Running Head: FLUENCY AND VALUATION

Easy on the Mind, Easy on the Wallet:

The Roles of Familiarity and Processing Fluency in Valuation Judgments

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Word Count: 3,998 (incl. references, footnotes, and acknowledgements) + Abstract: 122.

Abstract

Although people routinely estimate the value of items in the environment, from goods and services to natural resources and lost earnings following an accident, the processes that underlie human valuation estimates are not well understood. We show that people use familiarity and fluency—the ease with which they process information—to determine an item's value. In three studies, participants believed that familiar forms of currency (e.g., a familiar $1 bill) had greater purchasing power than their unfamiliar counterparts (e.g., a rare and unfamiliar coin). Mechanistic analyses showed a positive correlation between participants' familiarity with the unfamiliar currency and their estimates of its value. We conclude by discussing the theoretical and practical implications of our findings for researchers, marketing experts, and policymakers alike.

Easy on the Mind, Easy on the Wallet:
The Role of Processing Fluency in Valuation Judgments

Valuation estimates govern the routine decisions of whether to buy and sell goods and services, and the larger decisions of whether to attend college and which vocation to pursue. Although valuation is a fundamental component of human judgment, the principles that determine how people actually appraise a target's value are incompletely understood.

Financial and economic models explain the steps in monetary valuation, but many assume that human valuers are invariably rational. For example, the efficient market hypothesis (Fama, 1965) assumes that investors re-evaluate market prices instantly and rationally when exposed to new information, so a single investor cannot systematically outperform the market in the short-term. This definition assumes that informed investors are perfectly rational agents, immune to behaving subjectively or suboptimally.

In fact, many human valuation judgments tend to be biased (Tversky & Kahneman, 1974). The *endownment effect* is one particularly well-cited example, according to which people perceive greater value in goods they wish to sell than in identical goods they are attempting to buy (Thaler, 1980). Other researchers have also shown that sellers, buyers, and disinterested third parties adopt very different approaches to valuation tasks because they weight the same information quite differently (e.g., Birnbaum & Zimmerman, 1998).

Like buyers and sellers, people who interact with newly introduced or foreign currency exhibit a series of systematic valuation biases. For example, despite understanding the relevance of exchange rates, travelers tend to spend according to the face value of foreign currencies rather than their value in real terms (Raghubir & Srivastava, 2002). The introduction of the Euro in 2002 and the deletion of six zeroes from the Turkish

Lira in 2005 created similar valuation anomalies among Europeans across several countries (e.g., Cannon & Cipriani, 2006).

Other researchers have considered a range of specific valuation biases (for a review see Raghubir, 2006). For example, people are more reluctant to spend a $100 bill than to make equivalent gift certificate purchases (Raghubir & Srivastava, in press), credit card purchases (Prelec & Simester, 2001), and successive purchases with smaller denominations that sum to $100 (Mishra, Mishra, & Nayankankuppam, 2006). These studies suggest that people struggle to objectively valuate currency and consumables in the face of numerous cognitive biases.

Many attempts at valuation are similarly plagued by the subjective nature of valuation contexts. For example, judges and juries attempt to translate a plaintiff's pain into the language of monetary value when assigning damages in a negligence suit (Payne, Sunstein, Hastie, Viscusie, & Schkade, 2002). Likewise, national governments periodically weigh the costs of deforestation against the benefits of a new highway, and question whether the threat of global warming warrants costly power plant upgrades (Hanemann, 1994).

Such subjective judgments are laced with uncertainty, and humans tend to respond to uncertainty by adopting a variety of judgmental heuristics (e.g., Tversky & Kahneman, 1974). These heuristics, or cognitive shortcuts, simplify the valuation process, but they also introduce a range of suboptimal cognitive biases. For example, the U.S. government spends millions of dollars filtering arsenic from drinking water, while ignoring other hazards that are intuitively less hazardous, but actually kill many more people (Sunstein, 2002). Governments regularly allocate resources according to how much fear a toxin

engenders, rather than how many people it affects in reality, which often results in the dramatic misallocation of funds (Slovic, 2000).

Familiarity and Valuation

According to the *mere exposure effect* (Zajonc, 1968), familiar items are preferred to their unfamiliar but otherwise identical counterparts. Since familiarity generates the experience of liking, one might expect a familiar and therefore more likable item to also seem more valuable. One explanation for this effect is that familiar items become increasingly appealing because they become more fluently or easily processed (e.g., Fang, Singh, & Ahluwalia, 2007). Indeed, familiarity is one of many techniques that researchers have used to manipulate processing fluency (e.g., Alter & Oppenheimer, 2008a, 2008b; Alter Oppenheimer, Epley, & Eyre, 2007).

Although few studies have considered the role of familiarity in valuation processes directly, one recent paper examined whether the fluency of a stock's name influenced its performance immediately following its initial public offering (Alter & Oppenheimer, 2006). Indeed, stock performance data from the New York and American Stock Exchanges between 1990 and 2004 showed that fluently named stocks outperformed disfluently named stocks. Arguing for a similar mechanism, Mishra et al. (2006) noted that people are more reluctant to spend notes of larger denominations (e.g., a $50 bill) than several smaller notes with an equivalent value (e.g., 5 x $10 bills), in part because a $50 bill is more easily quantified.

In this paper, we examined the relationship between familiarity and valuation directly, and sought to show that unfamiliar forms of currency (Studies 1-3) seem less valuable than their more familiar but otherwise identical counterparts. We manipulated the

familiarity of the currency in our experiments by presenting more or less common forms of currency in Studies 1 and 2, and real or subtly altered versions of real currency in Study 3.

Familiarity might influence valuation judgments through different routes. Unfamiliar visual stimuli tend to be more difficult to process visually (e.g.,Winkielman & Cacioppo, 2001), and less familiar stimuli are more difficult to remember (e.g., Tversky & Kahneman, 1973). Both are forms of processing disfluency that tend to engender disliking. Moreover, participants may more readily recall using the familiar forms of currency, thereby associating them with greater value than their unfamiliar counterparts. Regardless of which cognitive route engendered disfluency, we expected unfamiliar currency instruments to seem less valuable than their more familiar counterparts.

Study 1

Method

Participants. Thirty-seven university staff and graduate students were recruited from a dining hall at Princeton University.

Design, materials and procedure. Participants completed a one-page questionnaire in which they estimated how many of each of ten inexpensive items they could purchase with $1 (items listed in Table 1).

Participants either completed a familiar-currency version or an unfamiliar-currency version of the questionnaire. The familiar-currency questionnaire contained a picture of a standard $1 bill, whereas the unfamiliar-currency questionnaire contained a picture of a Susan B. Anthony $1 coin (forms of currency from Studies 1-3 depicted in Figure 1). Produced in limited quantities from 1979-1981 and in 1999, Susan B. Anthony coins are considerably rarer than $1 bills, which constitute 45% of all notes produced by the Bureau

of Engraving and Printing (Bureau of Engraving and Printing, 2008). Accordingly, although both forms of currency are equally valuable, we expected participants to be more familiar with the $1 bill, and to therefore value the $1 bill more highly.

At the end of the questionnaire, participants reported their familiarity with the form of currency depicted at the top of the page (from 1 = never seen before to 7 = seen more than 50 times).

Results and Discussion

Manipulation check. As expected, participants were significantly more familiar with the $1 bill ($M = 7.00$, $SD = .00$) than with the $1 Susan B. Anthony coin ($M = 4.18$, $SD = 2.24$), $t(35) = 5.13$, $p < 10^{-4}$, $\eta_p^2 = .43$.

Primary analyses. We began by converting participants' purchasing power estimates to standardized Z-scores, a process we also adopted in Studies 2 and 3. This allowed us to compare the estimates of the relatively more and less expensive items on a single scale. For example, participants believed they could purchase approximately 8 pencils with $1 compared with 64 paper napkins.

As predicted, participants in the familiar-currency condition believed they could purchase more of each item, on average, with $1 than did participants in the unfamiliar-currency condition, $t(9) = 2.24$, $p = .015$, $\eta_p^2 = .54$. (Figure 2 contains a graphical depiction of the results pooled across experiments , and Table 1 contains the item-wise means from each experiment.) Further, in support of a familiarity mechanism, the more familiar participants in the disfluent-currency condition were with the Susan B. Anthony coin, the greater they estimated its purchasing power, $r(19) = .43$, $p < .05$. Thus, participants

believed that the monetary sum of $1 had greater purchasing power when it was depicted in a familiar format.[1]

Study 1 provided preliminary evidence that unfamiliar forms of currency seem less valuable than their more familiar counterparts. However, an alternative explanation is that coins may seem inherently less valuable than bills, regardless of their relative familiarity (e.g., Mishra et al., 2006). This account cannot explain why participants who were more familiar with the Susan B. Anthony dollar valued it more highly. Even when we confined our analysis to participants in the coin condition, familiarity reliably influenced valuation judgments. Nonetheless, in Study 2 we avoided this concern by avoiding coins altogether. Instead we presented participants in the familiar-currency condition with two regular $1 bills, and those in the unfamiliar-currency condition with one rare $2 bill.

Study 2

Method

Participants. The experimenter recruited 39 adult volunteers at a Princeton University campus dining hall.

Design, materials, and procedure. This questionnaire was similar to the questionnaire used in Study 1, with several exceptions. First, participants estimated the quantity of each item they could purchase with $2, rather than with $1. Second, the familiar-currency questionnaire depicted two $1 bills, whereas the unfamiliar-currency questionnaire depicted one $2 bill. Since there are 1520 $1 bills for every $2 bill in circulation (U.S. Treasury, 2008), we expected participants to be more familiar with the $1 bills than with the $2 bill. At the end of the questionnaire participants indicated their familiarity with the pictured form of currency on a 7-point scale.

Results and Discussion

Manipulation check. As expected, participants were more familiar with the $1 bill ($M = 6.90$, $SD = .31$) than with the $2 bill ($M = 3.21$, $SD = 2.04$), $t(37) = 7.99$, $p < 10^{-8}$, $\eta_p^2 = .63$.

Primary analyses. Participants in the familiar-currency condition believed they could purchase more of each item, on average, with $2 than did participants in the unfamiliar-currency condition, $t(9) = 4.23$, $p = .002$, $\eta^2_p = .67$ (see Table 1 and Figure 2). Further supporting the proposed familiarity mechanism, participants in the unfamiliar-currency condition who were more familiar with the $2 bill believed that it had greater purchasing power, $r\ (17) = .54$, $p = .02$. Study 2 therefore replicated Study 1, showing that participants perceived a more familiar form of currency to have greater purchasing power than its relatively unfamiliar counterpart.

In Study 3, we addressed two remaining concerns. First, participants in the familiar-currency condition may have perceived greater purchasing power merely because there were two bills in that condition and only one bill in the unfamiliar-currency condition. However, this alternative explanation contradicts previous research which suggests that people perceive greater value in a single bill than in several lesser bills of equivalent value (Mishra et al., 2006).[2] Moreover, this alternative interpretation cannot explain why participants in the $2 bill condition who were more familiar with the $2 bill estimated it to have greater purchasing power.

Nonetheless, in order to eliminate this concern in Study 3, all participants completed a questionnaire depicting a single bill. We contrasted a real $1 bill in the familiar-currency condition with a subtly altered $1 bill in the unfamiliar-currency

condition. The subtle alterations made the unfamiliar bill more difficult to process and necessarily less familiar, while maintaining its format, quantity, and face value. We expected to replicate the results from Studies 1 and 2, in which participants perceived greater value in the familiar currency than in the unfamiliar currency.

Additionally, while Studies 1 and 2 showed that unfamiliar, and therefore more disfluently processed, currency instruments are undervalued, any disfluently processed stimulus should seem less valuable than its more easily processed counterparts. Accordingly, in Study 3, we included a disfluent-items condition in which we left the currency unchanged, but decreased the fluency of the purchasable goods. Since unfamiliar and therefore disfluent currency instruments seem to be valued less highly, we assumed that disfluent consumable items would be valued less highly than their fluent counterparts. Consequently, we expected participants in the disfluent-item condition to attach lower value to the ten items, ultimately leading them to believe that the dollar was capable of purchasing more of those goods.

Study 3

Method

Participants. A diverse sample of 58 adult participants at a train station in Princeton, New Jersey, and student participants in dining halls at Princeton University, volunteered to take part in the study.

Design, materials and procedure. Participants completed one of three questionnaires. The familiar-currency questionnaire depicted a standard $1 bill and was identical to the familiar condition from Study 1. The unfamiliar-currency questionnaire was the same as the familiar condition, except that in place of the standard $1 bill there was a

subtly altered $1 bill (see Figure 1; the altered bill depicted George Washington facing left instead of right; the "ONE" seal from the back of the bill was moved to the front left of the bill; the series seal was moved from the front left to the front right of the bill; and the position of the treasurer's signature at the bottom right and the bill's serial number at the top right of the bill were exchanged). Finally, the disfluent-items questionnaire depicted a standard $1 bill, but the consumable items were printed in a disfluent 10-point grey, italicized, Arial font (*sample*), rather than the standard 12-point black Times New Roman font used in the other conditions (sample). Such font manipulations are a popular method of manipulating the fluency with which participants process printed information (Alter & Oppenheimer, 2008a). We did not ask participants how familiar the notes were since the altered bill was novel, but excluded the responses of one participant who questioned its authenticity at the end of the study.

Results and Discussion

A repeated measures analysis of variance (ANOVA) demonstrated that the familiarity of the depicted currency and the fluency of the consumable items influenced participants' purchasing power estimates, $F(2, 18) = 23.67$, $p < .001$, $\eta_p^2 = .73$ (see Figure 3). To examine these effects more closely, we conducted three planned pairwise contrasts (controlling for Type I error rates) comparing participants' purchasing estimates across the three conditions. As in Studies 1 and 2, participants in the familiar-currency condition believed that $1 had greater purchasing power across the 10 items relative to the unfamiliar-currency condition, $t(9) = 2.87$, $p = .018$, $\eta_p^2 = .48$. However, participants in the disfluent-items condition perceived greater purchasing power in the $1 bill than did

participants in either the familiar-currency, $t(9) = 4.61, p = .001, \eta_p^2 = .70$, or unfamiliar-currency conditions, $t(9) = 5.33, p < .00005, \eta_p^2 = .76$.[3]

These studies collectively show that unfamiliar currency instruments and disfluent purchasable goods appear less valuable than their familiar and fluent counterparts. Indeed, across the monetary familiarity conditions present in all three studies (and excluding the disfluent-items condition in Study 3), participants believed they could purchase a greater quantity of 28 of the 30 items (93.33%) with the familiar forms of currency, a significantly greater proportion than might be expected by chance, χ^2 (1, N = 30) = 22.53, $p < 10^{-5}$ (see Table 1).

General Discussion

Across three studies, we found that participants perceived greater purchasing power in familiar forms of currency than in their equivalent but less familiar counterparts. This effect held regardless of whether we contrasted a fluent $1 bill with a rare coin, a rare bill, or a subtly altered version of the same $1 bill. Studies 1 and 2 left open the possibility that participants merely responded to the global experience of disfluency associated with unfamiliarity by assigning lower valuation estimates. However, in Study 3, we showed that participants perceived the source of unfamiliarity or disfluency as less valuable, whether the source was a currency instrument or a consumable item. This finding suggests that people associate unfamiliarity or disfluency with its specific source, rather than with the judgment context at large. Moreover, consistent with existing research (Alter & Oppenheimer, 2008a), two different instantiations of fluency—familiarity and visual clarity—appeared to have similar effects on participants' valuation estimates. These convergent

results suggest that familiar stimuli seem more valuable at least in part because they are processed more fluently.

Theoretical Implications

This paper builds on a considerable body of work demonstrating that metacognition influences judgment across a broad array of domains (Alter & Oppenheimer, 2008a). Specifically, we found that the metacognitive experience of disfluency associated with processing unfamiliar stimuli led people to assign lower value to currency instruments and consumable goods.

In addition, Study 3 presented novel evidence that people attribute familiarity or fluency to its specific source. Rather than generally attenuating participants' valuation judgments, the experience of disfluency only diminished the apparent value of the stimuli that were unfamiliar or difficult to process. Thus, unfamiliar currency instruments seemed less valuable than familiar forms of currency, and consumable goods printed in a difficult-to-read font seemed less valuable than the same goods printed in a clear font in Study 3.

Just as participants in the present research were capable of attributing processing ease to its specific source (currency vs. consumable items), people also tend to discount fluency as an informative cue when it seems not to originate from the relevant judgmental target. Thus, although people generally assume that fluently processed surnames are more common, they discount fluency as an informative cue when the name is shared by a famous person like Bush, Gore, or Clinton (Oppenheimer, 2004).

Practical Implications

This research suggests that national governments should think carefully before amending the country's currency instruments. In fact, the U.S. government recently

introduced numerous currency updates, unveiling plans to produce a new series of banknotes covering all denominations from $5 to $100 in August 2008, shortly after announcing that 38 "Presidential" $1 coins would be released between 2007 and 2016. A similar announcement in 1999 preceded the release of 50 "U.S. State" quarters between 1999 and 2008.

The treasury's official motivation for these updates seems somewhat frivolous: to "return...circulating [currency] to its position as an object of aesthetic beauty" (*Presidential $1 Coin Act*, 2005). This paper suggests that seemingly innocuous decisions to update currency instruments might diminish the perceived value of the currency, with unintended economic consequences. More generally, these findings show that psychological theory has important implications for economic theory and policymaking.

Conclusion

Valuation is a task laden with uncertainty, because there is no consistent universal scale against which to measure an item's value. Many items, like food and water, seem more valuable in some contexts (e.g., following a fast) than in others (e.g., following a feast), and consumable items are so diverse (e.g., a goldfish vs. the services of a mechanic) that their values are difficult to compare on a common scale. In response to such uncertainty, our research suggests that people rely on the ubiquitous metacognitive cue of fluency to determine the value of both currency and consumable items. As a simple rule of thumb, people perceive greater value in easily processed goods than in their less easily processed but otherwise identical counterparts.

References

Alter, A. L., & Oppenheimer, D. M. (2006). Predicting short-term stock fluctuations by using processing fluency. *Proceedings of the National Academy of Sciences of the U.S.A.,* **103**, 9369-9372.

Alter, A. L., & Oppenheimer, D. M. (2008a). Uniting the tribes of fluency to form a metacognitive nation. Manuscript under review.

Alter, A. L., & Oppenheimer, D. M. (2008b). Effects of fluency on psychological distance and mental construal (or why New York is a large city, but *New York* is a civilized jungle). *Psychological Science,* **19**, 161-167.

Alter, A. L., Oppenheimer, D. M., Epley, N., & Eyre, R. N. (2007). Overcoming intuition: Metacognitive difficulty activates analytic reasoning. *Journal of Experimental Psychology: General,* **136**, 569-576.

Birnbaum, M. H., & Zimmerman, J. M. (1998). Buying and selling prices of investments: Configural weight model of interactions predicts violations of joint independence. *Organizational Behavior and Human Decision Processes,* **74**, 145-187.

Bureau of Engraving and Printing (2008). Money facts. Retrieved from http://www.moneyfactory.gov/document.cfm/18/2230 on February 2, 2008.

Cannon, E., & Cipriani, G. P. (2006). Euro-illusion: A natural experiment. *Journal of Money, Credit, and Banking,* **38**, 1391-1403.

Fama, E. (1965). The behavior of stock market prices. *Journal of Business,* **38**, 34-105.

Fang, X., Singh, S., & Ahluwalia, R. (2007). An examination of different explanations for the mere exposure effect. *Journal of Consumer Research,* **34**, 97-103.

Hanemann, W. M. (1994). Valuing the environment through contingent valuation. *Journal of Economic Perspectives,* **8**, 19-43.

Mishra, H., Mishra, A., & Nayakankuppam, D. (2006). Money: A bias for the whole. *Journal of Consumer Research,* **32**, 541-549.

Oppenheimer, D. M. (2004). Spontaneous discounting of availability in frequency judgment tasks. *Psychological Science,* **15**, 100-105.

Payne, J. W., Sunstein, C. R., Hastie, R., Viscusi, W. K., & Schkade, D. A. (2002). *Punitive damages: How juries decide.* Chicago: University of Chicago Press.

Prelec, D., & Simester, D. (2001). Always leave home without it: A further investigation of the credit card effect on willingness to pay. *Marketing Letters,* **12**, 5-12.

Presidential $1 Coin Act (Public Law 109-145), Section 101 (10) (2005).

Raghubir, P. (2006). An information processing view of the subjective value of money and prices. *Journal of Business Research,* **59**, 1053-1062.

Raghubir, P., & Srivastava, J. (2002). Effect of face value on product valuation in foreign currencies. *Journal of Consumer Research,* **29**, 335-347.

Raghubir, P., & Srivastava, J. (in press). Monopoly money: The effect of payment coupling and form on spending behavior. *Journal of Experimental Psychology: Applied.*

Slovic, P. (2000). *The perception of risk.* London: Earthscan.

Sunstein, C. R. (2002). *Risk and reason.* New York: Cambridge University Press.

Thaler, R. (1980). Towards a positive theory of consumer choice. *Journal of Economic Behavior and Organization,* **1**, 39-60.

Tversky, A., & Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. *Cognitive Psychology,* **5**, 207-232.

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science,* **185***,* 1125-1140.

Winkielman, P. & Cacioppo, J. T. (2001). Mind at ease puts a smile on the face: Psychophysiological evidence that processing facilitation leads to positive affect. *Journal of Personality and Social Psychology,* **81***,* 989–1000.

Zajonc, R. B. (1968) Attitudinal effects of mere exposure, *Journal of Personality and Social Psychology,* **9***,* 1-27.

Acknowledgements

We thank Alan Castel, Margaret Gerbasi, Melissa Miller, Priya Raghubir, Rolf Reber, Anuj Shah, Catherine Wolpe, and Jeffrey Zemla for their assistance. This research was supported by National Science Foundation grant 051811.

Table 1

	Mean perceived quantity purchasable per $ in Study 1		Mean perceived quantity purchasable per $ in Study 2		Mean perceived quantity purchasable per $ in Study 3		
	Familiar Currency ($1 bill)	Unfamiliar Currency (rare $1 coin)	Familiar Currency (2 x $1 bills)	Unfamiliar Currency (rare $2 bill)	Disfluent Items (real $1 bill)	Familiar Currency (real $1 bill)	Unfamiliar Currency (altered $1 bill)
Gumballs	9.53	6.70	12.67	10.71	3.82	6.17	5.09
Paperclips	70.67	62.70	130.63	34.57	88.89	47.50	20.09
Wrapping Paper (sq. feet)	9.88	11.07	26.88	8.57	11.21	3.33	1.81
Mexican Pesos	10.75	12.86	70.50	10.33	31.26	39.90	5.62
Pencils	7.73	7.67	15.67	7.29	8.56	7.25	3.36
Pieces of Skittles Candy	57.08	40.68	66.67	29.00	34.22	13.60	11.67
Thumb Tacks	47.08	34.57	50.38	32.20	33.72	25.83	13.00
Sheets of 8.5” x 11” Paper	58.00	55.33	129.94	76.57	39.94	28.33	27.45
Hershey’s Kisses	21.27	14.19	32.67	25.86	18.22	9.81	9.10
White Paper Napkins	70.36	56.85	102.88	71.67	58.94	38.82	22.10

Table 1. Mean perceived purchasing power of currency in each condition across Studies 1-3.

Figure 1. Familiar and unfamiliar forms of currency used in Studies 1-3.

Figure 2. Mean purchasing power estimates across the familiar-currency and unfamiliar-currency conditions, collapsed across Studies 1-3.

Figure 3. Purchasing power of $1 (averaged across ten consumable items) in Study 3. Each mean is significantly different from the others, all *p*s < .05.

Figure 1

STUDY 1	STUDY 2	STUDY 3
FAMILIAR CONDITION	**FAMILIAR CONDITION**	**FAMILIAR CONDITION**
		
UNFAMILIAR CONDITION	**UNFAMILIAR CONDITION**	**UNFAMILIAR CONDITION**
		

Figure 2

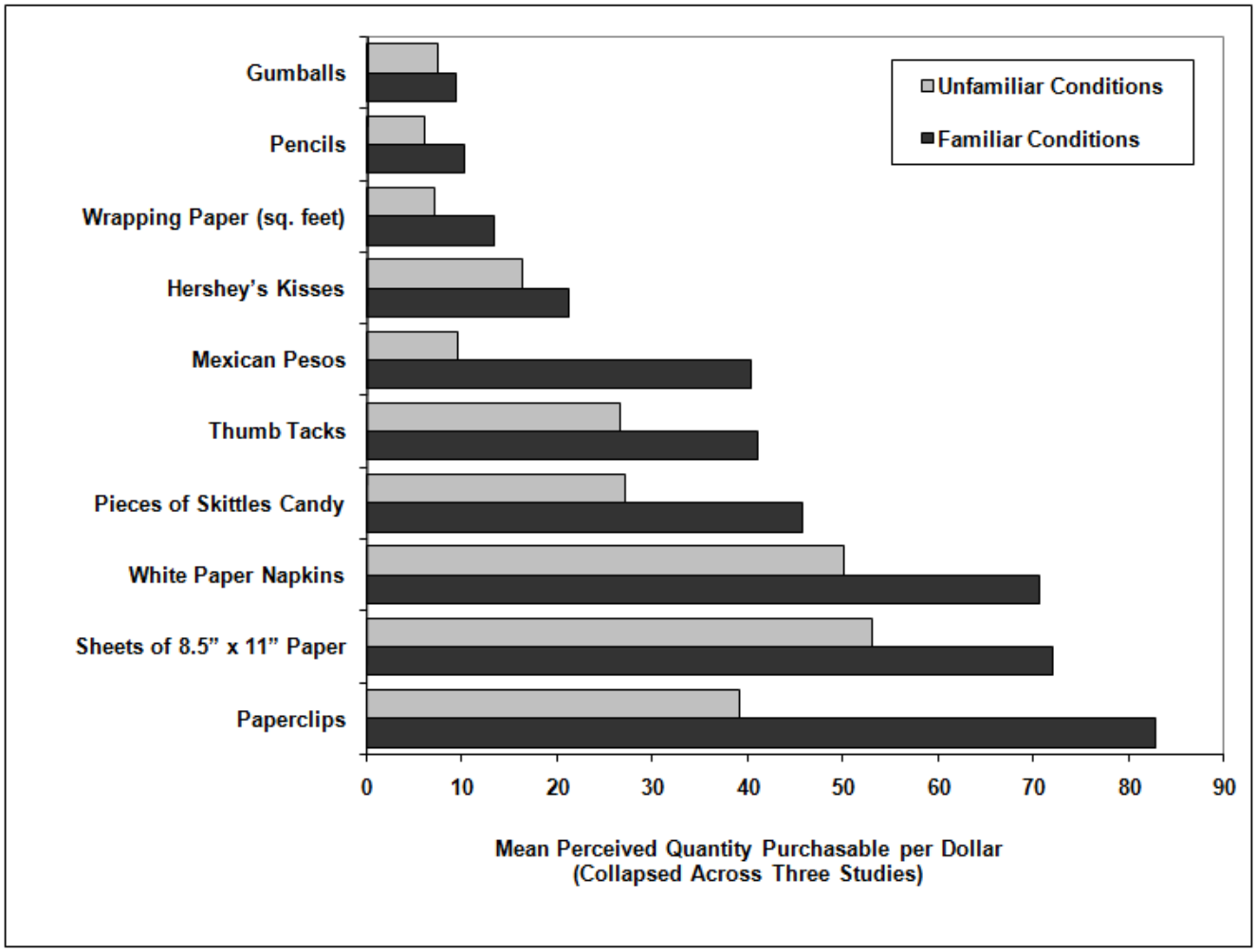
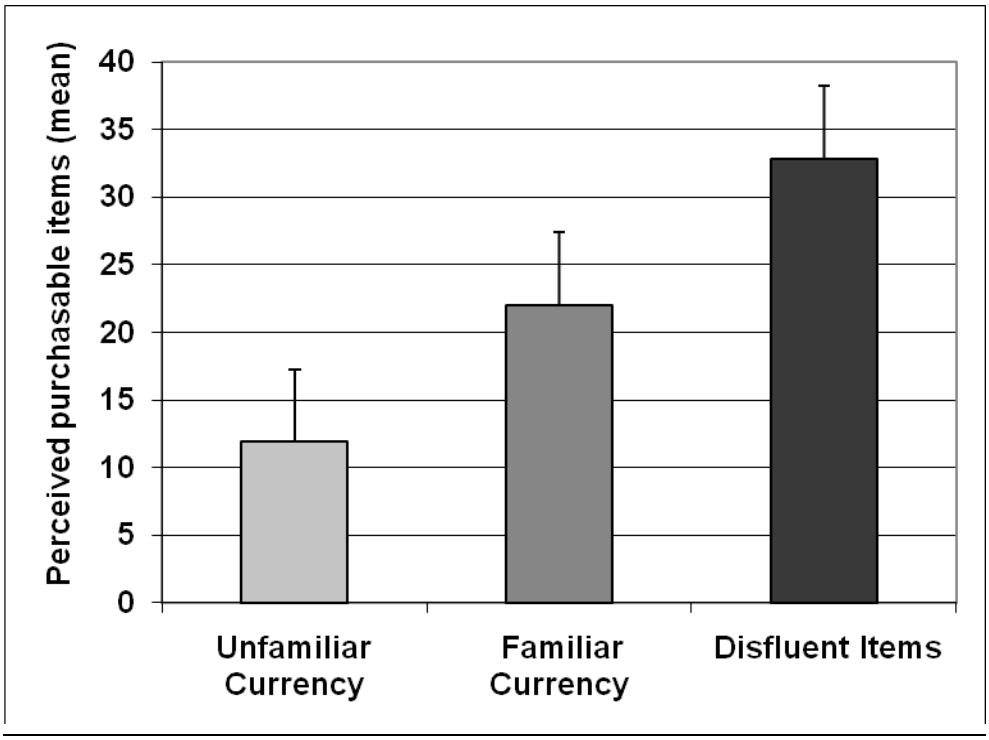

Gumballs
Pencils
Wrapping Paper (sq. feet)
Hershey's Kisses
Mexican Pesos
Thumb Tacks
Pieces of Skittles Candy
White Paper Napkins
Sheets of 8.5" x 11" Paper
Paperclips
Unfamiliar Conditions
Familiar Conditions
0
10
20
30
40
50
60
70
80
90
Mean Perceived Quantity Purchasable per Dollar
(Collapsed Across Three Studies)

Figure 3


Perceived purchasable items (mean)
40
35
30
25
20
15
10
5
0
Unfamiliar Currency
Familiar Currency
Disfluent Items

Footnotes

1 We also sought to eliminate the possibility that some participants in the unfamiliar-currency condition offered lower estimates because they did not believe the Susan B. Anthony coin was legal tender. This explanation seemed unlikely since a) the questionnaire asked participants to estimate the purchasing power of $1, generally, and merely provided the image of the coin as a reference; b) none of the participants reported purchasing power estimates of zero for any of the 10 items, eliminating the possibility that they believed the coin was fabricated; c) when the experimenter collected the completed questionnaire and explained the purpose of the study, none of the participants questioned the coin's authenticity; and d) even after eliminating the four participants who were completely unfamiliar with the coin, the results remained significant. Similar analyses in Studies 2 and 3 allayed the same concerns.

2 This discrepancy between our results and Mishra et al.'s (2006) is not surprising given that their whole-part effect relies on the difficulty of summing values of multiple bills. Summing two $1 bills after being told their total value (as in our study) is trivial compared to summing five bills of various denominations to an unknown value (as in theirs). The disfluency engendered by summing was trivial and overshadowed by familiarity effects in our study.

3 As in Studies 1 and 2, we examined the data for evidence that participants in the unfamiliar-currency condition doubted the altered bill's authenticity. Except for the one participant, whose data were excluded when he recognized that the altered bill was fabricated, none of the participants provided purchasing power estimates of zero for any of the 10 items. Thus, the effects were unlikely to have been driven by participants who believed the altered currency was fabricated and therefore valueless.