

# Stereotype Threat in the Marketplace: Consumer Anxiety and Purchase Intentions

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How do consumers react when they believe that a transaction partner will view them through the lens of a stereotype? We predicted and found that being aware of a negative stereotype about a group to which one belongs (e.g., gender) made consumers sensitive to whether service providers were in-group versus out-group members and lowered purchase intentions when the provider was an out-group member. We observed stereotype threat effects across diverse marketplace settings: financial services (experiment 1), automobile repairs (experiment 2), and automobile purchases (experiment 3). Furthermore, we found that reluctance to purchase from out-group (vs. in-group) members was caused by heightened anxiety. The presence of a soothing scent, as a situational factor to alleviate anxiety, mitigated stereotype threat effects on marketplace decisions.

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**I**t is a fact of life that most social groups at times are associated with negative traits, such as incompetence, avarice, or weaknesses (Cuddy, Fiske, and Glick 2007; Wheeler, Jarvis, and Petty 2001). Regrettably, victims of stereotypes tend to be faced with obstacles that hinder their achievement. Consumers are no exception: consider a woman talking to a financial planner or an elderly person wanting computer advice. These consumers may wonder whether they will be viewed by service providers through the lens of a stereotype (e.g., “Women do not understand numbers”: Broverman et al. 1972; Spencer, Steele, and

Quinn 1999; “Older people are technologically inept”: Rodin and Langer 1980; Thimm, Rademacher, and Kruse 1998).

We studied the effects of stereotype threat, which is the situational predicament caused by the awareness that one might be treated differently because of a negative stereotype about one’s group (Steele and Aronson 1995; for reviews, see Steele, Aronson, and Spencer 2007). In three experiments, we tested whether consumers who are aware that they might be stereotyped would lower their intentions to transact with certain service providers. Our results demonstrated the conditions under which stereotype-threatened consumers are likely to forgo versus go forth with a transaction. Furthermore, this research pinpointed consumer anxiety as being responsible for changes in judgment when consumers are aware that they are being stereotyped. Finally, we identified a salve that can ameliorate the anxiety-arousing effects of a potentially threatening circumstance.

We focused on one of the most prevalent stereotypes in North America: women’s competence and aptitude in science, technology, engineering, and math (STEM) domains. Women, compared to men, often are believed to be less competent in mathematics (Bradach and Eccles 1989; Dar-Nimrod and Heine 2006; Spencer et al. 1999) as well as science, technology, and engineering (Martin, Wood, and Little 1990; Nass, Moon, and Green 1997). There is widespread agreement that the stereotype exists and, actuarially,

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that women are not nearly as active in STEM-related studies or careers as are men (Halpern et al. 2007). The potential effects of the gender-STEM stereotype are likely to have far-ranging implications for not only women's lives but society in general. We asked whether the gender-STEM stereotype affects consumer emotions, judgments, and decisions. To test whether gender-STEM stereotype effects occur, we used a collection of marketplace domains: financial services (experiment 1), automobile repairs (experiment 2), and automobile purchases (experiment 3).

To date, consumer research in stereotyping and research on stereotype threat are two literatures that have existed roughly independently of one another. On the consumer behavior side, research has predominantly focused on how consumers use stereotypes to make judgments about products, service providers, or fellow consumers (Matta and Folkes 2005; Pechmann and Knight 2002). Less is known, however, about how consumers react when they believe that they are the targets of stereotypes (see Baker, Meyer, and Johnson [2008] as an exception). On the stereotype threat side, research has almost exclusively focused on achievement and performance effects, to the neglect of consumer concerns.

Our research looks beyond achievement endeavors to consumer decision making, while underscoring to the marketing community the fact that stereotypes pose threats to consumers and the consequences thereof. Given the abundance of contexts in which the groups to which consumers belong may be associated with negative traits—as many contexts as there are groups, in fact—such a dearth of research is surprising, not only because of the prevalence of such circumstances in the daily lives of consumers but also because of the myriad consequences for consumption, choice, and financial health.

## STEREOTYPE THREAT IN CONSUMPTION SETTINGS

Consumers might encounter many situations in which a negative stereotype about one's social group is relevant (e.g., women visiting an auto mechanic) and in which they may have to interact with transaction partners from social groups that are not implicated in the stereotype (i.e., out-group members; e.g., male auto mechanics). Stereotype threat has been studied extensively, albeit hardly in the area of consumer behavior (cf. Baker et al. 2008). A sizable literature has demonstrated insidious consequences for motivation and achievement when people anticipate that they might be stereotyped. For instance, compared to women who were exposed to neutral or counter-stereotypic television commercials, women who watched gender-stereotypic television commercials subsequently underperformed on a math test (Davies et al. 2002) and avoided leadership roles in favor of nonthreatening subordinate roles (Davies, Spencer, and Steele 2005).

When people anticipate being stereotyped, they shun situations that could reinforce negative associations about their

group. Women who had been reminded of the math-gender stereotype (i.e., women's supposed inferior math ability as compared to men's) adopted the avoidance goal of not wanting to perform badly on a math test rather than the approach goal of wanting to perform well (Brodish and Devine 2009). Other work has shown that situations in which people are stereotyped create a prevention focus, which increases their sensitivity to the potential for negative outcomes (Seibt and Forster 2004).

Awareness of the potential for stereotyping to occur, rather than believing in the stereotype, is key to changes in behavior among vulnerable consumers. For people to experience stereotype threat, they "need only to have knowledge that some people hold a negative stereotype about their group" (O'Brien and Crandall 2003, 782). Steele and Aronson (1995) noted that "for the person to be threatened, he need not even believe the stereotype. He need only know that it stands as a hypothesis about him in situations where the stereotype is relevant" (798). Therefore, heightened awareness of the negative in-group stereotype is sufficient to elevate concerns that the self will be viewed through the lens of the stereotype.

Stereotype threat should not manifest itself in the presence of all interaction partners. We propose that when a negative stereotype about one's in-group is salient, consumers' judgments about whether to transact with the firm will be affected by the group membership of the person with whom they anticipate transacting. Specifically, we propose that consumers' intentions to transact will be lower when a negative in-group stereotype is salient, and they will interact with out-group partners, as compared to in-group partners. However, when a negative stereotype is irrelevant or not salient to consumers, their judgments will not be affected by the group membership of the transaction partner. Formally:

**H1:** When a negative in-group stereotype is salient or relevant, compared to when an in-group stereotype is not salient or relevant, consumers' intentions to transact will be lower toward out-group versus in-group partners.

Anxiety, a state of suspense, tension, and apprehension, arises from a diffuse sense of threat (Arkin and Ruck 2007). Previous research has suggested that anxiety plays a crucial role in the stereotype threat effect among individuals who are part of disadvantaged groups (Steele 1997). African American students, as compared to European American students, experience more test anxiety and therefore change their exam answers more frequently. The net result is worse performance (Payne 1984). Anxiety, likewise, is a critical component in the relationship between stereotype threat and women's (poor) performance on a standardized math test (O'Brien and Crandall 2003; Osborne 2001; Spencer et al. 1999).

We propose that marketplace stereotype threat effects are based on heightened transaction-related anxiety toward an out-group service provider. For example, a female consumer

may worry that a male car mechanic will perform more work than is necessary because he holds the belief that women are ignorant of car technicalities and therefore gullible. In other words, consumers may experience greater anxiety toward a transaction with an out-group (vs. in-group) service provider because the negative stereotype might encourage maltreatment. Vohs, Baumeister, and Chin (2007) noted that “the anticipation of possibly feeling duped will be a powerful stimulant to watch out for such situations” (135). Hence, when a negative in-group stereotype is salient, consumers may vigilantly watch for cues that convey the possibility of being duped and seek to avoid transactions in which being duped is possible. This transaction-related anxiety is posited to lower consumers’ intentions to transact with out-group versus in-group transaction partners.

This line of reasoning is consistent with the viewpoint that anxiety plays a unique role in generating an avoidance response, more so than other negative emotions such as sadness or anger. Empirically, there are distinct effects from feeling anxious versus sadness or anger. First, anxiety increases the attractiveness of low-risk and secure options (e.g., cars known for being safe), whereas sadness does not (Raghunathan, Pham, and Corfman 2006). Second, anxiety makes people shun interactions with out-group members (Fiske and Ruscher 1993), whereas anger induces approach motivation and aggressiveness toward out-group members (Butz and Plant 2006; Plant and Butz 2006). Conceptually, anxiety is distinct from sadness and anger because anxiety is based on fear, which is a distinctly separate emotion from sadness and anger among core emotions (Blumberg and Izard 1986). As such, marketplace stereotype threat, which we posit produces anxiety about transacting with an out-group service provider, might well be based on the fear of being maltreated or duped (Vohs et al. 2007). Therefore, we propose anxiety as the underlying process for marketplace stereotype threat effects. Formally:

**H2:** Transaction-related anxiety will mediate the effect of stereotype threat on intentions to transact.

Some work has identified ways to reduce stereotype threat. For instance, in experiments involving academic performance, researchers have reduced stereotype threat effects by labeling a test “gender-fair” to female participants (Spencer et al. 1999) or informing African American participants of the “non-diagnostic” nature of the test (Aronson, Quinn, and Spencer 1998).

If consumer anxiety is indeed an underlying factor in the stereotype threat process, then reducing anxiety should mitigate stereotype threat effects. We focused on a novel situational factor (and one that firms can use) to moderate stereotype threat effects: scent. Scholarly writings and empirical research points to scent as a ready means of pacifying anxiety. We focused on a particular scent—vanilla—that prior olfactory research has tied to reductions in anxiety. In a medical study of patients undergoing a tense procedure for cancer diagnosis, a vanilla scent mixed into humidified air lessened anxiety up to 63% compared to patients who

were administered humidified air alone (Redd et al. 2005). The retail domain has noticed vanilla’s beneficial effects too, with stores such as Sony Style diffusing a blend of vanilla and orange notes into the air so as to put shoppers at ease when contemplating complex technology products (Vlahos 2007).

We predicted that the scent of vanilla would reduce anxiety and therefore moderate the stereotype threat effect. That is, when threatened consumers’ anxiety is soothed (via scent), they will not consider the group membership of a transaction partner as a central cue for purchase decisions, even when a negative in-group stereotype has been activated.

**H3:** Stereotype threat effects will be mitigated in the presence of the scent of vanilla, due to its anxiety-reducing ability.

Three laboratory experiments tested our predictions. In experiment 1, we predicted that women’s (but not men’s) consumer judgments would change when they are reminded of the math-gender stereotype (hypothesis 1). In experiment 2, we pinpointed transaction-related anxiety as the process that causes changes in judgments about transacting with an out-group service provider (hypothesis 2). In experiment 3, we documented that the scent of vanilla is an effective intervention to mitigate the stereotype threat effect in marketplace judgments. Together, the results suggest that when a negative in-group stereotype is salient, consumers become sensitive to the group membership of a service provider in generating judgments of whether to engage in a transaction. This effect occurs because threatened consumers experience anxiety about transacting with an out-group (vs. in-group) service provider.

## EXPERIMENT 1

Experiment 1 focused on women’s feelings in the domain of financial service decisions. Therefore, we operationalized the in-group as women and the out-group as men. The gender-STEM stereotype is relevant here, as math skills are seen as central to being a financial service provider (we confirmed this empirically; see below).

We systematically reminded (or not) female and male consumers of the gender-STEM stereotype via the insertion of math cues in an advertisement. This allowed us to test our hypothesis that when the gender-STEM stereotype was salient, women would use the gender of a would-be financial advisor in judging whether to carry out the transaction. We also tested male participants, for whom the stereotype was inapplicable, to demonstrate the specificity of the effect. This study used a 2 (participant gender: male vs. female)  $\times$  2 (math cue: present vs. absent)  $\times$  2 (financial advisor: men vs. women) between-subjects design.

### Method

*Pretest.* We performed a pretest to assess the relevance of math-related skills to investment. We provided partici-

pants ( $n = 34$ ; 16 women) with a set of factors that consumers might consider when choosing financial counselors or personal finance advisors. We asked participants to indicate, on an 11-point scale (0 = “not at all important,” and 10 = “extremely important”), how important each of these factors would be in their choice of a financial advisor. The results showed that mathematical skills are one of the top two most important attributes ( $M = 8.63$ ;  $SD = 1.02$ ), second only to past performance in investment ( $M = 9.24$ ;  $SD = .92$ ). Notably, math skills were considered more important to the financial advisor role than human factors (e.g., communication skills or personalized service;  $M = 7.91$ ;  $SD = 1.37$ ;  $t(33) = 3.02$ ,  $p < .01$ ), price ( $M = 7.50$ ;  $SD = 1.86$ ;  $t(33) = 3.05$ ,  $p < .01$ ), and brand name of the company ( $M = 5.32$ ;  $SD = 2.77$ ;  $t(33) = 6.76$ ,  $p < .001$ ), thereby highlighting its centrality to the job of financial advisor. No differences as a function of participant gender were found for perceived importance of these attributes for a provider of financial services.

**Main Study Stimuli.** We created two advertisements that were described to participants as having been developed by a financial firm that helps people make investment decisions. In one version, we embedded math cues, such as mathematical equations and symbols, in the background of the ad, whereas no math cues were present in the other ad (appendix figs. A1 and A2). We reasoned that the presence of subtle math cues would activate the gender-STEM stereotype and its relevance to the context, which we confirmed with a posttest (see below).

In addition to varying the presence of math cues in the background, we also varied the gender of the financial advisors in the ad to show a team of either six men or six women. This allowed us to assess whether participants' purchase intentions would differ on the basis of the gender of the would-be transaction partners. In total, four advertisements for the same product from the same firm were used.

**Participants and Procedures.** One hundred thirty-four undergraduates (77 women) participated as a partial course requirement. Participants read a description of a financial service company and generated intentions to transact with the company, assuming they had sufficient resources to invest. Participants evaluated one of four advertisements and then responded to a 3-item measure of intentions to purchase services from the firm (1 = “unlikely,” “uncertain,” “definitely would not,” and 7 = “likely,” “certain,” “definitely would”;  $\alpha = .84$ ), which were averaged into a purchase intent index. After completing demographic questions, participants were debriefed.

## Results

We predicted that intentions to transact would be explained by the interaction of participant gender, gender of the financial advisors in the ad, and whether math cues were present or absent in the ad. A 2 (participant gender)  $\times$  2 (math cue)  $\times$  2 (gender of financial advisors) ANOVA

revealed the predicted three-way interaction effect on intentions to purchase services ( $F(1, 126) = 5.09$ ,  $p < .05$ ). No other effects were significant ( $F$ 's  $< 1.15$ ,  $p$ 's  $> .29$ ).

We next tested the focused prediction that women's, but not men's, intent to purchase would differ as a function of gender of the financial advisors when they saw an advertisement with math cues (which presumably activated the gender-STEM stereotype). Consistent with our hypothesis, among participants presented with the math-cue advertisement, a 2 (participant gender)  $\times$  2 (gender of financial advisors) ANOVA demonstrated that female participants reported lower purchase intentions regarding a team of male financial advisors than female advisors ( $M_{\text{male ad}} = 2.63$ ;  $SD = 1.19$  vs.  $M_{\text{female ad}} = 3.67$ ;  $SD = 1.24$ ;  $F(1, 126) = 5.90$ ,  $p < .05$ ); however, and also in line with predictions, male participants' purchase intentions did not differ as a function of gender of the featured advisors ( $F < 1$ ). A parallel 2  $\times$  2 ANOVA for the ad without stereotype-activating math cues revealed no significant effects ( $F$ 's  $< 1.28$ ,  $p$ 's  $> .26$ ).

Another way to test hypothesis 1 is to ask whether women in the math-cue and neutral conditions differed in their intentions to interact with male financial advisors. In fact, women's intention to purchase services from male financial advisors was lower in the math cue (vs. neutral) ad condition ( $M_{\text{cue}} = 2.63$ ;  $SD = 1.19$  vs.  $M_{\text{neutral}} = 3.50$ ;  $SD = 1.34$ ;  $F(1, 126) = 4.66$ ,  $p < .05$ ). This result also supports our hypothesis that women tend to avoid men (as out-group transaction partners) when under the influence of stereotype threat (see fig. 1).

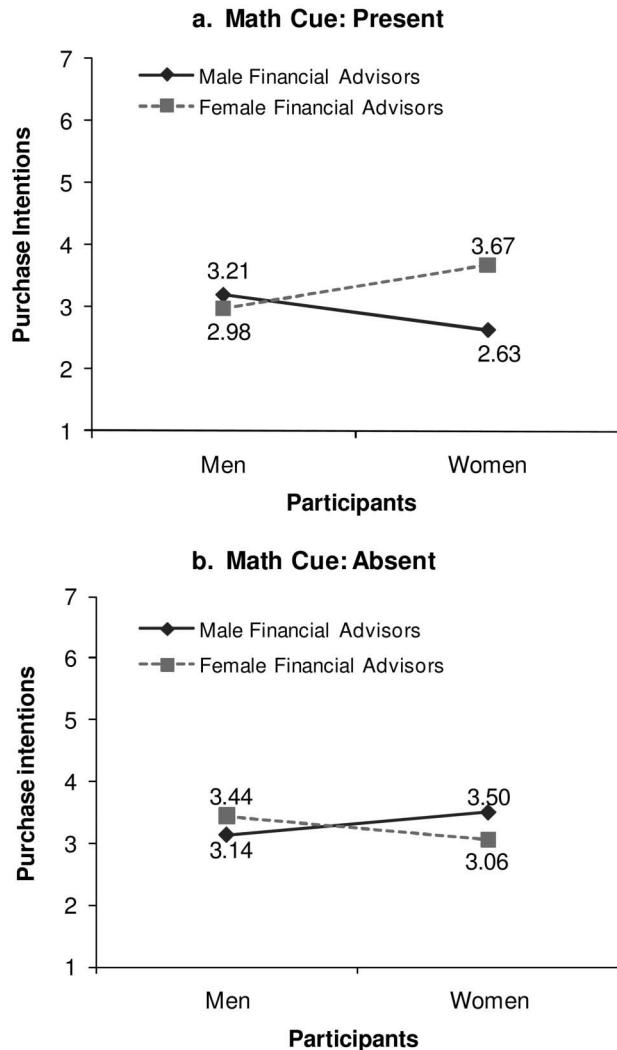
## Discussion

Consistent with hypothesis 1, experiment 1 found that women's intention to purchase financial services differed as a function of whether they were reminded of mathematics and the gender of the investment advisors featured in the firm's ad. Math symbols presumably activated the stereotype that women are supposedly less competent at math than are men. When no such stereotype was in operation (i.e., among women who did not see math cues and among men, for whom the stereotype is inapplicable), no change in purchase intentions was observed. This finding indicates that consumers lower their intentions to transact in a domain in which a negative in-group stereotype applies and they have to interact with an out-group compared to an in-group partner.

We presumed that being exposed to an advertisement with math cues would activate the gender-STEM stereotype in women. To assess this claim, and to marshal initial evidence in support of our contention that anxiety is elicited by marketplace stereotype threat, we conducted a follow-up study. We expected that seeing an advertisement with math cues present would elicit more anxiety in female participants than would a similar advertisement without math cues; no effect of advertisement condition was expected for men. Participants ( $n = 26$ ; 15 women) were given two advertisements for a tax services firm, one of which showed math symbols and equations, as in experiment 1, and one of which did

FIGURE 1

EXPERIMENT 1: PURCHASE INTENTIONS AS A FUNCTION OF PARTICIPANT GENDER, FINANCIAL ADVISOR, AND MATH CUE



not. (No people were featured in the ads, thereby making them gender neutral.) After perusing the advertisements, participants rated their anxiety using three items—"I am tense," "I feel at ease" (reversed coded), and "I am presently worrying over possible misfortunes"—to which participants rated their agreement using scales with anchors of 1 = "not at all" and 4 = "very much so" ( $\alpha = .63$ ). We averaged the three items to form an anxiety index.

A 2 (participant gender: male vs. female)  $\times$  2 (math cue: present vs. absent) ANOVA revealed only the predicted interaction effect ( $F(1, 22) = 4.13, p = .05$ ). Planned contrasts confirmed that female participants experienced a higher level of anxiety when they saw a tax services ad that featured math cues than when the ad did not contain math

cues ( $M_{\text{present}} = 1.97; SD = .46$  vs.  $M_{\text{absent}} = 1.40; SD = .28; F(1, 22) = 6.42, p < .05$ ). In addition, when math cues were embedded in the ad, female respondents felt more anxious than male respondents ( $M_{\text{women}} = 1.97; SD = .46$  vs.  $M_{\text{men}} = 1.33; SD = .24; F(1, 22) = 8.01, p < .01$ ). However, and as expected, ad condition did not affect the anxiety level of male participants ( $M_{\text{present}} = 1.33; SD = .24$  vs.  $M_{\text{absent}} = 1.44; SD = .50; F < 1$ ). These data support the notion that seeing math cues triggers a stereotype threat response in women, for whom there is a negative perception of their ability in STEM-related fields (Halpern et al. 2007).

These findings support our overarching thesis that when a negative in-group stereotype is salient, consumers' emotions and judgments differ from those made by consumers for whom the stereotype is inactive or irrelevant. Not only did women's judgments about whether to transact with a team of male (vs. female) financial service advisors change after they had been reminded of the gender-STEM stereotype, but the follow-up experiment suggested that their emotional states did as well. Specifically, anxiety seemed to be potentiated among women facing stereotype-threat conditions, an effect we tested formally in experiment 2.

### EXPERIMENT 2

Experiment 2 expanded on the findings of experiment 1 in four ways. First, it used a different marketplace context in which women might be stereotyped: automobile repairs. According to the 2009 labor force statistics (U.S. Bureau of Labor Statistics 2009), only 1.8% of automotive service technicians and mechanics are female. This fact makes evident how commonplace it is for female consumers to encounter male automobile technicians, which suggests that this is an area in which gender stereotypes are highly applicable. Hence, we predicted that female consumers' intentions to transact with an automotive repair shop would vary as a function of whether a stereotype pertaining to women being weak in car knowledge was activated, as well as the gender of the car technician.

Second, experiment 2 used a subtler way of presenting gender of the service provider than in the previous experiment. The car repair technician featured in the ads was a cartoonlike character. All of the features were the same for the "male" and "female" versions of the cartoon, with the one exception of the character's hairstyle (appendix figs. A3 and A4). To find the predicted effects using this subtle manipulation would strengthen our claims about the sensitivity of the proposed effects if even minute signals of out-group status (i.e., gender, as signaled by hairstyle alone) are sufficient to alter intentions to engage with a firm. In addition, that the cartoon character was the same across conditions (with the exception of hairstyle) should assuage concerns that differences in purchase intentions could arise from characteristics other than gender. This possibility was present in experiment 1's advertisements, as they featured human actors who differed across ad conditions. The possibility that a factor other than gender is causing the effects is mitigated, however, in the current experiment.

Third, this experiment used a different way of activating the negative in-group stereotype. Previous research has suggested that having participants record their group identity just before a stereotype-relevant activity (e.g., specifying race before taking a scholastic exam) can trigger a relevant negative in-group stereotype and therefore conjure up stereotype threat (Steele and Aronson 1995, study 4). Experiment 2, therefore, asked some participants to record their gender before starting the experiment in order to trigger the gender-STEM stereotype when relevant.

Fourth, this experiment sought to establish the mediating role of anxiety to account for stereotype threat effects. Anxiety is a likely causal candidate, as it has been linked to in-group-out-group effects in prior work. Intergroup anxiety leads stereotyped individuals to resist contact with out-group members (Fiske and Ruscher 1993). Stephan and Stephan (1985) concluded that the anxiety that people experience with out-group members stems from concerns about negative evaluations and fear of being harmed. Therefore, if heightened anxiety levels are observed, this finding would offer converging evidence that stereotype threat effects do operate in consumer settings and would give insight into the process by which it alters marketplace reactions.

## Method

*Participants and Design.* A total of 113 undergraduates (58 women) participated in exchange for extra course credit. This study used a 2 (participant gender: male vs. female)  $\times$  2 (stereotype activation: present vs. absent)  $\times$  2 (service provider: male vs. female) design.

*Procedures.* Participants were given a set of questionnaires and told that the experiment concerned evaluations of a local automotive repair service. Participants in the stereotype activation condition were asked to record their gender before they completed the questionnaires, whereas participants in the no-activation condition were asked to indicate their gender at the end of the experimental session (Steele and Aronson 1995). Next, half of the participants saw an ad that featured a male (cartoon) technician, whereas the other half saw an ad that featured a female (cartoon) technician. Participants then rated their intentions to have their car repaired at the advertised service shop, using two 7-point items (1 = "a bad idea/unattractive" to 7 = "a good idea/attractive";  $\alpha = .88$ ). A purchase intention index was created by averaging the two items.

Next, participants responded to two items asking the extent to which they would feel apprehensive or anxious about interacting with a car technician from this repair shop ("I worry that the car technician may not be truthful in dealing with me"; "This car technician may take advantage of me": 1 = "strongly disagree," and 7 = "strongly agree";  $\alpha = .91$ ). These items were averaged into an index of anxiety about the transaction. Finally, participants were debriefed.

## Results

*Purchase Intentions.* We predicted that intentions to transact with the automotive repair shop would be predicted by the interaction of participant gender, gender of the service provider in the ad, and whether participants' gender category had been activated before or after the ad viewing. A 2 (participant gender)  $\times$  2 (gender of service provider)  $\times$  2 (stereotype activation) ANOVA revealed a significant main effect of gender ( $F(1, 105) = 4.18, p < .05$ ) and the predicted three-way interaction effect ( $F(1, 105) = 3.93, p < .05$ ). No other effects were significant ( $F$ 's  $< 2.45, p$ 's  $> .12$ ).

Further analyses provided focused contrasts. Consistent with our hypothesis, among participants whose gender had been made salient before viewing the ad, a 2  $\times$  2 ANOVA demonstrated that female participants reported lower purchase intentions when the ad featured a male versus a female technician ( $M_{\text{male tech}} = 3.64; SD = .86$  vs.  $M_{\text{fem tech}} = 4.56; SD = 1.05; F(1, 105) = 4.12, p < .05$ ), whereas male participants' transaction intentions did not vary as a function of technician gender ( $F < 1$ ). When gender had not been activated, female participants more than male participants reported higher purchase intentions toward a male technician ( $M_{\text{men}} = 3.72; SD = 1.38$  vs.  $M_{\text{women}} = 4.82; SD = 1.19; F(1, 105) = 5.92, p < .05$ ). Further, when gender had not been activated, neither men nor women reported different purchase intentions toward male versus female technicians ( $F$ 's  $< 1.49, p$ 's  $> .22$ ).

Hypothesis 1 was also supported by findings that female participants' purchase intentions toward a male technician were lower when their own gender had been made salient, compared to when it was not ( $M_{\text{present}} = 3.64; SD = .86$  vs.  $M_{\text{absent}} = 4.82; SD = 1.19; F(1, 105) = 6.34, p < .05$ ). These results replicate and extend experiment 1's findings that when a relevant in-group stereotype is made salient, consumers become sensitive to the group membership of a transaction partner when judging whether to enter into a transaction (see table 1).

*Anxiety.* We anticipated that anxiety levels would be predicted by the interaction of participant gender, gender of the service provider in the ad, and whether participants' gender category had been activated before or after viewing the ad. In line with this prediction, an ANOVA with participant gender  $\times$  gender of service provider  $\times$  stereotype activation as predictors of anxiety scores revealed a significant three-way interaction term ( $F(1, 105) = 4.25, p < .05$ ). No other effects were significant ( $F$ 's  $< 3.43, p$ 's  $> .07$ ).

Next, planned contrasts were conducted. We focused on female consumers because our hypotheses predicted that they would feel heightened anxiety when their gender was salient and when they contemplate interacting with an out-group (i.e., male) versus in-group (i.e., female) car technician. Consistent with this prediction, in the stereotype activation condition, female participants reported more anxiety about transacting with a male versus a female car technician ( $M_{\text{male tech}} = 5.79; SD = .91$  vs.  $M_{\text{fem tech}} = 5.00; SD =$

TABLE 1

EXPERIMENT 2: MEANS AND STANDARD DEVIATIONS FOR DEPENDENT VARIABLES AS A FUNCTION OF PARTICIPANT GENDER, STEREOTYPE ACTIVATION, AND SERVICE PROVIDER

	Stereotype activation				No stereotype activation			
	Male service providers		Female service providers		Male service providers		Female service providers	
	Men	Women	Men	Women	Men	Women	Men	Women
Purchase intentions	4.21 (.89)	3.64 (.86)	3.77 (1.46)	4.56 (1.05)	3.72 (1.38)	4.82 (1.19)	3.66 (1.42)	4.25 (1.46)
Anxiety	4.69 (1.11)	5.83 (.81)	4.94 (1.39)	4.92 (1.28)	5.52 (1.22)	4.86 (1.50)	4.79 (1.33)	4.90 (.99)

NOTE.—Standard deviations are reported in parentheses. Cell sizes range from  $n = 11$  to 16.

1.32;  $F(1, 105) = 2.80, p = .097$ ), although this effect did not reach conventional levels of significance. As expected, male participants' anxiety levels did not vary as a function of technician gender ( $F < 1$ ), as the negative stereotype is inapplicable to them. Another look at the data also confirmed our predictions in that contemplating a transaction with a male car technician elicited more anxiety among female participants when their gender had been made salient versus when it had not ( $M_{\text{present}} = 5.79; SD = .91$  vs.  $M_{\text{absent}} = 4.71; SD = 1.44; F(1, 105) = 4.88, p < .05$ ).

These results mirror the pattern observed for purchase intentions and support our predictions about the role of anxiety. Moreover, they allow us to test hypothesis 2, which predicted a mediating role of anxiety in the stereotype threat process.

*Mediating Role of Anxiety.* To test whether anxiety mediated the interaction of participant gender  $\times$  gender of service provider  $\times$  stereotype activation on purchase intentions (hypothesis 2), we used the bootstrapping method with bias-corrected confidence estimates (Preacher and Hayes 2004). Analyses and bootstrap estimates (based on 5,000 bootstrap samples) indicated that the total effect ( $\beta = -1.86, t = -1.98, p = .05$ ) of the higher-order interaction term (i.e., participants' gender  $\times$  gender of the technician  $\times$  stereotype activation) was nonsignificant ( $\beta = -1.29, t = -1.40, p > .16$ ) when the anxiety index was included in the model. Furthermore, the indirect effect through anxiety was significant, with a point estimate of  $-.59$  and 95% confidence interval of  $-1.4240$  to  $-0.0733$ . This pattern of results indicates indirect-only mediation (Zhao, Lynch, and Chen 2010), in which omitted mediators are unlikely. In sum, these results suggest that anxiety mediated the combinatorial effect of participant gender, technician gender, and stereotype activation on purchase intentions. Together, these findings suggest that when consumers were aware of a negative in-group stereotype, anticipating a transaction with out-group members heightened anxiety, which, in turn, weakened intentions to purchase.

## Discussion

In experiment 2, we used a different marketplace context (i.e., automobile repair) and a different method of activating a negative stereotype and found parallel effects as observed in experiment 1. Moreover, experiment 2 identified anxiety

as a key mechanism of stereotype threat effects. We found that women became anxious when they contemplated transacting with out-group versus in-group service providers if the negative gender-STEM stereotype had been activated. A rise in consumer anxiety, in turn, was the driving force behind women's disinterest in transacting with the firm. In summary, experiment 2's results offered new insights into how stereotype threat provokes an avoidance response in the marketplace.

## EXPERIMENT 3

Experiment 3 was designed to achieve three aims. First, we used yet another marketplace setting in which women might feel stereotyped, namely, the purchase of a used car. STEM-gender stereotype is particularly relevant to this purchase in that today's automobiles are loaded with advanced technological and engineering features, and women might be considered weak in knowledge in such domains. Ayres and Siegelman's (1995) field experiment in fact found that gender discrimination is rife in car purchases. They noted, "In car negotiations, dealers might use a customer's race or gender to make inferences about a buyer's knowledge, search and bargaining costs, or, more generally, her reservation price at the specific dealership" (317).

Furthermore, car shopping is a common and costly marketplace activity. Nearly nine in 10 Americans own a car (Nielsen Company 2007), and a used car in 2009 cost an average of \$14,976 (NADA Data 2010), which highlights how much is at stake with this decision. Despite the prevalence of both men and women owning cars, 75% of female car buyers planned to bring a man with them to dealerships to ensure fair treatment (Blumberg 2005). In short, purchasing a car represents a common circumstance that many women enter, and, extant statistics suggest, they might do so with trepidation. Consistent with the previous two experiments, we predicted that female consumers' intentions to purchase from a car dealership would be lower when they considered interacting with a male versus a female service provider (i.e., car salesperson).

Second, we introduced a situational variable to attenuate the anxiety elicited by marketplace stereotype threat. Experiment 3 addressed the role of anxiety by offering a subtle situational factor—namely, scent—to assuage stereotype threat effects (hypothesis 3). Scent is fast becoming a pop-

ular method for influencing consumers (Trivedi 2006; Wilson and Stevenson 2006). Marketing research on scent thus far has focused on consumer memories of product information (Aradhna, Lwin, and Morrin 2010; Morrin and Rameshwar 2003) or product and store evaluations (Bosmans 2006; Mitchell, Kahn, and Knasko 1995; Spangenberg, Crowley, and Henderson 1996). Our use of scent to offset a sense of threat in the marketplace is therefore a novel contribution to the burgeoning field of olfactory consumer science.

We chose the scent of vanilla because it seems particularly important for stress reduction. Vanilla's calming effects have been recognized for centuries (Bythrow 2005; Rain 2004). More recently, patients reported almost two-thirds less anxiety when the room smelled like vanilla than plain air (Redd et al. 2005), and infants gazed longer and emitted fewer distress vocalizations (showing more approach and less avoidance behavior) toward a vanilla-scented toy than an unscented toy (Mennella and Beauchamp 2002). Building from the results of experiment 2, we predicted that in the presence of a soothing scent, female participants would not use the group membership of a service provider as a determinant in purchase intentions, even if they had been reminded previously of a relevant, negative stereotype about women. If observed, this finding would offer a subtle, yet practical, method of disrupting a judgment process that might unduly affect consumer welfare.

Third, we aimed to offer confirmatory evidence that the context that we have been studying was indeed stereotype threat, and we did so by measuring consumer confidence in the domain. As mentioned in the article's introduction, the phenomenon of stereotype threat occurs with the mere awareness that one's group membership might lead to being treated differently than others. Whether the consumer feels competent in the domain or agrees with the stereotype matters not (O'Brien and Crandall 2003; Steele and Aronson 1995). Hence, we assessed participants' knowledge in the domain of the stereotype threat to see whether it moderated the observed effects. We expected that it would not, in confirmation of our interpretation of the effects.

## Method

**Participants and Design.** We conducted this experiment using only female participants and activated stereotype threat among all participants. Ninety-one female undergraduates, who participated in exchange for extra course credit, were randomly assigned to one of the four conditions in a 2 (scent: present vs. absent)  $\times$  2 (car salesperson: male vs. female) design.

**Procedures.** To manipulate scent, a drop of vanilla essential oil was rubbed on the back of questionnaires 3 hours before each experiment session (Bosmans 2006). Scented questionnaires were stored in a sealed plastic container apart from the unscented questionnaires. Participants completed questionnaires in the presence of 10–15 other participants, all of whom were seated at wide spacing intervals through-

out a large classroom. Debriefing confirmed that no participants in the unscented condition noticed the vanilla scent.

All participants first listed their gender on the initial page of the questionnaire booklet, which was titled "Purchasing a Car Survey." This was intended to activate the stereotype that women generally are not knowledgeable about cars, as recording one's group membership activates relevant in-group stereotypes (Steele and Aronson 1995). After recording their gender, participants responded to items asking about their knowledge of cars. The two items were "To what extent can you confidently evaluate car performance when you test drive?" and "To what extent do you understand the mechanics of cars?" (1 = "not at all"; 7 = "very much";  $\alpha = .75$ ). The average score on the items formed an index of consumer competence.

Next, participants imagined that they needed to purchase a car and were visiting a dealership. To manipulate salesperson gender, half of the participants were presented with a scenario of visiting a car dealer and being greeted by a male salesperson (John Anderson), who was the only salesperson available at the moment. The rest of the participants were given the same scenario featuring a female salesperson (Joan Anderson). Participants then rated their intentions to purchase from the dealership, using two 7-point items (1 = "bad idea/unattractive" to 7 = "good idea/attractive";  $\alpha = .89$ ). A purchase intention index was created by averaging these items. Finally, participants were debriefed.

## Results

**Purchase Intentions.** We predicted that the interaction of scent condition and gender of the salesperson would predict purchase intentions among our sample of female participants in whom their gender has been made salient. A 2 (scent: present vs. absent)  $\times$  2 (car salesperson: male vs. female) ANOVA on purchase intentions revealed the predicted interaction effect ( $F(1, 87) = 7.45, p < .01$ ). Neither the main effect of car salesperson ( $F(1, 87) = 3.61, p > .06$ ) nor that of scent was significant ( $F < 1$ ). In support of hypothesis 3, planned contrasts confirmed that participants in the no-scent condition reported lower purchase intentions when imagining interacting with a male (vs. female) salesperson ( $M_{\text{male sale}} = 4.18; SD = 1.22$  vs.  $M_{\text{fem sale}} = 5.24; SD = .97; F(1, 87) = 10.16, p < .01$ ). This finding replicated the marketplace stereotype threat effect observed in experiments 1 and 2. Also in line with predictions, purchase intentions in the scented-questionnaire condition did not differ as a function of gender of the salesperson ( $M_{\text{fem sale}} = 4.68; SD = 1.13$  vs.  $M_{\text{male sale}} = 4.87; SD = 1.00; F < 1$ ). This finding suggests that the vanilla scent quelled their anxiety, which eliminated salesperson gender as a means for deciding about purchase intentions.

Also in confirmation of hypothesis 3, contrasts performed using only the male salesperson condition showed that purchase intentions were lower in the no-scent versus the scent condition ( $M_{\text{no scent}} = 4.18$  vs.  $M_{\text{scent}} = 4.87; F(1, 87) = 4.51, p < .05$ ). When participants imagined interacting with



a female salesperson, purchase intentions did not differ in vanilla-scented and unscented conditions ( $M_{no\ scent} = 5.24$  vs.  $M_{scent} = 4.68$ ;  $F(1, 87) = 3.01, p > .08$ ; see fig. 2).

*Does Consumer Competence Play a Role?* To confirm that the process that we had identified in this article was in fact stereotype threat, we checked to see whether consumer competence about cars played a role in predicting purchase intentions or whether the stereotype threat factors were key. In principle, consumer competence should not affect the stereotype threat effect because the latter occurs merely with awareness that one's group membership might alter the treatment that one receives (O'Brien and Crandall 2003; Steele and Aronson 1995). We tested this notion by building a general linear model with scent, gender of the car dealer, mean-centered participant competence about cars, and all interactions to predict purchase intentions. In line with expectations, the model showed that consumer competence was not a significant predictor of purchase intentions ( $F(1, 83) < 1$ ). Consumer competence also did not interact with other predictors ( $F$ 's(1, 83) < 3.11,  $p$ 's > .08), whereas the original two-way interaction of salesperson gender and scent remained significant ( $F(1, 83) = 7.68, p < .01$ ).

These data provide initial evidence that the stereotype threat effect, as manifested in changes in purchase intentions, was unaffected by participants' competence in the domain of the purchase. Hence, as long as a consumer is aware that she can be judged by a transaction partner in terms of a negative stereotype, the consumer might experience stereotype threat. Threat, in our model, is thought to elevate anxiety and focus her on the group membership of a transaction partner. However, the effect of consumer competence in predicting purchase intention was not formally tested in a design that would allow it to be brought forth as an alternative explanation. We look forward to future research that investigates this issue more thoroughly.

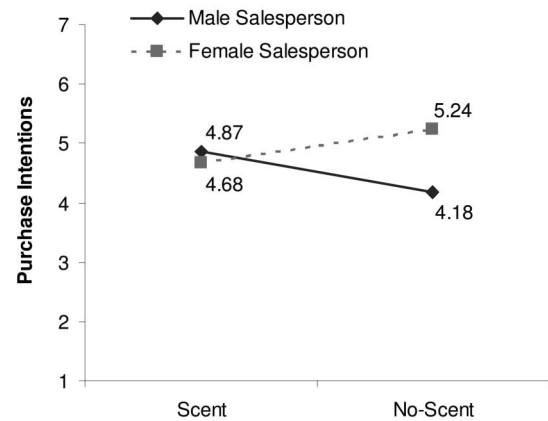
### Discussion

In this experiment, we could eliminate the stereotype threat effect with a soothing scent. Female consumers in a vanilla-scented environment who considered interacting with a car salesperson did not alter their intentions to transact on the basis of the gender of the salesperson, presumably due to vanilla's anxiety-quelling abilities (Mennella and Beauchamp 2002; Redd et al. 2005). The specificity of the stereotype threat effect to women in the scent-absent condition supports our underlying theory regarding the role of anxiety as a key factor in the process.

To further investigate whether the reduction of stereotype threat effect is attributed to the subtle smell of vanilla (a scent known to dispel anxiety) in the air but not to the presence of any scent, we conducted a follow-up test using vanilla-scented, grapefruit-scented, or unscented questionnaires. After first recording their gender, female participants ( $n = 52$ ) rated their intentions to purchase a car from a male salesperson on one of the three versions of questionnaires. Contrasts confirmed that female participants in the

FIGURE 2

EXPERIMENT 3: PURCHASE INTENTIONS AS A FUNCTION OF SALESPERSON GENDER AND SCENT



vanilla-scent condition ( $M_{van} = 4.84; SD = .90$ ) were more willing to purchase from a male salesperson than were those in the grapefruit ( $M_{grape} = 4.30; SD = .78; p = .05$ ) or unscented conditions ( $M_{unscent} = 4.15; SD = .88; p < .05$ ). This result supported our contention that reduced tense feelings about a purchase interaction were likely due to the soothing nature of the vanilla scent, rather than the general effect of a scented environment.

### GENERAL DISCUSSION

A few years ago, Lawrence Summers, then president of Harvard University, stated that women's underrepresentation in the higher ranks of science and engineering was due to "different availability of aptitude at the high end." He later apologized for the comments (Bombardieri 2005), but people around the globe were reminded of the belief that women and STEM domains do not mix. In addition to its pertinence to education and achievement, the current research demonstrates that negative stereotypes are important influences on consumer judgment.

We argued that when a negative in-group stereotype is salient, consumer judgments differ from judgments made by consumers for whom a stereotype is inactive or irrelevant. We found that a relevant negative stereotype caused consumers to become sensitive to the group membership (e.g., gender) of a service provider and affected their purchase intentions. We demonstrated this stereotype threat effect in the diverse marketplace settings of financial services (experiment 1), car repairs (experiment 2), and car purchases (experiment 3). Experiment 2 revealed that the marketplace stereotype threat effect was due to heightened anxiety. Experiment 3 showed that a situational variable (scent) can reduce transaction anxiety and nullify the stereotype threat effect on consumers' judgments.

## Costs and Benefits of Avoiding Transactions with Out-Group Members

There is the normative question of whether consumers would be advised to enter into negotiations that have the potential for the stereotype threat effect to emerge. There is not, however, an easy answer. Transaction-related anxiety (and fear of being duped, or “sugrophobia”; Vohs et al. 2007) is likely a double-edged sword in whether it leads to wise or regrettable decisions. Being aware that transaction partners might think one is incompetent could raise the potential for deceptive marketing tactics, which could translate into judicious decisions. Advice from the U.S. Department of Justice (2008) essentially states this point when recommending how to avoid Internet and telemarketer fraud. Therefore, when consumers fear they will be stereotyped, eschewing the transaction might be wise because it avoids being exploited. Averting exploitation, in turn, bolsters trust in the community, saves unnecessary monetary and time costs, and prevents undue negative affect.

To be sure, potential benefits are often offset by potential costs. The chance that a threatened customer might be exploited is just that, a chance. Therefore, shunning out-group service providers could mean forgoing genuine, helpful service. Also, as our research suggests, consumers might use a peripheral cue (e.g., group membership of a transaction partner) to decide whether to engage in the transaction, a cue that might not relate to the quality of service they would receive. Recent work supports the notion that there may be costs to elevated anxiety. Strongly endorsing the statement “I am afraid I will be taken advantage of by a dealer when negotiating for the price for a new car” was associated with a premium of up to 2% in car purchase prices (Zettermeyer, Scott Morton, and Silva-Risso 2006). Thus, poor economic outcomes may make for a vicious cycle of confirming stereotyped consumers’ concerns and worsening their outcomes.

We believe that these findings could be extended to consumers who are chronically under the influence of a negative stereotype. These consumers may constantly wonder whether they will be treated fairly. Chronic vigilance could make these consumers hypersensitive to the possibility of being duped or make them more sugrophobic than other consumers (Vohs et al. 2007). For instance, female consumers, compared to male consumers, report feeling intimidated when it comes to discussing investment portfolios with a financial planner (Koss-Feder 2006). As a consequence, women report turning away from finance and investment and toward frugality as a mode of wealth management (Oaff 2002). Likewise, women sometimes find themselves intimidated by the car-buying experience and hire brokers to help—albeit for additional fees (<http://www.edmunds.com/advice/women/families/articles/45991/article.html>). In other words, consumers’ well-being can be undermined due to chronic stereotype threat in the marketplace.

## Limitations and Directions for Future Research

Our research investigated stereotype threat effects in the domain of consumer behavior, which itself is an advance in that it indicates that the scope of stereotype threat effects is much larger than academic or workplace contexts. Yet there are also limitations to the conclusions that can be drawn from this work, which suggest new areas of scholarship for future research.

First, the current research identified and found transaction-related anxiety as the driver of the stereotype threat effect in the marketplace. Nonetheless, the measures in this research for tapping into consumer anxiety could use further refinement. The current measure on consumer anxiety might overlap with related constructs such as mistrust toward transaction partners (Kelley and Thibaut 1978), lack of confidence in fair transactions (Sabel 1993), or fear of being perceived as incompetent (Steele and Aronson 1995). Given that consumer anxiety can play a role in making marketplace decisions (Vohs et al. 2007), a fruitful area of exploration would be to distinguish consumer anxiety from related constructs and assess consumer anxiety with refined measurement items.

Second, with respect to the potential overlap between consumer anxiety and perceived incompetence, it is noteworthy that we found no condition effect on participants’ perception about their self-competence. This noneffect differs from findings of prior research on stereotype threat effect (e.g., Steele and Aronson 1995), and therefore a more formal test of the role of competence would be valuable. It could well be that the discrepancy arises from differences in research contexts (e.g., academic performance vs. consumer purchases) or the specific measurement instruments.

Third, our research found that stereotype threat effects could be mitigated through the use of vanilla scent. Although the soothing role of vanilla (known as “the olfactory security blanket”) is well documented, it should be noted that our research did not directly assess whether anxiety was reduced when consumers smelled the vanilla. Future research that clearly measures the soothing effect of vanilla scent and its capacity to offset stereotype threat effects in both marketplace and performance domains would be welcome. In addition, future research could identify situational factors that mitigate consumers’ anxiety about being stereotyped and consequently maltreated during transactions.

Last, our research focused on gender-STEM stereotypes and stereotype-threatened consumers’ avoidance of out-group versus in-group service providers. A pertinent question is whether the findings generalize to other domains, such as age, sexuality, ethnicity, or economic status. Relatedly, would stereotype-threatened consumers exhibit other distinct patterns of consumer behavior, such as amount of money spent, willingness to pay, or brand selection? An intriguing phenomenon is the case of stereotype lift (Grimm et al. 2009; Walton and Cohen 2003), in which stereotyped individuals perform better than nonstereotyped ones when they are aware of the stereotype. Future research that locates conditions under which stereotyped consumers perform bet-

ter, worse, or just differently than nonstereotyped consumers would benefit the field greatly.

Conclusions

This research demonstrated that consumers in whom a negative in-group stereotype was made salient based their intentions to transact with a firm on the group membership of a service provider. These consumers eschewed the transaction when they anticipated transacting with an out-group member but not so with an in-group member. Specifically, we found that female consumers who were reminded of a

negative stereotype about women in STEM domains reported lower intentions to use financial services when the firm advertised itself with male, as opposed to female, advisors. This pattern likewise emerged in decisions regarding automobile repair and automobile purchases. Moreover, we found that marketplace stereotype threat effects occurred via heightened anxiety. Finally, relieving anxiety (i.e., aided by a vanilla scent) rendered the gender of a service provider a nonissue in consumers' decisions to purchase. In total, this work underscores the importance of consumers' group identity in the marketplace when the threat of being stereotyped is in the air.

APPENDIX  
FIGURE A1

AD STIMULUS: MATH CUES PRESENT AND FEMALE FINANCIAL ADVISORS (EXPERIMENT 1)

**ALLOCATION OF TIME**

other  
 worrying about your investments

It's not that money isn't important. Of course it is. Which is why experts should help you manage it. And the personal attention you'll receive at KCC Investment Co. makes us an excellent choice. A dedicated team of specialists will get to know you, and your goals. All of our resources - our teams of advisors, our technology - are focused on protecting and growing client assets. Because it's your life, and your money. We think you should make the most of both. If you'd like to know more call us at 800-468-2352 or visit [www.kccinvestment.com](http://www.kccinvestment.com).

**KCC Investment Co.**

FIGURE A2

AD STIMULUS: MATH CUES ABSENT AND MALE FINANCIAL ADVISORS (EXPERIMENT 1)

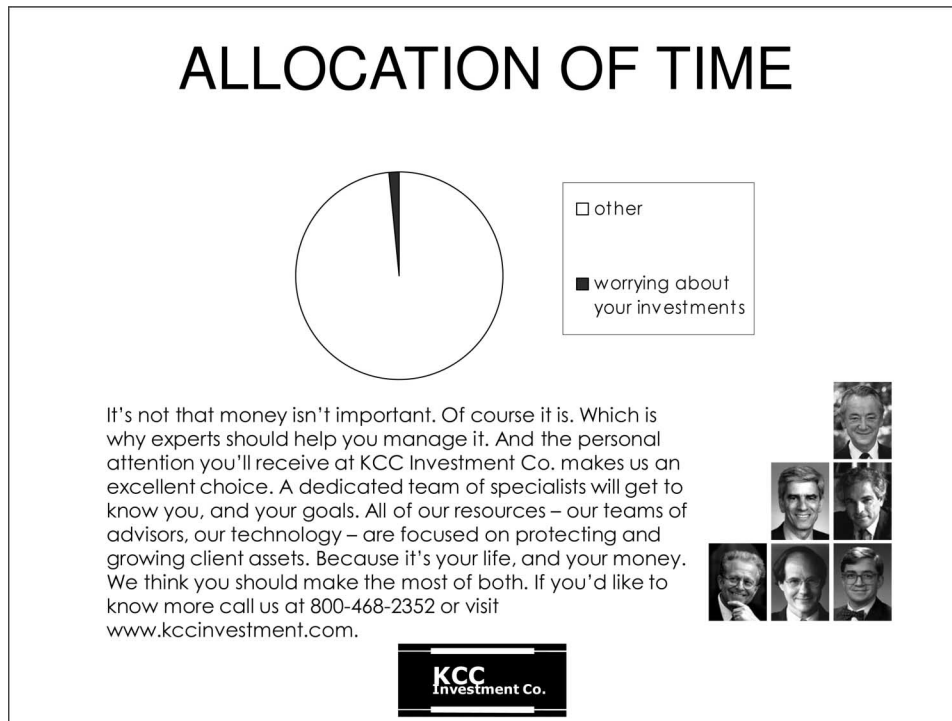


FIGURE A3

AD STIMULUS: MALE CAR TECHNICIAN (EXPERIMENT 2)

## Complete Automotive Repair Service Count on us for fair, friendly service!

Complete Automotive Repair Service is a full-service preventive maintenance and auto repair center. We have been performing high quality, guaranteed auto, SUV, and truck repairs in the Montreal area since 1979.

We service and repair all imported and domestic cars and trucks. Bring in your imported and domestic auto, SUV, or pickup today with complete confidence that your auto will be serviced or repaired correctly the first time.

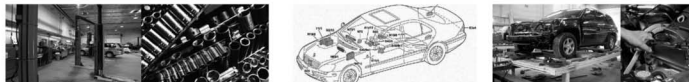


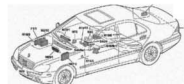
FIGURE A4

AD STIMULUS: FEMALE CAR TECHNICIAN (EXPERIMENT 2)

## Complete Automotive Repair Service Count on us for fair, friendly service!

Complete Automotive Repair Service is a full-service preventive maintenance and auto repair center. We have been performing high quality, guaranteed auto, SUV, and truck repairs in the Montreal area since 1979.

We service and repair all imported and domestic cars and trucks. Bring in your imported and domestic auto, SUV, or pickup today with complete confidence that your auto will be serviced or repaired correctly the first time.



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