamlin & Wynn, 2011; Hamlin, Wynn, & Bloom, 2010; Kenward &
5 Dahl, 2011; Scola, Holvoet, Arciszewski, & Picard, 2015; Tasimi, 2020; Vaish, Carpenter, &
6 Tomasello, 2010). What is more, this aversion toward wrongdoers appears to be powerful
7 enough to reduce children’s material interests (Tasimi, Johnson, & Wynn, 2017; Tasimi &
8 Wynn, 2016). For example, in one study (Tasimi & Wynn, 2016), 5- to 8-year-olds were
9 introduced to a nice character and a mean character, each of whom offered the child stickers.
10 Whereas the nice character offered the child only one sticker, the mean character offered a larger
11 amount—two, four, eight, or sixteen stickers. Across all ages tested, children rejected a larger
12 offering from a mean character in favor of a smaller offering from a nice character. Importantly,
13 however, the amount on offer mattered—the larger the mean character’s offering, the more likely
14 children were to accept it.

15 That children are willing to sacrifice their material interests when wrongdoers offer them
16 goods is open to two distinct explanations, either or both of which could be underlying their
17 decision-making. One possibility is that children reject goods from wrongdoers strictly because
18 they wish to avoid interactions with those whom they view as morally bad. Another possibility is
19 that children may see the goods themselves as tainted by their moral history—that is, the rewards
20 may have become undesirable because of their past. If the latter possibility is so, we would
21 expect children to reject goods with negative moral history. Prior work has not distinguished
22 between these possibilities, leaving open the question of whether children would evaluate

1

		Giver	
		Neutral	Bad
Money	Neutral	This is Angela. Angela has a dollar in her cubby. Angela says you can have the dollar, if you want.	This is Lila. Lila stole a cookie from another person. Lila has a dollar that she did not steal, in her cubby. Lila says you can have the dollar, if you want.
	Bad	This is Martha. Martha found a stolen dollar in her cubby. Martha says you can have the dollar, if you want.	This is Sharon. Sharon stole a dollar from another person. It's in her cubby. Sharon says you can have the dollar, if you want.

2

Dirty Money	This is Nicole. Nicole sneezed and used a dollar to wipe her nose. Nicole says you can have the dollar, if you want.
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3 Table 1. Sample scenarios, in the 2 (money) x 2 (giver) design, plus Dirty Money (baseline).

4

5 *2.1. Predictions*

6 Should moral concerns influence how children reason about money, there are three
7 different accounts that could explain their responses. (1) On an *associative* account, any item
8 with a negative association would be undesirable to children, which means that children would
9 prefer non-stolen money to stolen money, and they would also prefer money that is offered by a
10 morally neutral individual than a morally negative individual. Thus, we would expect to obtain
11 main effects of both money and giver on children's ratings. (2) On a *wrongdoer* account,
12 children would feel an aversion toward morally negative individuals but not toward stolen
13 money per se. This account would predict that we would obtain a main effect of giver, but not a
14 main effect of money on children's ratings. (3) On a *moral history* account, children, like adults
15 (Tasimi & Gelman, 2017), would believe that stolen money is imbued with moral history. On
16 this account, we would expect to obtain a main effect of money, but not a main effect of giver.
17 As an especially strong test of a moral history account, we would predict that children would be

1 more likely to want the money in the *bad-giver/neutral-money* scenario, which does not feature
2 stolen money, than in the *neutral-giver/bad-money* scenario, which does feature stolen money.

3 3. Study 1

4 3.1. Participants

5 Study 1 included twenty-four 5- and 6-year-olds (10 girls, 14 boys; age range = 5.14-6.18
6 years; mean age = 5.69 years; $SD = 0.35$) and twenty-four 8- and 9-year-olds (10 girls, 14 boys;
7 age range = 8.17-9.68 years; mean age = 8.84 years; $SD = 0.49$). Across our studies, participants
8 were recruited from suburban towns in the northeastern United States and tested individually in a
9 quiet room at their elementary school. In each study, parents provided written consent and
10 children provided oral assent. All sessions were audio-recorded.

11 3.2. Procedure

12 The task began with the following three practice trials: “Do you like candy?” “Do you
13 like dog food?” “Do you like carrots?” If children responded “yes,” the experimenter asked if
14 they liked the item in question “a little” or “a lot.” We included these questions at the beginning
15 of each study to convey the 3-point scale used for the test questions, with 0 corresponding to
16 “no,” 1 corresponding to “a little,” and 2 corresponding to “a lot.” To elaborate, the first question
17 (about candy) was designed to elicit a response of “a lot,” the second question (about dog food)
18 was designed to elicit a response of “no,” and the third question (about carrots) was designed to
19 elicit a response of “a little.”

20 Each child was then presented with five scenarios in which a dollar was described (see
21 Table 1), and they were asked if they wanted the dollar (“Do you want the dollar?”) and, if so,
22 how much they wanted it (“Do you want it a little or a lot?”). The gender of the characters was
23 matched to the gender of the child. An experimenter read the scenarios aloud, using a stick figure

1 drawing to represent each character. Order of presentation was counterbalanced across children,
2 and children were randomly assigned to one of five pre-determined orders.

3 Children received comprehension questions (e.g., “Who stole the dollar: Martha or
4 someone else?”; see Supplementary Materials for more information regarding each study) at the
5 end of each scenario, but before the test question, to ensure that they properly encoded the
6 relevant information. If children responded correctly, then the experimenter offered praise and
7 repeated the correct response (e.g., “That’s right! Someone else stole the dollar.”). If children
8 responded incorrectly, then the experimenter corrected the child and asked the question again
9 until they responded correctly, at which point the experimenter offered praise. In total, 7 of 24
10 children in the older age group and 13 of 24 children in the younger age group made at least one
11 error on the comprehension questions. Across all trials, 8- and 9-year-olds responded incorrectly
12 to 7% of the comprehension questions; 5- and 6-year-olds responded incorrectly to 18% of the
13 comprehension questions.

14 Finally, at the end of each trial (i.e., once the child responded whether and how much
15 they wanted the dollar in question), the experimenter asked the child to explain their response
16 (“Why?”). These explanation data will be reported later on in Section 7, collapsed over the three
17 studies, in order to have additional power for meaningful analyses.

18 *3.3. Results and Discussion*

19 Table 2 presents the data from this study. To understand whether children tracked the
20 information provided and responded appropriately to the task, we first compared the baseline
21 *dirty-money* scenario to the *neutral-giver/neutral-money* scenario. Both 5- and 6-year-olds and 8-
22 and 9-year-olds were more likely to want the dollar in the *neutral-giver/neutral-money* scenario

1 than in the *dirty-money* scenario, $ps < .001$, indicating that both age groups were sensitive to the
 2 task.

3 Next, we conducted a 2 (giver: neutral, bad) x 2 (money: neutral, bad) ANOVA on
 4 children's ratings on the four focal scenarios, with age as a between-subjects factor. This analysis
 5 yielded a main effect of money, $F(1, 46) = 13.50, p = .001, \eta_p^2 = .23$, with stolen money ($M =$
 6 $0.67; SD = 0.94$) being less desirable than non-stolen money ($M = 1.03; SD = 0.91$). There was
 7 no main effect of giver, $F(1, 46) = .02, p = .90, \eta_p^2 = 0$, which suggests that children's ratings
 8 were unaffected by whether the money was offered by a morally negative individual ($M = 0.85;$
 9 $SD = 0.94$) or a morally neutral individual ($M = 0.84; SD = 0.94$). This analysis also yielded a
 10 main effect of age, $F(1, 46) = 22.01, p < .001, \eta_p^2 = .32$, with older children ($M = 0.42; SD =$
 11 0.75) wanting money less overall than younger children ($M = 1.28; SD = 0.91$), as well as a giver
 12 \times money interaction, $F(1, 46) = 11.28, p = .002, \eta_p^2 = .20$. Follow-up analyses clarify the
 13 interaction by revealing that stolen money was less desirable when it was offered by someone
 14 who found it (*neutral-giver/bad-money*; $M = 0.54; SD = 0.90$) than someone who stole it (*bad-*
 15 *giver/bad-money*; $M = 0.79; SD = 0.97$), $t(47) = 2.13, p = .038, d = 0.31$, whereas non-stolen
 16 money was less desirable when offered by a thief (*bad-giver/neutral-money*; $M = 0.92; SD =$
 17 0.92) than a non-thief (*neutral-giver/neutral-money*; $M = 1.15; SD = 0.90$), $t(47) = 2.30, p =$
 18 $.026, d = 0.33$.

19

Scenario	8- and 9-year-olds	5- and 6-year-olds
Neutral-Giver/Neutral-Money	0.75 (0.85)	1.54 (0.78)
Neutral-Giver/Bad-Money	0.17 (0.56)	0.92 (1.02)
Bad-Giver/Neutral-Money	0.50 (0.78)	1.33 (0.87)

Bad-Giver/Bad-Money	0.25 (0.68)	1.33 (0.92)
Dirty-Money	0.13 (0.45)	0.21 (0.59)

Table 2. Study 1, Children's mean ratings of how much they would want the dollar, on a scale of 0 to 2, across the 5 scenarios. Standard deviations are in parentheses.

Finally, to understand whether children's ratings were more affected by the moral valence of the money or the moral valence of the giver, we compared the *neutral-giver/bad-money* and *bad-giver/neutral-money* scenarios and found that children were less likely to want the dollar in the *neutral-giver/bad-money* scenario than in the *bad-giver/neutral-money* scenario, $t(47) = 3.09, p = .003, d = 0.45$.

Overall, the findings from Study 1 indicate that children 5-9 years of age believe that money carries traces of its moral history. In the following study, we sought to replicate these initial findings by employing a stronger test of whether children think that stolen money is tainted.

4. Study 2

The findings from Study 1 point to the possibility that children link moral history to physical currency. However, in the previous study, the *bad-giver/neutral-money* scenario involved a morally negative individual who stole a food item and then offered the participant a dollar. Importantly, a dollar is not necessarily equivalent to a food item. Thus, the finding that children were less likely to want the money in the *neutral-giver/bad-money* scenario than in the *bad-giver/neutral-money* scenario does not directly pit the morality of the giver against the morality of the money. In Study 2, we provided such a test by presenting a scenario in which a thief stole a dollar but offered the participant another dollar that was not stolen.

From the standpoint of economic value, it should not matter if the proffered bill was the

1 stolen one or not—the two scenarios should be equivalent in terms of the monetary benefit
2 afforded to the child. Under this perspective, if a child would reject the stolen dollar, they should
3 also reject the non-stolen dollar offered to them by a thief of another dollar, as in both cases one
4 is rejecting a gift in the amount of the stolen sum. However, from a moral history standpoint, if
5 children believe that moral history clings to physical currency itself, then they should show a
6 particularly strong aversion toward the dollar that was itself stolen, and thus be less likely to
7 want the stolen dollar offered by a morally neutral individual than the non-stolen dollar offered
8 by a thief of another dollar.

9 *4.1. Participants*

10 Study 2 included twenty-four 5- and 6-year-olds (9 girls, 15 boys; age range = 5.27-6.81
11 years; mean age = 5.81 years; $SD = 0.36$) and twenty-four 8- and 9-year-olds (12 girls, 12 boys;
12 age range = 8.23-9.75 years; mean age = 9.08 years; $SD = 0.39$).

13 *4.2. Procedure*

14 The procedure was the same as in Study 1, with one exception: Here, the *bad-*
15 *giver/neutral-money* scenario involved a wrongdoer stealing a dollar rather than a cookie (e.g.,
16 “This is Lila. Lila stole a dollar from another person. The dollar that she stole is in her pocket.
17 Lila has another dollar that she did not steal, in her cubby. Lila says you can have the dollar in
18 her cubby, if you want.”). In total, 8 of 24 children in the older age group and 16 of 24 children
19 in the younger age group made at least one error on the comprehension questions. Across all
20 trials, 8- and 9-year-olds responded incorrectly to 10% of the comprehension questions (one
21 child needed to be corrected a second time on one trial); 5- and 6-year-olds responded incorrectly
22 to 23% of the comprehension questions (one child needed to be corrected a second time on one
23 trial). All errors were corrected, as described in Study 1.

1 4.3. Results and Discussion

2 See Table 3 for means. Children in both age groups were more likely to want the dollar in
 3 the *neutral-giver/neutral-money* scenario than in the *dirty-money* scenario, $ps < .01$, indicating
 4 that they were sensitive to the task. Next, we conducted a 2 (giver: neutral, bad) x 2 (money:
 5 neutral, bad) ANOVA on children's ratings with age as a between-subjects factor. This analysis
 6 yielded a main effect of money, $F(1, 46) = 10.65, p = .002, \eta_p^2 = .19$, but no main effect of giver,
 7 $F(1, 46) = .46, p = .50, \eta_p^2 = .01$. As in the previous study, children's ratings were affected by
 8 whether the proffered money was stolen ($M = 0.68; SD = 0.93$) or not ($M = 1; SD = 0.91$), but
 9 their ratings were unaffected by whether the proffered money was offered by a morally negative
 10 individual ($M = 0.86; SD = 0.95$) or a morally neutral individual ($M = 0.81; SD = 0.92$). This
 11 analysis also yielded a main effect of age, $F(1, 46) = 36.58, p < .001, \eta_p^2 = .44$, with older
 12 children ($M = 0.32; SD = 0.66$) wanting money less overall than younger children ($M = 1.35; SD$
 13 $= 0.88$), which is consistent with Study 1.

14

Scenario	8- and 9-year-olds	5- and 6-year-olds
Neutral-Giver/Neutral-Money	0.54 (0.78)	1.46 (0.78)
Neutral-Giver/Bad-Money	0.00 (0.00)	1.25 (0.94)
Bad-Giver/Neutral-Money	0.54 (0.78)	1.46 (0.83)
Bad-Giver/Bad-Money	0.21 (0.59)	1.25 (0.99)
Dirty-Money	0.00 (0.00)	0.33 (0.70)

15 **Table 3.** Study 2, Children's mean ratings of how much they would want the dollar, on a scale of
 16 0 to 2, across the 5 scenarios. Standard deviations are in parentheses.

17

18 Once again, we found that children were less likely to want the dollar in the *neutral-*

1 *giver/bad-money* scenario ($M = 0.63$; $SD = 0.91$) than in the *bad-giver/neutral-money* scenario
2 ($M = 1.00$; $SD = 0.92$), $t(47) = 2.77$, $p = .008$, $d = 0.40$, which suggests that children's ratings
3 were influenced more by the moral valence of the money than the moral valence of the giver.

4 In sum, these findings provide further support for the possibility that children imbue
5 money with moral history. As in Study 1, we found that children were more likely to want a non-
6 stolen dollar offered by a morally negative individual than a stolen dollar offered by a morally
7 neutral individual. Thus, children, like adults (Tasimi & Gelman, 2017), may believe that moral
8 history clings to physical currency.

9 5. Study 3

10 Although Studies 1 and 2 indicate that children report that they would less like to have
11 money with negative moral history, it is striking that older children were less likely to want
12 money overall. Compared to 5- and 6-year-olds, 8- and 9-year-olds seemed uninterested in the
13 proffered money, as evidenced by the main effect of age obtained in both Studies 1 and 2. In
14 fact, at least half of the 8- and 9-year-olds in each of the previous studies reported that they did
15 not want the money in the *neutral-giver/neutral-money* scenario (12 of 24 children in Study 1
16 and 15 of 24 children in Study 2). We suspect this reluctance may have been due to the older
17 children reasoning that money is not theirs to take unless otherwise stated. To address this
18 possibility, Study 3 stipulated that the character offering the dollar in each scenario did not need
19 it, and that the participant (child) had permission to take it. We reasoned that, with this
20 stipulation, we could understand how 8- and 9-year-olds reason about money with differing
21 moral histories in a context that removes a potential barrier to wanting the money.

22 5.1. Participants

1 Study 3 included twenty-four 5- and 6-year-olds (12 girls, 12 boys; age range = 5.09-6.99
2 years; mean age = 6.14 years; $SD = 0.64$) and twenty-four 8- and 9-year-olds (12 girls, 12 boys;
3 age range = 8.02-9.72 years; mean age = 8.84 years; $SD = 0.51$).

4 5.2. Materials and Procedure

5 The procedure was the same as in Study 2, with one exception: Here, it was noted that the
6 character in each scenario did not need the dollar and said the participant could have it (e.g.,
7 *neutral-giver/neutral-money*: “This is Angela. Angela has a dollar in her cubby. Angela doesn’t
8 need the dollar and she says you can have it.”). In total, 7 of 24 children in the older age group
9 and 16 of 24 children in the younger age group made at least one error on the comprehension
10 questions. Across all trials, 8- and 9-year-olds responded incorrectly to 7% of the comprehension
11 questions; 5- and 6-year-olds responded incorrectly to 18% of the comprehension questions. All
12 errors were corrected, as in the previous studies.

13 5.3. Results and Discussion

14 We first analyzed whether 8- and 9-year-olds were more likely to want the dollar in the
15 *neutral-giver/neutral-money* scenario in this study than in Studies 1 and 2. A one-way ANOVA
16 with study (1, 2, 3) as a between-subjects factor on children’s responses in the *neutral-*
17 *giver/neutral-money* scenario did not yield an effect of study, $F(2, 69) = .40, p = .68, \eta_p^2 = .01$.
18 Thus, stipulating that the character did not need the money resulted in no change in 8- and 9-
19 year-olds’ ratings.

20 As in Studies 1 and 2, children in both age groups preferred the dollar in the *neutral-*
21 *giver/neutral-money* scenario than in the *dirty-money* scenario, $ps < .001$. We next conducted a 2
22 (giver: neutral, bad) x 2 (money: neutral, bad) ANOVA on children’s ratings with age as a
23 between-subjects factor (see Table 4 for means), which yielded a main effect of money, $F(1, 46)$

1 = 7.84, $p = .007$, $\eta_p^2 = .15$, but no main effect of giver, $F(1, 46) = 0.36$, $p = .55$, $\eta_p^2 = .01$.
 2 Consistent with the previous studies, children preferred non-stolen money ($M = 1.06$; $SD = 0.90$)
 3 to stolen money ($M = 0.83$; $SD = 0.91$), but they did not distinguish between money offered by a
 4 morally neutral individual ($M = 0.92$; $SD = 0.91$) and money offered by a morally negative
 5 individual ($M = 0.98$; $SD = 0.92$). This analysis also yielded a main effect of age, $F(1, 46) =$
 6 13.68 , $p = .001$, $\eta_p^2 = .23$, such that older children ($M = 0.60$; $SD = 0.79$) wanted money less
 7 overall than younger children ($M = 1.29$; $SD = 0.91$), as well as an age \times giver \times money
 8 interaction, $F(1, 46) = 7.34$, $p = .009$, $\eta_p^2 = .14$. Given the interaction, results are reported
 9 separately for the two age groups.

10

Scenario	8- and 9-year-olds	5- and 6-year-olds
Neutral-Giver/Neutral-Money	0.63 (0.82)	1.50 (0.78)
Neutral-Giver/Bad-Money	0.50 (0.72)	1.04 (1.00)
Bad-Giver/Neutral-Money	0.88 (0.85)	1.25 (0.94)
Bad-Giver/Bad-Money	0.42 (0.72)	1.38 (0.88)
Dirty-Money	0.00 (0.00)	0.17 (0.48)

11 **Table 4.** Study 3, Children’s mean ratings of how much they would want the dollar, on a scale of
 12 0 to 2, across the 5 scenarios. Standard deviations are in parentheses.

13

14

15

Looking at the 8- and 9-year-olds, a 2 (giver: neutral, bad) \times 2 (money: neutral, bad)

16 ANOVA on their ratings yielded a main effect of money, $F(1, 23) = 5.24$, $p = .032$, $\eta_p^2 = .19$, but

17 no main effect of giver, $F(1, 23) = .49$, $p = .49$, $\eta_p^2 = .02$. Children in this older age group

18 preferred non-stolen money ($M = 0.75$; $SD = 0.84$) to stolen money ($M = 0.46$; $SD = 0.71$), but

19 they did not prefer money offered by a morally neutral individual ($M = 0.56$; $SD = 0.77$) to

1 money offered by a morally negative individual ($M = 0.65$; $SD = 0.81$). What is more, these
2 children were less likely to want the dollar in the *neutral-giver/bad-money* scenario ($M = 0.50$;
3 $SD = 0.72$) than in the *bad-giver/neutral-money* scenario ($M = 0.88$; $SD = 0.85$), $t(23) = 2.10$, $p =$
4 $.047$, $d = 0.43$, indicating that the moral history of the money mattered more than the moral
5 standing of the giver.

6 Turning to the younger age group, a 2 (giver: neutral, bad) x 2 (money: neutral, bad)
7 ANOVA on their ratings did not yield a main effect of money, $F(1, 23) = 2.63$, $p = .12$, $\eta_p^2 = .10$,
8 nor did it yield a main effect of giver, $F(1, 23) = .06$, $p = .81$, $\eta_p^2 = .003$. This analysis did,
9 however, yield a giver x money interaction, $F(1, 23) = 5.55$, $p = .027$, $\eta_p^2 = .19$. Follow-up
10 analyses clarify the interaction by revealing that 5- and 6-year-olds were less likely to want
11 stolen money ($M = 1.04$; $SD = 1.00$) than non-stolen money ($M = 1.50$; $SD = 0.78$) offered by a
12 morally neutral individual, $t(23) = 2.70$, $p = .013$, $d = 0.55$. However, when it came to money
13 offered by a morally negative individual, they did not distinguish between stolen ($M = 1.38$; SD
14 $= 0.88$) and non-stolen money ($M = 1.25$; $SD = 0.94$), $t(23) = .83$, $p = .42$, $d = 0.17$. Finally,
15 unlike the older age group, children in the younger age group responded similarly to the dollar in
16 the *neutral-giver/bad-money* scenario and the dollar in the *bad-giver/neutral-money* scenario,
17 $t(23) = 1.16$, $p = .26$, $d = 0.24$.

18 Overall, although the manipulation in Study 3 did not increase the rate at which 8- and 9-
19 year-olds wanted a dollar (i.e., they still typically rejected a dollar, even when it was offered by
20 someone who said they did not need it), this study nevertheless provides additional evidence that
21 children ages 8-9 think that moral history clings to physical currency. Importantly, however, the
22 findings from children ages 5-6 are less clear. That is, in this study, the younger age group did
23 not distinguish between stolen and non-stolen money. Following best practices suggested by

1 methodologists and statisticians (e.g., Cumming, 2013; Funder et al., 2014), we conducted a
 2 mega-analysis across our studies so that we could arrive at a more precise estimate of how
 3 children reason about money with differing moral histories, and whether this reasoning may
 4 reflect a developmental progression.

6. Mega-Analysis

6 For the mega-analysis, we conducted a 2 (giver: neutral, bad) x 2 (money: neutral, bad)
 7 ANOVA on children’s ratings with age (5- and 6-year-olds, 8- and 9-year-olds) and study (1, 2,
 8 3) as between-subjects factors (see Table 5 for means). This mega-analysis yielded a main effect
 9 of money, $F(1, 138) = 31.91, p < .001, \eta_p^2 = .19$, such that non-stolen money ($M = 1.03; SD =$
 10 0.90) was preferred to stolen money ($M = 0.73; SD = 0.93$). There was no main effect of giver,
 11 $F(1, 138) = .66, p = .42, \eta_p^2 = .01$, indicating that children did not distinguish between money
 12 offered by a morally neutral individual ($M = 0.86; SD = 0.92$) and money offered by a morally
 13 negative individual ($M = 0.90; SD = 0.93$). Moreover, there was a main effect of age, $F(1, 138) =$
 14 $68.38, p < .001, \eta_p^2 = .33$, with older children ($M = 0.45; SD = 0.74$) wanting money less overall
 15 than younger children ($M = 1.31; SD = 0.90$). Finally, this analysis yielded a giver x money
 16 interaction, $F(1, 138) = 7.48, p = .007, \eta_p^2 = .05$, as well as an age x study x giver x money
 17 interaction, $F(2, 138) = 3.55, p = .031, \eta_p^2 = .05$. Given the interaction, results are reported
 18 separately for the two age groups.

19

Scenario	8- and 9-year-olds ($n = 72$)	5- and 6-year-olds ($n = 72$)
Neutral-Giver/Neutral-Money	0.64 (0.81)	1.50 (0.77)
Neutral-Giver/Bad-Money	0.22 (0.56)	1.07 (0.98)
Bad-Giver/Neutral-Money	0.64 (0.81)	1.35 (0.87)

Bad-Giver/Bad-Money	0.29 (0.66)	1.32 (0.92)
Dirty-Money	0.04 (0.26)	0.24 (0.59)

Table 5. Mega-analysis, Children's mean ratings of how much they would want the dollar, on a scale of 0 to 2, across the 5 scenarios, collapsing across Studies 1-3. Standard deviations are in parentheses.

Looking at the 8- and 9-year-olds, a 2 (giver: neutral, bad) x 2 (money: neutral, bad)

ANOVA on their ratings with study as a between-subjects factor yielded a main effect of money, $F(1, 69) = 29.05, p < .001, \eta_p^2 = .30$, with non-stolen money ($M = 0.64; SD = 0.81$) being more desirable than stolen money ($M = 0.26; SD = 0.61$). There was no main effect of giver, $F(1, 69) = 0.33, p = .57, \eta_p^2 = .01$, indicating that children in the older age group did not distinguish between money offered by a morally neutral individual ($M = 0.43; SD = 0.73$) and a morally negative individual ($M = 0.47; SD = 0.76$). Finally, 8- and 9-year-olds placed more weight on the moral history of the money relative to the moral standing of the giver—they wanted the dollar more in the *bad-giver/neutral-money* scenario ($M = 0.64; SD = 0.81$) than in the *neutral-giver/bad-money* scenario ($M = 0.22; SD = 0.56$), $t(71) = 4.62, p < .001, d = 0.54$.

Looking at the 5- and 6-year-olds, a 2 (giver: neutral, bad) x 2 (money: neutral, bad)

ANOVA on their ratings with study as a between-subjects factor yielded a main effect of money, $F(1, 69) = 7.86, p = .007, \eta_p^2 = .10$, such that non-stolen money ($M = 1.42; SD = 0.82$) was more desirable than stolen money ($M = 1.19; SD = 0.96$). This analysis did not yield a main effect of giver, $F(1, 69) = 0.35, p = .56, \eta_p^2 = .01$, indicating that children in the younger age group, like children in the older age group, did not distinguish between money offered by a morally neutral individual ($M = 1.28; SD = 0.91$) and a morally negative individual ($M = 1.33; SD = 0.89$).

Unlike the older age group, this analysis also yielded a giver x money interaction, $F(1, 69) = 10.14, p = .002, \eta_p^2 = .13$. Follow-up analyses clarify the interaction by revealing that 5-

1 and 6-year-olds distinguished between stolen (*neutral-giver/bad-money*; $M = 1.07$; $SD = 0.98$)
 2 and non-stolen money (*neutral-giver/neutral-money*; $M = 1.50$; $SD = 0.77$) offered by a morally
 3 neutral individual, $t(71) = 4.05$, $p < .001$, $d = 0.48$, but they did not distinguish between stolen
 4 (*bad-giver/bad-money*; $M = 1.32$; $SD = 0.92$) and non-stolen money (*bad-giver/neutral-money*;
 5 $M = 1.35$; $SD = 0.87$) offered by a morally negative individual, $t(71) = 0.28$, $p = .78$, $d = 0.03$.
 6 Finally, like the 8- and 9-year-olds, the 5- and 6-year-olds placed more weight on the moral
 7 history of the money than the moral standing of the giver—they wanted the dollar more in the
 8 *bad-giver/neutral-money* scenario than in the *neutral-giver/bad-money* scenario, $t(71) = 2.40$, $p =$
 9 $.019$, $d = 0.28$.

10 Taken together, the findings from the mega-analysis reveal that children in both age
 11 groups seem to imbue money with moral history, but this effect was more robust in 8- and 9-
 12 year-olds than 5- and 6-year-olds. We explore this point, as well as broader implications of the
 13 findings, in the General Discussion below.

14 7. Children's Explanations

15 As foreshadowed above, we asked children to explain their response for each of the five
 16 scenarios. The two authors independently coded children's explanations according to the
 17 following coding categories, and were blind to scenario and age group when doing so:

- 18 • *Stealing* (e.g., “He stole it”; “He stealed it from somebody else”; “Then it would be like I
 19 was stealing it, and I don't want to have the dollar”);
- 20 • *Trouble* (e.g., “You'd get in trouble if somebody found out”; “If I took the dollar and
 21 someone found me, they'd tell the principal or something”; “You might get arrested”);
- 22 • *Ownership* (e.g., “It's his”; “It's not yours”; “Because it's somebody else's”);
- 23 • *Need* (e.g., “Because I don't need dollars”; “I have lots of money already”; “He wouldn't

- 1 be able to get more food to be alive”);
- 2 • *Money Good* (e.g., “I love dollars”; “You could buy stuff with it”; “Because it’s money
- 3 and everybody wants money”);
- 4 • *Do Good* (e.g., “So I can give it to my sister”; “When it’s Mother’s Day, I want to use it
- 5 to buy my mom some jewelry”; “I would give it to the right person that had it”);
- 6 • *Dirty* (e.g., “It’s dirty”; “He has snots on it”; “Because she just wiped her nose with it.
- 7 It’s disgusting”);
- 8 • *Low Value* (e.g., “Because it’s just one dollar”; “It’s just money”; “Because I don’t think
- 9 money is that important”);
- 10 • *Permission* (e.g., “Because she’s offering to give it to me”; “She asked me”; “Because
- 11 she says I can have it and that’s nice”); and
- 12 • *Earn* (e.g., “I want to earn money by myself”; “If you really want lots of money, you can
- 13 earn it or work for money”; “I’m going to earn money by myself by doing chores”).

14

15 All other responses that did not receive one of the above codes were coded as *Other* (e.g., “I

16 forgot”; “My parents let me name my cat, and I named him Dollar. That’s why”; “I don’t

17 know”). Three of the codes (*Low Value*, *Permission*, and *Earn*) are not considered further as they

18 were used so infrequently (8 of 720 trials for *Low Value*, 10 of 720 trials for *Permission*, and 6 of

19 720 trials for *Earn*). For the remaining eight codes, Cohen’s kappas ranged from 0.79-0.98 ($M =$

20 0.91).

21

Stealing	Trouble	Ownership	Need	Money Good	Do Good	Dirty	Other
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Neutral	3%	0%	7%	6%	43%	1%	1%	39%
Bad-Money	10%	1%	7%	7%	31%	6%	1%	40%
Bad-Giver	7%	0%	8%	7%	36%	8%	1%	36%
Bad-Both	13%	1%	3%	8%	36%	4%	1%	36%
Dirty	0%	0%	0%	0%	6%	3%	81%	11%

1 **Table 6.** 5- and 6-year-olds' explanations, collapsed across Studies 1-3. Summing across
 2 categories may exceed 100% due to rounding. For ease of presentation, 'Neutral' refers to the
 3 *neutral-giver/neutral-money* scenario, 'Bad-Money' refers to the *neutral-giver/bad-money*
 4 scenario, 'Bad-Giver' refers to the *bad-giver/neutral-money* scenario, 'Bad-Both' refers to the
 5 *bad-giver/bad-money* scenario, and 'Dirty' refers to the *dirty-money* scenario.
 6
 7

	Stealing	Trouble	Ownership	Need	Money Good	Do Good	Dirty	Other
Neutral	8%	1%	43%	8%	22%	8%	1%	22%
Bad-Money	35%	15%	38%	1%	7%	10%	0%	18%
Bad-Giver	25%	1%	28%	13%	15%	8%	0%	25%
Bad-Both	53%	10%	32%	3%	8%	8%	0%	11%
Dirty	0%	0%	0%	0%	0%	0%	94%	6%

8 **Table 7.** 8- and 9-year-olds' explanations, collapsed across Studies 1-3. Summing across
 9 categories may exceed 100% due to rounding. For ease of presentation, 'Neutral' refers to the
 10 *neutral-giver/neutral-money* scenario, 'Bad-Money' refers to the *neutral-giver/bad-money*
 11 scenario, 'Bad-Giver' refers to the *bad-giver/neutral-money* scenario, 'Bad-Both' refers to the
 12 *bad-giver/bad-money* scenario, and 'Dirty' refers to the *dirty-money* scenario.
 13

14 The predominant theme among the 5- and 6-year-olds was *Money Good*, which suggests
 15 that the functional utility of money was particularly salient to the younger age group. In contrast,

1 the 8- and 9-year-olds were more likely to use the full range of explanation codes, though
2 especially *Stealing* and *Ownership*, both of which involve attention to object history. Thus,
3 children's explanations mirror the overall data in two key respects: (1) younger children were
4 more likely to want money overall compared to older children, and (2) older children showed
5 greater attention to money's (moral) history than younger children. Moreover, children in both
6 age groups rarely appealed to the possibility of getting into trouble, suggesting that their aversion
7 to stolen money reflected an avoidance of money with negative moral history rather than a fear
8 of the consequences of accepting such money.

9 8. General Discussion

10 The present studies indicate that children do not think that a dollar is just a dollar.
11 Instead, children treat monetary tokens as carrying traces of their moral history, a pattern of
12 thinking that was largely clear and consistent among children ages 8-9 and present but weaker
13 among children ages 5-6. The mega-analysis, taking into account the data from all three studies,
14 revealed that children in both age groups preferred a non-stolen dollar offered by a morally
15 negative individual to a stolen dollar offered by a morally neutral individual. At the same time,
16 the mega-analysis also revealed that whereas older children preferred non-stolen over stolen
17 money regardless of who was offering it (i.e., a morally neutral or a morally negative individual),
18 younger children only preferred non-stolen over stolen money when it was offered by a morally
19 neutral individual.

20 Based on these findings, it seems that thinking about money in terms of its moral history
21 does not require experience with concepts that only adults likely encounter such as "dirty
22 money" or "blood money" (e.g., Tasimi & Gelman, 2017; Tasimi & Gross, 2020; Zelizer, 1994).
23 Instead, by elementary school age, children show reduced interest in money with negative moral

1 history. Specifically, when a “bad dollar” (*neutral-giver/bad-money*) and a “bad giver” (*bad-*
2 *giver/neutral-money*) were directly pitted against one another, the mega-analysis reported above
3 revealed that the “bad dollar” was judged to be worse, in both age groups. Given this difference,
4 neither an *associative* nor a *wrongdoer* account could capture the current findings, as negativity
5 did not affix equally to the scenarios involving negative information (*associative*) and, moreover,
6 children’s responses were not due to a strict desire to avoid interactions with a thief (*wrongdoer*).
7 Instead, our findings seem to be best captured by a *moral history* account—that is, children were
8 particularly resistant to accepting money that itself had a tainted history, at least when this
9 history was explicitly highlighted. An open question for future research is whether children
10 would make use of moral history if it were not so explicitly highlighted (e.g., if this information
11 was only indirectly communicated).

12 The current findings raise the question of why 5- and 6-year-olds showed less sensitivity
13 to moral history compared to 8- and 9-year-olds, especially because children ages 5-6 possess the
14 component pieces to reason about moral history—a sensitivity to object history as well as a
15 sensitivity to morality. Our data allow us to rule out several explanations for 5- and 6-year-olds’
16 responses, including difficulties with comprehending or processing the task. For example, that 5-
17 and 6-year-olds did not show strong and consistent attention to moral history is unlikely to
18 reflect insufficient attention to the details of the scenarios because children were not asked the
19 test question until they correctly responded to the comprehension question(s) for each scenario.
20 Moreover, children appropriately distinguished the *neutral-giver/neutral-money* and *dirty-money*
21 scenarios, indicating that the task was understandable to this age group. Furthermore, we also
22 can rule out the possibility that young children thought the thefts described in these vignettes
23 were morally acceptable. Specifically, in an additional study (see Study S1 in the Supplementary

1 Materials), we found that when 5- and 6-year-olds were asked what the giver should do with the
2 dollar in each scenario (i.e., keep it or give it away), they typically reported that thieves should
3 give away the money, indicating that they understand not only that stealing is wrong, but also
4 that stealing as described in these scenarios is wrong. Given these points, we view the
5 developmental change documented here as consistent with prior work showing that a sensitivity
6 to contamination and contagion increases from ages 5-6 to ages 8-9 (e.g., Diesendruck & Perez,
7 2015; Gelman et al., 2015; Hejmadi et al., 2004; Legare et al., 2009). In other words, the belief
8 that moral history clings to objects may be fragile among children ages 5-6 (see Study S2 in the
9 Supplementary Materials in which we compare 5- and 6-year-olds' attention to the moral history
10 of money vs. non-monetary objects), and this may be particularly true as the objects that children
11 reason about increase in value (although see Study S3 in the Supplementary Materials in which
12 we compare 5- and 6-year-olds' attention to the moral history of dollars vs. pennies and find no
13 effects of stolen money).

14 Elucidating the mechanisms that contribute to the belief that money carries traces of its
15 moral history represents an important direction for future work, as is the issue of what processes
16 may have influenced children's performance in the current studies. For example, one issue that
17 deserves further research is whether children may have been particularly prone to reasoning
18 about the experimental scenarios through the lens of ownership, and specifically to have been
19 hesitant to accept money when its provenance was unknown (namely, in the *neutral-giver/bad-*
20 *money* scenario, where it was unclear how the stolen dollar got to the character's desk and who
21 put it there). Recall that, in the mega-analysis, 5- and 6-year-olds preferred a non-stolen dollar
22 from a thief to a stolen dollar from a morally neutral individual, but they did not distinguish
23 between a thief offering them a stolen or a non-stolen dollar. From a pure valence standpoint,

1 this result is somewhat surprising, as a thief offering a stolen dollar involves two “negative
2 strikes” whereas a morally neutral individual offering a stolen dollar involves only one “negative
3 strike.” That said, much evidence indicates that, by preschool age, children have a naïve theory
4 of ownership (Nancekivell, Friedman, & Gelman, 2019), in which case it seems plausible that
5 children would find it unsettling to accept an item with unknown provenance. Moving forward, it
6 would be interesting to determine whether, and how, reasoning about ownership contributes to
7 the belief that moral history can cling to physical currency. It would also be interesting to
8 examine whether the present findings would generalize to other forms of moral taint not
9 involving theft and ownership (e.g., profits from a company that exploits its laborers or harms
10 the environment).

11 One unexpected result with the older children (8-9 years of age) is that they generally
12 reported that they did not want the proffered money, even when the money had no morally
13 negative past whatsoever (as in the *neutral-giver/neutral-money* scenario). Indeed, in Study 3,
14 children ages 8-9 were not any more likely to want a dollar when it was stipulated that the person
15 offering it to them had no need for it and said they could have it. One possibility is that children
16 of this age were hesitant to accept money that belonged to someone else, again given children's
17 sensitivity to ownership. Consistent with this possibility, the older children often mentioned
18 ownership in their explanations, and did so even in the *neutral-giver/neutral-money* scenario.
19 This sensitivity to ownership may have been especially pronounced in our studies, given that the
20 proffered money was stored in the givers' cubbies, which serve as storage areas for personal
21 property. Another possibility for why 8- and 9-year-olds were resistant to accepting money may
22 be because they questioned the giver's motives, and therefore were hesitant to accept their
23 offering (see Heyman, Barner, Heumann, & Schenck, 2014; Heyman, Fu, Barner, Zhishan,

1 Zhou, & Lee, 2016). Perhaps with additional information about the givers as well as their
2 motives, children ages 8-9 would be more likely to want money from unfamiliar others; research
3 is needed to address this issue.

4 Another potentially surprising result is that children in both age groups did not
5 distinguish between money that was offered by a morally negative or a morally neutral
6 individual. Although this finding may seem at odds with previous work showing that children
7 reject offerings from wrongdoers (Tasimi et al., 2017; Tasimi & Wynn, 2016), there are at least
8 two key differences between these two lines of research. First, children in the current
9 investigation were presented with the opportunity to accept *money* from wrongdoers, whereas
10 children in previous investigations were presented with the opportunity to accept *stickers* from
11 wrongdoers. We know from prior work that the greater the amount on offer, the more likely
12 children are to accept a wrongdoer's offering (Tasimi & Wynn, 2016), which indicates that value
13 can override children's aversion toward wrongdoers. It may be that money is especially valuable
14 to children (a point supported by children's explanations in the current study, in which 5- and 6-
15 year-olds, in particular, predominantly focused on money's positive qualities), thus overriding
16 their aversion toward wrongdoers. Second, the current research involved wrongdoers that *stole*
17 from others whereas past research involved wrongdoers that *hit* others. If children, like adults
18 (see Powell & Horne, 2017), consider hitting to be a more severe moral violation than stealing
19 (especially when the amount stolen is relatively modest), then this may affect their willingness to
20 accept the goods. As previous work has pointed out (Tasimi & Wynn, 2016), varying the types
21 of goods on offer as well as the nature of a wrongdoer's bad actions can help clarify whether and
22 to what extent children's decision to profit is affected by the moral standing of a giver.

23 Finally, although the present investigation focused on whether and when money is

1 imbued with moral history by characterizing broad patterns within each age group, our data
2 indicate variability in responding, both within and across studies. An open question is what
3 contributes to this variability. One possibility is that it may not reflect anything systematic, but
4 rather simply uncertainty at the level of individual respondents. However, a more intriguing
5 possibility is that this variability may reflect systematic variation across individuals, families,
6 schools, and/or communities. A first step toward addressing this possibility would be to assess
7 children at multiple time points to determine whether or not we detect stable individual
8 differences, wherein some children are consistently more bothered by “dirty money” than others.
9 Furthermore, if stable individual differences were found, it would be important to understand
10 what contributes to such differences. These might include, for example, contagion sensitivity,
11 messages from parents, explicit norms about property within schools, and so on. Relatedly, it is
12 intriguing to consider whether these individual differences persist across development. Even
13 adults vary in their response to "dirty money", with roughly half indicating they would reject
14 such a gift and the remainder indicating some degree of willingness to accept it (Tasimi &
15 Gelman, 2017). Understanding when in development such differences emerge is an issue
16 deserving of research. Altogether, these questions represent rich avenues for future work given
17 our finding that children do not think that a dollar is just a dollar.

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Supplementary Materials

Below are (1) the study scripts and (2) the findings for three supplemental studies that were designed to better understand the performance of the 5- and 6-year-olds in the principal studies.

Scenarios and Comprehension Questions for Studies 1-3 and Studies S1-S3

(illustrated with female characters)

Study 1

Neutral-giver/neutral-money: This is Angela. Angela has a dollar in her cubby. Where is Angela's dollar: her cubby or her backpack? Angela says you can have the dollar, if you want.

Bad-giver/neutral-money: This is Lila. Lila stole a cookie from another person. Lila has a dollar that she did not steal, in her cubby. What did Lila steal: a dollar or a cookie? Lila says you can have the dollar, if you want.

Neutral-giver/bad-money: This is Martha. Martha found a stolen dollar in her cubby. Who stole the dollar: Martha or someone else? Martha says you can have the dollar, if you want.

Bad-giver/bad-money: This is Sharon. Sharon stole a dollar from another person. Did Sharon steal the dollar? Sharon says you can have the dollar, if you want.

Dirty-money: This is Nicole. Nicole sneezed and used a dollar to wipe her nose. Is the dollar clean or dirty? Nicole says you can have the dollar, if you want.

Study 2

Neutral-giver/neutral-money: This is Angela. Angela has a dollar in her cubby. Where is Angela's dollar: her cubby or her backpack? Angela says you can have the dollar, if you want.

Bad-giver/neutral-money: This is Lila. Lila stole a dollar from another person. The dollar that she stole is in her pocket. Lila has another dollar that she did not steal, in her cubby. Which dollar did Lila steal: the one in her pocket or the one in her cubby? Lila says you can have the dollar in her cubby, if you want.

Neutral-giver/bad-money: This is Martha. Martha found a stolen dollar in her cubby. Who stole the dollar: Martha or someone else? Martha says you can have the dollar, if you want.

Bad-giver/bad-money: This is Sharon. Sharon stole a dollar from another person. Did Sharon steal the dollar? Sharon says you can have the dollar, if you want.

Dirty-money: This is Nicole. Nicole sneezed and used a dollar to wipe her nose. Is the dollar clean or dirty? Nicole says you can have the dollar, if you want.

Study 3

Neutral-giver/neutral-money: This is Angela. Angela has a dollar in her cubby. Where is

Angela's dollar: her cubby or her backpack? Angela doesn't need the dollar, and she says you can have it.

Bad-giver/neutral-money: This is Lila. Lila stole a dollar from another person. The dollar that she stole is in her pocket. Lila has another dollar that she did not steal, in her cubby. Which dollar did Lila steal: the one in her pocket or the one in her cubby? Lila doesn't need the dollar, and she says you can have it.

Neutral-giver/bad-money: This is Martha. Martha found a stolen dollar in her cubby. Who stole the dollar: Martha or someone else? Martha doesn't need the dollar, and she says you can have it.

Bad-giver/bad-money: This is Sharon. Sharon stole a dollar from another person. Did Sharon steal the dollar? Sharon doesn't need the dollar, and she says you can have it.

Dirty-money: This is Nicole. Nicole sneezed and used a dollar to wipe her nose. Is the dollar clean or dirty? Nicole doesn't need the dollar, and she says you can have it.

Study S1

Neutral-giver/neutral-money: This is Angela. Angela has a dollar in her cubby. Where is Angela's dollar: her cubby or her backpack? Do you think Angela should keep the dollar for herself, or give the dollar to someone else?

Bad-giver/neutral-money: This is Lila. Lila stole a dollar from another person. The dollar that she stole is in her pocket. Lila has another dollar that she did not steal, in her cubby. Which dollar did Lila steal: the one in her pocket or the one in her cubby? Do you think Lila should keep the dollar for herself, or give the dollar to someone else?

Neutral-giver/bad-money: This is Martha. Martha found a stolen dollar in her cubby. Who stole the dollar: Martha or someone else? Do you think Martha should keep the dollar for herself, or give the dollar to someone else?

Bad-giver/bad-money: This is Sharon. Sharon stole a dollar from another person. Did Sharon steal the dollar? Do you think Sharon should keep the dollar for herself, or give the dollar to someone else?

Dirty-money: This is Nicole. Nicole sneezed and used a dollar to wipe her nose. Is the dollar clean or dirty? Do you think Nicole should keep the dollar for herself, or give the dollar to someone else?

Study S2

Neutral-giver/neutral-item: This is Angela. Angela has a dollar (keychain) in her cubby. Where is Angela's dollar (keychain): her cubby or her backpack? Angela says you can have the dollar (keychain), if you want.

Bad-giver/neutral-item: This is Lila. Lila stole a dollar (keychain) from another person. The dollar (keychain) that she stole is in her pocket. Lila has another dollar (keychain) that she did not steal, in her cubby. Which dollar (keychain) did Lila steal: the one in her pocket or the one in her cubby? Lila says you can have the dollar (keychain) in her cubby, if you want.

Neutral-giver/bad-item: This is Martha. Martha found a stolen dollar (keychain) in her cubby. Who stole the dollar (keychain): Martha or someone else? Martha says you can have the dollar (keychain), if you want.

Bad-giver/bad-item: This is Sharon. Sharon stole a dollar (keychain) from another person. Did Sharon steal the dollar (keychain)? Sharon says you can have the dollar (keychain), if you want.

Dirty-money: This is Nicole. Nicole sneezed on a dollar (keychain). Is the dollar (keychain) clean or dirty? Nicole says you can have the dollar (keychain), if you want.

Study S3

Neutral-giver/neutral-money: This is Angela. Angela has a dollar (penny) in her cubby. Where is Angela's dollar (penny): her cubby or her backpack? Angela says you can have the dollar (penny), if you want.

Bad-giver/neutral-money: This is Lila. Lila stole a dollar (penny) from another person. The dollar (penny) that she stole is in her pocket. Lila has another dollar (penny) that she did not steal, in her cubby. Which dollar (penny) did Lila steal: the one in her pocket or the one in her cubby? Lila says you can have the dollar (penny) in her cubby, if you want.

Neutral-giver/bad-money: This is Martha. Martha found a stolen dollar (penny) in her cubby. Who stole the dollar (penny): Martha or someone else? Martha says you can have the dollar (penny), if you want.

Bad-giver/bad-money: This is Sharon. Sharon stole a dollar (penny) from another person. Did Sharon steal the dollar (penny)? Sharon says you can have the dollar (penny), if you want.

Dirty-money: This is Nicole. Nicole sneezed on a dollar (penny). Is the dollar (penny) clean or dirty? Nicole says you can have the dollar (penny), if you want.

Study S1

In this study, we asked children what the character should do with the dollar in each scenario—keep it or give it away. This task provides a straightforward test of children's normative judgments (what the character *should* do). Our primary prediction is that, if children view stealing as wrong, they should judge that a character that committed theft should not be entitled to keep the dollar. Thus, we predicted that children would endorse lower rates of keeping money when the giver was bad. It was also possible that children might indicate that the dollar should not be kept when it was stolen, as a consequence of the money being tainted.

Participants

This study included thirty-six 5- and 6-year-olds (16 girls, 20 boys; age range = 5.31-6.63 years; mean age = 5.82 years; $SD = 0.35$) and thirty-six 8- and 9-year-olds (20 girls, 16 boys; age

range = 8.25-9.91 years; mean age = 9.07 years; $SD = 0.48$).

Procedure

The procedure was the same as in Study 2, with one exception: Here, children were asked in each scenario whether the character should keep the dollar for themselves, or give the dollar to someone else (e.g., “Angela has a dollar in her cubby. Do you think Angela should keep the dollar for herself, or give the dollar to someone else?”). In total, 10 of 36 children in the older age group and 25 of 36 children in the younger age group made at least one error on the comprehension questions. Across all trials, 8- and 9-year-olds responded incorrectly to 6% of the comprehension questions; 5- and 6-year-olds responded incorrectly to 23% of the comprehension questions (one child needed to be corrected a second time on one trial). All errors were corrected, as described in Study 1.

Results and Discussion

See Table S.1 for the percentage of children in each age group reporting that the dollar should be kept. Because the design involved a dichotomous dependent measure, we conducted a repeated-measures binary logistic regression (RM-BLR). A RM-BLR with giver (neutral, bad) and money (neutral, bad) as within-subject predictors and age group (5- and 6-year-olds vs. 8- and 9-year-olds) as a between-subjects predictor yielded a main effect of giver, Wald $\chi^2 = 18.19$, $df = 1$, $p < .001$, indicating that, as predicted, children reported that those who stole money should not keep it (lower responses for bad givers than neutral givers). Additionally, there was a main effect of money, Wald $\chi^2 = 34.31$, $df = 1$, $p < .001$, and a money \times age interaction, Wald $\chi^2 = 13.54$, $df = 1$, $p < .001$; all other effects were not significant. These results suggest that there is also a knock-on effect whereby tainted money should also be returned (lower responses for bad

money than neutral money), though this effect appears to be substantially higher for older than younger children.

Scenario	8- and 9-year-olds	5- and 6-year-olds
Neutral-Giver/Neutral-Money	78%	69%
Neutral-Giver/Bad-Money	19%	47%
Bad-Giver/Neutral-Money	39%	36%
Bad-Giver/Bad-Money	8%	33%
Dirty-Money	97%	83%

Table S.1. Percentage of children in each age group reporting that the dollar should be kept, across the five scenarios.

In sum, both younger and older children indicated an understanding that stealing was wrong in these scenarios, in that they judged that a thief should not keep money that they had stolen. This result indicates that younger children's relative lack of sensitivity in the principal studies could not be attributed to their not understanding the moral implications of stealing money in the scenarios.

Study S2

Unlike 8- and 9-year-olds (as shown in Studies 1-3) and adults (as reported in Tasimi & Gelman, 2017), 5- and 6-year-olds did not consistently report that they do not want money with negative moral history. One possibility is that this result may reveal something specific about money. In other words, 5- and 6-year-olds may treat money as fungible in a way that non-monetary goods are not. If so, then they should care about the moral history of non-monetary goods despite not doing so for money. Another possibility is that children at these ages may not

imbue *any* object with moral history, whether it is money (e.g., a dollar bill) or a non-monetary good (e.g., an item that is worth a dollar) (although see Diesendruck & Perez, 2015). This study sought to arbitrate between these two possibilities.

Participants

Study S2 included sixty-three 5- and 6-year-olds (29 girls, 34 boys; age range = 5.19-6.79 years; mean age = 5.93 years; $SD = 0.46$).

Procedure

The procedure was similar to Study 2 with a few modifications. First, we varied whether the scenarios involved dollars or keychains. Thus, children were randomly assigned to a Dollar ($n = 32$) or a Keychain ($n = 31$) condition. Second, after the practice trials (but before the presentation of the main scenarios), the experimenter showed the child a picture of a dollar or a keychain and said, “Do you know what a dollar (keychain) is? Here’s a picture of a dollar (keychain that’s worth one dollar). I’m going to be asking you some questions about dollars (keychains that are worth one dollar).” In total, 35 of 63 children made at least one error on the comprehension questions. Across all trials, 5- and 6-year-olds responded incorrectly to 16% of the comprehension questions (three children each needed to be corrected a second time on one trial).

Results and Discussion

See Table S.2 for means. Children in the Dollar condition wanted the dollar more in the *neutral-giver/neutral-money* scenario than in the *dirty-money* scenario, $p < .001$, and children in the Keychain condition wanted the keychain more in the *neutral-giver/neutral-keychain* scenario than in the *dirty-keychain* scenario, $p < .001$. We next conducted a 2 (giver: neutral, bad) x 2 (item: neutral, bad) ANOVA on children’s ratings with condition (Money or Keychain) as a

between-subjects factor. This analysis yielded a main effect of item, $F(1, 61) = 8.95, p = .004, \eta_p^2 = .13$, but no main effect of giver, $F(1, 61) = .47, p = .50, \eta_p^2 = .01$. To elaborate, children's ratings were affected by whether the proffered item was stolen ($M = 0.97; SD = 0.88$) or not ($M = 1.25; SD = 0.86$), but their ratings were unaffected by whether the proffered item was offered by a morally negative individual ($M = 1.13; SD = 0.87$) or a morally neutral individual ($M = 1.08; SD = 0.90$). This analysis did not yield a main effect of condition, $F(1, 61) = 1.64, p = .21, \eta_p^2 = .03$, nor did condition interact with any factor.

Scenario	Dollar	Keychain
Neutral-Giver/Neutral-Item	1.19 (0.93)	1.23 (0.84)
Neutral-Giver/Bad-Item	1.19 (0.93)	0.71 (0.82)
Bad-Giver/Neutral-Item	1.38 (0.83)	1.19 (0.87)
Bad-Giver/Bad-Item	1.09 (0.89)	0.87 (0.85)
Dirty-Item	0.31 (0.74)	0.32 (0.60)

Table S.2. Study S2, Children's mean ratings of how much they would want a dollar or a keychain, on a scale of 0 to 2, across the 5 scenarios. Standard deviations are in parentheses.

To understand whether children's ratings were more affected by the moral valence of the item or the moral valence of the giver, we compared the *neutral-giver/bad-item* and *bad-giver/neutral-item* scenarios and found that children were less likely to want the item in the *neutral-giver/bad-item* scenario ($M = 0.95; SD = 0.91$) than in the *bad-giver/neutral-item* scenario ($M = 1.29; SD = 0.85$), $t(62) = 2.60, p = .011, d = 0.33$.

Overall, the findings from this study replicate the role of moral history in children's judgments, and further suggest that there is not a marked difference in 5- and 6-year-olds'

reasoning about money vs. non-monetary goods. Regardless, the above results encourage future research that could illuminate whether children's reasoning about moral history varies as a function of what goods they reason about.

Study S3

A potential explanation for why the 5- and 6-year-olds in Studies 1-3 did not imbue money with moral history, as did the 8- and 9-year-olds, is that they find dollars alluring, which, in turn, might override their ability to reason about moral history. Consistent with this point, past research has found that introducing—and increasing—material rewards can sometimes override children's sensitivity to morality-relevant issues among children of these ages (Tasimi et al., 2017; Tasimi & Wynn, 2016). That said, changing the value of the money on offer (e.g., from \$1 to \$100) does not seem to influence adults' reasoning about money with negative moral history (Tasimi & Gelman, 2017). Thus, Study S3 varied whether the proffered money was a dollar or a penny. With this approach, we could better understand whether the performance of 5- and 6-year-olds in the principal studies was largely influenced by the value of the good on offer (in which case we would expect a difference in how children reason about dollars versus pennies), or whether their performance might reflect a potential developmental progression in children coming to think that money can carry traces of its moral history (in which case we would expect similar reasoning about dollars and pennies).

Participants

This study included forty-eight 5- and 6-year-olds (24 girls, 24 boys; age range = 5.08-6.85 years; mean age = 6.11 years; $SD = 0.49$).

Materials and Procedure

The procedure was the same as in Study 2 with a few exceptions. First, we kept the

scenarios the same, but varied whether they involved dollars or pennies. Children in this study were thus randomly assigned to a Dollar ($n = 24$) or a Penny ($n = 24$) condition. Second, after the practice trials (but before the presentation of the key scenarios), the experimenter showed the child a picture of a dollar or a penny and said, “Do you know what this is? It’s a dollar/penny. In this game, I’m going to tell you some stories about dollars/pennies and ask you some questions. OK?” Finally, at the end of the study, the experimenter asked the child, “What’s worth more: a penny or a dollar?” We counterbalanced the order of the test question (“a penny or a dollar” vs. “a dollar or a penny”) and found that the majority of children thought that a dollar is worth more than a penny (38 of 48 children [79%], binomial probability test, $p < .001$). In total, 27 of 48 children made at least one error on the comprehension questions. Across all trials, 5- and 6-year-olds responded incorrectly to 15% of the comprehension questions (two children each needed to be corrected a second time on one trial).

Results and Discussion

See Table S.3 for means. Children in the Dollar condition wanted the dollar more in the *neutral-giver/neutral-money* scenario than in the *dirty-money* scenario, $p < .001$, and children in the Penny condition wanted the penny more in the *neutral-giver/neutral-money* scenario than in the *dirty-money* scenario, $p < .001$. We next conducted a 2 (giver: neutral, bad) x 2 (money: neutral, bad) ANOVA on children’s ratings with condition (Dollar or Penny) as a between-subjects factor¹. This analysis did not yield a main effect of money, $F(1, 46) = 3.38, p = .072, \eta_p^2 = .07$, but it did yield a main effect of giver, $F(1, 46) = 11.60, p = .001, \eta_p^2 = .20$. In contrast to

¹ We obtained the same pattern of results when excluding the ten children who responded that a penny is worth more than a dollar. That is, a 2 (giver: neutral, bad) x 2 (money: neutral, bad) ANOVA on children’s ratings with condition (Dollar or Penny) as a between-subjects factor did not yield a main effect of money, $F(1, 36) = 2.03, p = .16, \eta_p^2 = .05$, but it did yield a main effect of giver, $F(1, 36) = 11.02, p = .002, \eta_p^2 = .23$. All other effects were not significant.

all of the other studies, children's ratings were unaffected by whether the proffered money was stolen ($M = 1.11$; $SD = 0.90$) or not ($M = 1.29$; $SD = 0.83$), but their ratings were affected by whether the money was being offered by a morally negative individual ($M = 1.05$; $SD = 0.92$) or a morally neutral individual ($M = 1.35$; $SD = 0.79$). This analysis did not yield a main effect of condition, $F(1, 46) = 0.003$, $p = .96$, $\eta_p^2 = .00$, nor did condition interact with any factor.

Scenario	Dollar	Penny
Neutral-Giver/Neutral-Money	1.42 (0.78)	1.38 (0.71)
Neutral-Giver/Bad-Money	1.13 (0.95)	1.50 (0.72)
Bad-Giver/Neutral-Money	1.25 (0.94)	1.13 (0.90)
Bad-Giver/Bad-Money	1.04 (0.95)	0.79 (0.88)
Dirty-Money	0.21 (0.59)	0.21 (0.59)

Table S.3. Study S3, Children's mean ratings of how much they would want a penny or a dollar, on a scale of 0 to 2, across the 5 scenarios. Standard deviations are in parentheses.

Five- and six-year-olds did not distinguish between the money in the *neutral-giver/bad-money* and *bad-giver/neutral-money* scenarios, $t(47) = 0.90$, $p = .37$, $d = 0.13$, suggesting that, in this study, the moral history of the money and the moral standing of the giver were treated comparably.

Overall, the findings from Study S3 suggest that the performance of 5- and 6-year-olds in the principal studies was unlikely to result (at least strictly) from money's value overwhelming children's ability to reason about moral history. That is, in this study, children reasoned similarly about pennies and dollars even though most children said that a dollar is worth more than a penny. However, unlike every other study, here we obtained a main effect of giver. More

generally, the performance of the 5- and 6-year-olds, taking into account the principal studies as well as the supplementary studies, was somewhat inconsistent, raising the question of how children of this age reason about money with differing moral histories. To address this issue, we conducted an additional mega-analysis below, looking at only the data from the 5- and 6-year-olds.

Mega-Analysis on 5- and 6-year-olds

For the mega-analysis, we conducted a 2 (giver: neutral, bad) x 2 (money: neutral, bad) ANOVA on 5- and 6-year-olds' ratings with study (1, 2, 3, S2, S3) as between-subjects factors (see Table S.4 for means). We excluded children's responses to the keychain (Study S2) and penny (Study 3) scenarios, in order to maintain an analysis that was comparable across studies (i.e., focused exclusively on dollars). This mega-analysis yielded a main effect of money, $F(1, 123) = 12.28, p = .001, \eta_p^2 = .09$, but no main effect of giver, $F(1, 123) = 0.05, p = .82, \eta_p^2 = 0$. To elaborate, 5- and 6-year-olds preferred non-stolen ($M = 1.37; SD = 0.84$) to stolen money ($M = 1.16; SD = 0.94$), but they did not overall distinguish between money that was offered by a morally neutral individual ($M = 1.26; SD = 0.90$) or a morally negative individual ($M = 1.27; SD = 0.90$). The mega-analysis also yielded a giver \times money interaction, $F(1, 123) = 4.18, p = .043, \eta_p^2 = .03$, as well as a giver \times money \times study interaction, $F(4, 123) = 3.34, p = .012, \eta_p^2 = .10$. The three-way interaction is difficult to interpret, but importantly, we clarify the giver \times money interaction below.

Scenario	Dollar ($n = 128$)
Neutral-Giver/Neutral-Money	1.41 (0.82)
Neutral-Giver/Bad-Money	1.11 (0.96)

Bad-Giver/Neutral-Money	1.34 (0.87)
Bad-Giver/Bad-Money	1.21 (0.92)
Dirty-Money	0.25 (0.63)

Table S.4. Mega-analysis, 5- and 6-year-olds' mean ratings of how much they would want a dollar, on a scale of 0 to 2, across the 5 scenarios, collapsing across Studies 1-3 and Studies S2-S3. Standard deviations are in parentheses.

Whereas 5- and 6-year-olds preferred non-stolen (*neutral-giver/neutral-money*; $M = 1.41$; $SD = 0.82$) to stolen money (*neutral-giver/bad-money*; $M = 1.11$; $SD = 0.96$) offered by a morally neutral individual, $t(127) = 3.77$, $p < .001$, $d = 0.33$, they did not distinguish between non-stolen (*bad-giver/neutral-money*; $M = 1.34$; $SD = 0.87$) and stolen money (*bad-giver/bad-money*; $M = 1.21$; $SD = 0.92$) offered by a morally negative individual, $t(127) = 1.58$, $p = .12$, $d = 0.14$. Moreover, 5- and 6-year-olds placed more weight on the moral history of the money relative to the moral standing of the giver—they wanted the dollar more in the *bad-giver/neutral-money* scenario than in the *neutral-giver/bad-money* scenario, $t(127) = 2.65$, $p = .009$, $d = 0.23$.

Overall, the findings from this mega-analysis mirror the findings from the mega-analysis reported in the manuscript. Children ages 5-6 preferred a non-stolen dollar offered by a morally negative individual to a stolen dollar offered by a morally neutral individual, suggesting that they placed more weight on the moral history of the money than the moral standing of the giver. At the same time, 5- and 6-year-olds only preferred non-stolen over stolen money when it was offered by a morally neutral individual, not a morally negative individual. Thus, compared to 8- and 9-year-olds, it seems that 5- and 6-year-olds show less sensitivity to moral history when reasoning about money.