Effect of Face Value on Product Valuation in Foreign Currencies

PRIYA RAGHUBIR
JOYDEEP SRIVASTAVA*

This article examines systematic differences in people's spending behavior when using foreign currencies. Rather than overspend or underspend in general, we show that individuals' valuation of a product in an unfamiliar foreign currency is biased toward its nominal value—its face value—with inadequate adjustment for the exchange rate. This leads to underspending when the face value of a foreign currency is a multiple of an equivalent unit of a home currency (e.g., 4 Malaysian ringgits = 1 U.S. dollar) and overspending when it is a fraction (e.g., .4 Bahraini dinar = 1 U.S. dollar). Four studies demonstrate the robustness of the face value effect across different currencies, exchange rate frames, and with samples from two countries, and two studies show that ability-related factors such as time pressure and experience moderate the face value effect. The article concludes by discussing the theoretical implications of the findings.

Anecdotal evidence abounds that people treat and use foreign currency differently from their home currency as they have difficulty in getting used to and spending foreign money. On the one hand, people have been known to excessively account for their expenses on a holiday and report spending paralysis or underspending. On the other hand, people report the monopoly money phenomenon, where they treat the foreign money like play money, leading to overspending. Although individuals are cognizant of the exchange rate and attempt to account for it in their spending decisions, it appears that it takes a while to stop converting and think in terms of the foreign currency. Consider Americans spending in Canada or the United Kingdom (US$1.00 = C$1.50 = £.67). Although the exchange rates are well known, will average Americans do the conversion accurately? Or, will they overspend in the two foreign countries because the foreign money is treated like play money? Will they underspend because they are uncomfortable with the units of denomination? Or, will they spend more in one country than the other and, if so, which one?

This article proposes that there is a systematic difference in people's spending behavior when using foreign currencies. Rather than overspend or underspend across the board, we demonstrate that individuals' spending behavior is a function of whether the foreign currency is a fraction or a multiple of a unit of their home currency. A foreign currency is referred to as a multiple of the home or local currency when a unit of the local currency represents multiple units of the foreign currency (e.g., 1 U.S. dollar = 4 Malaysian ringgits in the United States). In contrast, a foreign currency is referred to as a fraction of the local currency when a unit of the local currency represents fractional units of the foreign currency (e.g., 1 U.S. dollar = .4 Bahraini dinar in the United States). We propose that the systematic difference occurs because people's subjective valuation of products when using foreign currencies is biased toward the nominal value of the product in a foreign currency, its face value, with inadequate adjustment for the exchange rate.

The face value effect proposed in this article is related to the money illusion effect that documents a bias in assessing economic transactions because of overweighting nominal values relative to real values (Shafir, Diamond, and Tversky 1997). For instance, an individual reacts differently to a 2% raise in times of 4% inflation than to a 2% cut in times of no inflation. While economic transactions can be represented in either nominal or real terms, and although people are aware of the distinction, money illusion suggests that judgments are often some combination of nominal and real values, with a bias toward nominal values because nominal representations are relatively simpler and more salient. In

*Priya Raghubir is assistant professor at the Haas School of Business, University of California, Berkeley, CA 94720; e-mail: raghubir@haas.berkeley.edu. Joydeep Srivastava is assistant professor at the Robert H. Smith School of Business, University of Maryland, College Park, MD 20742; e-mail: srivasta@rhsmith.umd.edu. This research was partially funded by the Hellman Family grant awarded by the University of California, Berkeley, to the first author. The authors, listed in alphabetical order, contributed equally to this article. The authors thank Lydia Price for her help in collecting the data for study 4. The authors acknowledge the helpful comments and suggestions of the editor, associate editor, three reviewers, seminar participants at the University of Wisconsin—Madison, Institute for Personality and Social Research, University of California, Berkeley, New York University, and session participants at the Association for Consumer Research conference (October 2000).

© 2002 by JOURNAL OF CONSUMER RESEARCH, Inc. ● Vol. 29 ● December 2002
All rights reserved. 0093-5301/2003/2903-0004$10.00

this article, we extend this argument in a different domain and examine how people use and spend unfamiliar forms of money (e.g., foreign currencies).

The main objective of this article is to examine people's spending behavior as a function of the relationship between the face value (nominal value) of the foreign currency and their home currency. Specifically, this article examines how the face value of a foreign currency and exchange rate affects the amount that people are willing to pay for a product as well as their purchase intentions for a product with a stated price. Study 1 demonstrates the face value effect and shows that people systematically spend less in currencies where a unit of the home currency equates to a larger face value denomination (e.g., 1 U.S. dollar = 1,100 Korean won = 24,500 Romanian leu). Study 2 reverses the underspending effect for currencies where a unit of the home currency equates to a fractional face value denomination (e.g., 1 U.S. dollar = .4 Bahraini dinar for U.S. residents). Studies 3 and 4 systematically rule out alternative explanations and demonstrate the robustness of the face value effect across exchange rate presentation frames and across countries and currencies, respectively.

Arguably, the face value effect is due to the accessibility and perceptual salience of the face value of the foreign currency. Theoretically, therefore, the strength and persistence of the face value effect is likely to depend on the extent to which an individual has the opportunity or the time available to process exchange rate information and/or has experience in using a particular foreign currency. The last two studies show that the time available to process exchange information (study 5) and experience with a foreign currency, both measured (study 5) and manipulated (study 6), moderate the face value effect.

The rest of the article is organized as follows. The next section presents a model of how individuals value products when using foreign money. We then describe and report the results of six studies that (i) demonstrate the face value effect (study 1), (ii) explore its boundary conditions (studies 2–4), and (iii) identify variables that moderate the effect (studies 5 and 6). The article concludes by discussing the theoretical implications of our findings.

A MODEL OF PRODUCT VALUATION IN FOREIGN CURRENCIES

To understand the manner in which individuals value products when using foreign currencies, one needs to consider the intrinsic properties of the currency. Although economic transactions can be represented in either nominal or real terms, Shafir et al.'s (1997) money illusion suggests that people think predominantly in terms of nominal rather than real values. As a result, people underweight inflation rates and changes in prices. For example, in one of their tasks they asked people to compare Ann and Barbara. While Ann had received a 2% raise with no inflation, Barbara had received a 5% raise, but the inflation rate in her area was 4%. Although subjects accurately estimated that Ann was doing better in economic terms, they believed that Barbara was happier and less likely to quit her job if she received a job offer from a competitor. Shafir et al. (1997) found similar underweighting of inflation and deflation information in problems ranging from real estate transactions to more complicated business contracts. People seem to rely more on the absolute increase in prices or wages, without adequately correcting for their appreciation or depreciation in real terms.

Using the money illusion effect as a starting point, we use an anchoring and adjustment process to describe how people use foreign money. According to the anchoring and adjustment heuristic, an individual forms an initial judgment by anchoring on a more salient and easy to use attribute and then adjusts that initial judgment to reflect other remaining attributes. An anchoring and adjustment model has been found to be a good descriptor of a variety of judgment tasks including numerical estimation (Tversky and Kahneman 1974), spatial distance and volume estimation (Raghubir and Krishna 1996, 1999), prediction tasks (Davis, Hoch, and Ragsdale 1986), and purchase quantity decisions (Wansink, Kent, and Hoch 1998). Further, despite the argument that judgment heuristics are prevalent only in artificial laboratory settings, there is evidence that anchoring and adjustment is present in real world settings (Northcraft and Neale 1987). Finally, anchoring and adjustment is appealing because it is relatively easy to execute, and it approximates people's verbal descriptions of their judgment process (Davis et al. 1986).

In the context of valuing products in a foreign currency, first consider the case where products have posted prices. We argue that people use price or the face value as a natural anchor because it is the most accessible and perceptually salient information. Since the price in foreign money is unfamiliar, people are uncertain of its value in real terms. There is, thus, an inherent tendency to convert the foreign money in terms of a familiar referent such as the home currency by adjusting for the exchange rate. Next, consider the case where people have to decide how much they are willing to pay in a foreign currency in the absence of a posted price. We argue that people use the amount that they would be willing to pay in their home currency as a referent and then adjust this referent based on the foreign exchange rate.

In both cases, the adjustment tends to be inadequate, leading to a bias in favor of the face value of the foreign currency when the price is posted in a foreign currency as well as when a referent in home currency terms is converted to a foreign currency. Such a two-stage process is extremely effort efficient because perceptually salient anchors may serve as an automatic input not requiring the use of scarce cognitive resources (Gilbert 1989). However, subsequent adjustment, when done, typically involves conscious processing. Although relying on the face value and adjusting for the exchange rate appears to be a reasonable strategy in terms of effort-accuracy trade-offs, systematic biases in judgments occur when people overweight the nominal value

or face value of the foreign money and inadequately adjust for the exchange rate.

For posted prices, since the most accessible and salient piece of information—face value—is used as an initial input, the subjective value of a product (V), in home currency terms, is initially equated to the nominal value (Vn) of the product in the foreign currency (FCY):

$$V = Vn = FCY. \quad \textbf{(1)}$$

Given an exchange rate (r), the initial price of the product stated in terms of the face value of the foreign currency will be adjusted based on the exchange rate to arrive at the real value (Vr) in home currency terms. However, as is typical, the adjustment required to reflect the prevalent exchange rate is likely to be inadequate. With complete normative adjustment:

$$V = Vr = \frac{FCY}{r}. \quad \textbf{(2)}$$

Although people are aware of the distinction between nominal and real values, the anchoring and adjustment process suggests that their judgments are some combination of nominal and real values, with a bias toward nominal values because nominal representations are relatively simpler and more salient.

The theoretical issue is how people integrate the two pieces of information, Vn and Vr, in arriving at their subjective valuation, V. Although the literature suggests alternative information integration rules (e.g., Anderson 1970), the averaging model has been found to be quite representative of a variety of judgment tasks. Importantly, research suggests that an averaging model is consistent with an anchoring and adjustment process (see Johnson and Puto 1987). Recent work incorporating an anchoring and adjustment process in forming price expectations shows that an averaging model parsimoniously describes the integration process (Johnson and Plott 1989).

We thus propose a simple model where α is between zero and one, inclusive:

$$V = \alpha Vn + (1 - \alpha)Vr = \alpha FCY + (1 - \alpha)\left(\frac{FCY}{r}\right). \quad \textbf{(3)}$$

The use of the face value suggests that $\alpha > 0$, implying overweighting of the nominal value relative to the normative value ($\alpha = 0$). The inadequate exchange rate adjustment implies $(1 - \alpha) < 1$ (normative value = 1).

For one unit of FCY, $Vr = 1/r$, and $V = \alpha + (1 - \alpha)/r$. By definition when $r > 1$, the bias, $(Vr - V) < 0$, or $Vr < V$. When $Vr < V$, one unit of FCY seems more than what it is worth in normative terms, which is likely to lead to underspending. Study 1 tests this hypothesis. On the other hand, when $r < 1$, $(Vr - V) > 0$ or $Vr > V$, one unit of FCY seems less than what it is worth, which is likely to lead to overspending. Studies 2–4 examine the effect of $r < 1$ and $r > 1$ on people's propensity to spend. While the value of r, whether it is greater than or less than one, affects the direction of the bias, the strength of the bias is contingent on the value of α. As $\alpha \to 0$, the bias reduces. Studies 5 and 6 discuss the factors that affect α.

As an illustration of the above formulation of the face value effect, consider an American spending in Canada or Malaysia. The FCY is a multiple of the local currency (LCY; e.g., US\$1.00 = C\$1.50 = 4 Malaysian ringgits). If the valuation is even partially based on the nominal representation of the FCY ($\alpha > 0$), people are likely to treat it as worth more than its equivalent in home currency. As a result, 20 Malaysian ringgits will be perceived to be more than 5 U.S. dollars, and the high face value of the FCY is likely to discourage spending. In contrast, consider an American visiting Bahrain or the United Kingdom. The exchange rate is such that face values of the FCY are worth more than unit values of the LCY (e.g., US\$1.00 = .4 Bahraini dinar = £.67). This is likely to encourage spending as an item costing £1 is likely to be perceived as costing something a bit over US\$1.00 but not as high as US\$1.50 if valuation is based on nominal and real values. This should raise people's willingness to spend and increase purchase intentions.

In the absence of a posted price, the subjective value of a product, V, is initially equated to Vr(= LCY), the amount an individual is willing to pay in his or her home currency. However, because willingness to pay has to be expressed in foreign currency, the home currency will be adjusted based on the exchange rate to arrive at the nominal value, Vn(= LCY × r), in foreign currency terms. Given that the adjustment is inadequate, people's judgments are a combination of nominal and real values with a bias toward nominal values. To summarize, the proposed face value effect suggests that to the extent people's valuation is based on the face value of the FCY or LCY × r ($\alpha > 0$) and they inadequately adjust for the exchange rate (r), they are likely to underspend when $r > 1$ and overspend when $r < 1$.

It is important to note the simple model developed is intended to be a paramorphic linear representation of individuals' decisions wherein the input evidence is linked to the decision. The limitations of such a linear representation are noted in the general discussion.

STUDY 1: THE FACE VALUE EFFECT

As a first step, study 1 examines whether people overspend or underspend in a foreign currency where the face value is a multiple of a unit of the home currency ($r > 1$). When $r > 1$, it is plausible that because the home currency is perceived to go a long way in foreign currency terms, the foreign currency will be treated as play money and freely spent, leading to overspending. In contrast, our formulation suggests that for $r > 1$, $Vr < V$, implying that people are more likely to underspend when the face value of a foreign currency is a multiple of the home currency. These opposing

predictions are tested by examining the extent to which people are willing to spend across six foreign currencies that differ in units of face value.

Method

Ninety-seven U.S. undergraduate business students participated in the study for partial course credit. The cover story indicated that subjects were to assist in a merchandising purchase decision. They were told that merchandise planning involves three basic decisions: what merchandise to stock, what price to pay for the merchandise, and how much to sell it for. Subjects were asked to imagine that they were working in the buying department for Macy's and were in charge of the men's department. They had been assigned to purchase silk ties at the World Garment Expo in Montreal. The description mentioned that tie manufacturers from around the world would be displaying their merchandise at the Expo, including the top six manufacturers with whom Macy's had done business in the past. It was emphasized that although the six manufacturers were from all over the world, each was highly competitive and well regarded in the industry. Subjects were told that the prices were typically within a tight range of each other and the quality of the silk conformed to Macy's strict standards. They were also informed that all six manufacturers had historically been able to deliver bulk orders on time.

Two aspects of the task description are noteworthy. First, we attempted to ensure that there would be no differences in quality perceptions to reduce country-of-origin effects independent of currency exchange rates. Second, our test is relatively conservative because it was explicitly mentioned that the prices were within a tight range.

After the task description, subjects were provided with a booklet containing the names of six tie manufacturers from all around the world. A color picture of a silk tie was provided with each of the manufacturers. As such, the design was within-subjects, where foreign currency was manipulated at six levels. The order of the six currencies was randomized, as was the picture of the tie associated with each currency, leading to five different questionnaires that randomized order of elicitation of currencies and the tie associated with each manufacturer.

The six foreign currencies were chosen to be from one to six digit multiples of a U.S. dollar. We chose three European currencies (Norwegian krone, Luxembourg franc, and Romanian leu) and three Asian currencies (Japanese yen, Korean won, and Turkish lira) in an attempt to control for any continent stereotype effects. The six currencies were chosen to be relatively amenable to rounding. The exchange rate for each of the six currencies was provided alongside the manufacturer names. Subjects were informed that although the exchange rates were approximate, their manager had asked them to assume these exchange rates for the purposes of this decision. The six currencies and the exchange rates were (1) Norway, US$1.00 = 9.5 Norwegian krone; (2) Luxembourg, US$1.00 = 48 Luxembourg francs; (3) Japan, US$1.00 = 110 Japanese yen; (4) Korea, US$1.00 = 1,100 Korean wons; (5) Romania, US$1.00 = 24,500 Romanian leu; and (6) Turkey, US$1.00 = 685,000 Turkish lira. Note that the currencies manipulated face value such that one unit of the home currency increased the face value of the foreign currency from a single digit to six digits, and that Asian and European currencies were interspersed in this ranking. Country-of-origin differences were not expected based on a pretest with 33 undergraduate students where the six exchange rates were given to subjects who were asked how much they would expect to pay for a can of Coca-Cola in U.S. dollar terms in each country. There were no systematic differences.

The primary dependent measure was the price that subjects were willing to pay per tie in each of the six currencies. They were told: "The way in which the purchasing process operates is that buyers place offers for the price they are willing to pay for a tie. This is your first time at the World Garment Expo. We have selected a sample of one tie each, representative of the selection offered by each manufacturer. Examine the ties and indicate next to each the maximum amount in the currency of the manufacturer that you would be willing to pay for each tie. (It is assumed that you will be ordering in bulk)." The exchange rate was used to convert this data in U.S. dollar terms. Subjects were then asked to decide how much they would charge in U.S. dollars for each tie when it would be sold at regular price at Macy's. This selling price was elicited to measure any systematic preferences for one tie over another and to examine any country-of-origin effects.

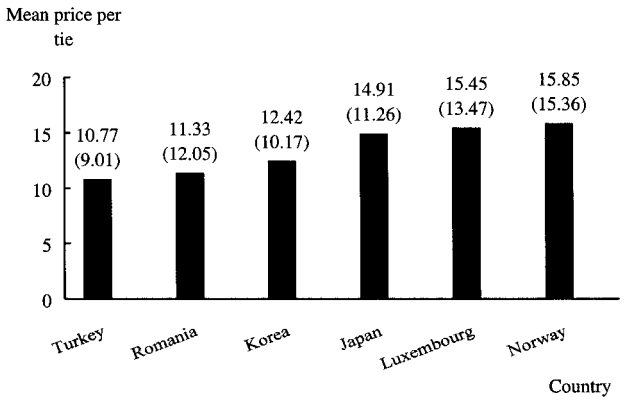
Subjects were also asked to respond to questions regarding the degree of difficulty, extent of effort involved in the task, and the extent to which they rounded their pricing decisions. Responses to these measures were used to understand the correlation between task difficulty, effort, and the extent to which subjects were biased by the face value of the currencies. This allowed a test of the flexible correction model where people attempt to correct for biasing influences as a function of their awareness of these influences and the effort they put into the task (Wegener, Petty, and Dunn 1998). The effort questions were "How much effort did it take you to decide the price you would be willing to pay?" and "How much effort did it take you to decide on the price you would charge at Macy's?" (1 = very little effort; 9 = a lot of effort). The use of rounding was elicited by asking, "To what extent did you round off the exchange rates while making your price decisions?" (1 = did not round at all; 9 = rounded a lot). Finally, subjects were asked, "How interesting did you find this study?" (1 = not at all interesting; 9 = very interesting).

Results and Discussion

A one-way, six-level repeated measures ANOVA on subjects' willingness to pay per tie (elicited in foreign currency terms and converted to U.S. dollar terms for the analysis) revealed a significant effect of currency ($F(5, 480) = 5.86$, $p < .001$). Figure 1 shows that subjects' willingness to pay increased with the face value of the foreign currency as the

FIGURE 1

STUDY 1: MEANS AND STANDARD DEVIATIONS OF PRICE PER TIE



exchange rate became a larger multiple of the home currency. While the mean willingness to pay in U.S. dollar terms was $15.85 when the manufacturer was from Norway, it drops through $15.45 for the Luxembourg manufacturer to $14.91 for the Japanese manufacturer. These three estimates are significantly higher than the next three: $12.42 for the Korean manufacturer, $11.33 for the Romanian manufacturer, to $10.77 for the Turkish manufacturer (about two-thirds of the price for the Norwegian manufacturer).

A similar analysis of the selling price revealed a significant effect of currency ($F(5, 460) = 2.59$, $p < .02$). Given that the selling price was elicited in U.S. dollars, the effect was smaller as the mean selling price ranged from $27.21 in the Korean won condition to $33.62 in the Norwegian krone condition. Since the results reflect a possible country-of-origin effect, the selling price in U.S. dollars was incorporated as a covariate in the repeated measures ANOVA of the willingness to pay measure. The effect of currency on willingness to pay was robust ($F(5, 414) = 3.98$, $p < .005$) despite the significance of the selling price covariate ($F(1, 414) = 80.54$, $p < .001$; lower degrees of freedom reflect partial nonresponse).

A within-subjects incidence of bias measure was computed for each subject by adding together the number of instances where willingness to pay was higher in a currency with a lower face value. This measure indicates the extent of bias per person and can vary from a minimum of zero to a maximum of 15. The mean incidence of bias was 8.06 with over a quarter of the subjects ($n = 24$) making 11 or more judgments of higher willingness to pay with a lower face value currency and only 18 of 97 making five or fewer biased judgments. This measure was correlated with perceptions of effort in a test based on the methodology suggested by Wegener et al. (1998), who illustrated the use of such correlations to examine how degree of accuracy with cognitive process variables related to automaticity of a process. The correlation was not significant (r = .14, NS). Level of interest in the study was also not significantly correlated with the incidence of bias (r = .003, NS).

Overall, the evidence is against the common wisdom that when the home currency is perceived to go a long way in foreign currency terms, the foreign currency will be treated as play money and that people will overspend. In contrast, consistent with the face value effect where individuals use a referent in home currency terms and adjust this referent based on the exchange rate, individuals' willingness to pay decreased with the face value of the foreign currency.

A post hoc analysis showed that the incidence of bias was correlated with the self-report of the extent to which subjects rounded their estimates (r = .36, $p < .001$). This result suggests that our findings may be due to a task requiring substantial cognitive resources, leading to rounding, exacerbating the bias. In terms of the model, the implication is that α and r may be related and that this relationship appears to be nonlinear, flattening out at high values of r.

In study 1, there was no home currency control against which to assess whether the relatively greater or lower willingness to spend represented overspending or underspending in absolute terms. The next two studies address this issue and extend the investigation to a foreign currency that is a fraction of the home currency.

STUDY 2: REVERSING THE UNDERSPENDING EFFECT

Study 2 tests the prediction that individuals are likely to underspend when the foreign currency is a multiple of the home currency and overspend when the foreign currency is a fraction of the home currency. While study 1 examined foreign currencies that are multiples of the home currency, study 2 examines two foreign currencies, one that is a multiple of the home currency and another that is a fraction. In addition, a control condition is included where individuals have to make decisions in their home currency (U.S. dollars). Finally, task difficulty is reduced by moving to a between-subjects design, where each subject is exposed to only one rather than a set of currencies. Studies 2 to 4 use a similar procedure that is described in detail.

Method

Ninety-six students from a U.S. undergraduate introductory marketing class participated in the study for partial course credit. One subject was eliminated because of incomplete data, leaving a usable sample of 95 subjects. Subjects were randomly assigned to three conditions in a between-subjects design. The three conditions were U.S. dollar, Malaysian ringgit (1 U.S. dollar = 4 ringgits), and the Bahraini dinar (1 U.S. dollar = .4 dinar). The U.S. dollar represents the control condition, whereas the Malaysian ringgit and Bahraini dinar represent the conditions where the foreign currency is a multiple and fraction of the home currency, respectively. The two foreign currencies were chosen because they were both relatively unfamiliar to U.S. subjects, and the exchange rates were similar to each other in the numerals used (exchange

rates were .4 and 4). The product category used was also plausible for both countries. Further, both countries are in Asia with neither country being a major exporter of consumer products to the United States, minimizing the possibility of country-of-origin differences.

A pretest with 33 subjects, similar to the subjects in the study, confirmed that there were no systematic differences across the two countries in terms of perceived quality and general price levels. Subjects were asked, "In which country would you expect the price of a silk scarf of the same quality to be higher?" Ten subjects indicated "Definitely higher in Malaysia," 14 indicated "definitely higher in Bahrain," and nine indicated "the same." Subjects were then informed of the two exchange rates and asked, "Do you believe that things, in general, are more or less expensive in one of these countries versus the other?" This question was intended to test for the possibility that exchange rates are perceived to be diagnostic of inflation rates and costs of production (both of which affect selling price) in a country. Fifteen subjects indicated no difference, 11 indicated that things would be more expensive in Bahrain, and seven indicated that they would be more expensive in Malaysia. This data suggests that there are no significant differences in cost perceptions across the two countries.

In the study, subjects were asked to imagine that they had traveled to Asia to celebrate the millennium and that they wished to purchase souvenirs and gifts for their friends and family. They were told that Asian silk is ideal as it is easy to carry and is liked by most people. In the Malaysian ringgit (Bahraini dinar) condition, subjects were told that they were on the streets of Kuala Lumpur in Malaysia (Bahrain in the Middle East) bargaining for silk scarves and ties with a street vendor. The exchange rate was explicitly provided to the subjects. In the Malaysian ringgit condition, they were told that US$1.00 = 4 Malaysian ringgits, and in the Bahraini dinar condition, US$1.00 = .4Bahraini dinar. In the U.S. dollar condition, subjects were told that they had returned home without purchasing any souvenirs and gifts. They were told that they had decided to go to Chinatown in San Francisco where they were bargaining for silk scarves and ties with a street vendor.

After the scenario description, all subjects were then presented with a color picture of a set of nine scarves and 11 ties with code numbers S1–S9 and T1–T11, respectively, on a page. Subjects were told that these were examples of the scarves and ties available. The scarves were on the top half of the page with one large scarf surrounded by eight smaller scarves, and the ties were on the bottom half of the page. The scarves were described as follows: "Each scarf is 100% fine silk twill (14 mm weight). Scarves are 90cm^2 (35.4")." Ties were described as follows: "These knock-out ties are truly among the finest anywhere, at any price. Each tie is 100% fine silk twill (14 mm weight)." Subjects were given as much time as they needed to look at the patterns and colors available.

They were then asked the following: "Please indicate (1) the number of each item that you would like to purchase and (2) the maximum price you would be willing to pay for each in Malaysian ringgits (Bahraini dinars/US dollars)." Subjects were provided with a table with code numbers on the side. Using this, they marked the quantity of each scarf or tie they would like to purchase, if at all, and indicated next to it the maximum price (in the local currency) that they would be willing to pay for it. As such, we tried to keep the experimental task as realistic to an actual shopping scenario as possible; leaving the subject with a wide array of choices covering purchase incidence, purchase quantity, and purchase price.

The number of items purchased (separately for each scarf and tie) was multiplied by the amount subjects were willing to pay per item, which was then aggregated across scarves and ties to give the total amount an individual was willing to pay. The appropriate exchange rate was then used to convert the total amount the subjects were willing to pay for both scarves and ties, and the total number purchased, into the dependent measure—the amount subjects were willing to pay per item in U.S. dollar terms.

Subjects were also asked to respond to a series of seven-point Likert scales (1 = strongly agree, 7 = strongly disagree). The scales measured subjects' beliefs and attitudes toward foreign travel as well as shopping overseas and were used to rule out differences between conditions on these variables. There were none. Demographic data, including whether the subjects were born in the United States, had visited other countries, and the number of languages they spoke, were collected to ensure that the subjects did not differ on these dimensions across conditions.

Results and Discussion

We first performed a repeated measures analysis of variance on the two dependent measures: the U.S. dollar equivalent of the amount per item spent on scarves and the U.S. dollar equivalent of the amount per item spent on ties, with the currency factor as a between-subjects independent variable. This analysis revealed a main effect of currency ($F(2, 92) = 6.93$, $p < .002$), reflecting higher prices paid in the Bahraini dinar condition relative to the U.S. dollar and to Malaysian ringgit conditions.

There was also a main effect of the product category ($F(1, 92) = 19.57$, $p < .001$), reflecting a higher price for ties as compared to scarves and an interaction between these two factors ($F(2, 92) = 4.94$, $p < .01$). The pattern of the interaction showed that the price premium commanded by ties over scarves was the highest in Bahrain (M's = 43.71 and 30.69) as compared to the other two conditions. Although not hypothesized, the significant interaction calls into question whether the hypothesized effects will occur for both product categories (see General Discussion). While each product category was analyzed individually, the results are robust even when combining across the two product categories ($F(2, 92) = 7.19$, $p < .01$).

An ANOVA on the amount paid per item in U.S. dollar terms revealed a significant effect of currency for both scarves and ties. As shown in table 1, subjects' willingness to pay

TABLE 1

STUDY 2: MEANS OF DEPENDENT MEASURES

Dependent measure	Malaysian ringgit	Bahraini dinar	U.S. dollar	*F*-value	*p*-value
Scarves:					
Number	5.91	7.29	5.84	.82	.45
Amount per scarf (in US$)	9.83	30.69	16.73	4.39*	.05
Total (in US$)	56.95	320.56	90.81	1.98**	.14
Ties:					
Number	4.97	6.90	5.06	1.27	.29
Amount per tie (in US$)	14.16	43.71	18.99	9.05*	.01
Total (in US$)	60.73	370.73	87.34	2.84**	.06
Total (aggregate of scarves and ties):					
Number	10.88	14.19	10.91	1.22	.30
Amount per item (in US$)	13.08	39.13	18.78	7.19*	.01
Total (in US$)	117.68	691.29	178.16	2.41**	.09

*Denotes all means significantly different from each other at $p < .05$.
**Denotes all means significantly different from each other at $p < .1$.

per scarf was significantly different across the three conditions (M's = 9.83, 16.73, and 30.69 for ringgit, dollar, and dinar, respectively; $F(2, 92) = 4.39, p < .05$) as was the willingness to pay per tie (M's = 14.16, 18.99, and 43.71 for ringgit, dollar, and dinar, respectively; $F(2, 92) = 9.05$, $p < .01$). Consistent with the idea that people tend to overweight face value, there was overspending in the Bahraini dinar condition and underspending in the Malaysian ringgit condition relative to the U.S. dollar condition, and the amount spent in dinars was significantly larger (almost three times) than the amount spent in ringgits. To examine if the presence of outliers led to this pattern of results (due to subjects not understanding the task and confusing the currency unit of elicitation), we conducted the same ANOVA's dropping one observation from each end of the distribution of average price willing to pay, one at a time four times. The results were robust to this analysis.

Table 1 shows that there was no significant difference in the number of items individuals were willing to purchase across the three conditions (p's $> .25$). However, the effect of currency on willingness to pay directionally percolates to the total amount willing to pay for both scarves (M's = \$56.95, \$90.81, and \$320.56, in the Malaysian ringgit, U.S. dollar, and Bahrani dinar conditions, respectively; $F(2, 92) = 1.98$, $p < .15$) and ties (M's = \$60.73, \$87.34, and \$370.73, in the ringgit, dollar, and dinar conditions, respectively; $F(2, 92) = 2.84$, $p < .06$). Similar to the willingness to pay measure, we checked for robustness by removing outliers and found a stronger pattern of results.

Study 2 corroborates and extends study 1 findings by demonstrating that individuals' propensity to spend foreign money varies as a function of its face value. Consistent with a model that individuals overweight face value and inadequately adjust for the exchange rate, people's willingness to pay was higher when the foreign currency was a fraction of the home currency (dinar condition). In contrast, consistent with study 1, people's willingness to pay was lower when the foreign currency was a multiple of the home currency (ringgit condition).

Note that if subjects used only the real values, there would be no difference in the Bahraini dinar and Malaysian ringgit conditions. The results suggest that although people overweight the nominal representation ($\alpha > 0$), they appear to use a mixture of nominal and real values in making their judgments.

Note that people tend to inadequately account for the real values and thereby adjust for the exchange rates even in situations where it is relatively easy to convert an unfamiliar foreign currency into a home currency, as was the case in this study. Consequently, there is a systematic pattern of the overspending (underspending) as a function of whether the face value of the foreign money is a fraction (multiple) of the home currency, respectively. In the next two studies, we assess the robustness of these findings and eliminate alternative explanations.

STUDY 3: ROBUSTNESS TO FRAMING OF EXCHANGE RATE

Study 3 assesses the robustness of the findings in studies 1 and 2 to the manner in which the exchange rate information is provided. The exchange rate information in studies 1 and 2 was framed in terms of a single unit of the home currency (e.g., 1 U.S. dollar = 4 Malaysian ringgits). It is possible that the effects were due to the multiple face value being on the foreign currency, rather than on the home currency (e.g., 1 Malaysian ringgit = .25 U.S. dollar). Extensive research suggests that people tend to adopt the specific frame that is presented, and alternative framings of the same information could lead to different results (Kahneman and Tversky 1979). Further, framing effects are ubiquitous and have been shown in a variety of domains including money illusion (Shafir et al. 1997). Although our face value formulation does not predict variations in val-

TABLE 2

STUDY 4: MEANS OF DEPENDENT MEASURES

Dependent measure	Indian rupee+	U.S. dollar*	Hong Kong dollar	Chinese yuan	*F*-value
Scarves:					
Number	9.77	8.00	8.39	10.25	1.19**
Amount per scarf (in HK$)	39.66	105.60	90.14	69.70	9.68
Total (in HK$)	334.40	791.19	700.00	553.80	7.79
Ties:					
Number	7.18	6.47	5.83	7.40	6.56**
Amount per tie (in HK$)	53.25	132.60	95.43	84.26	7.96
Total (in HK$)	313.90	758.86	522.39	645.50	6.58
Total (aggregate of scarves and ties):					
Number	16.95	14.47	14.22	17.65	.70**
Amount per item (in HK$)	45.46	113.60	91.54	76.38	10.81
Total (in HK$)	648.30	1,550.05	1,222.39	1,199.30	9.36

+Significantly different at $p < .1$ from control for all variables except number of scarves, ties, and total number.
*Significantly different at $p < .05$ from control for all variables except number of scarves, ties, and total number.
**Not significant at $p < .05$ (all others significant at $p < .002$).

uation due to the framing of the exchange rate, it is plausible that framing a foreign currency in units of a local currency may influence the relative weight given to the nominal values or face value (α). Study 3 examines whether the results of study 2 replicate using different foreign currency frames.

Method

Eighty-one students from a U.S. undergraduate introductory marketing class were assigned randomly to a 2 × 2 between-subjects design, where foreign currency and exchange rate were each manipulated at two levels. The foreign currency conditions, the procedures, and measures used were identical to those in study 2. To manipulate the exchange rate frame, one condition was similar to study 2: 1 U.S. dollar = 4 Malaysian ringgits, and 1 U.S. dollar = .4 Bahraini dinar. In the other condition, the exchange rates were reframed as 1 Malaysian ringgit = .25 U.S. dollar, and 1 Bahraini dinar = 2.5 U.S. dollars in the ringgit and dinar conditions, respectively.

Results

A 2 × 2 ANOVA on the amount willing to pay per scarf, per tie, and per item (aggregated across scarves and ties) revealed no significant effect of the frame in which the exchange rate was provided (main and interaction F's < 1). For example, the amount subjects were willing to pay per item was not significantly different across the original versus the reframed condition ($F(1, 77) = .02$, $p > .9$) in both the ringgit (M's = 12.79 and 13.08) and dinar (M's = 19.46 and 23.16) conditions. The data were aggregated over the two framing conditions and analyzed as a one-way, two-level ANOVA. Replicating study 2 findings, the results show that subjects' willingness to pay was significantly higher in the Bahraini dinar condition relative to the Malaysian ringgit condition for scarves (M's = 18.63 and 12.25), ties (M's = 24.03 and 13.52; combined $F(2, 158) = 3.09$, $p < .05$), and per item (aggregated across scarves and ties; M's = 21.59 and 12.93, $F(1, 79) = 3.35$, $p < .05$). There was no significant difference in the number of scarves or ties people were willing to purchase as a function of currency or frame (F's < 1). However, as in study 2, the total amount subjects were willing to pay for scarves and ties was marginally higher in the Bahraini dinar versus Malaysian ringgit condition (M's = $137.81 and $101.38 for scarves; M's = $174.06 and $108.82 for ties in the dinar and ringgit conditions, respectively; combined $F(2, 158) = 1.65$, $p < .10$). This translated to a marginally higher total amount in the dinar relative to the ringgit condition (M's = $311.88 and $210.20; $F(1, 79) = 1.69$, $p < .10$). Study 3 provides additional support for the model and shows that the relative overweighting of nominal values is robust to the manner in which exchange rate is framed. The next study examines the generalizability of the face value effect and its lack of sensitivity to framing across different home and foreign currencies.

STUDY 4: GENERALIZABILITY ACROSS COUNTRIES AND CURRENCIES

Students from an undergraduate introductory marketing class in Hong Kong ($n = 123$) participated in this study. The sample was well traveled: 97.6% had traveled outside Hong Kong, with 95.9% having done so in the last five years and as many as 77% having made two or more such trips. The tourist scenario, procedures, and measures used in this study were similar to those in studies 2 and 3. The foreign currencies used were Indian rupees (Rs; multiple) and U.S. dollars (fraction). Exchange rate frame was manipulated as in study 3 (e.g., HK$1.00 = Rs6, or Rs1 = HK$.17; and HK$1.00 = US$.125, or US$1.00 = HK$8.00). Subjects were randomly assigned to six between-subject conditions, where currency and exchange rate frame was each manipulated at two levels. There were two control conditions, one in which the willingness to pay was indicated in the home currency (Hong Kong dollar), whereas in the other, it was

indicated in a foreign currency (Chinese yuan) with equivalent face value (1 Hong Kong dollar = 1 yuan).

The results reported in table 2 show that consistent with studies 2 and 3, willingness to pay (in Hong Kong dollar terms) was higher in the U.S. dollar condition (M = HK$113.60) than in the Hong Kong dollar condition (M = HK$84.49), which, in turn, was higher than in the Indian rupee condition (M = HK$45.46; both p's < .05). The results are similar across both scarves and ties, when analyzed separately (see table 2). As in study 3, a 2 × 2 ANOVA revealed no significant effects of the exchange rate frame (p's > .15). Further, the two control conditions were not significantly different, attesting to the idea that the effect is due to the differences in face values.

Studies 5 and 6 explore factors that may moderate the strength and persistence of the face value effect—the time available to process exchange information and the experience that an individual has with using a foreign currency. Further, studies 5 and 6 simplify the task to a single price judgment for a single stimulus and measure purchase intentions for a stated price.

STUDY 5: MODERATING ROLE OF TIME PRESSURE

The robustness of the face value effect raises the possibility that the effect may operate at an automatic level. Even quasi-automatic biases may be moderated by ability-related variables that differentially affect the opportunity to process the easy to use heuristic and the relatively more effort-requiring adjusting information (e.g., Bargh 1989; Gilbert 1989).

Study 5 examines whether the strength and persistence of the face value bias varies with the time available to process exchange rate information. The strength of the face value effect is likely to be negatively related to the time available to process information and adjust the initial judgment based on the exchange rate. This study thus examines whether reliance on face value of a foreign currency varies with time pressure. We expect that the bias will be exacerbated in conditions where the time pressure is high. Individuals are likely to rely more heavily on the face value of the foreign money (higher α) and adjust even less as they have less time to process exchange rate information.

Method

Seventy-six undergraduate students from an introductory summer session marketing class in the United States participated in the study for course credit. Unlike the regular sessions, approximately half of the students in the summer session are foreigners visiting the United States, often for the first time. About 54% in our sample were foreign students. The composition of the sample provides a natural setting in which to examine whether individuals are more prone to the face value bias as a function of whether their home currency is the U.S. dollar or not. Given that foreign students are less experienced in using the U.S. dollar, they are likely to rely more on the face value of the foreign currency and rely on a conversion of the foreign currency in U.S. dollar terms, relative to domestic students who naturally use the U.S. dollar as their home currency.

Subjects were randomly assigned to a 2 (currency) × 2 (time pressure) between-subjects design. Foreign currency was manipulated at two levels (Bahraini dinar and Malaysian ringgit) as in earlier studies, and time pressure was manipulated by showing the stimuli of a scarf with the exchange rate for a relatively short (five-second) or long (20-second) period, using an overhead projector. In the experimental task, subjects were shown a color picture of a scarf on a transparency that included the foreign currency manipulation including the exchange rate information (1 U.S. dollar = 4 Malaysian ringgits or 1 U.S. dollar = .4 Bahraini dinar). Subjects had to respond to the dependent measures immediately following the exposure to the exchange rate information. On the first page, they indicated the maximum price they would be willing to pay for the scarf. On the next page, subjects indicated their purchase intention on a seven-point item (1 = definitely will not purchase; 7 = definitely will purchase) where the price for the scarf was specified as 160 Malaysian ringgits (16 Bahraini dinars), equivalent to 40 U.S. dollars.

In addition to the primary dependent measures, a seven-point item measured perceptions of quality of the scarf (1 = poor quality, 7 = good quality), and three items measured attitudes toward the stated price of the scarf at 160 Malaysian ringgits or 16 Bahraini dinars. The three items (1 = not at all expensive, 7 = very expensive; 1 = poor value for money, 7 = good value for money; and 1 = a bad bargain, 7 = an excellent bargain) were averaged to form a composite measure of price attitude (Cronbach's α = .74). Demographic data, including number of countries visited and number of overseas trips made in the last five years, were collected to ensure that the subjects did not differ on these dimensions across the experimental conditions.

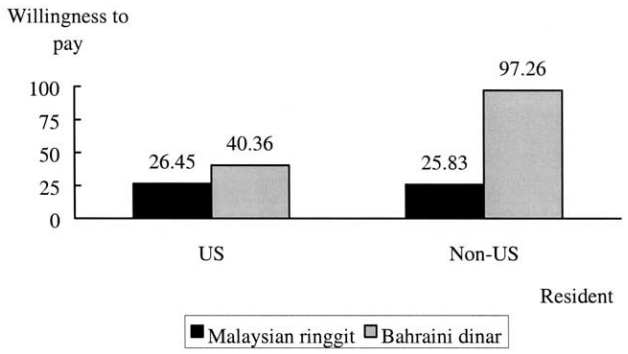
Results and Discussion

A 2 × 2 × 2 ANOVA (currency × time pressure × country of residence) on the maximum price willing to pay, incorporating number of countries visited as a covariate ($F(1, 68) = 3.03$, $p < .1$), yielded a significant main effect of currency ($F(1, 68) = 13.51$, $p < .0001$). Subjects' willingness to pay in U.S. dollar terms was significantly higher in the Bahraini dinar (M = 74.5) relative to the Malaysian ringgit condition (M = 26.2). However, the main effect of currency is qualified by two significant two-way interactions.

First, the interaction between currency and country of residence was significant ($F(1, 68) = 6.05$, $p < .02$). Figure 2 shows that the effect of face value on willingness to pay was much stronger for foreign students relative to domestic students. Given that domestic students have more experience with the U.S. dollar, their willingness to pay was directionally higher in the dinar condition (M = 40.36) relative to the ringgit condition (M = 26.45), but the effect did not reach significance. This could be due to the relatively small sample size of this study, as earlier studies found significant

FIGURE 2

STUDY 5: CURRENCY AND COUNTRY-OF-RESIDENCE INTERACTION



differences with a U.S. sample. In contrast, foreign students' willingness to pay was almost four times higher in the Bahraini dinar condition ($M = 97.26$) relative to the Malaysian ringgit condition ($M = 25.83$; $t = 3.72$, $p < .001$).

Second, the interaction between currency and time pressure was marginally significant ($F(1, 68) = 3.56$, $p < .06$) in the expected direction. Figure 3 shows that when time pressure was high, subjects' willingness to pay was almost four times the amount in the dinar condition ($M = 83.59$) relative to the ringgit condition ($M = 21.08$; $t = 2.89$, $p < .007$). In contrast, when time pressure was low, subjects' willingness to pay in the dinar condition was only about twice the willingness to pay in the ringgit condition (M's $= 66.84$ and 31.81; $t = 2.18$, $p < .03$).

Analysis of the purchase intention data shows that there was no significant effect of currency. However, the two significant two-way interactions reveal a pattern similar to the willingness to pay data. First, the interaction between currency and country of residence was significant ($F(1, 68) = 3.71$, $p < .05$), suggesting that the effect of face value on purchase intention was significant for foreign students (M's $= 4.74$ and 3.65 for dinar and ringgit conditions, respectively) but not for domestic students (M's $= 3.38$ and 3.35 for dinar and ringgit). Second, the interaction between currency and time pressure was significant ($F(1, 68) = 6.86$, $p < .01$). The results show that effect of face value on purchase intention was significant when time pressure was high (M's $= 4.24$ and 2.42 in the dinar and ringgit conditions, respectively; $t = 2.63$, $p < .01$). The face value effect was however not significant when time pressure was low (M's $= 4.14$ and 4.61 for dinar and ringgit; $p > .45$). No other effects were significant.

Study 5 suggests that the strength of the face value bias varies with the time available to process exchange rate information. Like other heuristics that lead to biased judgments (Tversky and Kahneman 1974), individuals are likely to rely more heavily on the face value of money as the time available to process information diminishes. Accordingly, the face value bias is exacerbated for those under high time pressure. However, the face value bias in the amount willing to pay persists for those under low time pressure.

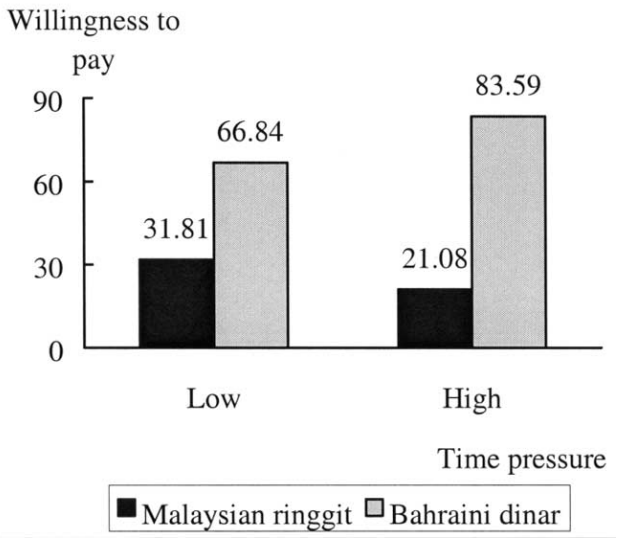
Study 5 also shows that foreign subjects were more prone to the bias relative to domestic subjects, arguably because they are less experienced in using the U.S. dollar. Note that these foreign students may have generated a price in their own domestic currency (not the U.S. dollar) and then converted that into U.S. dollars, as compared to the U.S. subjects who could skip the first step, leading to an exacerbation of the bias with errors compounding each other. Further, it is interesting to note that the difference between non-U.S. students and U.S. students was most marked in the prices they were willing to pay in Bahraini dinars. It is plausible that this may be due to the non-U.S. students predominantly being from countries where the U.S. dollar domestic exchange rates are multiples rather than fractional. Study 6 explicitly manipulates subjects' experience with currency and examines whether the face value effect persists when individuals are experienced in using the foreign currency.

STUDY 6: MODERATING ROLE OF EXPERIENCE

Study 6 examines whether the strength and persistence of the face value bias depends on the experience of the decision maker in using a foreign currency. Unlike study 5 where subjects' country of residence was used as a measure of experience, this study manipulates experience with using a foreign currency. It is expected that inexperienced individuals will rely more on face value while making their judgments (i.e., $\alpha > 0$) than those who have experience in using a foreign currency. Experienced individuals are less likely to rely on

FIGURE 3

STUDY 5: CURRENCY AND TIME PRESSURE INTERACTION



the nominal values (i.e., $\alpha \rightarrow 0$). Further, in study 6, using a within-subjects design where the manipulation of foreign currency is more transparent, we examine whether the bias would persist in the low-experience condition. A within-subjects design is a very strong test for a bias as it makes the manipulations easily accessible to subjects, encouraging normatively appropriate calculations.

Method

Fifty-eight undergraduate students from a U.S. introductory marketing class were randomly assigned to a 2 × 2 × 2 design where foreign currency (Bahraini dinar and Malaysian ringgit) was a within-subjects factor. The order in which subjects saw either currency was counterbalanced between subjects (ringgit first and then dinar, or dinar first and then ringgit). The third factor was experience (present and absent). In the experience present condition, subjects were asked to convert the price of several items that were given in foreign currency terms into U.S. dollars before they responded to the dependent measures including the maximum amount they would be willing to pay. The items included a range of 10 products ranging in price from $1.00 (cup of coffee) to $62.50 (Swatch watch). Five were food items (coffee, sandwich and chips, bottle of beer, can of soda, and bottled water, all within a $6.00 range), and the remaining items spanned the typical duty-free fare (carton of cigarettes, bottle of scotch, box of chocolates, perfume, and a watch). Further, while the prices of six of the items varied slightly between the ringgit and the dinar condition to make the manipulation plausible, the mean prices of the five items in each category were the same for either currency. The four items with the same price included the first and last item on the list to prevent any effects of order. The calculation difficulty was also the same across the two currencies (e.g., an equal number of items that were straight multiples of the exchange rate such as Malaysian ringgit 24 or Bahraini dinar 2, with one item in each necessitating the use of a quarter). Thus, task difficulty and prices were controlled in the two currency conditions under the experience manipulation. The manipulation ensured that subjects experienced converting a range of prices from the foreign currency to the U.S. dollar.

Subjects were told: "Assume that you are at the airport while waiting for a plane to bring you back to the U.S. after a trip to Asia. The exchange rate is $1 = [Currency]. You look around at the airport in [Country], and see the prices of a variety of products in the duty free shopping arcade. Here are some of the products with their prices." After the list of prices was given, subjects were asked to "Please fill in the US dollar equivalent of the each of the items in the right hand side column. Do NOT use a calculator." The scenario was the same as in study 2.

As in study 5, subjects were asked to indicate the maximum price they would be willing to pay for the scarf. In addition to the willingness to pay measure, several seven-point items measured perceptions of the scarf. These included ratings of whether the purchase was a poor or good value for money, along with quality perceptions of the scarf as in previous studies.

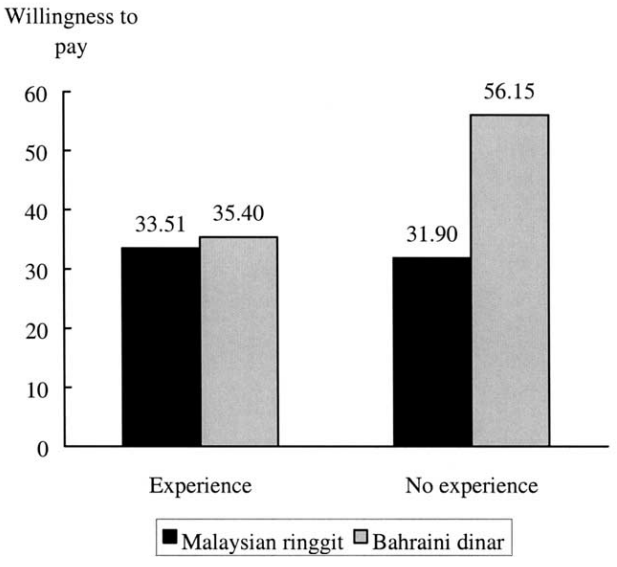
Results and Discussion

A 2 × 2 × 2 ANOVA with order and experience as the between-subjects factors and currency as the within-subjects factor revealed that order did not affect the maximum amount subjects were willing to pay ($F(1, 56) < 1$), and neither did it figure in any significant interaction (p's > .20). The main effect of experience in converting the foreign currency into U.S. dollars on willingness to pay was not significant ($F(1, 56) = 2.04$, $p > .2$; note, however, that this may be due to small sample size). As in earlier studies, currency had a significant effect on the maximum amount that subjects were willing to pay; they were willing to pay significantly higher in the Bahraini dinar relative to the Malaysian ringgit condition (M's = 44.45 and 32.76; ($F(1, 52) = 5.35$, $p < .02$). However, this main effect was qualified by the interaction between currency and experience ($F(1, 52) = 4.04$, $p < .04$). Figure 4 shows that the willingness to pay was significantly different for inexperienced subjects (M's = 56.15 and 31.9 in the dinar and ringgit conditions, respectively) but not for experienced subjects (M's = 35.4 and 33.51).

Results also indicate that in the experience condition, willingness to pay across the two currencies was equal in real terms for 64.3% (18/28) of the subjects relative to 33.3% (10/30) in the no-experience condition ($z = 2.36$, $p < .05$). Together, the results indicate that the face value effect due to overreliance on the face value of the foreign currency is less likely to persist for experienced individuals.

FIGURE 4

STUDY 6: MEANS OF MAXIMUM AMOUNT WILLING TO PAY



Study 6 shows that subjects who are unfamiliar with a foreign currency are the most likely to be prone to the face value bias. In contrast, subjects who have some experience in using the foreign currency and converting it into a more familiar home currency are not as likely to rely on the face value of the foreign money. Said differently, the face value bias will be attenuated for sophisticated and experienced decision makers.

GENERAL DISCUSSION

The primary objective of this article was to examine systematic differences in people's spending behavior when using foreign currencies. Together, the six studies demonstrate that people's willingness to spend and purchase intentions increase or decrease as a function of the relationship between the face value of the foreign currency and their home currency. Labeled the face value effect, our findings show that people tend to underspend when the face value of the foreign currency is a multiple of a unit of the home currency. In contrast, people tend to overspend when the face value is a fraction of the unit of the home currency.

Based on an anchoring and adjustment model, it is proposed that in valuing products in foreign currencies, individuals use a combination of nominal and real values in foreign and home currency terms, respectively. However, overreliance on the nominal value or the face value of the foreign currency and inadequate adjustment based on the exchange rate leads to the systematic biases. Structurally, the anchoring and adjustment process is represented by an averaging model where people's subjective valuation is based on a combination of the face value of the foreign money and its real value in home currency terms. The face value effect is a manifestation of the tendency to overweight the face value of the foreign money and inadequately adjust for the exchange rate.

Consistent with our prediction, study 1 shows that people underspend when the face value of the foreign currency is a multiple of a unit of the home currency. Further, the extent to which people underspend increases with the face value of the foreign currency (e.g., 1 U.S. dollar = 9.5 Norwegian krone = 24,500 Romanian leu). Study 2 reverses the effect and demonstrates that people tend to overspend when the face value of a foreign currency is a fraction of a unit of the home currency. Studies 3 and 4 corroborate the findings by showing that the face value effect is robust to exchange rate framing and is generalizable across different home and foreign currencies, respectively. Studies 5 and 6 then explore some boundary conditions and specifically examine whether the strength and persistence of the bias is contingent on the ability and experience to process the exchange rate. Although the bias persists, study 5 shows that the time available to process information and inexperience exacerbate the face value effect. Study 6 successfully eliminates the bias in the short term for those who are trained to use the exchange rate to convert the foreign currency.

Across studies (except studies 1 and 4), the face value effect appears to be stronger for the currency that was a fraction (dinar) compared to the currency that was a multiple (ringgit). The asymmetric effect may be due to the differential difficulty in using whole numbers versus fractions or multiplying versus dividing. The results are also indicative of a relationship between α and exchange rate, r. There are at least two reasons for this relationship. First, the reliance on face value may be a function of the ease with which the foreign money can be converted, implying that as r approaches a round number, α is likely to reduce. Second, α may vary with the absolute deviation of r from one, implying that as r deviates from one, the need to adjust increases implying a nonlinear relationship. From an effort-accuracy perspective, when r is close to one, it may not be worthwhile to adjust. Further, note that for currencies that are multiples of the home currency, r can range from one to ∞, whereas for fractional currencies, r is bounded between zero and one. The lower bound may account for the lower likelihood of adjustment for a currency that is a fraction of the home currency. Future research should examine the asymmetric and nonlinear nature of this effect.

In study 2, we found that the effect of currency was stronger for the higher-priced product (tie) compared to the lower-priced one (scarf). However, since the effect did not replicate in studies 3 and 4, the robustness of the effect is questionable. In studies 5 and 6, although experience was operationalized in two different ways, it is possible that the manner in which individuals gain experience affects not only the extent of bias but also the manner in which information is integrated. This is offered as an area for future research. Further, in study 6, subjects in the experience present condition not only were asked to make calculations but were also exposed to a range of prices in the foreign currency. These prices could have acted as a reference against which they evaluated the scarf. Future research should tease out the effects of reference prices and experience on attenuating the bias and explore whether the attenuation is robust or the bias recurs after the effects of experience have worn off.

Despite attempts to make the tasks as realistic as possible, the studies reported were laboratory experiments, and issues of generalizability when real money is on the line do arise. For instance, when people actually exchange foreign currency they may feel richer or poorer depending on the exchange rate, and the differences in perceptions of wealth may affect product valuation. In our studies, subjects did not experience carrying the foreign money (although study 5 examined the face value effect when subjects were told that a specific amount was exchanged). Future research should examine this issue, for example, by comparing sales of a similar item at duty-free shops around the world. We would expect that sales would be higher in duty-free stores of countries whose face value was high (e.g., Bahrain) as compared to those where they were low (e.g., Japan), while controlling for other differences in purchase patterns in these countries. Further, there may be systematic differences in per capita tourist spending where the foreign currency is a fraction or a multiple of the home currency.

Notwithstanding some of the limitations, the results

clearly highlight the main theoretical principle underlying our findings: although people are aware of the distinction between nominal and real values, their judgments are biased toward the nominal values. As such, our investigation extends the money illusion effect to the domain of foreign currencies. Arguably, reliance on nominal representations is due to the ease and relative salience of nominal versus real values rather than being strategic or motivational in nature (Shafir et al. 1997). Our results demonstrate that the strength and persistence of this bias toward nominal values depends on the ability and the experience of the decision maker. The findings suggest that the effect of face value on judgment may have an automatic component that respondents find difficult to control. Consistent with an interpretation of an automatic process, the strong and robust effect is only attenuated for those with relatively more experience and ability.

From a consumer welfare perspective, our results suggest that individuals are prone to systematic biases in spending foreign money even when they are cognizant of the exchange rate. To the extent that these effects occur outside of conscious awareness, individuals may be unaware that they are paying too much or too little, which may potentially result in forgone opportunities. For example, studies conducted in France show support for an accordion effect where prices are perceived to be less different from each other when they are expressed in euros versus francs, because the prices in euros are compressed with 1euro = 6.56 French francs (Gaston-Breton and Desmet 1999). The findings provide evidence of automaticity in a sequential anchoring and adjustment process where one uses an automatic input and then engages in controlled processing (Gilbert 1989). Importantly, our results indicate that ability and experience-related factors may moderate the face value effect. To the extent there is a tendency to convert an unfamiliar foreign currency in familiar home currency terms, factors that reduce the ambiguity in the conversion process should reduce the face value bias.

Substantively, this article contributes to our understanding of individuals' propensity to spend and value products when using foreign currencies. There is relatively little literature that examines individuals' spending behavior across countries and currencies. This article shows that in using foreign currencies, individuals' spending decision is based primarily on the face value of the currency and secondarily on the prevalent exchange rate. This leads to systematic differences in individuals' purchase intentions and their willingness to pay. In contrast, many macroeconomics studies suggest that exchange rate is the primary determinant of individuals' propensity to spend in a foreign currency. The macro studies, however, typically consider factors that are aggregate in nature and are interdependent making it difficult to establish causal relationships among the variables. Our research thus highlights the importance of micro studies in informing macro inquiries.

[*Received August 2001. Revised May 2002. David Glen Mick served as editor and Michael D. Johnson served as associate editor for this article.*]

REFERENCES

Anderson, Norman H. (1970), "Functional Measurement and Psychophysical Judgments," *Psychological Review*, 91 (1), 112–149.

Bargh, John A. (1989), "Conditional Automaticity: Varieties of Automatic Influence in Social Perception and Cognition," in *Unintended Thought*, ed. James S. Uleman and John A. Bargh, New York: Guilford, 3–51.

Davis, Harry, Stephen J. Hoch, and E. K. Easton Ragsdale (1986), "An Anchoring and Adjustment Model of Spousal Predictions," *Journal of Consumer Research*, 13 (June), 25–37.

Gaston-Breton, Charlotte and Pierre Desmet (1999), "Perceived Effects of Psychological Price Thresholds according to the Monetary Unit," paper presented at the Second Annual Conference of Pricing Research, Fordham University, New York.

Gilbert, Daniel T. (1989), "Thinking Lightly about Others: Automatic Components of the Social Inference Process," in *Unintended Thought*, ed. James S. Uleman and John A. Bargh, New York: Guilford, 189–211.

Johnson, Michael D. and Charles R. Plott (1989), "The Effect of Two Trading Institutions on Price Expectations and the Stability of Supply-Response Lag Markets," *Journal of Economic Psychology*, 10 (2), 189–216.

Johnson, Michael D. and Christopher P. Puto (1987), "A Review of Consumer Judgment and Choice," in *Review of Marketing*, ed. Michael J. Houston, Chicago: American Marketing Association, 236–292.

Kahneman, Daniel and Amos Tversky (1979), "Prospect Theory: An Analysis of Decision under Risk," *Econometrica*, 47 (March), 263–291.

Northcraft, Gregory B. and Margaret A. Neale (1987), "Experts, Amateurs, and Real Estate: An Anchoring and Adjustment Perspective on Property Pricing Decisions," *Organizational Behavior and Human Decision Processes*, 39 (February), 84–97.

Raghubir, Priya and Aradhna Krishna (1996), "As the Crow Flies: Bias in Consumers' Map-Based Distance Judgments," *Journal of Consumer Research*, 23 (June), 26–39.

——— (1999), "Vital Dimension in Volume Perceptions: Can the Eye Fool the Stomach?" *Journal of Marketing Research*, 36 (August), 313–326.

Shafir, Eldar, Peter Diamond, and Amos Tversky (1997), "Money Illusion," *Quarterly Journal of Economics*, 112 (May), 341–374.

Tversky, Amos and Daniel Kahneman (1974), "Judgment under Uncertainty: Heuristics and Biases," *Science*, 185, 1124–1131.

Wansink, Brian, Robert J. Kent, and Stephen J. Hoch (1998), "An Anchoring and Adjustment Model of Purchase Quantity Decisions," *Journal of Marketing Research*, 35 (February), 71–81.

Wegener, Duane T., Richard E. Petty, and Meghan Dunn (1998), "The Metacognition of Bias Correction: Naive Theories of Bias and the Flexible Correction Model," in *Metacognition: Cognitive and Social Dimensions*, ed. Guy Lories et al., Thousand Oaks, CA: Sage, 202–227.