

# When cash costs you: The pain of holding coins over banknotes

Jay Zenkić<sup>1</sup>  | Nicole L. Mead<sup>2</sup>  | Kobe Millet<sup>3</sup> 

<sup>1</sup>Deakin University, Geelong, Victoria, Australia

<sup>2</sup>York University Schulich School of Business, Toronto, Ontario, Canada

<sup>3</sup>Vrije Universiteit Amsterdam, Amsterdam, The Netherlands

## Correspondence

Jay Zenkić, Deakin University, 1 Gheringhap St, Geelong, Vic. 3220, Australia.

Email: [jay.zenkić@deakin.edu.au](mailto:jay.zenkić@deakin.edu.au)

## Funding information

The Australian Government; Think Forward Initiative

## Abstract

We hypothesize that the physical characteristics of cash lead to differences in “pain of holding” which influences spending. In one field study (rural India) and two controlled experiments ( $N=1710$ ), we tested that hypothesis by endowing people with coins or equivalently valued banknotes and measuring their pain of holding and spending. Holding denomination constant (e.g., \$1 coins vs. \$1 banknotes), participants reported a greater pain of holding for coins (vs banknotes) which in turn increased spending. These findings were consistent across three incentive-compatible experiments using a range of contexts (spending/donation), populations (Americans/Indians), and currencies (USD/INR). There was no evidence that coins were spent more than banknotes because of lower perceived purchasing power. Our findings suggest that the pain of holding contributes to under-saving, which may be especially problematic among vulnerable populations who rely on cash. Conceptually, we shed new insight on the denomination effect (greater spending of smaller than larger denominations) and the pain of paying (the aversive experience of spending money). Practically, we provide recommendations for practitioners who wish to encourage donations, spending, or saving.

## KEY WORDS

cash, consumer welfare, money, saving, spending

## INTRODUCTION

Cash is still ubiquitous worldwide. Despite the proliferation of new forms of payment, the Bank for International Settlements—the bank for central banks—indicates that cash in global circulation has increased over the past two decades, even after accounting for population and GDP growth (Bech et al., 2018). Indeed, cash is the most common form of payment in America (Kumar et al., 2018) and accounts for 79% of all point-of-sale transactions in the Eurozone (Esselink & Hernández, 2017). Given the importance of cash, it is imperative to understand how consumers perceive and spend it.

In this work, we posit that some cash is annoying to keep because of its physical characteristics, which we term the *pain of holding*. This pain, in turn, may drive consumers to spend more money because people try to rid themselves of annoying stimuli (Doob & Wood, 1972;

Kahn, 1966; Mikolic et al., 1997). Building on past work which suggests that not all cash is spent the same way (e.g., Di Muro & Noseworthy, 2013; Mishra et al., 2006; Raghuram & Srivastava, 2009; Vandoros, 2013), we expect that the bulk, weight, and cumbersome nature of coins leads people to experience a greater pain of holding for coins than equivalently valued banknotes. In turn, consumers may spend more coins than equivalent banknotes.

## CONCEPTUAL FRAMEWORK

The notion that the physical form of cash should be descriptive and not affect spending (Kahneman & Tversky, 1979; Tversky et al., 1988) has been challenged by two overlapping bodies of literature. The first, the *denomination effect*, has found that consumers are less likely to

Accepted by Thomas Kramer, Editor; Associate Editor, Catherine Yeung

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial-NoDerivs](https://creativecommons.org/licenses/by-nc-nd/4.0/) License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2023 The Authors. *Journal of Consumer Psychology* published by Wiley Periodicals LLC on behalf of Society for Consumer Psychology.

spend larger denominations than smaller denominations (Raghubir & Srivastava, 2009; Vandoros, 2013). For example, consumers are less likely to buy T-shirts when they hold more pleasant larger denominations (e.g., \$100 banknote) than less pleasant smaller denominations (e.g.,  $5 \times \$20$  banknotes = \$100; Mishra et al., 2006).

The second has found that the physical characteristics of cash, such as whether it is clean or dirty (Di Muro & Noseworthy, 2013) or light or heavy (Vandoros, 2013) change the likelihood of spending that money. For example, Vandoros (2013) found that people were more likely to spend their payment when it was given to them in coins, which are heavy and cumbersome, as compared to a note, which is lighter and more convenient to carry. Building on this research, we argue that the physical characteristics of cash can produce a feeling of annoyance in consumers, which we term *the pain of holding*. Because people try to remove annoying stimuli (Doob & Wood, 1972; Kahn, 1966; Mikolic et al., 1997), the pain of holding may increase spending.

While there are numerous physical characteristics of money which could produce a pain of holding, we focus on the two forms of cash—coins and banknotes—for two reasons. First, despite the proliferation of digital payments, cash is still ubiquitous (Bech et al., 2018). Banknotes are in circulation because they are cheap to produce and convenient to carry. Coins, though initially more expensive, have a longer lifespan (Sargent & Velde, 2003). Second, the physical characteristics of cash make them an ideal test of the pain of holding. Coins are cumbersome because they are heavy, bulky, and haphazardly kept (Vandoros, 2013). Banknotes, in comparison, are light, easily handled, and conveniently folded, making them convenient to carry (Reutskaja et al., 2020). Thus, coins and banknotes provide a natural test of the pain of holding hypothesis while holding other factors constant (e.g., familiarity, denomination).

Although past studies have examined the differential spending of coins and banknotes, conclusions have been limited because of empirical constraints. One study did not find a difference in amount spent when people were given  $5 \times \$1$  coins as compared to  $5 \times \$1$  banknotes (Study 1b; Raghubir & Srivastava, 2009). The authors speculated that people held onto the coins because the coins were low in circulation and retained as souvenirs. A different study (Experiment B; Vandoros, 2013) found that participants endowed with coins totaling £5 (i.e.,  $2 \times £1$ ,  $4 \times 50p$ , and  $5 \times 20p$ ) were more likely to make a purchase than participants who were given a £5 note. While informative, that study confounded denomination with cash form and thus it is inconclusive whether denomination or cash form increased likelihood of spending. We sought to build on this past research by systematically examining the effect of coins (vs banknotes) on spending while holding denomination constant (e.g., \$1 coin vs. \$1 banknote) in contexts that were free from collectability concerns. For generalizability, we examined the differential spending of coins

and banknotes across currencies (INR/USD) and contexts (field/online; spending/donation).

We posit that greater spending of coins (vs. banknotes) is driven by differences in pain of holding. However, an alternative possibility is that people perceive they can buy fewer things with the same amount in coins than banknotes (i.e., perceived purchasing power; Peetz & Soliman, 2016). Indeed, past work has found that people believe they can purchase more products (e.g., paper clips) with a \$1 banknote than a \$1 coin (Alter & Oppenheimer, 2008). If consumers perceive that coins have lower purchasing power than banknotes, they may spend more coins to compensate. Accordingly, we capture both pain of holding and perceived purchasing power in Studies 2–3 to examine which of the two possible mechanisms drives greater spending of coins than banknotes. Study materials and data are available on OSF: <https://osf.io/rvyfkl/>.

## STUDY 1

To evaluate whether coins are more of a pain to hold than equivalent banknotes, and whether the two may be spent differentially, we conducted a field study in rural India—one of the most cash-reliant and financially constrained areas of the world. In exchange for completing a short (unrelated) survey, participants earned 100-Rupees (~\$1.50USD in 2019, at time of study) in either primarily coins or banknotes of the same denomination (10-Rupees). One-hundred Rupees was ~25% of the daily wage for many locals and thus constituted a meaningful cash injection. Because the study was conducted in rural Telangana where 10-Rupee coins and banknotes were in wide use (Reserve Bank of India, 2019), coins in this context do not suffer from the collectability concerns that may have hampered the detection of greater spending of coins than banknotes in past work (Study 1b; Raghubir & Srivastava, 2009). After paying participants, we covertly measured their spending in a nearby shop. We predicted that participants would spend more coins than banknotes even though people from the same nationality and similar income bracket think the money should be saved (see Appendix S1).

## Participants and procedure

We approached 110 Indian consumers ( $M_{age} = 36.70$ ,  $SD = 8.63$ ; 47 women) who were entering a rural shop (see Figure 1). A priori, we intended to gather at least 100 responses to detect a medium-sized effect (Cohen, 1988).

Our shop partner accepted only cash and stocked a variety of items that were practical and affordable for the local population. For example, single-use shampoo sachets costed 1-Rupee, 50 g of nuts 36-Rupees, and hair oil 75-Rupees. We approached people entering the shop

to access real shoppers; individuals who came explicitly for payment were turned away.

To ensure that participants perceived their payment as income, participants earned the 100-Rupees for completing a “customer satisfaction survey.” Illiterate participants completed the survey with the help of the research assistant. Afterward, participants were paid in 10 units of 10-Rupees (100-Rupees total). To mimic what an individual might carry normally, participants were randomly assigned to receive either eight coins (and two banknotes) or eight banknotes (and two coins; see Figure 2).

Because we did not want participants to know we were interested in how they perceived and used the money, we assessed pain of holding in a separate validation check. Eighty people from the same population held (and returned) the 100-Rupees in primarily coins or banknotes (see Figure 2). Then, they completed a 5-item measure of the pain of holding which we devised from previous work (Morewedge et al., 2007; Thomas et al., 2011). Specifically, participants indicated how much of a pain, annoying, bothersome, irritating, and inconvenient this money would be to hold on to (1 = *Not at all* to 7 = *Very much*;  $\alpha=0.89$ ;  $M=3.10$ ,  $SD=1.85$ ). A *t*-test confirmed that participants reported a higher pain of holding for the coins ( $M=4.07$ ,  $SD=1.90$ ) than the banknotes ( $M=2.30$ ,  $SD=1.38$ ;  $p<0.001$ ,  $[-2.50, -1.02]$ ,  $d=1.08$ ).



FIGURE 1 Rural Indian shop.



FIGURE 2 Rupees earned (Experimental condition).

After receiving their payment in the main study, participants were thanked to reinforce that the survey was over. They then entered the shop unaware that their spending would be observed. Inside, participants had to request their chosen items from a confederate shop assistant who was blind to experimental condition. When participants paid for their goods, the confederate covertly recorded the number of 10-Rupee coins and/or banknotes used. To record the correct condition, the research assistant and confederate conferred after each participant. Seven participants did not enter the shop after receiving payment and were recorded as having spent “0”-Rupees.

## Results and discussion

In all studies in this article, we report confidence intervals instead of *t*-statistics because the dependent variables were not normally distributed. Analyses were bootstrapped (10,000 samples) and bias-corrected.

We first examined if possessing more coins (vs. banknotes) led to higher overall spending. Supporting our theorizing, a *t*-test showed that participants spent more of their 100-Rupees in the eight coins condition ( $M_{\text{Rupees}}=67.96$ ,  $SD=37.74$ ) than the eight banknotes condition ( $M_{\text{Rupees}}=53.04$ ,  $SD=38.37$ ;  $p=0.042$ ,  $[-29.02, -0.49]$ ,  $d=0.39$ ). Subsequently, we examined the makeup of this spending to determine if coins drove greater spending in the eight coins (vs eight banknotes) condition. Supporting this theorizing, a *t*-test showed that coins constituted a higher proportion of spending in the eight coins condition ( $M=76.41\%$ ,  $SD=33.40\%$ ) than the eight banknotes condition ( $M_{\text{Rupees}}=30.59\%$ ,  $SD=32.72\%$ ;  $p<0.001$ ,  $[-58-0.33]$ ,  $d=1.39$ ).

Finally, we checked if participants were more likely to spend their coins than banknotes. To do this, we ran two *t*-tests which predicted proportion spent of participants' (a) primary form of money (i.e., eight coins vs. eight banknotes) and (b) secondary form of money (i.e., two banknotes vs. two coins). Supporting the hypothesis that coins are spent more than banknotes, participants spent more coins when their primary form of money was coins ( $M_{8\text{Coins}}=74.07\%$ ,  $SD=38.84\%$  vs.  $M_{8\text{Banknotes}}=48.88\%$ ,  $SD=42.12\%$ ,  $p=0.002$ ,  $d=0.62$ ).



and when their secondary form of money was coins ( $M_{2\text{Coins}}=69.64\%$ ,  $SD=45.41\%$  vs.  $M_{2\text{Banknotes}}=43.52\%$ ,  $SD=48.61\%$ ,  $p=0.004$ ,  $d=0.56$ ).

The finding that rural Indian laborers visiting a local shop spent more when they were paid primarily with coins than banknotes is striking given their financial constraints and the fact that Indian people with a similar income indicated a preference to save an additional 100-Rupees (Appendix S1). While the results of Study 1 supported our hypotheses, the pain of holding was measured separately to protect the cover story. We addressed this in Study 2.

## STUDY 2

Study 2 examined two possible mechanisms for greater spending of coins than equivalent banknotes: pain of holding and perceived purchasing power (AsPredicted #119530). After earning \$10 in either 10 coins or 10 banknotes of \$1, participants could buy a Dunkin' Donuts shop card with as much of their earnings as they wanted. We predicted that participants who earned coins (vs. equivalently valued banknotes) would spend more of their earnings, despite the card being less fungible than cash, because of a greater pain of holding (not lower perceived purchasing power). Given the very low income of participants in Study 1, we measured socioeconomic status (SES) to explore the effect's generalizability across SES levels.

### Participants and procedure

In exchange for \$0.45 for 3 min, 802 USA-based participants were sourced from Prolific. This sample size was based on an estimated small effect size due to the online setting ( $d=0.2$ ; G\*Power  $\alpha=0.05$ ,  $1-\beta=0.80$ ; Faul et al., 2007). Following our preregistration exclusion criteria (comprehension check/self-selected exclusion questions), we removed 28 responses (3%), leaving 774 participants ( $M_{\text{age}}=38.06$ ,  $SD=13.62$ ; 381 women). Results are descriptively the same when all participants are included (Appendix S2).

Participants first completed a task to earn an extra payment: counting the number of \$1 coins in four images (randomized order). Afterward, they were told they would receive \$10 if their participant number was randomly drawn. The manipulation was the composition of this payment. Participants were told they would receive the money in the mail in either  $10\times\$1$  coins or  $10\times\$1$  banknotes (Appendix 1 for stimuli). In this online context, \$1 coins were not seen as being desirable to collect (see Appendix S3).

Then, participants could spend their money on a Dunkin' Donuts card. Specifically, participants were asked to "Use the slider below to tell us how many

of the \$1 coins[notes] you would like to turn into a Dunkin' Donuts Gift Card (you will receive the gift card and the remaining coins[notes] in the mail)," with a slider ranging from 0 to 10 coins (notes) in intervals of 1 ( $M=1.79$ ,  $SD=3.73$ ). Spending was incentive compatible: Participants were told that eight participants would have their decision executed and that they would receive the money and/or shop card in the mail as per their decisions. In reality, to preserve participant anonymity, eight participants received a digital bonus of \$10.

Participants subsequently completed the putative mediator, the pain of holding measure from Study 1 ( $M=2.28$ ,  $SD=1.81$ ). To measure perceived purchasing power, we used a procedure from Polman et al. (2018): Participants indicated how many dozen eggs, scissors, loaves of bread, Energizer AA batteries, and Sharpie markers they could buy using their 10 coins/banknotes. To illustrate, if coins have lower perceived purchasing power than banknotes, participants should think they can buy fewer loaves of bread with them (Alter & Oppenheimer, 2008). Finally, participants completed the MacArthur SES ladder (Adler et al., 2000) by indicating which rung (1–10, lowest to highest;  $M=5.00$ ,  $SD=1.73$ ) they sat on in society.

### Results and discussion

Consistent with theorizing, the pain of holding was higher for the coins ( $M=2.77$ ,  $SD=1.97$ ) than banknotes ( $M=1.81$ ,  $SD=1.50$ ;  $p<0.001$ ,  $[-1.21, -0.71]$ ,  $d=0.55$ ). Likewise, participants spent more on the Dunkin' Donuts card when possessing coins ( $M=\$2.37$ ,  $SD=\$4.15$ ) than banknotes ( $M=\$1.24$ ,  $SD=\$3.19$ ;  $p<0.001$ ,  $[-1.66, -0.61]$ ,  $d=0.31$ ). Indeed, participants were more likely to convert one or more units of their money into the shop card in the coins condition ( $98/379=25.86\%$ ) than the banknotes condition ( $56/395=14.18\%$ ;  $\chi^2=16.56$ ;  $p<0.001$ ).

To evaluate the perceived purchasing power alternative explanation, we conducted a repeated-measures ANOVA (between-subjects: experimental condition; within-subjects: product type). There was no effect of experimental condition on purchasing power ( $F(1, 772)=0.66$ ,  $p=0.42$ ,  $\eta_p^2=0.001$ ). There was a significant within-subjects effect of product type ( $F(4, 3088)=163.04$ ,  $p<0.001$ ,  $\eta_p^2=0.174$ ), but this was not moderated by experimental condition ( $F(4, 3088)=0.72$ ,  $p=0.58$ ,  $\eta_p^2=0.001$ ). Thus, there was no evidence that experimental condition affected purchasing power (see Table 1).

A subsequent mediation analysis (Hayes, 2017; model 4) confirmed that increased pain of holding coins (vs banknotes) statistically explained greater spending, whereas perceived purchasing power did not. Specifically, when regressing spending on experimental condition, pain of holding, and perceived

**TABLE 1** *T*-tests for the effect of experimental condition on pain of holding and perceived purchasing power (by item).

	Coins condition		Banknotes condition		<i>p</i>	95% CI	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
<b>Study 2</b>	<b>(<i>n</i>=379)</b>		<b>(<i>n</i>=395)</b>				
<b>Pain of holding</b>	<b>2.77</b>	<b>1.97</b>	<b>1.81</b>	<b>1.49</b>	<b>&lt;0.001</b>	<b>-1.21, -0.71</b>	<b>0.55</b>
Perceived purchasing power							
Dozen eggs	2.29	3.22	2.29	2.04	0.99	-0.38, 0.38	0.00
Scissors	3.04	2.39	3.16	2.18	0.48	-0.21, 0.44	0.05
Loaves of bread	4.06	3.98	3.83	5.12	0.50	-0.87, 0.43	0.05
Energizer AA batteries	7.60	7.62	7.01	5.40	0.21	-1.52, 0.34	0.09
Sharpie markers	5.94	6.80	5.85	5.90	0.85	-0.98, 0.81	0.01
<b>Study 3</b>	<b>(<i>n</i>=388)</b>		<b>(<i>n</i>=393)</b>				
<b>Pain of holding</b>	<b>2.55</b>	<b>1.85</b>	<b>1.70</b>	<b>1.33</b>	<b>&lt;0.001</b>	<b>-1.08, -0.62</b>	<b>0.53</b>
Perceived purchasing power							
Dozen eggs	3.45	3.54	3.32	3.09	0.59	-0.60, 0.34	0.04
Scissors	3.47	3.42	3.25	2.23	0.29	-0.62, 0.19	0.08
Loaves of bread	4.01	2.32	4.08	3.30	0.71	-0.34, 48	0.03
Energizer AA batteries	7.35	7.61	7.58	7.50	0.68	-0.83, 1.29	0.03
Sharpie markers	6.97	15.54	5.87	4.44	0.18	-2.72, 0.51	0.10

purchasing power, we found an indirect effect of experimental condition on amount spent through pain of holding ( $a \times b = 0.86$ , LLCI = 0.60, ULCI = 1.16) while the direct effect of experimental condition disappeared ( $p = 0.23$ ) suggesting full mediation. There were no indirect effects through perceived purchasing power ( $a \times bs < 0.02$ , CIs include 0; see Appendix S4 for full details).

Finally, we tested the potential moderating role of SES. As preregistered, we regressed spending on experimental condition, mean-centered SES, and their interaction. In this model, the effect of experimental condition on spending remained ( $B = 1.14$ ,  $p < 0.001$ ). There was no effect of SES ( $p = 0.17$ ) nor an interaction between condition and SES ( $p = 0.71$ ) suggesting that SES does not moderate the effect of experimental condition on spending.

Conceptually replicating and extending Study 1, we found that the greater pain of holding coins (vs. banknotes) drove participants to spend more on a shop card despite that card being less fungible than cash. To further examine the generalizability of these effects, we next examined donation, which carries no tangible reward unlike a shop card which may be used later.

## STUDY 3

Study 3 assessed whether participants would outright “dispose” of their coins. For this purpose, we chose incentive-compatible donation. We predicted greater donation of coins (vs. banknotes) because of a greater

pain of holding, not lower perceived purchasing power (AsPredicted #113645).

## Participants and procedure

We expected a small ( $d = 0.2$ ) effect size of cash form on donation and sourced 801 USA-based prolific participants for \$0.45/3 min. Seven-hundred and eighty-one participants ( $M_{\text{age}} = 37.25$ ,  $SD = 13.42$ ; 395 women) remained after 20 responses (2%) were removed according to the preregistered exclusion criteria. Results are descriptively the same when all participants are included (Appendix S5).

Study 3 followed the procedure of Study 2. However, instead of spending on a shop card, participants could donate to the American Red Cross: “Use the slider below to tell us how many of the \$1 coins[notes] you would like to donate to the American Red Cross (you will receive the remaining coins[notes] in the mail)” ( $M = 2.96$ ,  $SD = 3.79$ ). Subsequently, participants completed the pain of holding ( $\alpha = 0.97$ ;  $M = 2.12$ ,  $SD = 1.66$ ) and perceived purchasing power measures from Study 2. Eight randomly selected participants received digital payment (\$10) minus any sum we donated to the American Red Cross on their behalf.

## Results and discussion

Conceptually replicating and extending Studies 1–2, Study 3 found higher pain of holding for coins ( $M = 2.55$ ,  $SD = 1.85$ ) than banknotes ( $M = 1.70$ ,  $SD = 1.33$ ;  $p < 0.001$ ,

[-1.08, -0.62],  $d=0.53$ ). Participants also donated more coins ( $M=\$3.31$ ,  $SD=\$3.95$ ) than banknotes ( $M=\$2.65$ ,  $SD=\$3.59$ ;  $p=0.014$ , [-1.19, -0.13],  $d=0.18$ ).

Consistent with Study 2, a repeated-measures ANOVA revealed no effect of experimental condition on perceived purchasing power ( $F(1, 779)=0.76$ ,  $p=0.38$ ,  $\eta_p^2=0.001$ ). There was a significant within-subjects effect of product type ( $F(4, 3116)=76.09$ ,  $p<0.001$ ,  $\eta_p^2=0.089$ ), but no interaction between experimental condition and product type ( $F(4, 3116)=1.44$ ,  $p=0.22$ ,  $\eta_p^2=0.002$ ).

Finally, a mediation analysis (Hayes, 2017; model 4) revealed that earning coins (vs. banknotes) in the study increased donation through pain of holding ( $a\times b=0.58$ ,  $LLCI=0.37$ ,  $ULCI=0.84$ ) but not perceived purchasing power ( $a\times bs<0.01$ , CIs include 0; see Appendix S6), in line with Study 2. The direct effect of experimental condition disappeared ( $p=0.76$ ), suggesting full mediation of donation by pain of holding.

## GENERAL DISCUSSION

Do people experience differences in pain of holding depending on the type of cash they carry? And if so, does this pain of holding lead to increased spending? The three studies presented here suggest “yes” and “yes”: Participants spent more coins than banknotes of the same objective value because they experienced a greater pain of holding. The results were robust and generalizable, emerging in the field and online, across a range of spending decisions (store-items/shop-card/donation), populations and currencies (Americans/USD, Indians/INR), and SES levels. The alternative possibility—that coins have lower perceived purchasing power than banknotes—was not empirically supported.

### Theoretical contributions

This research introduces the *pain of holding* construct and shows that spending of coins and banknotes is influenced by this pain. While we focused on cash form, it is likely that other characteristics of money also contribute to the pain of holding. For example, ripped and soiled cash (e.g., Di Muro & Noseworthy, 2013) or foreign cash (e.g., Raghurib & Srivastava, 2002) may also be more annoying to hold which in turn contributes to increased spending.

The pain of holding may even be a previously un-discussed reason for the denomination effect (Mishra et al., 2006; Raghurib & Srivastava, 2009) which refers to the greater spending of smaller denominations (e.g.,  $10\times\$1$ ) than larger denominations (e.g.,  $1\times\$10$ ). Previous research has explained this effect through large (vs. small) denominations being more likable (Mishra et al., 2006) and psychologically harder to break (Raghurib & Srivastava, 2009). Our findings suggest that smaller

denominations (e.g.,  $10\times\$1$  notes) may also be spent more than larger denominations (e.g.,  $1\times\$10$  notes) because the smaller denominations are annoying to keep.

We also introduce the pain of *holding* as a counterpoint to the pain of *paying*. While the pain of paying is a well-established negative emotion experienced at the point of parting with money (Prelec & Loewenstein, 1998; Soman, 2003), the pain of holding is a negative emotion experienced at the prospect of keeping it. As a higher pain of holding leads to greater spending, it stands to reason higher pain of holding might lower pain of paying. For example, coins are more of a pain to keep and are spent more readily than banknotes, suggesting that they carry a lower pain of paying.

### Practical implications

Any money that is not spent is saved by definition (e.g., Webley, 2014). Thus, this research offers a novel reason—the pain of holding—for why some consumers might not save as much as they otherwise would. Approximately, 330million poorer consumers still receive their income entirely in cash (Demirgüç-Kunt et al., 2018) and may be most adversely affected by coin payments/returns (Martin & Hill, 2015). Our conceptual framework suggests that practitioners can encourage saving through interventions that directly reduce the pain of holding. For example, the reduced cumbersomeness of having coins on hand may be one reason that cash lock boxes have successfully increased saving in cash-reliant, developing countries (Dupas & Robinson, 2013). As another example, organizations and governments could encourage saving (and reduce administrative and minting costs) by returning change to consumers digitally rather than in cash. To illustrate, consumers in Hong Kong can opt to receive their change or even to deposit loose coins onto their “Octopus” public transport card at certain retailers (Octopus, 2023).

In contrast, practitioners interested in increasing spending or donation could provide consumers with more coins (vs banknotes) as part of their change. A theater might thus provide more coin-based change for tickets to encourage spending at the concession stand, while a museum could increase their revenue from donations with the same practice. Consumers even appear willing to accept fees of more than 10% to convert their coins into banknotes (e.g., Coinstar, 2020).

### Limitations and future directions

Some limitations warrant mention and pave the way for further research. First, our samples relied on adults who have experience with coins and banknotes. Children by contrast have less experience with cash and may even value coins (Bruner & Goodman, 1947). Coins make sound when dropped and thus provide

tangible, physical feedback of cause-and-effect, which children appreciate (Schlottmann, 2001). These characteristics of coins, combined with a lack of understanding about the objective value of money, may lead children to *prefer* coins to banknotes. In this way, children may not experience the pain of holding, and may even prefer to save rather than spend coins. Further research could therefore examine how pain of holding differs among children and adults.

Second, we relied on mediation and not moderation to show that the pain of holding drives people's increased inclination to spend coins (vs. banknotes). As such, the process evidence is correlational and not causal in nature. Future research could manipulate contextual cues that may dampen the nuisance of coins and thereby diminish spending. For example, endowing consumers with coins while reminding half of them of the usefulness of having coins for certain transactions (e.g., parking meters/laundry machines) may attenuate the pain of holding among those who were reminded (vs. not).

Third, while our studies did not find lower perceived purchasing power for coins than banknotes (cf. Alter & Oppenheimer, 2008), it is still possible that cash form and the pain of holding affect the subjective value of money (Buechel & Morewedge, 2014; Raghuram, 2006). Perceived purchasing power refers to how far a person thinks their money will go, but it stops short of assessing satisfaction with or liking of the cash. In this way, future research can examine the relationship between the pain of holding and subjective valuation using measures that directly tap into satisfaction with the cash. Two such measures include Mishra et al.'s (2006) 3-item scale (e.g., "How much value do you see in this money?") and Bruce et al.'s (1983) ranking approach ("Select which is more valuable": Coin vs Banknote).

## CONCLUDING COMMENTS

Consumers spend more when carrying coins than equivalently valued banknotes because coins are more of a pain to hold. This set of findings opens new avenues for increasing saving and the potential to increase consumer financial well-being.

## ACKNOWLEDGMENTS

This research benefited from the support of an Australian Government's Research Training Program Scholarship (Jay Zenkić) and an ING Think Forward Initiative Short-Term Research Grant (Jay Zenkić and Nicole L. Mead). These funders had no role in the conduct, design, analysis, interpretation, or reporting of this research. We extend a warm thank you to Daniel Gregg, Nalini Janakiraman, Sanju Jain, and Rohith Reddy for their invaluable assistance in conducting the field study in India. We also thank the International Crops Research Institute for the Semi-Arid Tropics for hosting the first author in India.

Open access publishing facilitated by Deakin University, as part of the Wiley - Deakin University agreement via the Council of Australian University Librarians.

## CONFLICT OF INTEREST STATEMENT

None.

## DATA AVAILABILITY STATEMENT

Study materials and data are available on OSF: <https://osf.io/rvyfkl/>.

## ORCID

Jay Zenkić  <https://orcid.org/0000-0002-0041-3388>

Nicole L. Mead  <https://orcid.org/0000-0002-9621-4999>

Kobe Millet  <https://orcid.org/0000-0003-4365-6109>

## REFERENCES

- Adler, N. E., Epel, E. S., Castellazzo, G., & Ickovics, J. R. (2000). Relationship of subjective and objective social status with psychological and physiological functioning: Preliminary data in healthy, white women. *Health Psychology, 19*, 586–592.
- Alter, A. L., & Oppenheimer, D. M. (2008). Easy on the mind, easy on the wallet: The roles of familiarity and processing fluency in valuation judgments. *Psychonomic Bulletin & Review, 15*(5), 985–990.
- Bech, M. L., Faruqi, U., Ougaard, F., & Picillo, C. (2018). *Payments are a-changin' but cash still rules*. BIS Quarterly Review, March.
- Bruce, V., Gilmore, D., Mason, L., & Mayhew, P. (1983). Factors affecting the perceived value of coins. *Journal of Economic Psychology, 4*(4), 335–347.
- Bruner, J. S., & Goodman, C. C. (1947). Value and need as organizing factors in perception. *The Journal of Abnormal and Social Psychology, 42*(1), 33–44.
- Buechel, E. C., & Morewedge, C. K. (2014). The (relative and absolute) subjective value of money. In E. Bijleveld & H. Aarts (Eds.), *The psychological science of money* (pp. 93–120). Springer New York.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Erlbaum.
- Coinstar. (2020). *How it works*. <https://www.coinstar.com/howcoinstarworks>
- Demirgüç-Kunt, A., Klapper, L., Singer, D., & Ansar, S. (2018). *The global Findex database 2017: Measuring financial inclusion and the fintech revolution*. World Bank Publications.
- Di Muro, F., & Noseworthy, T. J. (2013). Money isn't everything, but it helps if it Doesn't look used: How the physical appearance of money influences spending. *Journal of Consumer Research, 39*(6), 1330–1342.
- Doob, A. N., & Wood, L. E. (1972). Catharsis and aggression: Effects of annoyance and retaliation on aggressive behavior. *Journal of Personality and Social Psychology, 22*(2), 156–162.
- Dupas, P., & Robinson, J. (2013). Why don't the poor save more? Evidence from health savings experiments. *American Economic Review, 103*(4), 1138–1171.
- Esselink, H., & Hernández, L. (2017). The use of cash by households in the euro area. *ECB Occasional Paper, 201*, 1–68.
- Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G\* power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*(2), 175–191.
- Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Publications.
- Kahn, M. (1966). The physiology of catharsis. *Journal of Personality and Social Psychology, 3*(3), 278–286.



- Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47, 263–291.
- Kumar, R., Maktabi, T., & O'Brien, S. (2018). 2018 findings from the diary of consumer payment choice. *Federal Reserve Bank of San Francisco*, 1–16.
- Martin, K. D., & Hill, R. P. (2015). Saving and well-being at the base of the pyramid: Implications for transformative financial services delivery. *Journal of Service Research*, 18(3), 405–421.
- Mikolic, J. M., Parker, J. C., & Pruitt, D. G. (1997). Escalation in response to persistent annoyance: Groups versus individuals and gender effects. *Journal of Personality and Social Psychology*, 72(1), 151–163.
- Mishra, H., Mishra, A., & Nayakankuppam, D. (2006). Money: A bias for the whole. *Journal of Consumer Research*, 32(4), 541–549.
- Morewedge, C. K., Holtzman, L., & Epley, N. (2007). Unfixed resources: Perceived costs, consumption, and the accessible account effect. *Journal of Consumer Research*, 34(4), 459–467.
- Octopus. (2023). *Other ways to reload*. <https://www.octopus.com.hk/en/consumer/octopus-cards/reload/change-top-up/index.html>
- Peez, J., & Soliman, M. (2016). Big money: The effect of money size on value perceptions and saving motivation. *Perception*, 45(6), 631–641.
- Polman, E., Effron, D. A., & Thomas, M. R. (2018). Other people's money: Money's perceived purchasing power is smaller for others than for the self. *Journal of Consumer Research*, 45(1), 109–125.
- Prelec, D., & Loewenstein, G. (1998). The red and the black: Mental accounting of savings and debt. *Marketing Science*, 17(1), 4–28.
- Raghubir, P. (2006). An information processing review of the subjective value of money and prices. *Journal of Business Research*, 59(10–11), 1053–1062.
- Raghubir, P., & Srivastava, J. (2002). Effect of face value on product valuation in foreign currencies. *Journal of Consumer Research*, 29(3), 335–347.
- Raghubir, P., & Srivastava, J. (2009). The denomination effect. *Journal of Consumer Research*, 36(4), 701–713.
- Reserve Bank of India. (2019). *Currency management*. <https://rbidocs.rbi.org.in/rdocs/AnnualReport/PDFs/8CURRENCYM ANAGEMENT2AA79CD7EB33457F8781DE90C017D216.PDF>
- Reutskaja, E., Iyamabo, J., Raghubir, P., & Gallo, I. (2020). Price-denomination effect: Choosing to pay with denominations that are the same as the product prices. *Frontiers in Psychology*, 11, 552888.
- Sargent, T. J., & Velde, F. R. (2003). *The big problem of small change*. Princeton University Press.
- Schlottmann, A. (2001). Perception versus knowledge of cause and effect in children: When seeing is believing. *Current Directions in Psychological Science*, 10(4), 111–115.
- Soman, D. (2003). The effect of payment transparency on consumption: Quasi-experiments from the field. *Marketing Letters*, 14(3), 173–183.
- Thomas, M., Desai, K. K., & Seenivasan, S. (2011). How credit card payments increase unhealthy food purchases: Visceral regulation of vices. *Journal of Consumer Research*, 38(1), 126–139.
- Tversky, A., Sattath, S., & Slovic, P. (1988). Contingent weighting in judgment and choice. *Psychological Review*, 95(3), 371–384.
- Vandoros, S. (2013). My five pounds are not as good as yours, so I will spend them. *Experimental Economics*, 16, 546–559.
- Webley, P. (2014). 13. The development of saving. In S. D. Preston, M. L. Kringsbach, & B. Knutson (Eds.), *The interdisciplinary science of consumption* (pp. 243–262). MIT Press.

## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

**How to cite this article:** Zenkić, J., Mead, N. L., & Millet, K. (2024). When cash costs you: The pain of holding coins over banknotes. *Journal of Consumer Psychology*, 34, 641–649. <https://doi.org/10.1002/jcpy.1395>

## APPENDIX 1

### COINS CONDITION

Thank you for finishing all of the questions.

You have been entered into a draw for an extra payment of \$10.

Should you win the draw for the extra payment of \$10, you will receive this in the form of 10 \$1 coins:





### BANKNOTES CONDITION

Thank you for finishing all of the questions.

You have been entered into a draw for an extra payment of \$10.

Should you win the draw for the extra payment of \$10, you will receive this in the form of 10 \$1 banknotes:

