

## Are Men Seduced by Red? The Effect of Red Versus Black Prices on Price Perceptions<sup>☆</sup>

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### Abstract

Although the use of color in promotional ads is ubiquitous in the market, little is known about the impact of color on price perception. This research reports findings from four studies that assessed the impact of red on consumers' perceptions of savings. These studies reveal that the effect of red versus black prices on perception of savings is moderated by gender. Male consumers perceived greater savings when prices were presented in red than when presented in black (studies 1a and 1b). The effect persists in a multi-ad context (study 2). However, this effect of red abated when the level of involvement in the task was high (study 3). Women appeared to be naturally inclined toward greater elaboration of the ad and showed greater price recall. Theoretical and practical implications are discussed.

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Many retailers use the color red to signal the value they are offering. A content analysis of pricing information in 505 retail advertisements revealed that retailers often use red to indicate and emphasize savings.<sup>2</sup> Why is this the case? Is this likely to be an effective strategy for communicating value? Will advertisements with prices presented in red be seen as offering better value than those in black? Subtle changes in visual presentation of prices have been shown to affect price perception in surprising ways (Coulter and Norberg 2009). For example, ads featuring sale prices in a smaller font than regular prices were seen as offering better value than when sale prices were in a larger font (Coulter and Coulter 2005). Such findings support the notion that consumers often use heuristic cues to process price information.

Mounting evidence suggests that color may serve as a heuristic cue in judgment. Extant research demonstrates that the effect of color on perceptions is quite common. For example, consumers are more persuaded by color highlights in an ad compared to an ad that is simply black and white (Meyers-Levy and Peracchio 1995). In addition, it has been shown that the color red in particular leads to perceive better performance (Hagemann, Strauss, and Leissing 2008) and makes men more attracted to members of the opposite sex (Elliot and Niesta 2008). In the pricing context, where colors might be used to emphasize the importance of price over other attributes, research finds that when consumers evaluated cars on a website with a red background with flames (vs. a green one with dollar signs) they were less likely to identify price as an important attribute in car choice and would go on to choose a more expensive car (Mandel and Johnson 2002). That is, the color red seems to lead people to be less price-conscious and lead them to choose more expensive options. Consequently, consumers may be using color as a heuristic to aid them with their decision making.

However, the uses of these heuristics are likely to be influenced by consumers' gender. Available evidence suggests that males may be especially likely to use heuristic cues. For example, Meyers-Levy and Sternthal (1991) found that men have a higher threshold for elaboration which would seem to make

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<sup>2</sup> Print flyers were coded for the color of the price information. Wal-Mart's (117) and Sports Authority's prices (77) were red. Target's prices (114) were black. Macy's (197) used red prices when saving information was not present and black prices when saving information was present.

them more likely to use heuristic cues. Hence, one might expect price color to be used as a heuristic cue especially by male consumers. Indeed, our research (studies 1a–3) shows that gender moderates the effect of red versus black prices on price perceptions. We demonstrate that when retail prices are presented in red, men feel more positively, and perceive the retailer to be offering a better deal. Consistent with the premise that such heuristic processing is more likely to occur when the level of elaboration is low, we show that the effect of red on evaluations made by men disappear when their involvement is high. In sharp contrast, and consistent with expectations, women appear to be chronically more inclined toward elaboration of an ad. The net result is that women exhibit better memory for price information and greater skepticism of the widespread use of red to highlight prices. To the best of our knowledge this is the first research to examine the effect of color on price perceptions.

Our primary aim is to examine whether gender moderates the effect of price color (red vs. black) on consumers' perceptions of savings. We explore this and related research issues in four separate studies. Study 1a demonstrates that men perceive greater savings when prices are presented in red as opposed to black. Study 1b replicates the findings and shows that red prices (relative to black) evoke more favorable responses (akin to pleasure of getting a deal: Grewal, Monroe, and Krishnan 1998) among men, and that such positive responses partially mediate the effect of red on their perceptions of savings. Study 2 demonstrates that the effects for men carry across multiple ads. That is, even when men are shown more than one ad they continue to show an effect of red while women continue to process prices thoroughly. This multi-ad study rules out novelty as an explanation of the effect. Finally, study 3 demonstrates that the effect of red occurs when involvement is low and this effect is eliminated when the level of involvement is high. In the following section, we review relevant literature leading to our central hypothesis.

### Effects of color

Since Odbert and colleagues' 1942 finding (Odbert, Karwoski, and Eckerson 1942) that colors are associated with mood states, a number of studies have examined the effects of red (Clarke and Costall 2008; Gorn et al. 2004; Labrecque and Milne 2012). Relevant to this research, participants asked to evaluate several color samples and indicate how they felt on the dimension of pleasure in response to the color indicated greater pleasure in response to red compared to green and yellow (Valdez and Mehrabian 1994). Though research suggests that red may lead to a change in more conscious attitudes (Crowley 1993), the effect of color on information processing by consumers appears to be strongest in contexts that are relatively low in involvement (Meyers-Levy and Peracchio 1995).

Furthermore, the effects of color appear to be quite pervasive. For example, D'Andrade and Egan (1974) attempted to show that the effect of color results primarily from cultural associations, but found null effects underscoring the effect's cross-cultural importance. Another study (Maier et al. 2009) showed that one-year olds exhibit a preference for red Lego

bricks over green ones, suggesting that the effect of red may be hard-wired.

The effect of red has also been shown in sports. For example, Hill and Barton (2005) analyzed the effect of uniform color on a team's performance and concluded that individuals or teams wearing red uniforms are more likely to win. These effects appear to be due in part to the effect of red on the referees. Indeed, subsequent research found that referees assign more points to competitors wearing red than those wearing blue (Hagemann, Strauss, and Leissing 2008). The authors attribute this to a "psychological effect" of the red on the referees. Thus, the tendency of red to serve as a heuristic cue appears to have substantial real-world implications.

Men appear to be particularly susceptible to the effects of red color. For example, Elliot and Niesta (2008) showed that the use of red color generate greater feelings of attraction to members of the opposite sex for men. Consistent with this premise, Elliot and Niesta note that men who see a photo of a woman against a red background or in a red shirt are more interested in taking her on a date and exhibit greater willingness to spend money during the date. Similarly, Kayser, Elliot, and Feltman (2010) found that the color red caused men to exhibit more romantic behavior. Thus, all these streams of work suggest that men compared to women may be more susceptible to the heuristic effects of red.

### Gender and the use of heuristic cues

According to Heuristic and Systematic Processing Theory, individuals may use either heuristic or systematic processing when making judgments, but one of the two is likely to dominate (Chaiken 1980; Chaiken and Maheswaran 1994). One of the factors that determines which will be the dominant (preferred) mode is the level of felt involvement. When people are involved, it seems they are more motivated to engage in more effortful, detailed processing and are likely to adopt a systematic processing style; that is, they make a conscious effort to comprehend, evaluate and assess the validity of arguments presented in a communication (Chaiken and Trope 1999). A systematic processing strategy is cognitively demanding and so typically requires greater motivation for the individual to use it. In contrast, individuals who are less involved and thus less motivated are more likely to pursue an information processing strategy that is relatively less demanding and entails a lower level of elaboration. This processing style relies on the use of heuristic cues or shortcuts to make judgment. Among the heuristics tools people can use are scripts, schemas, or other simple cognitive rules based on past experiences and observations to form judgments. As a result it is the more cognitively economical means of forming a judgment.

In the context of prices, consumers' use of heuristic cues is prevalent (Coulter and Coulter 2005, 2010; Coulter and Norberg 2009; Thomas and Morwitz 2005, 2009). Similar to other decision-making contexts, consumers use heuristics to assess value to simplify judgments. They will use the heuristic cues present in pricing information to judge price (Inman, McAlister, and Hoyer 1990; Thomas and Morwitz 2009).

Given a lower likelihood of elaboration of advertising in general, men may be especially likely to use heuristic cues in perceiving savings. Extant research (Meyers-Levy and Maheswaran 1991; Meyers-Levy and Sternthal 1991) provides some evidence to support that processing of ads by males is less in-depth, and that males are more likely to use heuristic cues to form judgments about an ad. As a result, men are more susceptible to quantity surcharges because, rather than calculate the unit price, males use a heuristic (“buy more, save more”) to judge savings (Manning and Sprott 2007). Such low involvement decision-making is associated with greater reliance on heuristic cues that, in turn, leads to the reduced recall observed among men following ad processing (Meyers-Levy and Sternthal 1991). Moreover, it appears that the effects of color may be especially prevalent in low involvement situations suggesting its use as a heuristic cue (Meyers-Levy and Peracchio 1995). Therefore, it is logical to expect men to be susceptible to heuristics when processing prices and to be persuaded by the red color (relative to black color) in which the price information is presented.

In summary, men are more likely to use heuristic processing to judge price in a retail ad and thus be more likely to rely on red color prices as a visual heuristic to judge savings. When prices are red, it will lead to a less through processing and perceptions of higher savings at the advertised store. More formally, we expect that:

**H1.** Gender moderates price color’s influence on evaluations such that men evaluate prices in red more favorably than those in black while women do not.

### Study 1a

The primary objective of this study is to provide an initial demonstration that the color in which price information (red vs. black) is presented influences how the retail ad is perceived and evaluated. However, we expect that men and women will respond to prices in red versus black in retail ads differently. Specifically, we expect that men will perceive greater savings when prices are presented in red compared to when they are presented in black.

#### Method

One hundred twenty-four graduate students at an east coast university in the USA were recruited to participate in the study. They were assigned to one of two conditions (price color: red or black). Each participant was provided a booklet that contained multiple pages. On the first page, participants were introduced to the task with a short note that asked them to imagine they were setting up a new apartment. Participants were provided with a mock retail ad featuring three toasters and two microwaves (Appendix A). The prices used in the retail ad were based on a content analysis of prices of similar products in the local metropolitan area.

After reviewing the retail ad, participants assessed the promoted offers on a three-item measure of perceived savings ( $\alpha = .74$ ; “I would be saving a lot of money if I made my

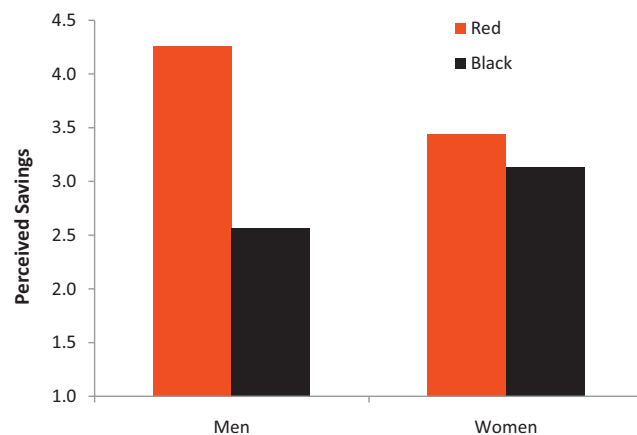


Fig. 1. Perceived savings as a function of the gender by price color interaction: study 1.

purchases at this store”; “This store is selling the advertised products at a considerable discount”; and “If I looked around, I could probably find similar products selling at a lower price” (reverse coded); Grewal et al. 1998). These were assessed using seven-point scales (1 = “strongly disagree”; 7 = “strongly agree”). Finally, participants provided basic demographic information by indicating their age group and gender.

#### Analysis and findings

To validate our prediction that males will evaluate the store with prices presented in red more favorably than the store with prices presented in black, we analyzed participants’ perceptions of savings using a 2 (price color: red or black)  $\times$  2 (gender: male or female) between-subjects analysis of variance (ANOVA).

As expected, the analysis revealed a significant two-way interaction between gender and price color ( $F(1, 120) = 12.47$ ,  $p < .001$ ). An exploration of the nature of this interaction using simple main effects tests confirmed that the male participants perceived greater savings when prices were represented in red than in black ( $M_{\text{Red}} = 4.26$ ;  $M_{\text{Black}} = 2.56$ ;  $F(1, 120) = 43.73$ ,  $p < .001$ ; see Fig. 1). Also, as expected, no effect of price color was found for female participants ( $M_{\text{Red}} = 3.4$ ;  $M_{\text{Black}} = 3.1$ ;  $F < 1$ ). In summary, the results provide strong support for the hypothesis.

#### Discussion

Study 1a provides an initial demonstration that the influence of price color on consumer evaluation of retailer promotions is moderated by gender. Specifically, male participants perceive greater savings when prices appear in red versus black, but no such effect is seen among women. The findings are consistent with our reasoning that when processing the information contained in such ads, men utilize the color of the price as a visual heuristic to form judgments about savings offered by the retailer. Therefore, the use of the color red by men as a heuristic cue to judge savings may make good sense in that it might reduce the cognitive burden associated with the evaluation process.

Considerable evidence shows that people often use a how-do-I-feel-about-it heuristic in which they reflect on their affective state and use it to form a judgment (Pham 1998). In the pricing domain, transaction value (i.e., perceived savings) is thought to be based on the consumer's affective response driven by their assessment of price information (akin to the Grewal, Monroe, and Krishnan 1998 transaction value concept). Here we argue that perceived savings will be based on the consumer's affective response driven by the representation of the price (i.e., the color of the price). Specifically, study 1b examines whether how people feel mediates the effect of price color on perceived savings.

### Study 1b

#### Method

One hundred sixty-three graduate business students at an east coast university in the USA were assigned to one of two conditions (price color: red or black). This study used the same stimuli (retail ads) that were used in study 1a. After viewing the retail ad, participants evaluated the savings offered by completing the same perceived savings measure that was used in the previous studies ( $\alpha = .76$ ). In addition, we assessed participants' emotional (affective) states by requesting them to respond to a three-item scale relating to positive affect (happy, pleased and glad:  $\alpha = .87$ ; 1 = "not at all", 9 = "extremely") that were adapted from Watson, Clark, and Tellegen (1988).

#### Analysis and findings

##### Perceived savings

The results obtained here lend further support to our predicted differences in reactions to prices in color by men and women. As expected, we obtained a significant two-way interaction effect of price color by gender on perception of savings ( $F(1, 158) = 16.13, p < .001$ ). Furthermore, males perceived greater savings at the store when the prices in the retail ad were presented in red than in black ( $M_{\text{Red}} = 4.21$ ;  $M_{\text{Black}} = 3.02$ ;  $F(1, 158) = 27.74, p < .001$ ). However, no such effect of color was observed for female participants ( $M_{\text{Red}} = 3.05$ ;  $M_{\text{Black}} = 3.19$ ;  $F < 1$ ).

##### Pleasure analysis

A 2 (price color: red or black)  $\times$  2 (gender: male or female) between-subjects ANOVA revealed a significant price color by gender interaction effect on affect ( $F(1, 159) = 5.77, p < .05$ ). Furthermore, the retail ad containing prices in red elicited more positive affect among men than did the retail ad with prices in black ( $M_{\text{Red}} = 5.27$ ;  $M_{\text{Black}} = 4.28$ ;  $F(1, 159) = 8.41, p < .01$ ). However, women exhibited a similar pattern of positive affect toward both red and black prices used in retail ads ( $M_{\text{Red}} = 3.87$ ;  $M_{\text{Black}} = 4.11$ ;  $F < 1$ ).

Finally, we examined whether the effect of red on perceived savings for men was mediated by positive affect. The effect of red reduced from  $F(1, 84) = 25.76$  ( $\eta = .49$ ) to  $F(1, 83) = 19.63$

( $\eta = .44$ ) and the positive affect covariate was marginally significant,  $F(1, 83) = 2.93$  ( $p < .10$ ). Therefore, positive affect partially mediates the effect of red on perceived savings for men. These findings are consistent with prior research and with our expectations. Prices in red seem to serve as a positive heuristic cue such that when men are asked how do they feel about them, their response is favorable.

To further examine the mediating effect of affect, we also used Preacher and Hayes' (2004; Zhao, Lynch, and Chen 2010) method. Bootstrapping tests (Preacher and Hayes 2004; Zhao, Lynch, and Chen 2010) revealed that the effect of color (red, black) and gender (male, female) on perceptions of savings was mediated by the affect created by the flyer ( $a \times b = .053$ , 95% CI = .003 to .156). In the indirect path, a change in color from black to red increased affect by .48 units ( $t = 1.92, p = .05$ ). Holding constant the color, a unit increase in affect increased perception of savings by .11 units ( $t = 2.07, p < .05$ ). There was also an effect of gender; males' perception of savings being higher than those for females by .40 units ( $t = 2.31, p < .05$ ). Using affect as a mediator, the direct effect of color on perceptions of savings was reduced but remained significant ( $c' = .56$ ;  $t = 3.30, p < .001$ ;  $c = .51$ ;  $t = 2.98, p < .01$ ) and since  $a \times b \times c$  (.027) was positive it suggested a complementary mediation (Zhao, Lynch, and Chen 2010).

#### Discussion

The results confirm that the positivity generated by red prices partially mediates the effect of red on men's evaluation of a store's prices. Specifically, we found that, compared to prices presented in black, prices presented in red put males in a more positive state, which, in turn, enhanced their perceptions of savings offered. This finding is consistent with previous research suggesting that the effect of color on evaluation is a two stage process with change at the affect stage preceding a change at the evaluation stage (Crowley 1993).

To extend the results of study 1 we conducted a second study that used a multi-ad context. Study 2 models a typical consumer shopping situation in which multiple ads are evaluated and hence tests the generalizability of the results. Further, an alternative explanation for the results in study 1 could be the novelty of the ad. When the prices appear in red it is novel and leads to a more favorable evaluation. If the effect is a result of novelty, we would expect the effect to diminish for a second ad.

### Study 2

As outlined above, study 2 examines the effect of price color in a more naturalistic multi-ad context in which participants see more than one ad. Such a multi-ad approach will also enable us to rule out novelty of the prices in red as a possible explanation of the results obtained in study 1(a, b). Another aim of study 2 is to accumulate evidence to support our earlier conjecture that men engage in less thorough processing of an ad as compared to women. Study 2 addresses this by assessing ad recall and recognition.

Prior research has found that men have a higher threshold for elaboration of an ad than women. Further, the ability to recall ad content is directly related to information processing depth (Meyers-Levy and Sternthal 1991). Said another way, men need greater motivation to process an ad in depth. Hence, if men are engaged in shallower (less in-depth) processing of price information, their recall of prices in the retail ad and recognition of accompanying attributes (brand) would be less accurate than women. Study 2 seeks to test this prediction.

### Method

The study was implemented as a 2 (price color retail ad 1: red or black)  $\times$  2 (price color retail ad 2: red or black) design. One hundred fifty-eight graduate business students attending an east-coast university in the USA were assigned to one of the four conditions. As with study 1, participants were provided with a retail ad from a store (retail ad 1; see Appendix B) and assessed the perceived savings in this store's ad on the same three items measuring perceptions of savings used in study 1 ( $\alpha = .67$ ). Following a filler task, participants responded to measures that assessed recall and recognition of specific information in this retail ad. Specifically, they (1) recalled the price of one of the products, (2) indicated their overall confidence (1 = "not at all confident" and 10 = "extremely confident") in their recall of price information and (3) recognize the brand of the least expensive toaster.

After completing another filler task, we presented participants with a second retail ad promoting the same products as in store 1, but arranged in a different layout so as to appear different from store 1 (see Appendix B). Participants then evaluated the perceived savings at this store using the same three-items used for store 1 ( $\alpha = .72$ ).

### Analysis and findings

We conducted the analysis in two stages. First, we examined how participants reacted to the ad from store 1. Note that the analysis in this stage merely replicates the results for an ad from a single store in studies 1a and 1b. Our results are consistent with those obtained in study 1 (a, b) and showed a significant two-way interaction effect of gender and color of price on perceived savings ( $F(1, 154) = 9.07, p < .01$ ). Further, examination of the nature of the interaction revealed that males perceived greater savings when prices were presented in red than when they appeared in black ( $M_{\text{Red}} = 3.79; M_{\text{Black}} = 2.75; F(1, 154) = 18.56, p < .001$ ). In contrast, no effect of price color was found for female participants ( $M_{\text{Red}} = 3.12; M_{\text{Black}} = 3.16; F < 1$ ). Overall, the pattern of results replicates our findings from study 1(a, b).

Interestingly, the multi-ad context exaggerated the differences between men and women in price perception. For men, the results for ad 2 were similar to those obtained for ad 1. Regardless of ad 1 price color, they viewed the prices in red for ad 2 to be more favorable ( $M_{\text{Red}} = 3.81; M_{\text{Black}} = 2.70; F(1, 150) = 18.99, p < .001; M_{\text{Red1-Red2}} = 3.91, M_{\text{Black1-Red2}} = 3.71, M_{\text{Red1-Black2}} = 2.70; M_{\text{Black1-Black2}} = 2.70$ ). In contrast, not only

did women not perceive greater savings when prices were in red for ad 1, but when prices were in red for both ad 1 and ad 2, women's evaluation of store 2 were more negative than if the prices of store 1 were black ( $M_{\text{Red1-Red2}} = 2.45; M_{\text{Black1-Red2}} = 3.73; F(1, 150) = 8.85, p < .05$ ). However, women perceived no differences in savings when ad 2 prices were in black ( $M_{\text{Red1-Black2}} = 3.06; M_{\text{Black1-Black2}} = 3.26, F < 1$ ). Thus, female participants perceived lower savings at store 2 when both store 1 and store 2 featured their prices in red.

### Process analysis

Our conceptual framework suggests that the influence of price color on evaluations provided by male and female participants depends on the depth of processing engaged in by the participant. When participants engage in deeper processing, as in the case of women for an ad, the price color effects will diminish and they should have better memory for information provided in the ad. To evaluate this hypothesis, we compared male and female participant responses on measures of recall and recognition for the ad for store 1. As expected, women showed more accurate recall of price information (Emerson microwave;  $t(154) = 2.44, p < .05$ ) than male participants. That is, men's recall of the price of the Emerson microwave deviated more from the actual price than women's did ( $M_{\text{Female recalled price}} = \$81.09; M_{\text{Male recalled price}} = \$74.88; \text{actual price} = \$89.99$ ). In addition, more women accurately recognized the brand of toaster that had the lowest price (chi-square (1) = 4.44,  $p < .05$ ; 69 percent for women vs. 53 percent for men). Finally, female participants expressed more confidence about their memory of prices in the ad than men ( $M_{\text{Female}} = 7.28; M_{\text{Male}} = 6.22; t(156) = 2.60, p < .05$ ). Overall, these results are consistent with the depth of processing argument offered.

### Discussion

The study 2 results replicated the results from study 1; male participants perceive greater savings when prices appear in red versus black. Furthermore, the results hold across a multi-ad context, eliminating the possibility that the effect of prices in red stems from the novelty of the red color. Instead men used the retail ad with prices in red as a heuristic cue to judge savings at the store, whereas women did not. Women processed information in the ad more deeply and showed enhanced memory for pricing information in the retail ad indicating deeper processing than men.

The effect of the multi-ad context on women's price perception is also intriguing. It appears that when women see multiple ads in which prices appear in red, their greater vigilance (Manning and Sprott 2007) makes them more skeptical of the promotion. As a result, women perceive lower savings when they see multiple ads with prices listed in red.

To provide a more nuanced understanding of the conditions under which prices communicated in red are capable of signaling greater savings, we conducted study 3, which investigates the moderating role of extrinsically induced involvement on the perception of prices. We anticipate that prices in red will

continue to signal greater savings for men, but only in situations where such consumers have low involvement in the task.

### Study 3

The results obtained in the earlier studies are consistent with the arguments that compared to women, men are more likely to use prices in red as a heuristic cue when they are processing price information. The goal of this study is to investigate the conditions under which the effect of price color among men may be enhanced or subdued. Specifically, our focus is on the level of involvement—a variable that has been shown to play a significant role in determining how consumers select and utilize information when making judgments (Chaiken and Maheswaran 1994; Meyers-Levy and Peracchio 1996; Petty, Cacioppo, and Schumann 1983; Richins, Bloch, and McQuarrie 1992). Specifically, the extent to which people will engage in more systematic or heuristic processes.

Past research suggests that if men are made more involved in the task they will be motivated to process an ad more systematically (Meyers-Levy and Sternthal 1991). Therefore, if men are made to engage in deeper processing, they will be less likely to use heuristic cues like the color of a price to draw inferences about savings in an ad. As a result, assessment of savings from an ad by men may be expected to be similar to the assessment of savings made by women. In other words, we expect the effect of the red among men to be diminished when the level of involvement is high.

### Method

One hundred fifty-two graduate business students were distributed across the four cells of a 2 (price color: red or black)  $\times$  2 (involvement: low or high) between-subjects factorial design. The procedure was similar to that used in studies 1(a, b) and 2, in so far as participants were exposed to the ad with prices in red or black. Before viewing and evaluating this ad, participants were provided a manipulation of involvement that entailed either indicating that they would be evaluating products that would be marketed to their local metropolitan area (high involvement) or indicating nothing about the marketing of the products (low involvement; Suri and Monroe 2003). A pilot study ( $n = 104$ ; males: 45 percent) dividing participants equally between these involvement manipulations accompanying a similar retail ad revealed significant differences between the two conditions ( $\alpha = .91$ ; Interested in reading the descriptions; Involved in the task; Interested in understanding the descriptions:  $M_{\text{High involvement}} = 5.77$  vs.  $M_{\text{Low involvement}} = 5.00$ ;  $t(102) = 2.02$ ,  $p < .05$ ). After reading this information and viewing the ad, participants responded to the same perceived savings measure used in the previous two studies ( $\alpha = .71$ ). We also asked them to indicate their level of agreement (seven point scales) with two items: “know a lot about toasters and microwave ovens” and “interest in learning about kitchen appliances.” They were also asked to indicate whether they had bought a microwave in the past year and whether they had bought a toaster in the past year.

### Analysis and findings

We found that the level of knowledge ( $M_{\text{Men}} = 3.22$  vs.  $M_{\text{Women}} = 2.99$ ;  $p > .30$ ) and interest in learning about kitchen appliances ( $M_{\text{Men}} = 4.57$  vs.  $M_{\text{Women}} = 4.70$ ;  $p > .50$ ) were similar for men and women. Additionally, there were no gender effects on whether they had bought a microwave or a toaster in the past year (both  $p > .30$ ).

Our primary prediction was that the effects of price color for male participants would depend on the level of involvement. We anticipated that male participants would evaluate ads more positively when prices were in red than in black, though we expected this effect to be limited to low-involvement conditions.

A 2 (price color: red or black)  $\times$  2 (gender: male or female)  $\times$  2 (involvement: low or high) between-subjects ANOVA revealed the predicted three-way interaction ( $F(1, 144) = 5.42$ ,  $p < .05$ ). As expected, the gender by color interaction was significant in the low-involvement condition ( $F(1, 144) = 3.76$ ,  $p = .05$ ), but not in the high involvement condition (Men:  $M_{\text{Red}} = 3.12$ ;  $M_{\text{Black}} = 3.43$ ; Women:  $M_{\text{Red}} = 3.05$ ;  $M_{\text{Black}} = 2.69$ ; overall interaction:  $p > .15$ ). Further, examination of the nature of the interaction in the low-involvement conditions revealed that males perceived greater savings when prices appeared in red than when they appeared in black ( $M_{\text{Red}} = 3.74$ ;  $M_{\text{Black}} = 3.12$ ;  $F(1, 144) = 5.51$ ,  $p < .05$ ). In contrast, no effect of price color was found for women ( $M_{\text{Red}} = 3.23$ ;  $M_{\text{Black}} = 3.38$ ;  $F < 1$ ).

### Discussion

The results from study 3 demonstrate that, as we predicted, male participants in a low-involvement context evaluated an ad with prices in red as more favorable while male participants in a high involvement context did not. Evidence suggests that in low involvement contexts people are more likely to use heuristic cues to form judgments. For example, a promotional signal, such as a point of purchase display noting a price cut, is more likely to be used by less involved, low need for cognition individuals (Inman, McAlister, and Hoyer 1990).

Further, it seems that motivation, similar to the involvement manipulation used in the present research, can moderate the allocation of attentional resources. Numerous functional neuroimaging and event-related potential (ERP) studies have confirmed that people can be motivated to allocate more attention to the more important elements of a visual display (see Kastner and Ungerleider 2000; Luck, Woodman, and Vogel 2000). For example, Kiss, Driver, and Eimer (2009) recently confirmed these results by varying rewards for finding a color group (i.e., red among gray) within a display. The results showed that increasing the rewards significantly improved the performance of the participants. Thus, women who appear inherently more motivated to process ads in depth and men under high-involvement conditions, such as in the research here, will be more likely to base their judgment of retailer on a more comprehensive assessment that includes savings cues in addition to price.

## General discussion

Previous research has demonstrated that subtle changes in the presentation of price influences price perception (Grewal, Marmorstein, and Sharma 1996). The present work is designed to be the first to consider the effect of red on price perception: that a price in red impacts perceived savings. This research introduces the idea that prices in red serve a heuristic function. Under conditions of low elaboration (e.g., low involvement male consumers) a price in red signals greater perceived savings relative to prices in black. Consistent with a heuristic processing interpretation, we show that the effect of red disappears when the likelihood of elaboration is high. The present research is therefore intended to make contributions to the literatures on price perception, color, and retail promotions.

This research sheds light on how the color of price information in an ad affects perceived savings. Consistent with past research (Elliot and Niesta 2008), we demonstrate that men respond positively to the color red. More interesting, however, is that these effects extend to perception of price information in an ad. When prices appear in red, men evaluate them more favorably than when they appear in black (studies 1–2 and study 3–low involvement). Men seem to process the ads less in-depth and use price color as a visual heuristic to judge perceived savings offered by the store. This effect occurs in both single and multi-ad contexts, eliminating the possibility of a novelty effect on evaluation. When men are made to process an ad in more depth, the effect of red is eliminated (study 3). While men show a robust effect under low-involvement conditions, the effect diminishes when men are more highly involved in the task. Additionally, we demonstrate that the effect of red is partially mediated by positive affect experienced after seeing prices in red. When men see prices in red they feel more positively and perceive greater savings. In contrast, women appear immune to the effects of prices in red due to their tendency to process ads in greater depth. Moreover, when multiple ads feature prices in red, women appear more skeptical and perceive fewer savings. Future research should also explore whether women's skepticism of prices presented in red activates a heuristic that negatively influences their judgments of retailers.

A multi-study research article, like this one, has the opportunity to assess the robustness of the research findings. We used meta-analytic techniques to assess the overall strength of the effect, the overall significance of the effect, and the robustness of our results. We first calculated the effect sizes associated with the simple planned contrasts (i.e., the two cells pertaining to red prices and black prices for men) (study 1a:  $\eta = .59$ , study 1b:  $\eta = .48$ , study 2:  $\eta = .45$ , study 3:  $\eta = .33$ ). We followed procedures suggested by Rosenthal and Rosnow (2008) and confirmed that the effect sizes were homogeneous ( $\chi^2(3) = 3.49, ns$ ); the average weighted  $\eta$  is .48. We then tested the significance of the overall relationship, using Rosenthal and Rosnow's (2008) *p*-value combination technique. The results indicate that the overall relationship was significant at  $p < .001$ . Finally, we used Rosenthal and Rosnow's (2008) file drawer technique to determine that it would take over 100 null studies to reduce the

significance of our results to the .05 level, suggesting that the results are robust.

These results might also be an example of biased competition. Biased competition theory suggests that visual scenes (e.g., ads) are cluttered and contain many different elements that cannot all be processed simultaneously due to the limited processing capacity of the visual system (Desimone and Duncan 1995; Duncan 1998). Consequently, multiple stimuli present at the same time in the visual field compete for neural representation and when people give attention to any one target it leaves less available for others. It may be that when price information in retail ads is emphasized (e.g., by making it red), compared to other product attributes, the ability for people to process the other attributes of the ad (e.g., photo quality of products) is diminished. As a result, the price and the individual's positive reaction to prices in red determine their perceived savings, regardless of the other cues present. Since males are shallow processors of ads, and allocate limited cognitive resources to the task, they will be more likely to make a judgment based on this more dominant cue.

Previous research demonstrates that red leads to greater attraction among men to members of the opposite sex (Elliot and Niesta 2008). While this reaction would seem to be classified as a positive one, similar to findings from the studies reported here, it is unclear if the mechanisms underlying the two effects are indeed the same. We might classify a feeling of desire as an affective reaction, however, it would seem quite different than the more generic feeling of positive affect examined here (captured by the adjectives "happy", "pleased" and "glad") that seems to better capture the feeling of getting a good deal. Future research is needed to understand the nature of red's effect on men's judgment to accurately predict its effects in consumption contexts.

Along similar lines, future research is needed to understand the extent to which the effects of red extend to other long wavelength colors, such as orange and yellow. Research finds, for example, that the color orange has similar properties to red (Clarke and Costall 2008; Labrecque and Milne 2012), thus we might expect orange to have similar effects to the color red that are quite different from those of blue (Gorn et al. 2004). It was once thought that the effects of color could be predicted by color wavelength (Walters, Apter, and Svebak 1982). However recent evidence suggests that this may be an oversimplification (Labrecque and Milne 2012) and that there is something uniquely meaningful about the color red (Elliot and Aarts 2011; Kayser, Elliot, and Feltman 2010; Maier et al. 2009). The perception of red appears to be handled by a cognitive subsystem distinct from the subsystem processing blue and yellow; it has a dedicated region of the cortex that seems to have evolved more recently than the subsystem for blue and yellow (Mollon 1989). Thus, red is distinguished from other colors by a number of unique characteristics. Nonetheless, future research is needed to understand the extent to which the effects observed here are exclusive to the color red.

Consumer reaction to color also appears more complex than previously thought, proving much richer than a simple positive or negative reaction. Labrecque and Milne (2012) argue that

colors have personalities that can extend to a product or brand. Moreover, the specific effects of color appear highly context dependent (Elliot et al. 2007; Gorn et al. 2004; Mehta and Zhu 2009). For example, in earlier work by Gorn and his colleagues, red had a negative effect on consumer reaction. When red was used as the background of a real-estate website, its arousing properties led people to perceive a longer download time and indicate less willingness to recommend the website (Gorn et al. 2004). More recently, in a performance context it seems red can both help and hinder an individual's performance, depending on the nature of the task (Elliot et al. 2007; Mehta and Zhu 2009). Thus it is clear that despite the ubiquity of color in the marketplace, research into its effects is still in its infancy and offers tremendous opportunity for future research.

In addition to its theoretical import, this research has considerable pragmatic implications. Price color selectively enhances consumer perception of price; retailers can improve the efficiency of their marketing efforts by listing prices in red for male target audiences. In spite of e-commerce growth and tighter margins, brick and mortar retailers continue to churn out full-color weekly circulars and local ads to lure customers. The importance of the format in which price information in product ads is displayed is becoming increasingly recognized by retailers. Recent research has moved from examining the effects of cues such as brand name, price level, country of origin, and warranty to more subtle cues such as position of price in an ad, fonts used to

represent the price information, and the semantics that are used in conjunction with the price information. For example, leading drugstore chains have stepped-up research efforts on the effectiveness of ad format for their own ads as well as the practices of competitors (Puccinelli et al. 2009). A primary focus of this research is the use and effectiveness of color in advertising.

As retailers compete ever more fiercely to be perceived by consumers as offering good value, they have become creative in the use of color to signal value. For example, Best Buy's store circular emphasizes prices by placing them on a yellow background that stands out against a predominantly blue ad. Wal-Mart highlights promotions with their red "Rollback" logo or superimposes the price on a red background. Retailers such as Target and CVS use varied color formats to highlight price. However, if the purchase is important and or is likely to be made by a woman, retailers can realize substantial cost savings by listing prices in black. Thus, retailers may enhance their effectiveness and realize cost savings by using color strategically in their promotional materials.

Finally, in this research we used price promotions as are presented routinely in store flyers and newspaper inserts. Given growth of the online and mobile media, additional research needs to examine if differences in situation and media (see Grewal et al. 2011; Philips and Suri 2004; Suri, Swaminathan, and Monroe 2004) might abate or enhance the effects of red color prices observed in this study.



Appendix A. Stimuli for Study 1a, 1b and 3

Black price condition

Red price condition

**Find everything you need under one roof....ours!**

**HAMILTON BEACH 4-Slice IntelliToast Toaster** has two sets of extra-wide slots and toast boost feature for easy removal.

**\$34.99**



**T-FAL AVANTE 2-slice classic chrome toaster** has extra-wide slots, angled for easy removal. Electronic browning control.

**\$49.99**



**KRUPPS COOL TOUCH 2-Slice toaster** chrome exterior and extra-wide slots. Quartz heating element for even toasting.

**\$39.99**



**\$69.99**  
**SHARP 0.8 CU. FT. MICROWAVE OVEN** has 800 watts of power. Programmable and audio signal elimination. Includes limited warranty.



**\$89.99**  
**EMERSON 0.9 CU. FT. MICROWAVE** has 900 watts of power. Glass turntable and handy quick cook feature.



**NOW, PLEASE TURN TO THE NEXT PAGE AND TELL US YOUR IMPRESSIONS OF THE STORE AND THE ADVERTISED PRODUCTS.**

**Find everything you need under one roof....ours!**

**HAMILTON BEACH 4-Slice IntelliToast Toaster** has two sets of extra-wide slots and toast boost feature for easy removal.

**\$34.99**



**T-FAL AVANTE 2-slice classic chrome toaster** has extra-wide slots, angled for easy removal. Electronic browning control.

**\$49.99**



**KRUPPS COOL TOUCH 2-Slice toaster** chrome exterior and extra-wide slots. Quartz heating element for even toasting.

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**SHARP 0.8 CU. FT. MICROWAVE OVEN** has 800 watts of power. Programmable and audio signal elimination. Includes limited warranty.



**\$89.99**  
**EMERSON 0.9 CU. FT. MICROWAVE** has 900 watts of power. Glass turntable and handy quick cook feature.



**NOW, PLEASE TURN TO THE NEXT PAGE AND TELL US YOUR IMPRESSIONS OF THE STORE AND THE ADVERTISED PRODUCTS.**

Appendix B. Sample stimuli for study 2

Store ad 1 (Black price condition)

Store ad 2 (Red price condition)

**Find everything you need under one roof....ours!**

**HAMILTON BEACH 4-Slice IntelliToast Toaster** has two sets of extra-wide slots and toast boost feature for easy removal.

**\$34.99**



**T-FAL AVANTE 2-slice classic chrome toaster** has extra-wide slots, angled for easy removal. Electronic browning control.

**\$49.99**



**KRUPPS COOL TOUCH 2-Slice toaster** chrome exterior and extra-wide slots. Quartz heating element for even toasting.

**\$39.99**



**\$69.99**  
**SHARP 0.8 CU. FT. MICROWAVE OVEN** has 800 watts of power. Programmable and audio signal elimination. Includes limited warranty.



**\$89.99**  
**EMERSON 0.9 CU. FT. MICROWAVE** has 900 watts of power. Glass turntable and handy quick cook feature.



**NOW, PLEASE TURN TO THE NEXT PAGE AND TELL US YOUR IMPRESSIONS OF THE STORE AND THE ADVERTISED PRODUCTS.**

**The One-Stop Appliance Shop**



**\$83.99**  
**EMERSON 0.9 CU. FT. MICROWAVE** has 900 watts of power. Glass turntable and handy quick cook feature.



**\$71.99**  
**SHARP 0.8 CU. FT. MICROWAVE OVEN** 800 watts, programmable with audio signal elimination. Includes limited warranty.



**\$54.99**  
**T-FAL AVANTE 2-slice classic chrome toaster** has extra-wide slots, angled for easy removal. Electronic browning control.



**\$38.99**  
**COOL TOUCH 2-Slice toaster** chrome exterior and extra-wide slots. Quartz heating element for even toasting.



**\$34.99**  
**HAMILTON BEACH 4-Slice IntelliToast Toaster** has two sets of extra-wide slots and toast boost feature for easy removal.

**See what we have in STORE for you!**

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