Adriana V. Madzharov, Lauren G. Block, & Maureen Morrin

The Cool Scent of Power: Effects of Ambient Scent on Consumer Preferences and Choice Behavior

The present research examines how ambient scents affect consumers' spatial perceptions in retail environments, which in turn influence customers' feelings of power and, thus, product preference and purchasing behavior. Specifically, the authors demonstrate that in a warm- (vs. cool-) scented and thus perceptually more (vs. less) socially dense environment, people experience a greater (vs. lesser) need for power, which manifests in increased preference for and purchase of premium products and brands. This research extends knowledge on store atmospherics and customer experience management through the effects of ambient scent on spatial perceptions and builds on recent research on power in choice contexts.

Keywords: scent, store atmospherics, luxury consumption, consumer choice

Retailers and other service providers are keenly interested in managing the in-store customer experience (Kaltcheva and Weitz 2006; Otnes, Ilhan, and Kulkarni 2012). Factors such as in-store displays (Inman, Winer, and Ferraro 2009) and shelf facings (Chandon et al. 2009) have been shown to influence purchase behavior, as have atmospheric factors such as lighting, music, and color (Brüggen, Foubert, and Gremler 2011; Summer and Hebert 2001). Indeed, it could be said that companies are entering a new era of sensory marketing in which efforts revolve around engaging all five of customers' senses to create the multisensory experience they seek (Krishna 2010). This new trend has placed more focus on the underexplored senses of touch (Peck and Wiggins 2006) and smell (Krishna 2012), with companies investing particularly heavily in scent marketing (Klara 2012). More firms are emitting specially designed ambient scents into service environments through the heating, ventilating, and air conditioning systems of retail stores (e.g., Jimmy Choo, Sony), hotels (e.g., Sheraton, Marriott), and banks (e.g., Credit Suisse) (Klara 2012).

Adriana V. Madzharov is Assistant Professor of Marketing, Wesley J. Howe School of Technology Management, Stevens Institute of Technology (e-mail: adriana.madzharov@stevens.edu). Lauren G. Block is Lippert Professor of Marketing, Baruch College, the City University of New York (e-mail: lauren.block@baruch.cuny.edu). Maureen Morrin is Professor of Marketing, Fox School of Business, Temple University (e-mail: maureen.morrin@temple.edu). Correspondence may be directed to the first author. This article is based on the first author's dissertation. Financial support from the Interpublic Research Award at Baruch College, the City University of New York is gratefully acknowledged. The authors extend their gratitude to Michael Rubin and Teresa Tridente for providing the store setting and data for the two field studies. The authors thank ScentAir for providing the scent delivery systems and the scents for the second field study. They also thank the *JM* review team for invaluable feedback throughout the revision process. Stephen Nowlis served as area editor for this article.

Some practitioners believe that after the exhaustive use of visual and auditory stimulation in the shopper environment, scents are one of the few sensory tools left that represent untapped opportunities (Klara 2012). This intuition is supported by some distinguishable characteristics of the sense of smell, such as that it is the most direct and basic sense and cannot be easily turned off (Herz 2010). Although, in general, people do not pay much attention to odors in the environment, ambient scents are difficult to escape, which potentially makes them subtle yet powerful influencers (Herz 2010). The rich and powerful nature of humans' sense of smell and the wide variety of pleasant scents available to retailers make scent marketing an open and fruitful area for research (Herz 2010; Klara 2012).

Scent has generated increased attention and effort from consumer psychologists as part of the broader area of sensory research (Krishna 2012; Morrin 2010). To date, most of the scent-related research in marketing has focused on the effects of pleasant scent on memory (Krishna, Lwin, and Morrin 2010; Morrin and Ratneshwar 2000, 2003), evaluation (Biswas et al. 2014; Bosmans 2006; Spangenberg, Grohmann, and Sprott 2005; Spangenberg et al. 2006), and variety-seeking behavior (Mitchell, Kahn, and Knasko 1995). For example, studies have shown that under certain conditions such as congruency (Spangenberg, Grohmann, and Sprott 2005; Spangenberg et al. 2006) and fluency (Herrmann et al. 2013), pleasant ambient scents can positively affect product and store evaluations as well as consumer spending. Despite the recent proliferation of scent research, there is still much we do not know. For example, research has not addressed how scent properties other than pleasantness might influence consumers in ways that are meaningful to marketers or examined the mechanisms by which such properties might do so (Herrmann et al. 2013).

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In this research, we contribute to these efforts to build a more unified scent theory in consumer behavior by establishing how scents that differ on semantic meanings related to temperature influence preference and choice behavior. We build on literature that has shown that scents can be categorized on the basis of the semantic meanings they carry (e.g., Holland, Hendricks, and Aarts 2005; Krishna, Elder, and Caldara 2010), and we contribute to the very limited research on odor-induced synesthesia, whereby a person uses a term from one sense (e.g., touch) to describe an experience from another sense (e.g., smell) (Shepard 2012; Stevenson and Tomiczek 2007). Importantly, we uniquely contribute to the extant literature on scents and odor-induced synesthesia by demonstrating that the process by which scents perceived as "warm" or "cool" affect customer behavior is based on the production of a spatial bias in social density perception. We demonstrate how the sense of smell can affect the visual sense through spatial perception, thus providing understanding to the complex nature of consumer experiences in the store.

More specifically, we show across several experiments, including two field studies, that a warm (vs. cool) ambient scent leads people to perceive the environment around them as more (vs. less) socially dense. As a result, they experience a reduced sense of power and, thus, engage in power-compensatory behavior manifested as increased preference for premium brands and products. We define premium brands/products as those that consumers perceive as more prestigious, luxurious, high-status, or upscale, depending on retail assortment and context. We define social density as the joint perceptual evaluation of the number of people present, the physical proximity between them, and the overall spaciousness of the environment (Eroglu and Machleit 1990; Hui and Bateson 1991). We begin with a pilot study in which we demonstrate that a warm (vs. cool) scent leads to perceptions of higher social density. Then, in Study 1, we provide preliminary evidence that a warm (vs. cool) scent leads to power-compensatory preferences by showing that people in a warm- (vs. cool-) scent condition have a greater preference for prestige-focused (vs. performance-focused) advertising. In Study 2, we provide real-life data showing that a warm (vs. cool) scent increases the tendency to buy premium brands. In another field study (Study 3), we demonstrate that a warm scent (vs. no scent or cool scent) leads to increased purchases of premium products, higher overall spending, and an increased number of purchased items. In this second field study, we also provide evidence for the underlying process and show that social density perceptions and power restoration motivations are the driving mechanisms for the effect of scent on increased purchasing of premium products. Finally, in Study 4, we provide additional process support by demonstrating how in-store factors such as salesperson–customer interaction can moderate the effect of scent on power-compensatory customer preferences.

The findings from our studies contribute to marketing theory by demonstrating, for the first time, that ambient scents can affect behavior through more than, and independent of, scent pleasantness (i.e., its hedonic quality). Thus, we demonstrate a new cognitive mechanism for scent effects through the spatial bias of social density perceptions. As such, we contribute to marketing theory by taking a multisensory approach to studying scent effects and in-store atmospherics. We also contribute to the literature on power by identifying a new atmospherics factor that can manipulate power in a subtle but consistent way in retail contexts. Previous research on power has mainly explored consequences of power in consumption contexts but not the potential antecedent factors in the consumer environment that can produce such consequential effects.

Conceptual Framework

Scent and Consumer Behavior

Consumer research on scent has demonstrated positive effects of pleasant scents on attention and memory for brands and products as well as on information processing (Herrmann et al. 2013; Krishna, Lwin, and Morrin 2010; Mitchell, Kahn, and Knasko 1995; Morrin and Ratneshwar 2000, 2003). For example, studies on ambient scents have demonstrated that simple versus complex pleasant scents lead to increased spending in the store because they are more easily processed (Herrmann et al. 2013). Studies have also shown that pleasant ambient scents can positively affect evaluations, variety seeking, and spending, especially when scents are semantically congruent with the products being evaluated (Mitchell, Kahn, and Knasko 1995; Spangenberg, Grohmann, and Sprott 2005; Spangenberg et al. 2006). Research has shown that the semantic associations of scents can play a key role in explaining scent effects on consumer perceptions and evaluations (Krishna, Elder, and Caldara 2010). Extant research has suggested that scents carry common semantic associations, learned through repeated exposure to different smells in different contexts, which can become activated and lead to increased mental accessibility of those concepts (Holland, Hendriks, and Aarts 2005; Krishna, Elder, and Caldara 2010; Mitchell, Kahn, and Knasko 1995). For example, studies have shown that a pleasant masculine (feminine) ambient scent leads to increased evaluations, intentions to visit, and higher spending in the men's (women's) section of a store (Spangenberg et al. 2006).

Research regarding the phenomenon known as synesthesia, which refers to the experience of one of the human senses through activation of another human sense, has been limited (Stevenson and Tomiczek 2007). One study demonstrates odor-induced synesthesia, whereby the scent of lemons (vs. that of animals) was implicitly associated with soft (vs. rough) fabric (Dematte et al. 2006). Related to this notion, research has established that scents can carry haptic-based associations, whereby some scents are perceived to be warm (e.g., vanilla, cinnamon) and others are perceived to be cool (e.g., peppermint, eucalyptus) (Krishna, Elder, and Caldara 2010). In a seminal article, Krishna, Elder, and Caldara (2010) show that gel packs infused with a cool (vs. warm) scent were evaluated as more effective at cooling (vs. warming) participants' hands. The authors posit that the semantic congruency of the two cues (the olfactory and the

tactile) led to the enhancement effect they observed (Krishna, Elder, and Caldara 2010).

In the present research, we propose that semantic associations of a scent can be used as an input for judgment of *visual* information—importantly, without the necessary condition of semantic congruency. We build on research regarding spatial biases that suggests that sensory cues from modalities other than vision can modify spatial judgments (e.g., touch on visual size estimation bias; Krishna 2008). We posit that people will incorporate warm and cool scents' semantic associations with temperature into spatial perceptions of social density. We thus identify a new perceptual process as a driver of scent effects on behavior. We demonstrate that through the process of social density perceptions, warm (vs. cool) scents can systematically bias consumer behavior toward power-compensatory preferences.

Social Density Perceptions and Power

Social density judgment is a holistic perceptual evaluation formed by any combination, singly or together, of how many people are present, the physical proximity between them, and the overall spaciousness of the environment (Eroglu and Machleit 1990). Extant research has established that a strong bidirectional correlation exists between temperature and spatial proximity both as fundamental features of the physical environment and as psychological concepts in people's minds (Ijzerman and Semin 2010). Particularly in the physical world, warm (vs. cool) temperatures are associated with physical proximity (vs. distance). For example, close physical proximity to another person leads to increased physical warmth (e.g., being held makes a person warmer). In addition, high human density, such as an increased number of people in a limited space, can raise actual ambient temperature (Michon, Chebat, and Turley 2005). Studies have also shown that sitting in close physical proximity to another person (without touching them) can increase perceived ambient temperature even if actual temperature does not change (Ijzerman and Semin 2010). Moreover, research has demonstrated that physically manipulated temperature can bias perceptions of physical proximity such that an actual warm (vs. cool) temperature can lead to perceptions of greater physical proximity (vs. distance) between two people, although actual proximity remains unchanged (Ijzerman and Semin 2009). In the present research, we extend this body of knowledge and propose that semantically priming temperature concepts through the experience of a warm (or cool) ambient scent will produce similar effects on perceptions of social density such that a warm (vs. cool) ambient scent will lead to perceptions of greater (lesser) social density. Formally stated,

> H_1: People in a warm- (vs. cool-) ambient-scented environment perceive it as more (vs. less) socially dense.

Social density is an important retail factor that can affect in-store consumer experiences such as approach behavior and shopping satisfaction (Hui and Bateson 1991; Machleit, Eroglu, and Mantel 2000). Research has established that perceived control is a crucial mediating factor that drives these effects (Van Rompay et al. 2008). Specifically, scholars have shown that increased social density decreases the perceived control people experience over their social environment because high social density involves an element of social interference and related perceptions that circumstances are more influenced by others (Hui and Bateson 1991; Machleit, Eroglu, and Mantel 2000; Van Rompay et al. 2008). Thus, social density affects the perceived control consumers feel, or the degree of social power they experience (Rucker, Galinsky, and Dubois 2012).

Researchers have traditionally defined power, as a social construct, as "asymmetric control over valued resources in social relations" (Rucker, Galinsky, and Dubois 2012). Powerlessness is typically an aversive state that people work to change through activities and consumption that restore their sense of power. People in a state of low perceived power place greater value on products and attributes that can satisfy their active goal of power restoration (Rucker, Galinsky, and Dubois 2012). For example, Rucker and Galinsky (2009) demonstrate that people in a low (vs. high) power state evaluate high-status products more favorably than high-performance products. In consumption contexts, power-compensatory behavior is evidenced through stronger acquisition behavior, especially for status-related products (Rucker and Galinsky 2008; Rucker, Galinsky, and Dubois 2012).

Building on these findings, we propose that the consumer's sense of power from scent-based social density perceptions will produce similar effects on buyer behavior. Specifically, we propose that in a warm- (vs. cool-) scent environment people will perceive greater social density and, as a result, feel less powerful, which will manifest in a customer response that we herein define as "power-compensatory preferences" such as more favorable evaluation of prestige- (vs. performance-) focused ads, increased purchases of premium brands, a higher dollar amount spent on premium products, an increased number of purchased items, and higher overall spending to restore the customer's sense of power (i.e., power restoration motivations). Formally stated,

> H_2: (a) A warm (vs. cool) ambient scent leads to power-compensatory customer preferences and purchase behavior; (b) this effect is serially mediated by social density perceptions and power restoration motivations.

We first perform a pretest to choose the warm and cool scents used in the main studies. Then, we report a highly controlled pilot study to test the effect of warm versus cool scents on perceptions of social density (H_1). We then present four studies that collectively test the effect of warm (vs. cool) scents on the marketing outcomes previously identified in the literature as being particularly influenced by power-compensatory motives: ad evaluations and product choice (Rucker and Galinsky 2009). Specifically, we find preliminary support for H_{2a} in a laboratory study (Study 1) in which we show that a warm (vs. cool) scent leads to preference for prestige- (vs. performance-) focused ads. We provide additional support for H_{2a} with real-life purchase data from two field studies (Studies 2 and 3), in which we show that a warm (vs. cool) scent leads to increased purchasing of premium brands and products,

higher overall spending, and an increased number of items purchased. In Study 3, we also provide support for the underlying mechanisms of social density perceptions and power restoration motivations on power-compensatory behavior (i.e., H_{2b}). Finally, in Study 4, we provide further support for a power-compensatory mechanism by demonstrating the moderating impact of an in-store factor (rude vs. polite salesperson interaction).

Pretest

We pretested six essential oils, three of which we expected to be perceived as warm scents (warm vanilla sugar, cinnamon pumpkin, and spice) and three as cool scents (eucalyptus-spearmint, peppermint, and winter wonderland; similar to Krishna, Elder, and Caldara 2010). Thirty-three undergraduate students participated (N = 33). Following an established procedure (see Krishna, Elder, and Caldara 2010), participants evaluated each scent on perceived temperature and liking ("smells like a cool/warm scent," and "dislike/like scent a lot"; seven-point scales). Of the six scents, cinnamon ($M_{cinnamon}$ = 4.55) and vanilla ($M_{vanilla}$ = 4.61) were rated as the warmest, and peppermint was rated as the coolest ($M_{peppermint}$ = 3.06). Cinnamon and peppermint were significantly different on the temperature dimension ($M_{cinnamon}$ = 4.55, $M_{peppermint}$ = 3.06; t(32) = 4.23, $p < .001$), as were vanilla and peppermint ($M_{vanilla}$ = 4.61, $M_{peppermint}$ = 3.06; t(32) = 3.68, $p = .001$). The three scents did not differ significantly on liking. In the main studies, we alternate between cinnamon and vanilla as the warm scent but always use peppermint as the cool scent. Next, we report a pilot study in which we aim to find support for H_1 and show that a warm (vs. cool) scent will lead to perceptions of higher social density, thus demonstrating the biasing effect of scent on spatial perceptions.

Pilot Study

Method

Design and participants. One hundred thirteen (50% male) undergraduate students participated in the pilot study. We ran it as a single-factor (ambient scent: cool [peppermint] vs. warm [cinnamon]) between-subjects design.

Procedure. We conducted the experiment in a marketing laboratory with a maximum capacity of nine people. Participants filled out the survey in groups of eight people, on average. We used an electric diffuser to emit the ambient scent into the room (Morrin and Ratneshwar 2003). In both conditions, several drops of essential oil were placed in a diffuser hidden behind a cardboard partition, and 15 minutes of diffusion time elapsed before the beginning of a session.

Participants first answered questions regarding social density ("Does it seem there are a lot of people around you right now?" "How spacious do you think this room is?"; seven-point scales: 1 = "not at all," and 7 = "very"). In addition, we asked participants to give a quick estimate of the number of people in the room ("Now, without looking around or counting, give us your first quick estimate of how many people are in the room right now, including yourself and excluding the experimenter [if present]"). Then participants indicated whether there was a person on their right and left side, respectively (1 = "yes," and 2 = "no"). We also recorded the actual number of people present in the room in each session. There were marginally more people present in the cool- versus the warm-scent condition (M_{cool} = 8.08 vs. M_{warm} = 7.60; F(1, 111) = 3.10, $p < .10$), which we control for by entering the number of people present as a covariate in the main analyses. There were no significant differences across conditions on the other two spatial covariates, "Person on the left side" and "Person on the right side" (ps > .10).

To minimize demand effects, testers asked participants questions about the ambient scent only after they responded to the other dependent measures: "Did you notice any smell in the room when you first came in/right now?" ("yes/no") and "What smell did you notice?" (open-ended question). Finally, participants answered demographic questions and a hypothesis probe. No one guessed anything regarding the hypothesis. Approximately half (46%) the participants reported that they remembered noticing a smell when they first came in, and approximately half (56%) indicated that they noticed a smell at the end of the survey. There were no significant differences between conditions on these measures (ps > .10). In total, 4% of the participants in the cool-scent condition correctly identified the scent as peppermint, and 6% of the participants in the warm-scent condition correctly identified the scent as cinnamon, consistent with previous research suggesting that it is difficult for people to accurately identify scents (Herz 2010).

Results

The items measuring perceived number of people and spaciousness (reverse-coded) were highly correlated (r = .48, $p < 001$), so we combined them for a measure of social density. An analysis of covariance (ANCOVA) with ambient scent as a between-subjects factor and the three spatial covariates (person on the right side, person on the left side, and actual number of people) as controls revealed a significant main effect such that participants in the cool-scent condition thought the room was less socially dense than participants in the warm-scent condition (M_{cool} = 3.97 vs. M_{warm} = 4.59; F(1, 108) = 5.99, $p < .05$). Of the covariates, only actual number of people was significant (F(1, 108) = 6.45, $p < .01$) such that the higher the actual number of people, the greater the perception of social density, as we expected. Removing the covariates from the analysis does not change the significance of the effect. This pattern emerges for each of the individual measures of social density as well (number of people: M_{cool} = 3.37 vs. M_{warm} = 4.02; F(1, 108) = 4.01, $p < .05$; room spaciousness: M_{cool} = 3.43 vs. M_{warm} = 2.85; F(1, 108) = 4.76, $p < .05$).

We created an additional measure of social density to reflect participants' spatial perceptual bias by subtracting the actual from the estimated number of people present in the room. An analysis of variance (ANOVA) with ambient scent as a between-subjects factor revealed a significant main effect such that participants in the cool-scent condition systematically underestimated the number of people in

the room (M_{cool} = –1.18 vs. M_{warm} = .14; F(1, 111) = 18.86, $p < .001$). When the covariates for person on the right side and person on the left side are entered into this analysis, the main effect of scent on biased estimated number of people is still significant (M_{cool} = –1.13 vs. M_{warm} = .11; F(1, 109) = 16.47, $p < .001$).

Discussion

The results from this pilot study show that people in a warm- (vs. cool-) scent condition perceive the environment around them as more socially dense, as indicated by subjective perceptions of spaciousness and number of people present, in support of H_1. To further explore whether people perceive warm and cool scents similarly in terms of the associations these scents evoke and whether there might be an alternative dimension to these scents that is driving the social density bias, we conducted two additional pilot studies. In Pilot Study 2, we tested whether associations with warmth are the driving mechanism for the social density bias. We ran a single-factor design study (scent: warm [cinnamon] vs. cool [peppermint]) in which we first asked participants (N = 38) how pleasant the scent was (seven-point scale) and how much they associated the scent in the room with warmth (five-point scale); next, we measured social density perceptions ("How full of people is the room?" "How tight is the space around you?"; seven-point scales, r = .31). Results of an ANOVA show that participants perceived the two scents as equally pleasant (M_{warm} = 3.35 vs. M_{cool} = 3.11; F(1, 36) = .33, $p = .57$) but that associations with warmth were higher in the warm- versus cool-scent condition (M_{warm} = 2.75 vs. M_{cool} = 1.89; F(1, 36) = 8.02, $p < .01$), as we predicted. There was no significant direct effect of scent on social density perceptions (M_{warm} = 3.00 vs. M_{cool} = 3.08; F(1, 36) = .05, $p = .83$). However, a mediation analysis revealed that there was a significant indirect effect of scent on social density perceptions through associations with warmth ($a_1 \times b_1$ = .29, 95% confidence interval [CI] = [.05, .76]). Thus, scent can bias social density perceptions indirectly through its associations with warmth. We speculate that cuing people to the scent's presence might render its direct effect on social density perceptions nonsignificant but its indirect effects through warmth significant.

In Pilot Study 3, we explored alternative associations that warm and cool scents might evoke. We ran a single-factor design study (scent: warm [vanilla] vs. cool [peppermint]) in which we first asked participants (N = 25) how socially connected, private, and attached to close friends they felt (seven-point scales). We next asked them how cold/warm they felt at the moment (nine-point scale: 1 = "cold," and 9 = "warm") as well as how much they associated the scent in the room with family gatherings, social events, being alone, and being with the people they love. In support of our theorizing, results of an ANCOVA controlling for age and gender showed a significant direct effect of scent on feeling warmer, with people in the warm- (vs. cool-) scent condition feeling warmer (M_{warm} = 6.44 vs. M_{cool} = 5.06; F(1, 21) = 5.39, $p < .05$). There were no significant effects of scent on the other measures ($ps > .10$). We conclude that the scents we used do not tend to produce alternative associations (other than those that are temperature related). Detailed results from these studies are available from the authors upon request. In the next laboratory study, we examine the direct effects of scent on power-compensatory behavior demonstrated by preference for prestige- versus performance-focused advertisements.

Study 1

Method

Design and participants. Seventy-eight (47% male) undergraduate business students from a large northeastern U.S. university participated in Study 1. We ran it as a single-factor (ambient scent: cool [peppermint] vs. warm [vanilla]) between-subjects design.

Procedure. To examine power-compensatory preferences, we administered ad evaluation measures. We presented participants with a scenario in which we asked them to evaluate both a prestige-focused and a performance-focused print advertisement. We followed a procedure similar to that of Rucker and Galinsky (2009), in which participants saw two ads for the same premium product (i.e., a BMW car), differing only in selling strategy. In one ad, the focus was on the status the product conveys to others, whereas in the other ad, the focus was on performance value. We told participants to imagine that they worked for an advertising agency and had to evaluate these two ads. Both ads presented the same picture of a BMW car and differed only in the slogan displayed. The tagline for the prestige-focused advertisement read "Prestige. It's yours!" The tagline for the performance-focused ad read "Experience a smooth ride" (stimuli are available in the Appendix). Participants indicated which ad they liked more and which ad was more effective (nine-point scales; 1 = "like ad A/think ad A is more effective," and 9 = "like ad B/think ad B is more effective"). Next, participants answered questions on demographics and a probe question (no one guessed the true purpose of the study).

Results and Discussion

The two items of liking and perceived effectiveness of the ad were highly correlated (r = .81, $p < .001$), so we combined them to form an index of ad preference (α = .89). An ANOVA on ambient scent revealed a significant main effect on ad preference such that people in the warm- versus the cool-scent condition had a greater preference for the prestige-focused versus the performance-focused ad (M_{warm} = 6.17 vs. M_{cool} = 4.83; F(1, 76) = 4.18, $p < .05$). Thus, in this study, we provided preliminary evidence that a warm versus cool scent leads to power-compensatory preferences by showing that people evaluated the prestige-focused (vs. performance-focused) ad more positively.

In the next study (a field study), we aim to provide support for the premise that a warm (vs. cool) ambient scent will lead to increased purchases of premium brands (H_{2a}) with real-life data from an actual shopping environment (an eyeglass retailer store). A lowered sense of power typically motivates people to seek ways to restore that sense of

power, which they can accomplish by acquiring products that demonstrate status (Rucker, Galinsky, and Dubois 2012). Thus, in Study 2 we expect that people in a warm- (vs. cool-) scented store will purchase significantly more premium brands. We also measure the number of items purchased per transaction and overall spending because we expect that customers who want to restore a sense of power may also be more likely to purchase multiple items on a single occasion and spend more money overall.

Study 2

Method

Design and participants. We ran Study 2 as a single-factor (ambient scent: cool [peppermint] vs. warm [cinnamon]) between-subjects design. Data were collected from 154 shoppers (45% male) who were customers in an optics retail store located in a northeastern U.S. town. Sixty-five consumers (42% male) shopped in the presence of the warm scent, and 89 (48% male) shopped in the presence of the cool scent.

Procedure. We conducted the experiment in an optics retail store located in an urban shopping area. The retailer sold both sunglasses and prescription glasses for men, women, and children in a wide range of brands and prices. The retailer maintained consistent advertising, pricing, and product availability during the study period. We ran the experiment for a 22-day period, with the warm scent present for 11 days and the cool scent for another 11 days; there was 1 day of no scent between the two conditions to ensure dissipation of the previous scent and full ventilation of the store. For the scent manipulation, we used a procedure similar to the ones from published scent research involving field experiments (Herrmann et al. 2013; Spangenberg et al. 2006). The scent was diffused throughout the entire store with a commercial scent diffuser designed for retailer use. Two researchers and the store owner pretested and adjusted the scent intensity to an unobtrusive level. The diffuser was set to 15 seconds on/off timing, and the same scent intensity was maintained throughout the two scent-condition periods. The scent machine was turned on at 8 A.M. each day and turned off at 8 P.M. Extraneous odors were avoided in the store during the study. Data were collected during the store's operating hours (9:30 A.M. to 7:00 P.M.). The sales personnel were blind to the hypotheses.

Measures. The retailer collected and recorded sales data on several measures: brands purchased, number of items purchased per transaction, and total dollar amount spent per transaction. We only considered purchase data on sunglasses and prescription glasses, excluding purchase data on lenses bought without the frames.

When a customer purchases prescription glasses, he or she must choose the brand of frames into which the lenses will be inserted. Customers can choose from a variety of brands of eyeglass frames, ranging from low-end/private label to high-end/luxury/premium brands. This particular retailer offered 51 brands of products sold in the store, which the store owner rated on the premium dimension on a six-point scale (1 = "low end," and 6 = "premium"). We then grouped brands rated at 6 (e.g., Tom Ford, Gucci, Michael Kors, Versace, Prada, Jimmy Choo, Marc Jacobs) or 5 (e.g., Armani, Roberto Cavalli, Moschino, Swiss Flex, Prodesign, Ralph Lauren, Fendi) to form the premium brand category. We grouped brands rated at 4 (e.g., Ray-Ban, Guess, English Laundry, Viva, Carrera) or 3 (e.g., Niche, Eddie Bauer, Harvé Benard) to form a neutral brand category and grouped brands rated at 2 (e.g., Uber, New Millennium, Prell, Retro) or 1 (e.g., Zimco, Lido West, Smilen, Capri) to form a low-end brand category. Thus, there were 16 brands in the premium category, 21 in the neutral category, and 15 in the low-end category. Note that the average prices for each of the three categories were as follows: for the low-end brands, \$61.48; for the neutral brands, \$156.89; and for the premium brands, \$256.50.

Results and Discussion

Premium brand purchases. The number of brands purchased in the three categories (premium, neutral, and low end) significantly differed across condition ($\chi^2(2, 174) = 5.99$, $p = .05$). As we predicted, customers in the warm- (vs. cool-) scent condition made significantly more purchases from the premium category compared with the other two categories. Premium brands accounted for 11.4% of all purchases in the warm-scent condition, compared with only 3.2% in the cool-scent condition ($\chi^2(1, 174) = 4.55$, $p < .05$). There was no difference between conditions in the number of neutral brand purchases ($P_{warm} = 26.6\%$ vs. $P_{cool} = 37.9\%$; $\chi^2(1, 174) = 2.51$, $p > .10$) or low-end brand purchases ($P_{warm} = 62.0\%$ vs. $P_{cool} = 58.9\%$; $\chi^2(1, 174) = .17$, $p > .10$) as a proportion of all purchases made.

Number of items purchased and total dollar amount spent. An ANOVA with scent as a between-subjects factor revealed a significant main effect of scent. The number of items purchased was significantly higher in the warm- versus cool-scent condition ($M_{warm} = 1.22$ vs. $M_{cool} = 1.07$; $F(1, 152) = 5.54$, $p < .05$).

An ANOVA with scent as a between-subjects factor revealed that although the effect of scent did not reach significance, people spent a higher total dollar amount in the warm- versus cool-scent condition ($M_{warm} = \$132.85$ vs. $M_{cool} = \$108.92$; $F(1, 152) = 1.84$, $p = .18$).

The results from this field study show that in a warm- (vs. cool-) scent condition, shoppers are more likely to purchase premium brands and purchase more items on a single shopping occasion. In the next field study, we aim to replicate the effects of scent on purchasing behavior with a larger variety of products over a longer time period. We conducted Study 3 in a store with higher daily store receipts. The study also included an unscented control condition to examine the separate effects of the warm and cool scents. This study design enables us to draw more specific conclusions that can be used in retail strategy, including whether retailers should use a warm or a cool scent for their specific purposes. In this field study, we also administered a short supplemental survey to a subset of customers to provide process evidence in support of the conceptual framework.

Study 3

Method

Design and participants. We ran Study 3 as a single-factor (ambient scent: cool [peppermint] vs. warm [cinnamon] vs. control [no scent]) between-subjects design. The study took place in a campus retail store of a northeastern U.S. university over a period of seven weeks. Data were collected on 1,127 sales transactions (i.e., customers checking out) for a total of 1,989 items purchased. In addition, a survey questionnaire was administered to a sample of the purchasing customers (N = 246) who shopped during the seven-week period when the scent conditions were manipulated and sales transactions monitored.

Procedure. We conducted the experiment in a busy campus store (average annual sales of $1 million) during a midsemester period. During the study period, the store sold a wide variety of apparel, accessories, and souvenirs as well as a smaller assortment of stationery items, beverages, and snacks. The products sold consisted of a wide range of brands and prices. No textbooks or software packages were on display during the study period, because the study took place midsemester (only a few of these products were sold, mostly through special orders). The retailer maintained consistent advertising, pricing, and product availability during the study period. During the seven-week period, we alternated the conditions in the following order: first, no scent was present for five days; then, the cool scent was present for five days; this was followed by three days of ventilation of the store; and then the warm scent was present for five days. After that, no data were collected for two weeks (i.e., before, during, and after the Thanksgiving holiday period). We resumed data collection with the cool scent for three days, followed by a ventilation period of one day, followed by the no-scent condition for one day; we repeated the same schedule for the warm scent. Note that we did not record data for ventilation days. We used a scent-diffusion procedure similar to Study 2. The scent delivery systems were turned on at 8 A.M. each day and turned off at 5 P.M., and they were set at a medium intensity level that was maintained throughout the two scent-condition periods. Data were collected during the store's operating hours (9:00 A.M. to 5:00 P.M.). The sales personnel were blind to the hypotheses.

A short questionnaire was administered for five days in each condition (both before and after the holiday break), always between 11 A.M. and 3 P.M., across several weekdays. Shoppers were approached while waiting to pay for their purchases at the register.

Measures. We used the sales transaction records to extract data on premium item purchases, the percentage of dollars spent on premium items, number of items purchased per transaction (i.e., based on the basket of items purchased at checkout), and total dollar amount spent per transaction. The store manager rated each item sold in the store on a three-point scale according to premium level (1 = "low end," 2 = "neutral," and 3 = "premium"). We excluded from the analysis 18 transactions that were department-based, preordered purchases. To control for any potential idiosyncrasies due to academic scheduling, we included day-of-the-week covariates in all of the analyses (Monday through Thursday are dummy-coded, with Friday as the baseline). We report the results for these covariates only when they are significant.

The survey questionnaire was administered while shoppers were standing in line to check out (thus, they had selected their items but had not yet paid for them). The questionnaire asked shoppers to estimate the number of people in the store (open-ended question). We used this item to measure social density perceptions. Next, participants were asked to list each product they were buying and to indicate how respected it would make them feel (seven-point scales: 1 = "not at all," and 7 = "very"). We used this item to measure power restoration motivations, or how much status or power customers anticipated from the purchase of each item. We excluded from analysis the responses of 12 survey participants who did not fully complete the questionnaire.

Results: Sales Records (1,127 Transactions for 1,989 Items Sold)

Premium item purchases. We expected to find that, across the three conditions, more premium (but not neutral or low-end) item purchases would occur when the warm scent (vs. cool scent or no scent) was present in the store. We conducted a logistic regression on whether an item purchased was premium (0 = no, 1 = yes) as a function of scent condition (dummy-coded; warm scent: 1 = yes, 0 = no; cool scent: 1 = yes, 0 = no; unscented control condition served as the baseline), with days of the week entered as covariates. The results show that, as we predicted, a significantly larger proportion of purchased items were premium in the warm- (36.67%) versus cool- (27.55%) scent condition ($\beta = .42$, $\chi^2(1) = 11.49$, $p = .001$), and a marginally larger proportion of items purchased were premium in the warm-scent (36.67%) versus the unscented control (30.96%; $\beta = .26$, $\chi^2(1) = 3.27$, $p = .07$) condition. There were no significant differences between the cool-scent (27.55%) and control conditions (30.96%; $\beta = -.16$, $\chi^2(1) = 1.39$, $p > .10$). A similar logistic regression on whether an item purchased was in the neutral category (0 = no, 1 = yes) had no significant effects (ps > .10); a logistic regression on whether an item purchased was in the low-end category (0 = no, 1 = yes) shows that a smaller proportion of low-end items were purchased in the warm- (25.43%) versus cool- (34.06%) scent condition ($\beta = -.42$, $\chi^2(1) = 13.64$, $p < .001$) and in the warm-scent (25.43%) versus unscented control (31.99%) condition ($\beta = -.32$, $\chi^2(1) = 5.94$, $p < .05$). There were no significant differences between the cool-scent and control conditions ($\beta = .09$, $\chi^2(1) = .55$, $p > .10$).

Percentage of dollars per transaction spent on premium products. We created an additional measure to capture preference for premium products. We expected that people in the warm-scent (vs. cool-scent or control) condition would not only buy more premium products but also spend more money on these items as a proportion of the overall amount spent. Again, for comparison, we examine spending in each of the three item categories (premium, neutral, and low

end). An ANCOVA with scent as a between-subjects factor and days of the week as covariates revealed a significant main effect of scent ($F(2, 1,120) = 6.07$, $p < .01$). Planned contrasts showed that a larger proportion of dollars per transaction were spent on premium items in the warm- versus cool-scent condition ($M_{warm} = 36.96\%$ vs. $M_{cool} = 26.27\%$; $p = .001$); a larger proportion was also spent on premium items in the warm-scent versus unscented control condition ($M_{warm} = 36.96\%$ vs. $M_{control} = 29.52\%$; $p < .05$). The proportion spent on premium items was not significantly different between the cool-scent and control conditions ($p > .10$). The linear contrast was significant, suggesting that the proportion of customers' transaction dollars spent on premium items progressively increased from the cool-scent to the unscented control to the warm-scent condition ($F(1, 1,120) = 11.97$, $p = .001$). Of the covariates, only the comparison between Tuesday and Friday was significant, suggesting that consumers spent a larger proportion of money on premium items on Fridays versus Tuesdays ($F(1, 1,120) = 11.28$, $p = .001$).

A similar analysis on proportion of transaction dollars spent on neutral category items revealed a significant main effect of scent ($F(2, 1,120) = 4.41$, $p < .05$) such that a larger proportion of customer transaction dollars was spent on neutral items in the cool- versus warm-scent condition ($M_{cool} = 28.69\%$ vs. $M_{warm} = 20.18\%$; $p < .01$); a marginally larger proportion was spent on neutral items in the unscented versus warm-scent condition ($M_{control} = 26.18\%$ vs. $M_{warm} = 20.18\%$; $p = .08$). The proportion spent on neutral items was not significantly different between the cool-scent and control conditions ($p > .10$). The linear contrast was significant, indicating that the proportion of customers' transaction dollars spent on neutral items progressively decreased from the cool-scent to the unscented control to the warm-scent condition ($F(1, 1,120) = 8.67$, $p < .01$). The covariates for days of the week were all significant (except the comparison between Monday and Friday), suggesting that the proportion of dollars spent on neutral items increased toward the end of the week. A similar analysis on proportion of dollars spent on low-end items showed no significant differences across conditions; none of the contrasts were significant ($M_{cool} = 45.04\%$ vs. $M_{control} = 44.34\%$ vs. $M_{warm} = 43.52\%$; $F(2, 1,120) = .10$, $p > .10$). The covariates for days of the week were all significant, suggesting that the proportion of dollars spent on low-end items decreased toward the end of the week.

Number of items purchased per transaction. We expected that customers in the warm-scented (vs. cool-scented or unscented) store who needed to restore their sense of power would purchase more items on average. An ANCOVA with scent as a between-subjects factor and days of the week as covariates revealed a significant main effect of scent ($F(2, 1,120) = 5.17$, $p < .01$). Planned contrasts showed that the number of items purchased per transaction was significantly higher in the warm- versus cool-scent condition ($M_{warm} = 1.91$ vs. $M_{cool} = 1.57$; $p < .01$) and in the unscented control vs. cool-scent condition ($M_{control} = 1.84$ vs. $M_{cool} = 1.57$; $p < .05$). The number of items per transaction did not significantly differ between the warm-scent and unscented control conditions ($M_{warm} = 1.91$ vs. $M_{control} = 1.84$; $p > .10$). The linear contrast was significant, suggesting that the number of items purchased progressively increased from the cool-scent to the unscented control to the warm-scent condition ($F(1, 1,120) = 9.21$, $p < .01$).

Total dollar amount spent. An ANCOVA on total dollar amount spent per transaction with scent as a between-subjects factor and days of the week as covariates revealed a marginally significant main effect of scent ($F(2, 1,120) = 2.44$, $p = .09$). Planned contrasts showed that total dollar amount spent was higher in the warm- vs. cool-scent condition ($M_{warm} = \$32.75$ vs. $M_{cool} = \$25.44$; $p < .05$). The amount spent was not significantly different between the cool-scent and the unscented control conditions or between the warm-scent and the unscented control conditions ($M_{control} = \$27.61$; $ps > .10$). The linear contrast was significant, suggesting that total dollar amount spent progressively increased from the cool-scent to the control to the warm-scent condition ($F(1, 1,120) = 4.80$, $p < .05$). Of the covariates, only the comparison between Tuesday and Friday was significant, indicating that total dollar amount spent was higher on Fridays than on Tuesdays ($F(1, 1,120) = 5.74$, $p < .05$).

Next, we present the results from the analysis of the survey data. In this survey, which was administered to a subset of consumers who purchased during the test period, we collected process measures that capture the underlying processes of social density perceptions and power restoration motivations in addition to the measures of premium preference.

Survey Results

Percentage of transaction dollars spent on premium items. An ANCOVA with scent as a between-subjects factor and days of the week as covariates revealed a significant main effect of scent, indicating that survey respondents spent a higher proportion of their transaction dollars on premium items in the warm-scent condition ($F(2, 240) = 11.60$, $p < .001$). Specifically, planned contrasts showed that the percentage spent on premium items was higher in the warm- versus cool-scent condition ($M_{warm} = 48.31\%$ vs. $M_{cool} = 17.31\%$; $p < .001$) and in the warm-scent versus control condition ($M_{warm} = 48.31\%$ vs. $M_{control} = 23.76\%$; $p < .01$); there were no significant differences between the control condition and the cool-scent condition ($M_{control} = 23.76\%$ vs. $M_{cool} = 17.31\%$; $p > .10$). In addition, the linear contrast was significant, revealing that the percentage spent on premium items progressively increased from the cool-scent to the control to the warm-scent condition ($F(1, 240) = 21.76$, $p < .001$). The covariate codes for days of the week were all significant, suggesting that the proportion of dollars spent on premium items increased toward the end of the week.

A similar analysis on the proportion of transaction dollars spent on neutral category items revealed a significant main effect of scent ($F(2, 240) = 3.28$, $p < .05$). Planned contrasts showed that a larger proportion of customer transaction dollars were spent on neutral items in the cool- versus warm-scent condition ($M_{cool} = 40.50\%$ vs. $M_{warm} =$

24.64%; $p < .05$); a marginally larger proportion was spent on neutral items in the cool-scent vs. control condition ($M_{cool} = 40.50\%$ vs. $M_{control} = 25.12\%$; $p = .08$). The proportion spent on neutral items was not significantly different between the warm-scent and unscented control conditions ($p > .10$). The linear contrast was significant, suggesting that the proportion of customers' transaction dollars spent on neutral items progressively decreased from the cool-scent to the unscented control to the warm-scent condition ($F(1, 240) = 5.77$, $p < .05$). A similar analysis on proportion of dollars spent on low-end items showed a significant main effect of scent ($F(2, 240) = 3.84$, $p < .05$). Planned contrasts showed that a larger proportion of customer transaction dollars were spent on low-end items in the cool- versus warm-scent condition ($M_{cool} = 42.33\%$ vs. $M_{warm} = 27.46\%$; $p < .05$) as well as in the control vs. warm-scent condition ($M_{control} = 49.35\%$ vs. $M_{warm} = 27.46\%$; $p < .05$). The proportion spent on low-end items was not significantly different between the cool-scent and control conditions ($p > .10$). The linear contrast was significant, suggesting that the proportion of customers' transaction dollars spent on low-end items progressively decreased from the cool-scent to the unscented control to the warm-scent condition ($F(1, 240) = 4.60$, $p < .05$). The covariate codes for days of the week were all significant, indicating that the proportion of dollars spent on low-end items decreased toward the end of the week.

Total dollars spent. An ANCOVA on total dollars spent per transaction among the survey respondents with scent as a between-subjects factor and days of the week as covariates revealed a significant main effect of scent ($F(2, 240) = 6.54$, $p < .01$). Specifically, planned contrasts showed that the total dollar amount spent was significantly higher in the warm- versus cool-scent condition ($M_{warm} = \$39.55$ vs. $M_{cool} = \$18.14$; $p < .001$) and in the warm-scent versus unscented control condition ($M_{warm} = \$39.55$ vs. $M_{control} = \$24.17$; $p = .05$). Total dollar amount spent was not significantly different between the cool-scent condition and control condition ($p > .10$). The linear contrast was significant, revealing that total dollar amount spent progressively increased from the cool-scent to the control to the warm-scent condition ($F(1, 240) = 12.58$, $p < .001$). Of the covariates for days of the week, only the comparison between Tuesday and Friday was significant, indicating that total dollar amount spent was higher on Fridays versus Tuesdays ($F(1, 240) = 4.51$, $p < .05$).

Mediation Analysis

Next, we aim to provide process evidence for the effects of scent on purchasing of premium items. Specifically, we test the mediating roles of social density perceptions and power restoration motivations (in that order) in the effect of scent on the purchasing of premium items. We expect that customers in the warm-scent (vs. control and cool-scent) condition will estimate a higher number of people in the store, which in turn will lead to greater anticipated feelings of respect through the purchasing of premium products ultimately driving the purchase of such products. Thus, we test the following sequence: ambient scent → social density perceptions → power restoration motivations → premium purchases.

We performed a serial mediation test of multilevel categorical variable indirect effects, using a bias-corrected bootstrap procedure (Hayes's Model 6; n = 10,000 as recommended in Hayes and Preacher [2013]) with scent as the independent factor, estimated number of people in the store and reported feelings of respect with chosen product as mediators (in that sequence), premium purchases as the dependent variable (1 = premium, 0 = other), and dummy-coded days of the week as covariates. We conducted the analysis in two consecutive runs (using the same bootstrap samples) in which we used the warm-scent condition as the reference group and compared it with the other two conditions. Thus, in the first run we compared the cool-scent condition with the warm-scent condition (independent factor) using dummy coding (cool scent: 1 = yes, 0 = no) and the control versus warm-scent code as the covariate (control condition: 1 = yes, 0 = no); in the second run, the codes were swapped (see Hayes and Preacher 2013). The results for the cool-scent versus warm-scent condition comparison as well as for the unscented control versus warm-scent comparison showed significant serial indirect effects of scent on premium purchases through estimated number of people and reported feelings of respect (mean-centered) with 95% CIs excluding 0 (for the cool- vs. warm-scent condition comparison: $a_1 \times b_1 = -.12$, 95% CI = [–.23, –.06]; for the control vs. warm-scent condition comparison: $a_1 \times b_1 = -.08$, 95% CI = [–.16, –.03]). Specifically, the analysis revealed that ambient scent predicted the estimated number of people in the store for both comparison codes (for cool- vs. warm-scent: $a_1 = -2.06$, $p < .001$; for control vs. warm-scent: $a_2 = -1.27$, $p = .001$). As we proposed in our theory and in support of H_1, participants in the cool-scent and control conditions (vs. warm-scent condition) estimated a smaller number of people in the store, indicating a social density perceptual bias. Furthermore, the analysis revealed that, consequently, the anticipated number predicted anticipated feelings of respect (i.e., power restoration motivations) through the purchased items ($d_{21} = .19$, $p < .001$), which in turn predicted premium purchases ($b_2 = .32$, $p < .001$). Thus, people in the warm-scent (vs. cool-scent and control) condition who estimated a higher number of people in the store also anticipated that the items they bought would make them feel more respected and, ultimately, they made more premium purchases. Table 1 and Figure 1 depict the results. These results support our theory regarding the mediating roles of social density perceptions and power restoration motivations in the effect of scent on purchasing behavior.

Discussion

The results from this second field study replicate the power-compensatory shopping patterns we observed in Study 2. In addition, the results from the sequential mediation analyses from the survey sample demonstrate social density perceptions and power restoration motivations as the underlying processes for the increased purchases for premium products. Next, we investigate the moderating effect of another

TABLE 1
Model Summary for the Effect of Warm Ambient Scent (vs. Cool and No Scent) on Premium Purchases Through Social Density Perceptions and Power Restoration Motivations (Study 3)

Antecedent	Social Density	Power Restoration	Premium Purchases
Cool scent	–2.06*** (.30)	–.21 (.25)	–1.86*** (.43)
Control (no scent)	–1.27** (.38)	–.26 (.30)	–.93* (.43)
Social density	—	–.19*** (.04)	.07 (.06)
Power restoration	—	—	.32*** (.08)
Constant	2.70*** (.46)	.21 (.38)	.30 (.51)
	R^2 = .20	R^2 = .08	
	F(5, 366) = 18.72	F(6, 365) = 5.27	
	$p < .001$	$p < .001$	

*$p < .05$.
**$p < .01$.
***$p < .001$.
Notes: Coefficients presented with standard errors in parentheses.

relevant in-store factor on the effects of scent on power-compensatory preferences. In Study 4, we create a scenario in which the shopper is served by either polite or rude salespeople such that the customer would feel either respected or not respected as a result of the interaction. We expect that shoppers in a cool-scented environment, who would otherwise feel powerful and thus not in need of status-enhancing purchases, but who encounter very disrespectful salespeople, will also exhibit a preference for status enhancement similar to those in the warm-scented environment. Thus, with this next study, we intend to provide additional process evidence for the power mechanism through moderation-of-process design (Spencer, Zanna, and Fong 2005) in which we manipulate both scent and interpersonal power experienced by the consumer. Importantly, we broaden the managerial relevance of our effects of scent on customer preferences by showing how scent interacts with another key retail factor: interactions with store personnel.

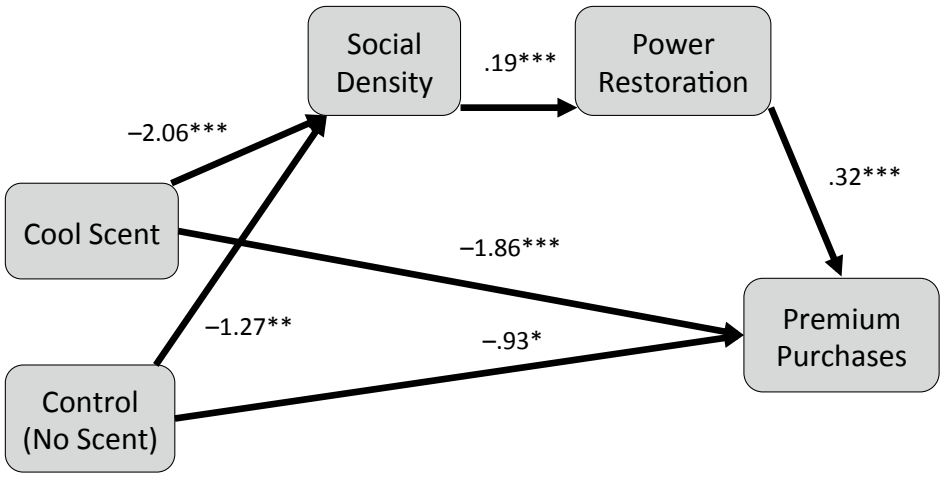
Study 4

Method

Design and participants. One hundred fifteen (60% male) undergraduate students from a large northeastern U.S. university participated in Study 4. We ran the study as a 2 (ambient scent: cool [peppermint] vs. warm [vanilla]) × 2 (salesperson: rude vs. polite) full factorial with random assignment.

Procedure. The procedure for this study was similar to that of Study 1. We conducted the study in one conference room with small groups of participants (from one to five participants per session). The warm and cool scents were emitted using an electric diffuser that contained several drops of essential oil. The diffuser was run for 15 minutes before the first session each day and then ran continuously on a low setting throughout the session. The room was aired out between sessions by allowing at least one day to pass between scent changes. In addition to the scent manipulation, we added another manipulation in the form of exposure to a scenario involving either rude or polite salespeople. We did so to determine whether we could reduce the amount of power the participants experienced in the cool condition of

FIGURE 1
The Effects of Warm Ambient Scent (vs. Cool and No Scent) on Premium Purchases Through Social Density Perceptions and Power Restoration Motivations (Study 3)



*$p < .05$.
**$p < .01$.
***$p < .001$.
Notes: The warm-scent condition is the baseline condition.

the study, which we expected would manifest in an increased power-compensatory preference. The salesperson scenarios were as follows:

Rude salesperson condition:

> Imagine now that you are shopping for an item of clothing in an upscale department store in a mall. You see something on the shelf behind the counter that you cannot reach on your own. You would like to inspect the item and need help from the salesclerks. You look at the salesclerks to get their attention. Both salesclerks see you but they choose to ignore you to carry on their own personal conversation. This goes on for some time. You say "excuse me" to get their attention, but they continue to ignore you. You wait for a few moments and eventually decide to exit that area of the store. You do not buy the item you saw because you could not get the salesclerks to do what you wanted them to do.

Polite salesperson condition:

> Imagine now that you are shopping for an item of clothing in an upscale department store in a mall. You see something on the shelf behind the counter that you cannot reach on your own. You would like to inspect the item and need help from the salesclerks. You look at the salesclerks to get their attention. Both salesclerks see you and they immediately turn to help you, stopping their own personal conversation. They ask how they can serve you and are extremely polite and helpful. You examine the item but decide to keep shopping before making a final decision. You eventually decide to exit that area of the store. Even though you do not buy the item you saw, you feel you were quite able to get the salesclerks to do what you needed them to do.

Participants were then asked how they would rate the salesclerks in this department as a manipulation check in terms of how respectful and responsive they were (on nine-point scales). Subsequently, participants were presented with the same two BMW ads as in Study 1 (i.e., a prestige-focused ad and a performance-focused ad of a BMW car). They were asked to choose the advertisements they would prefer to represent the automobile (binary choice). This measure served as our key dependent measure. Finally, participants answered questions on demographics and a hypothesis probe (no one guessed the true purpose of the study).

Results

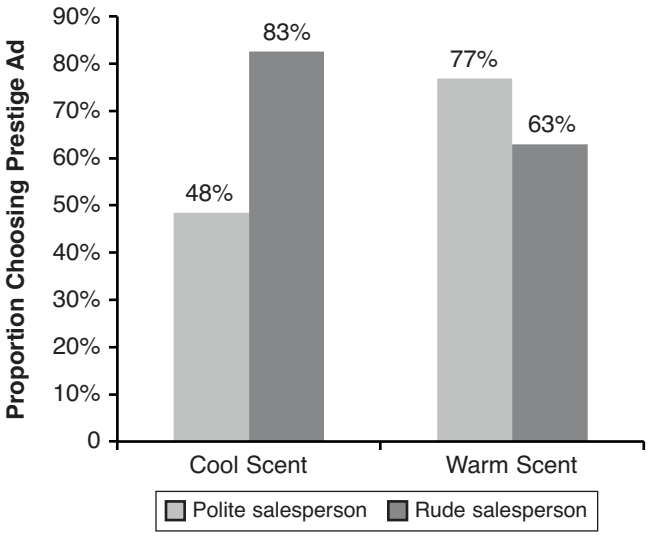
Manipulation check. We conducted an ANOVA on how respectful and responsive (items averaged; r = .88, $p < .001$) the salesclerks were in the shopping scenario as a function of scent condition (cool vs. warm), salesperson condition (rude vs. polite), and their interaction. As we expected, only salesperson condition was significant ($F(1, 111) = 726.69$, $p < .001$). Participants in the rude salesperson condition ($M_{\text{rude salesperson}} = 1.48$) were significantly less likely to agree that the salesclerks were respectful and responsive compared with those in the polite salesperson condition ($M_{\text{polite salesperson}} = 7.92$). None of the other effects were significant ($ps > .10$).

Ad preference (BMW ad). We conducted a logistic regression on advertisement choice (performance = 0, prestige = 1) as a function of ambient scent (cool = 0, warm = 1) and salesperson type (polite = 0, rude = 1). Scent was significant (b = 1.27, z = 2.16, $p < .05$), with a warm (vs. cool) ambient scent increasing participants' likelihood of choosing the prestige-focused ad. Salesperson condition was also significant (b = 1.62, z = 2.47, $p < .05$), with the context of a rude salesperson increasing participants' likelihood of choosing the prestige-focused ad. The interaction between scent condition and salesperson condition was also significant (b = –2.30, z = –2.62, $p < .01$). In support of our proposed power-compensatory mechanism, we find that people in the polite salesperson condition were significantly more likely to choose the prestige-focused ad when in the warm- (vs. cool-) scent condition ($P_{\text{warm}} = 76.9\%$ vs. $P_{\text{cool}} = 48.4\%$; effect = 1.27, z = 2.16, $p < .05$) and that participants in the cool-scent condition who experienced rude salespeople were significantly more likely to choose the prestige-focused ad ($P_{\text{polite salesperson}} = 48.4\%$ vs. $P_{\text{rude salesperson}} = 82.6\%$; effect = 1.62, z = 2.47, $p < .05$). Note that there was no significant effect of salesperson type in the warm-scent condition ($P_{\text{polite salesperson}} = 76.9\%$ vs. $P_{\text{rude salesperson}} = 62.9\%$; effect = –.68, z = –1.16, $p > .20$) and no significant effect of scent in the rude salesperson condition ($P_{\text{warm}} = 62.9\%$ vs. $P_{\text{cool}} = 82.6\%$; effect = –1.03, z = –1.58, $p > .10$; see Figure 2).

Discussion

We replicate the finding that people in the warm-scent condition prefer the prestige-focused ad. Importantly, the finding that people in the cool-scent, rude salesperson condition exhibited equivalent preferences to those in the warm-scent condition provides additional support for our underlying

FIGURE 2
The Effects of Warm (vs. Cool) Ambient Scent and Polite (vs. Rude) Salesperson on Prestige-Focused Ad Choice (Study 4)



power-compensatory motivation explanation. We had no a priori expectations regarding either the relative strength of scent versus salesperson behavior on power-compensatory motives or whether they had additive effects. We leave such exploration of the joint effects of environmental influences on shoppers' power-compensatory preferences for further research.

General Discussion

This research demonstrates that ambient scents that differ on perceived temperature (warm vs. cool scents) can systematically affect customer preferences. Both highly controlled experiments and real-world field studies show that a warm (vs. cool) ambient scent leads to perceptions of higher social density (pilot study and Study 3), power-compensatory preferences (for prestige- vs. performance-focused ads in Studies 1 and 4), increased purchasing of premium products and increased multiple-item purchases (in Studies 2 and 3), and higher overall spending in the store (in Study 3). We also demonstrate that the effect of scent on power-compensatory purchasing behavior is driven by the underlying processes of social density perceptions and power restoration motivations (Study 3). Finally, in Study 4, we show that another key retail factor, sales personnel–customer encounter, interacts with ambient scent and creates boundary conditions for the effects of scent on power-compensatory preferences.

Our findings make important theoretical contributions to several streams of research in marketing and have significant practical implications for marketing managers. Much of the previous research has focused on how scent affects attitudes, evaluation, and memory. The current effort takes a more fine-tuned approach and, to the best of our knowledge, is the first to examine how scent affects premium product shopping patterns.

Importantly, the present research contributes to a better understanding of an important, associative-based, underlying process that drives scent effects. Prior researchers have often relied on a simple stimulus-organism-response model to explain scent effects on consumer behavior (Morrin 2010). In this article, we move beyond such an approach and demonstrate that perceptual processes involving social density can elicit clear and predictable effects on buyer behavior. These findings might help explain why, in previous studies, researchers have not always observed strictly positive effects of pleasant scents on approach behavior, as suggested by the stimulus-organism-response model. The current findings demonstrate that scent can affect behavior through cognitive rather than affective routes, which is consistent with other scent research (Chebat and Michon 2003; Krishna, Elder, and Caldara 2010; Morrin and Chebat 2005). However, in our article we find that scent-based semantic congruency is not necessary for these cognitive processes to operate, as previous research has suggested (Krishna, Elder, and Caldara 2010). Therefore, we have identified a more generalizable effect of scent on behavior and a new perceptual mechanism underlying the outcomes. In addition, although spatial perception and social density in particular are important factors for in-store behavior, limited research has delved beyond evaluative effects and into actual patterns of purchasing behavior. The current research responds to the call for greater exploration and knowledge on the downstream effects of spatial perceptions in retail (Krishna 2008; Machleit, Eroglu, and Mantel 2000).

Likewise, this article contributes to multisensory research by demonstrating the effect of the sense of smell on the sense of vision through spatial perceptions. To the best of our knowledge, this is the first research to show how something we smell in the environment can affect how we feel about the space surrounding us. We show that scents can produce not only multisensory enhancement (e.g., as previously shown with effects of congruent scents on touch perception; Krishna, Elder, and Caldara 2010) but also a multisensory interference. Specifically, scents can significantly bias spatial perceptions of social density, effectively interfering with accurate visual perception. As such, our work contributes to the limited research on sensory synesthesia in the consumer behavior literature. Increasing interest in synesthesia in the field of psychology is evident in recent work demonstrating, for example, color associations for days and letters (Rouw et al. 2014) and spatial associations from numbers (Jonas et al. 2014); yet to date synesthesia has attracted little marketing research attention. The results we report here suggest that there is an opportunity to make both theoretical and managerial contributions by exploring such possibilities. Furthermore, despite the recent upsurge of interest in synesthesia among psychologists, little progress has been made in terms of identifying underlying process mechanisms for such effects (Rouw and Ridderinkhof 2014). Shopper behavior would seem to provide an ideal testing ground to better understand the drivers of such multisensory perceptual processes.

This article also carries several important managerial implications. Our findings provide practitioners with concrete insights on how different categories of scents work, and they can ultimately be translated into specific guidance for retailers' strategy. For example, a retailer can easily manipulate social density perceptions with a subtle and relatively inexpensive application of ambient scenting in the store environment, and such scents can systematically shape consumer preferences and choices consistent with the retailer's goals and strategy. More specifically, our results suggest that using a warm scent in stores that sell mixed-quality products may drive sales toward premium products. Although this strategy might seem at odds with the common strategy of luxury retail stores to appear cold and spacious, results from our final study indicate that in cool-scented environments, other retailer actions (e.g., salesperson encounters) can activate power-compensatory behaviors and premium purchases. In Study 4, participants in the cool-scent condition who encountered a rude and disrespectful salesperson demonstrated a prestige-focused preference. These findings are consistent with recent work on retail service that shows that rejection by a salesperson leads to higher preference for luxury (but not mainstream) brands (Ward and Dahl 2014). Although in the real world, salespeople in luxury stores are not necessarily rude or dis-

respectful, it is a common stereotype that they often treat customers in a condescending and impolite way (Ward and Dahl 2014). Our results suggest that this rudeness might lead consumers to seek status through their product choices, and thus, our lab results corroborate the real-world strategy of luxury retailers. However, because our results suggest that applying a warm scent in the store can have a similar effect, a luxury retailer might be more successful and positively viewed by a wider range of consumers if warm scents are applied in the store. Extensions of the results reported here could also explore the effect of scent on customers' expectations of power as compared with their experience of power (Rucker, Hu, and Galinsky 2014). For example, if customers high on trait-level power enter luxury stores focused on expectations of power, warm (vs. cool) ambient scents might have quite different effects from those demonstrated here (Rucker, Hu, and Galinsky 2014).

Future studies could explore other moderating factors that we believe might influence the effect of ambient scent on customer behavior, such as personal space standards. Specifically, personal space standards can vary across cultures. We might expect that in individualist cultures, perceptions of high social density might have a stronger effect on power, whereas in collectivist cultures, the effect might be weaker or nonsignificant. Future research could also explore other potential moderators such as store type (e.g., discount vs. high-end store) or store popularity as alternative means of restoring power in natural settings. Many research directions can extend the present findings and contribute to further exploration of the phenomenon introduced in this article.

APPENDIX
Study 1 and Study 4: Ad Stimuli

A: Performance-Focused Ad

B: Prestige-Focused Ad

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