THE COOL SCENT OF POWER: EFFECTS OF AMBIENT SCENT ON CONSUMER PREFERENCES AND CHOICE BEHAVIOR

by

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A dissertation submitted to the Graduate Faculty in Business in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York

2013

This manuscript has been read and accepted for the
Graduate Faculty in Business in satisfaction of the
dissertation requirement for the degree of Doctor of Philosophy.

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Abstract

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The present research examines the effects of ambient scents that differ on perceived temperature on spatial perceptions of social density, and subsequent scent effects on product preference and choice. I demonstrate that a warm (vs. cold) scent activates the concept of warmth (vs. coldness) and as a result people perceive the environment around them as more (vs. less) socially dense. Subsequently, I build on recent research on power in consumer behavior, and show that ambient scent affects perceived sense of power through the scent-based density perceptions which ultimately leads to power-compensatory consumption behavior. Specifically, I show that in a warm-scent and perceptually more socially dense (vs. cold-scent and perceptually less dense) environment people experience greater (vs. lesser) need for power exhibited through higher willingness-to-pay for high-status products, higher evaluation of prestige- vs. performance-focused ads, greater desire for choice, and increased purchases of luxury brands.

ACKNOWLEDGEMENTS

My journey in the PhD program at Baruch College, CUNY, has been one of the most rewarding and extraordinary experiences that would not have been possible without the enormous support and help from my family, friends and colleagues.

I would like to thank my advisor and the chair of this dissertation, Lauren Block, as well as the dissertation committee members, Stephen Gould, Sankar Sen and Mimi Morrin, for their support and guidance throughout my time in the doctoral program and the dissertation process. I am very grateful to the marketing faculty members (present and former), to the members of the PhD Office and the Baruch College administration for their help and assistance through my five years in the program. In particular, I would like to express my gratitude to Leon Schiffman, Thomas Kramer, Pragya Mathur, Sajesh Sajesh, Mahima Hada, Gloria Thomas, Andy Grein, Nermin Eyugoblu, Eleonora Curlo, Charles Gengler, Kapil Bawa, Hammou Elbarmi, Ronald Neath, Joseph Weintrop, Leslie De Jesus, and Michael Eccles. I would also like to thank my present and former fellow doctoral students and dear friends: Keith, Beth, Bruno, Ozge, Marina, Ranya, Yoshiko, Lauren, Rhonda, Zoe, and Danny.

Last but not least, I would like to thank my amazing family for their unconditional support and unlimited patience, for always being there for me and believing in me. This accomplishment would not have been possible without their love, understanding and enormous support.

Thank you all for accompanying me during this unforgettable journey.

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INTRODUCTION

Consumers increasingly express a desire for more intense and fuller sensory experiences that stimulate and satisfy all five senses (Lazarus 2010). Over the last decade, marketers have realized this need and have moved from predominantly relying on visual and auditory stimulation to fully engaging consumers' senses of smell, touch and taste (Lazarus 2010; Lindstrom 2005). Companies have entered a new era of sensory marketing in which efforts evolve around employing sensory-enhancing techniques in an attempt to create the multisensory experience that consumers seek (Krishna 2010; Lazarus 2010; Lindstrom 2005). This new trend has placed more focus and importance on the sense of smell and in the past few years, companies have heavily invested in scent marketing, i.e. in using scents to influence the consumer experience (Lindstrom 2005; Morrin 2010; Vlahos 2007).

The Scent Marketing Institute has estimated that about $80 million was spent on scent marketing in 2006 and that this amount will increase more than six times and surpassing $500 million in the next four years (Vlahos 2007). Most of it is allocated to applying ambient scents in the service environment where specially designed scents are pumped through the air-conditioning systems (Vlahos 2007). The marketplace has become a more fragranced world than ever and unique ambient scents are emitted in almost every place that you can imagine: retail stores (e.g., Thomas Pink, Jimmy Choo, Sony), hotels (e.g., Sheraton, Marriott), and banks (e.g., Credit Suisse Bank; Lindstrom 2005; Vlahos 2007).

Practitioners justify this extensive application of ambient scents with the notion that after an exhaustive use of visual and auditory stimulation in the consumer environment, scents are the

only sensory tool left that still carries wide and unexplored opportunities (Vlahos 2007). This intuition is supported by some distinguishable characteristics of the sense of smell over the other senses; like the fact that the sense of smell is our most direct and basic sense that cannot be easily turned off (Herz 2010; Vlahos 2007). Although in general, people do not pay much attention to scents in the environment, ambient scents are hard to escape which potentially makes them subtle but powerful influencers (Herz 2010; Lindstrom 2005). In fact, just recently new groundbreaking research from neuroscience found that the human body has hundreds of receptors for scents (while we only have three for vision; Buck 2005). Therefore, our bodies are very well-equipped to process scent information, and knowingly or not we are able to detect and distinguish between over 10,000 different scents and remember them over a long period of time (Buck 2005; Morrin 2010). Given this astonishing value of the sense of smell, it is not surprising that marketers place so much commercial promise on ambient scents. However, very few of managers' intuitions about how scents specifically affect consumer behavior are supported by empirical evidence. Consumer research has yet to establish the systematic role that ambient scents play in shaping consumer behavior.

Although recently scents have generated increased attention and effort from consumer psychologists as part of the broader area of sensory research, the sense of smell is still a relatively underresearched sense in consumer behavior (Krishna 2012; Morrin 2010). Consistent with the new findings on scent from neuroscience, consumer research has established robust effects of scents on memory for product and brand information (Krishna 2011; Lwin et al. 2010; Morrin et al. 2011). However, in other areas, findings are still mixed and a systematic and generalized knowledge on scent effects is limited (Krishna 2012; Morrin 2010). For instance, in research on ambient scents, which is the most prevalent, studies demonstrate that pleasant scents

lead to more positive general evaluations of the store and its products (Morrin 2010). However, it is still not well-established what the underlying processes for these effects are and whether scents can lead to affective influences or work through more cognitive routes (Bosmans 2006; Mattila and Wirtz 2001; Morrin and Ratneshwar 2003). Importantly, consumer research has not yet moved beyond an investigation of the general evaluative effects of scents and into adoption of alternative theoretical frameworks that explain the positive effect of pleasant scents on consumer approach behavior in the store. Importantly, with the exception of one study (Mitchell, Kahn, and Knasko 1995) there is no work that examines whether and how ambient scents shape consumers' consumption patterns (e.g., preferences and choice behavior). In addition, extant research has placed pleasant scents into one broad category despite the fact that there are different varieties or types of pleasant scents that practitioners use in the store (Morrin 2010). Research has not established yet the effects of generalized categories of scents on consumer preferences and choice behavior.

In the present research, I take a more fine-tuned approach to studying the effects of ambient scents on consumer behavior by examining the systematic effects of scents that differ on semantic meaning. Extant research has established that scents can be categorized based on the semantic meaning that they carry and can activate and increase accessibility of semantic concepts which ultimately leads to concept-consistent thoughts and behavior (Holland, Hendricks, and Aarts 2005; Krishna, Elder, and Caldara 2010). One such categorization that is widely accepted and used in both theory and practice is based on the temperature dimension where scents are categorized as warm or cold based on the strong temperature associations that they evoke (e.g., warm scents are vanilla and cinnamon while cold scents are peppermint and eucalyptus; Herz 2009; Krishna et al. 2010a). In this paper, I build on these findings and

demonstrate that scents that differ on perceived temperature systematically affect consumer preferences and choice behavior through the process of producing a spatial bias in social density perceptions. Social density is defined as the perception of number of people in a limited space (Hui and Bateson 1991).

Across four experiments and one field study I demonstrate that a warm (vs. cold) scent activates the concept of warmth (coldness) and as a result people perceive the environment around them as more (less) socially dense (e.g., greater physical and social proximity between people, lesser spaciousness of the room, and greater number of people present). Subsequently, these biased social density perceptions lead people in the warm (vs. cold) scent to experience less power and as a result to adopt a power-compensatory consumption behavior. Specifically, in a warm (vs. cold) scented environment people are willing to pay higher price for high-status products, value prestige qualities of products more positively, seek more choice and purchase more luxury brands.

The present research will provide important theoretical contributions to scent research by demonstrating systematic effects of scent categorization on consumption patterns like preference, choice and purchasing patterns; previous research has been limited to general approach behavior variables like time spent in the store and overall dollar amount spent. In addition, previous research has not established what scent characteristics or scent categories based on these characteristics can systematically lead to effects on consumption, independent of context and scent salience. Importantly, the present paper identifies a new perceptual process (social density) as a mechanism for the scent effects on consumer behavior. By doing so, this research also contributes to the literature on spatial perception by showing for the first time that stimuli

perceived by our sense of smell (scents) can affect perception in our visual sense. In addition, this research contributes to consumer research on power by identifying an antecedent factor of power in the consumer context, namely ambient scent. Previous consumer research on power has mainly explored consequences of power in consumption context but not potential antecedent factors in the consumer environment that can produce such consequential effects.

The findings from the present research also promise to have wide practical and managerial applications. Specifically, with the demonstrated effects of scent on social density perception (an important retail factor; Hui and Bateson 1991), the present research can provide managers with specific guidance on how these spatial perceptions can be manipulated, when needed, by using ambient scents in the store environment. Importantly, by identifying systematic, context-independent effects of scent on consumption patterns, this research provides more strategic insight on how ambient stimuli can shape specific consumer behavior like preference and choice.

THEORETICAL BACKGROUND

Scent Research in Consumer Behavior

Marketers have increasingly recognized the potential role of scents for brand differentiation and promotion (Lindstrom 2005; Morrin 2010). In the marketplace, scents are regarded either as product-specific scents (i.e., as a property of the product) or as ambient scents (i.e., as a property of the marketplace environment; Bosmans 2006). In the past decade, the greatest growth in scent marketing has been in the use of ambient scents (Morrin 2010). Companies' interest in ambient scents has also been accompanied by technological advances in scent applications that allow for a diverse scent selection and usage (Bosmans 2006). A larger number and variety of retailers (e.g., Bloomingdales, the Omni Hotels, Credit Suisse Banks) continuously apply scents in their environments with the notion that ambient scent can distinguish the brand (e.g., signature scents) and create positive consumer mood states and evaluations (Krishna 2011; Morrin 2010).

Similar to practitioners, consumer psychologists have exhibited a parallel interest in scent over the last decade with most of research focused on ambient scents (Morrin 2010). Consumer research on both product-specific scent and ambient scent has demonstrated robust effects of scent on memory (Krishna Lwin, and Morrin 2010; Morrin and Ratneshwar 2000, 2003). Both product-specific and ambient pleasant scents have been found to significantly improve memory for brand and product information through the process of increased attention or cognitive

associations (Krishna et al. 2010b; Morrin and Ratneshwar 2000, 2003). For example, Morrin and Ratneshwar (2000, 2003) demonstrate that pleasant ambient scents improve recall and recognition for familiar and unfamiliar brands and that these effects are driven by increased attention (i.e. time spent evaluating the brands). Krishna, Lwin, and Morrin (2010) extend this work further by demonstrating that product scent is more effective than ambient scent because product scent possesses contextual distinctiveness and increases the number of more specific, product/scent-related associations stored in memory (Krishna et al. 2010b). These recent studies present consistent findings on the effects of scent on memory and their underlying processes. However, the remaining part of scent research which looks mostly at ambient scent effects on consumers' perceptions, evaluations and behavior does not always offer such clear view (Morrin 2010). Most scent studies are filled with mixed findings and suggest that sensory research is only beginning to understand the complex nature of the scent effects and the processes that drive them (Krishna 2010).

Consumer studies on ambient scent have primarily examined the effect of scent valence (e.g., pleasantness) and have demonstrated that under certain conditions pleasant ambient scents can positively affect product and store evaluations, consumer spending and variety-seeking behavior (Bosmans 2006; Herrmann et al. 2012; Mitchell et al. 1995; Morrin and Chebat 2005; Spangenberg, Crowley and Henderson 1996; Spangengberg, Grohmann and Sprott 2005; Spangenberg et al. 2006). Most studies on ambient scent use the theoretical framework of the S-O-R model (Stimulus-Organism-Response) which is also used to describe effects of other environmental factors such as color and music (Mehrabian and Russell 1974; Morrin 2010). According to that model a pleasant scent (vs. unpleasant or no scent; S) should affect the

consumer by eliciting more positive evaluations (O) which should ultimately lead to an approach (avoidance) response (R; Morrin 2010).

Some consumer studies have shown that pleasant scents can improve consumer perceptions and evaluations of the store and its products, and subsequently lead to approach behavior (e.g., intentions to visit, spending; Spangenberg et al. 1996; Morrin 2010). However, other studies do not replicate these positive effects of pleasant scents; in addition, it is not clear what the underlying processes for these effects are when they exist (Herrmann et al. 2012; Morrin 2010). Contrary to most common practitioners' intuition that pleasant scents attract consumers through a mood mechanism (i.e., via pleasure or arousal), empirical results suggest this does not always happen (Bone and Ellen 1999; Morrin 2010). Although some studies show effects of scent through mood (Mattila and Wirtz 2001), other consumer studies do not find any scent effects on pleasure or arousal levels but instead demonstrate more cognitive mechanisms are at play (Bone and Ellen 1999; Chebat and Michon 2003; Morrin and Chebat 2005). Research is still in the process of understanding the exact mechanisms for scents' evaluative effects (Morrin 2010).

Recent research in consumer behavior argues that the semantic nature of scents is a key factor in explaining the presence or absence of scent effects on consumer perceptions and evaluations (Krishna et al. 2010a). Extant research has concluded that scents carry common semantic associations learned through repeated exposure to different smells in different contexts (Krishna et al. 2010a). Associations may be formed between scents and other sensory information (e.g., chocolate taste and chocolate scent) as well as semantic and episodic knowledge by means of co-occurrence (e.g., citrus scent and cleaning; Holland et al. 2005).

Research has demonstrated that upon exposure and experience of scents, semantic associations can become activated, leading to increased mental accessibility of related concepts (Holland et al. 2005; Mitchell et al. 1995). Thus, when the ambient scent is congruent with the product category, the scent increases the accessibility of attitudes, memories and information about the product leading to greater elaboration and inferences (e.g., floral ambient scent and floral arrangements; Mitchell et al. 1995). These processes in turn lead to more positive evaluations of the products and approach behavior. For instance, studies have shown that a masculine (feminine) ambient scent lead to increased positive evaluations, intentions to visit and higher spending in a men's (women's) section of the store (Spangenberg et al. 2006). Therefore, some of the research defines scents' semantic congruency as a necessary condition for the positive effects of pleasant scents on evaluations and approach behavior (Spangenberg et al. 2006; Spangenberg et al. 2005).

However, scent congruency can be challenged from a practical point of view because the correct thematically congruent scent in a specific shopping environment is not always obvious and could be difficult to ascertain (Elder et al. 2010; Herz 2010). For example, for some store environments that sell scent-literal products (e.g., coffee in coffee shops, bread in bakeries), the choice of congruent scent could be straightforward, however the majority of retail environments sell products that do not have obviously translatable scents (Herz 2010). In addition, ambient scent usage is not limited to consumer products environments but also to service environments (e.g., hotels, hospitals, airport lounges).

Importantly, existent research also demonstrates that even non-congruent pleasant scents can produce positive effects on perceptions and evaluations (Bosmans 2006; Herrmann et al.

2012; Morrin and Ratneshwar 2003). For instance, Bosmans (2006) demonstrates that incongruent pleasant scents can be effective when they are not made salient and when people have low processing motivation. Similarly, simple vs. complex pleasant scents, although non-congruent, can boost spending because of increased general processing fluency (Herrmann et al. 2012). Therefore, although the literature agrees that the semantic nature of scents is central to their influence, research has yet to identify and establish other mechanisms besides scent congruency and fluency that explain the effects of scents on perception and behavior (Morrin 2010).

Recent work on scent suggests that moving beyond evaluation-mediated theoretical framework might contribute to more clear understanding of how scents work (Herrmann et al. 2012; Morrin 2010). Future research should also be directed towards a broader exploration of scents that goes beyond dependency on contextual factors like scent congruency and salience (Herrmann et al. 2012; Herz 2010; Morrin 2010). In addition, scent research has rarely considered the characteristics of the scent and has not examined how and which characteristics affect consumers in ways that are meaningful to marketing practitioners (Herrmann et al. 2012). Most of existent studies look at pleasant scents either as one broad category or as very narrow categories based on contextual congruency. This lack of generalized scent categorization might be one of the reasons why studies do not replicate the positive effects of pleasant scents. Building a more unified theory of scent effects on consumer behavior might be possible through establishing the systematic effects of generalized scent categories on consumer perceptions. Importantly, such approach might be a necessary initial step towards understanding the underlying mechanisms of scent influences and answering the ultimate question of how ambient scents shape patterns of consumption behavior; something that research has not yet established

(Mitchell et al. 1996). Most of the research on scent reports effects of scent on attitudes and intentions rather than effects on purchase behavior and consumption patterns like choice and preference (Herrmann et al. 2012).

In the present paper, I contribute to filling these gaps in the scent literature by exploring the influence of more broadly defined semantic categories of pleasant scents on actual preference and choice behavior, and by identifying a new perceptual process as a driver of scent effects on behavior. I take a more fine-tuned approach to studying pleasant ambient scents and specifically explore the effect of scents that differ on the temperature dimension. I demonstrate that through the process of social density perceptions, this scent category can systematically bias consumer behavior towards power-compensatory patterns of consumption.

Warm and Cold Scents

Research has shown that certain scents are strongly associated with general concepts like cleanness, masculinity, and temperature and upon exposure evoke semantic associations that lead to concept-related judgment and behavior (Holland et al. 2005; Krishna et al. 2010a). Research has established that scents can be categorized based on the semantic associations they evoke and one such categorization that is widely accepted and used in both theory and practice is based on the temperature dimension (Herz 2009; Scent Air). Specifically, some scents are categorized as warm, like vanilla and cinnamon while others are cold scents, like peppermint and eucalyptus (Herz 2009; Krishna et al. 2010a). Most of these scents also have a tactile quality and can

produce a physiological cooling or warming sensation (Herz 2009); because of this quality they have been extensively used in temperature contexts and over time people have learned to strongly associate these scents with temperature. Scent research suggests that most of the time the chemical nature of the scent itself (e.g., its tactile quality) plays a secondary role in the subjective experience as a result of the scent, thus, it is the meaning of the scent (or the associations that it evokes) that induces the consequent psychological or physiological reaction to it (Herz 2009).

Recent sensory research has established that scents can influence perception in other modalities through the semantic associations they evoke. Specifically for scents that differ on the temperature dimension, recent studies have shown that these scents can affect tactile perception such that for example a scent cue can enhance the effect of a tactile cue through semantic transfer (Krishna et al. 2010a). Krishna and colleagues (2010a) demonstrate such multisensory enhancement (Spence 2002) of smell on touch and show that gel-packs infused with cold scents (vs. warm scents) were evaluated as more effective for cooling (vs. warming) participants' hands. The authors posit that the semantic congruency of the two cues (the olfactory and the tactile) lead to the enhancement effect (Krishna et al. 2010a). These results also suggest that the semantic information from the smell was incorporated and inputted in the evaluation of the tactile information.

In the present paper, I build on these previous findings and propose that semantic information from the smell can also be used as an input for judgment of visual information, importantly without the necessary condition of semantic congruency. I built on research on 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) and examine ambient scent as previously unexplored such cue. Research argues that a sensory cue can be used in spatial judgment given its perceived diagnosticity when it is a controlled and conscious source of information but also given its mere accessibility when judgments are automatic (Raghubir 2010). In the present paper I build on these findings and posit that warm and cold scents' semantic associations with temperature will be incorporated into the spatial perception of social density. In order to arrive at my specific propositions, I build on extant research from social cognition and general psychology on the relationship between temperature and spatial proximity.

Temperature and Social Density

Extant research has established that there exists a very strong bi-directional correlation 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; Williams, Huang, and Bargh 2009). Particularly in the physical world, warm (vs. cold) temperatures are associated with physical proximity (vs. distance). For instance, high human density, i.e., an increased number of people in a limited space, can increase ambient temperature (Michon et al. 2005). The opposite is also true: close physical proximity to another person leads to increased physical warmth (e.g., being held makes you warmer; Williams et al. 2009). However, studies have also shown that sitting in close physical proximity to another person (without actual touch) can increase perceived ambient temperature even if actual temperature does not change (Ijzerman and Semin 2010). Importantly, research also shows that physically

manipulated temperature can bias perceptions of physical proximity. For example, studies have shown that an actual warm (vs. cold) 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 paper, I build on and extend these findings by proposing that semantically primed temperature through warm (cold) ambient scent will produce similar effects on perceptions of proximity (distance). I propose that the temperature associations that warm and cold scents evoke upon exposure to them will be used as an input for judgment of social density perceptions. More specifically, I propose that a warm (vs. cold) ambient scent will lead to perceptions of greater physical proximity (distance) between people, of greater number of people present and of lesser space, ultimately biasing social density judgments. Specifically, one cue that people use to form their judgment of social density is spatial proximity (Eroglu and Machleit 1990). This perception is correlated with the other two factors that form social density judgments, namely overall spaciousness of the environment and number of people in it, such that in a limited space, greater proximity between people leads to perceptions of less spaciousness and overall to perceptions of a more socially dense environment in terms of number of people present (Eroglu and Machleit 1990). Thus, I posit that the scent temperature cue will bias perceptions of social density such that a warm (vs. cold) ambient scent will lead to overall perceptions of more socially dense environment. Formally stated:

H1: People in a warm (vs. cold) ambient scent environment will perceive it as more (vs. less) socially dense. This effect will be mediated by the temperature associations evoked by the scents.

The proposed effect of ambient scent on perceptions of social density is important in its own right as it brings further understanding of how the sense of smell can influence perceptions in other modalities. To the best of my knowledge, this is the first research that demonstrates that what we smell in the environment can affect how we see and feel about space, thus contributing to both sensory and spatial research. Although consumer research has established that knowledge on spatial biases is particularly relevant and has important implications for atmospherics perceptions, store design and layout decisions, consumer studies are still in the beginning of such investigations (Krishna 2008). Thus, the current work contributes to this line of research by identifying a new sensory factor (ambient scent) which can produce spatial biases.

In addition, consumer studies have demonstrated that social density as a more specific spatial perception can significantly affect in-store consumer experiences (Hui and Bateson 1991; Machleit, Eroglu, and Powell Mantel 2000). For instance, social density or perceived crowding has been shown to influence approach behavior, and satisfaction from the shopping experience (Hui and Bateson 1991; Machleit et al. 2000). Importantly, research has established that perceived control is a crucial mediating factor driving these effects (Van Rompay et al. 2008). Specifically, increased social density is shown to decrease the perceived control people experience over their social environment (Hui and Bateson 1991; Machleit et al. 2000). High social density involves an element of social interference and related perceptions that

circumstances are largely influenced by others, and that others are more in control (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). Although consumer research on social density has looked into its effects on general approach behavior (e.g., time spent in the store), this line of research has not specifically explored how changes in perceived control or power, as a result of the social density perceptions, affect more specific buying behavior like consumer preferences and choices.

In the present research I undertake such investigation and particularly examine how scent-based perceptions of social density affect experienced power and subsequent consumption behavior. Specifically, I propose that in a warm (vs. cold) ambient scent environment people will perceive it as more socially dense and in turn will experience less power (perceived control) which will ultimately lead to power-compensatory consumption patterns. Below, I review recent literature on power in consumer behavior from which I derive my propositions.

Power in Consumer Behavior

Power as a social construct has traditionally been defined as "asymmetric control over valued resources in social relations" and as such, typically involves a comparison, interaction, and a relative state of dependence between two or more parties (Rucker et al. 2012). Some research makes the distinction between social power and personal power, where social power is defined as power over others, or the ability of a person to influence others and exercise control

over them (e.g., a manager has power over his employees), while personal power is defined as freedom from others, or the ability to ignore the influences of others, to control one's own outcomes, and to be personally independent (Rucker et al. 2012). However, both types correlate with a more general sense of power and research has shown that the psychological experience of power does not have to stem from a particular basis, nor does it have to be activated with respect to the social or personal subcomponents (Rucker et al. 2012). Rather, because of its pervasiveness, individuals can feel a general sense of more or less power due to numerous factors and manipulations in everyday life (e.g., even from simple cognitive priming or physical embodiment; Rucker et al. 2012). For example, power can stem from structural factors such as hierarchical roles in society (Galinsky, Gruenfeld, and Magee 2003), from cognitive factors such as episodic recall of moments of experienced power, semantic priming with powerful/powerless words (Smith and Trope 2006), or from physical factors like expansive body postures or positions (Carney, Cuddy, and Yap 2010). Consistent with this research, as previously shown in consumer studies on atmospherics, sense of power, termed as "perceived control" in that literature, can be influenced by social density as well (Hui and Batteson 1991).

Importantly, experienced state of general power can significantly shape people's thinking and behavior (Rucker et al. 2012). Specifically, in a state of high power, the individual places a greater weight and value on the self and his goals, and in turn experiences higher perceived (illusionary) control and independence from others (Rucker et al. 2012). On the other hand, in a state of low power, the individual is more sensitive and considerate of others and experiences more empathy and dependence towards them (Rucker et al. 2012).

Although abundant research on power exists in the psychology literature that demonstrates pervasive effects of power on many aspects of human behavior, research on power has just started to examine this construct in consumer behavior context. Existing studies are beginning to demonstrate how experienced sense of power can significantly influence consumption patterns, or how consumers shop and what they value (e.g., types of products; Rucker et al. 2012). For instance, studies shows that powerlessness is generally an aversive state that people seek to change by restoring power, and one way to do this in a consumption context is through power-compensatory consumption patterns (Rucker et al. 2012). One such pattern is acquiring and displaying status-related products (Rucker and Galinsky 2008). For example, Rucker and Galinsky (2008) demonstrate that power-induced differences through episodic recall significantly affected consumers' willingness to pay for products as a function of status such that low-power (vs. high-power) participants were willing to pay more for status-associated products but there were no differences for products not associated with status. In addition, research also shows that choice and power, as constructs both rooted in the personal sense of control, are substitutable (Inesi et al. 2011). Thus, when people experience lower sense of power, one way to restore power and compensate is through more choice (Inesi et al. 2011). For example, Inesi and colleagues (2011) demonstrate that when people are in a lowered state of power they prefer larger assortments of products, indicating desire for more choice. Power is also shown to influence what type of products consumers value in terms of products' ability to satisfy specific consumer goals and needs (Rucker et al. 2012). For example, Rucker and Galinsky (2009) demonstrate that people in a high-power state evaluate products advertised in terms of their performance (vs. status) more favorably because such products would benefit them as individuals directly.

Building on these findings from consumer research on power, I propose that sense of power stemming from the scent-based social density perceptions will produce similar effects on consumption patterns. Specifically, I propose that in a warm (vs. cold) scent environment people will feel more socially dense and as a result less powerful, which will be exhibited through power-compensatory consumption patterns (e.g., higher willingness-to-pay for high-status products, and choice of larger assortments). In addition, I propose that perceptions of high vs. low social density will lead to power-compensatory consumption patterns through the mediating process of experienced sense of power. Formally stated:

H2: Warm vs. cold scent will lead to higher willingness-to-pay for high-status products. This effect will be mediated by social density perceptions. There will be no effect of scent on willingness-to-pay for low-status products.

H3: Warm vs. cold scent will lead to higher evaluation of prestige-focused vs. performance focused ads. This effect will be mediated by social density perceptions.

H4: Warm vs. cold scent will lead to higher preference for larger (vs. smaller) assortments. This effect will be mediated by social density perceptions.

H5: High vs. low social density perceptions will lead to higher evaluation of prestige-focused vs. performance focused ads and higher preference for larger (vs. smaller) assortments. These effects will be mediated by experienced sense of power.

OVERVIEW OF STUDIES

I first conducted a pretest study (pretest) to determine the choice of warm and cold scents for the main studies. I pretested three warm and three cold scents, previously used in the literature. The results from the pretest showed that peppermint was perceived as the coldest scent and both cinnamon and vanilla were perceived as the warmest scents. Since the first one of these two warm scents differed in familiarity (vanilla) compared to the other warm scent (cinnamon) and to the cold scent (peppermint), in the first two main studies and in the field experiment, I use cinnamon as the warm scent (studies 1, 2 and 5), in the third study (study 3) I use vanilla as the warm scent, in all studies the cold scent is peppermint.

In study 1, I find support for the proposition that warm (vs. cold) ambient scent activates associations with temperature (warmth). In addition, in this study I demonstrate the indirect effect of scent on social density perceptions through the temperature associations, thus supporting H1. Specifically, I show that associations of the scent with warmth mediate the effect of scent on perceptions of how full the room is and on how tight the space is. In addition, I demonstrate that scent does not affect reported state of happiness and arousal as alternative explanation for the proposed effects of scent on social density.

In study 2 I replicate the findings from study 1 on social density perceptions, in a more spatially controlled environment when the scent is not made salient. I also find support for H2: the results show that a warm (vs. cold) scent leads to higher willingness-to-pay for high-status products but not for low-status products and that these effects are mediated by perceptions of social density.

In study 3, I replicate the findings from study 2 on social density with a different warm scent (vanilla). In addition I also find support for H3 and H4. The results demonstrate that people in the warm (vs. cold) scent condition reported higher evaluations (choice, preference, and perceived effectiveness) of ads describing the products in terms of their prestige (vs. performance) qualities, and preference for larger (vs. smaller) product assortments. In addition, these effects of scent on ad evaluations and assortment choice were mediated by perceptions of social density (e.g., perceived physical distance between people).

In study 4, I find more direct support for the proposition that perceptions of social density lead to power compensatory consumption patterns through the sense of power, thus confirming H5. The results demonstrate that perceptions of a more socially dense environment lead to higher evaluations of prestige- (vs. performance-) focused ads and preference for more choice, and that these effects are mediated by experienced lower sense of power.

In study 5 (field study), I add more ecological validity to the findings from the previous experiments and demonstrate the effects of warm and cold scents on actual consumption behavior in a retail environment. Specifically, the results show that in a warm- (vs. cold) scented retail store people purchase more luxury brands, and fewer gifts – patterns consistent with a power-compensatory consumption behavior.

The theoretical model is depicted in figure 1.

PRETEST

Subjects and Procedure

In order to select the warm and the cold scents for the main studies, I conducted a pretest (N = 33) among undergraduates from a large northeastern university. Following a procedure similar to the one used by Krishna and colleagues (Krishna et al. 2010a), I tested 6 different essential oils, three of which I expected people to perceive as warm scents and three as cold scents. For the warm scents, I chose warm vanilla sugar, cinnamon pumpkin, and spice; for the cold scents, I chose eucalyptus-spearmint, peppermint, and winter wonderland. Four of these scents have previously been shown to differ on the temperature dimension (e.g., peppermint, eucalyptus-spearmint, warm vanilla sugar, and cinnamon; Herz 2009, Krishna et al. 2010a). Exactly two drops of each essential oil were placed onto a cotton ball that was left in a sealed zip-lock bag for 12 hours before the experiment. The scents were identified by randomly assigned letters (A through F), and were randomly presented to participants one scent at a time. Respondents were asked to open each zip-locked bag and sniff the cotton ball inside. Participants were first asked to identify each scent (i.e., "It smells to me like___"), and then to evaluate it on several 7-point semantic differential scales, including temperature (smells like a cold scent/smells like a warm scent), liking (dislike scent a lot/like scent a lot), and familiarity (unfamiliar/familiar). Liking and familiarity are two factors most often evaluated when examining scent (hedonic) perception (Herz 2010), thus it was important to include them in the pretest.

Results

Of the six scents, pumpkin cinnamon ($M_{cinnamon} = 4.55$) and warm vanilla sugar ($M_{vanilla} = 4.61$) were rated as the warmest, and peppermint was rated as the coldest ($M_{peppermint} = 3.06$; figure 2). Peppermint, warm vanilla, and pumpkin cinnamon were equally liked ($p > .10$). Previous research suggests that the most important dimension in human judgment of scents is the hedonic one (Morrin and Ratneshwar 2003), therefore the fact that the three scents were equally liked is particularly important. Vanilla was rated as more familiar than pumpkin cinnamon and peppermint ($ps < .05$) while peppermint and cinnamon were equally familiar ($ps > .10$; figure 3). Thus, for the first two main studies (study 1 and 2) and the field experiment, I selected pumpkin cinnamon as the warm scent and peppermint as the cold scent. The two selected scents were significantly different on the temperature dimension ($M_{cinnamon} = 4.55$, $M_{peppermint} = 3.06$, $t(33) = 4.22$, $p < .000$). In the third main study (study 3), I used vanilla as the warm scent and peppermint as the cold scent. The two selected scents for the third study (study 3) were significantly different on the temperature dimension ($M_{vanilla} = 4.61$, $M_{peppermint} = 3.06$, $t(33) = 3.68$, $p < .001$).

STUDY 1

In this study, I explore whether the presence of an ambient warm (vs. cold) scent will activate associations with warmth (vs. coldness) and how these activated associations will lead to biased perceptions of social density. Thus, I test for H1 and expect that a warm (vs. cold) scent will lead to perceptions of greater social density and that associations of the scent with warmth (vs. coldness) will mediate this effect.

Method

Design and subjects. Thirty-eight (21 male and 17 female) undergraduate business students from a large Northeastern university participated in a study that was run as a single factor (ambient scent: cold vs. warm) between-subjects design. Based on the results from the pretest, for the warm scent I used cinnamon, and for the cold scent I used peppermint.

Procedure. Upon entering the classroom, participants were informed they would be asked to give their opinion about different store environments. The investigator informed the participants that before they start the paper-and-pencil questionnaire, she would spray the room with scent spray.

First, participants were asked a question about the air environment in the room (i.e., "How ventilated do you think the room is?"; 7-point scale, 1 = not at all, 7 = very). Next, participants answered questions about the scent: "Do you notice any smell in the room right now?" (yes, no). Participants evaluated the scent on pleasantness, familiarity, and intensity (i.e., "Please, evaluate the scent in the room on the following?"; pleasant, familiar, intense,; 7-point scale, 1 = not at all, 7 = very). Next, participants were asked to indicate the associations of the scent with temperature (i.e., "Please indicate how much you associate the scent with the following adjectives?; warm, cold; 5-point scales, 1 = not at all, 5 = extremely). Then, for about 10 minutes, participants completed an unrelated filler task. After the filler task the investigator sprayed the room once again. Participants answered whether they noticed the smell at the moment and evaluated their thermal state or how warm and cold they felt (i.e., "Please, read each adjective and indicate to what extent each one applies to how you feel right now?: warm, cold"; 5-point scales, 1 = not at all, 5 = extremely).

Next, participants completed Mehrabian and Russell's Pleasure and Arousal scales: two six-item, 8-point semantic differentials (i.e.; "Each pair of words below describes a feeling dimension. Please indicate how each pair describes your feelings at the moment."). The items in the Pleasure scale were unhappy/happy, annoyed/pleased, unsatisfied/satisfied, depressed/contented, bored/relaxed and despairing/hopeful (e.g. -4 = unhappy, 4 = happy); the items in the Arousal scale were relaxed/stimulated, calm/excited, sluggish/frenzied, dull/jittery, wide sleepy/awake and unaroused/aroused.

Next, participants answered questions on perceptions of social density with two measures which have been used in the literature to capture perceived social density (Hui and Bateson

1991): spaciousness (i.e., “How tight do you feel the space around you is?”), and number of people present (i.e., “How full of people does this room seem to you?”), 7-point scales from 1 = not at all to 7 = very. Finally, participants answered two questions on demographics (i.e., gender and age).

Results

Scent perceptions. The vast majority of the participants reported that they noticed the smell (97.4.9 %, N = 37). There were no significant differences between conditions on how ventilated the room was perceived ($p > .10$). Across conditions, both the cold and the warm scent were perceived equal on intensity ($M_c = 4.80$ vs. $M_w = 4.94$; $F < 1$), pleasantness ($M_c = 3.35$ vs. $M_w = 3.12$; $F < 1$), and familiarity ($M_c = 4.70$ vs. $M_w = 3.70$; $p > .10$).

An ANOVA with ambient scent as a between-subjects factor revealed a significant main effect on associations of the scent such that participants in the warm-scent condition reported associating the scent more with warm than participants in the cold-scent condition ($M_w = 2.75$ vs. $M_c = 1.89$; $F(1, 36) = 8.02$, $p < .01$; figure 4). There were no significant differences on associations of the scents with cold (Fs < 1) and the two associations (with warm and cold) were not highly correlated ($r = -.166$, $p > .10$).

Perceived state: temperature, pleasure and arousal. An ANOVA with ambient scent as a between-subjects factor revealed a significant main effect on participants perceived thermal state such that in the warm-scent condition people reported feeling warmer, and less cold than people in the cold-scent condition (for warm: $M_w = 2.95$ vs. $M_c = 2.22$; $F(1, 36) = 3.92$, $p < .05$; for cold: $M_w = 1.80$ vs. $M_c = 2.67$; $F(1, 36) = 3.92$, $p < .05$). The two items were highly correlated ($r = -.359$, $p < .05$); the cold measure was reverse coded and combined with the warm measure to form an index of perceived thermal state (higher score indicating warmer thermal state). People in the warm-scent condition scored higher on the index than participants in the cold-scent condition ($M_w = 3.58$ vs. $M_c = 2.78$; $F(1, 36) = 6.06$, $p < .05$; figure 5). Neither the Arousal nor the Pleasure indexes affected any of the effects when entered as covariates.

Results for the Pleasure and Arousal scales were recoded so that 8 represented the highest score on pleasure/arousal and 1 represented the lowest (e.g. 8 = happy, 1 = unhappy; 8 = excited, 1 = calm). The Cronbach's alpha for the Pleasure scale was $\alpha = .95$, and for the Arousal scale was $\alpha = .72$. Ambient scent did not have a significant effect on the Pleasure or Arousal dimensions (Fs < 1).

Social density perceptions. The measures of room fullness and space tightness were highly correlated ($r = .313$, $p < .05$) and combined to form an index of social density. There were no significant main effects of scent on the index of social density or on the two measures individually (Fs < 1). Thus, scent did not directly affect perceptions of social density. However, mediation analysis revealed the scent affected these spatial perceptions indirectly through the mediation of associations of the scent with warm. A bias corrected bootstrap 95% CI indicated

that the indirect effect of ambient scent on perception of social density was significant (a_1 x b_1 = .29, 95% CI [.08, .88]). Associations of the scent with warm mediated the effect of ambient scent on perceptions of social density such that people in the warm-scent (vs. cold-scent) condition reported greater associations of the scent with warm and also reported perceptions of greater social density, demonstrated by positive coefficients and a confidence interval excluding zero (figure 6). The effect remained significant even after controlling for arousal (a_1 x b_1 = .28, 95% CI [.04, .73]). There was no indirect effect of scent on social density perceptions through the combined index of perceived thermal state (a_1 x b_1 = .17, 95% CI [-.06, .70]).

Discussion

In study 1, I confirmed that the warm (vs. cold) scent lead to associations of warmth; however the scents did not differ on associations with coldness. This result can be due to the fact that the question about associations of warm were immediately followed by the question of associations with cold, thus we asked about temperature associations with two separate questions always following the same order. This might have lead participants to ignore the second question (about cold) which is also supported by the fact that associations with warm and cold were not correlated as they should be if participants have answered the second question carefully.

Associations of the scent with warm mediated the effect of scent on perceptions of social density partially supporting H1. Particularly, in the warm (vs. cold) condition, people associated the scent more with warm, and these associations lead to perceptions of greater social density.

Thus, in this study we have preliminary evidence that warm vs. cold scent activates the concept of warmth and that this concept leads to biased social density perceptions. Importantly, consistent with the scent literature, the results indicate that it is the semantic associations and not the perceptions of thermal state that lead to the effects of scent on social density perceptions (Herz 2009). In addition, perceived states of pleasure or arousal were not affected by the scent and did not mediate the effects of scent on social density perceptions. Thus, I have ruled out these alternative explanations.

The procedure used in study 1 has several limitations. First, the scent was made salient and the results might have created demand effects. Asking participants about temperature and then social density might have facilitated their biased spatial perceptions since temperature and social density are very strongly associated in people's minds. This can also be one reason why I did not find any direct effects of scent on social density: making the relationship between temperature and social density so obvious might have lead participants to intentionally change their responses. Thus, in the next studies I address this limitation, and measure social density perceptions without cuing people in by asking about temperature associations first. Unlike in study 1, in the next studies, the scent is not made salient and specific attention is not drawn to its presence in the room as it would be in a more realistic setting in the store.

The second limitation of study 1 has to do with the setting and the fact that spatial factors like distance between participants, and whether each participant had a person on their left or right side, were not strictly controlled for. The study was done in a classroom, where I had two different conditions with approximately the same number of people in each (18 in the cold-scent condition vs. 20 in the warm-scent condition) and approximately the same distance between

participants controlled by the position of the desks and chairs. However, these spatial factors were not included in the analysis of the social density perceptions. Thus, in the next studies I address these limitations by physically controlling for these spatial factors and by also including them as covariates in the analysis.

STUDY 2

In this study, the effects of warm vs. cold scents on perceptions of social density are explored, as are the effects on downstream power-compensatory consumption patterns (i.e., willingness to pay for high-status products; Rucker and Galinsky 2008). In this study, I test for H1, and expect that a warm (vs. cold) scent will create perceptions of greater social density, measured by reported perceptions of greater number of people present and a smaller overall space. In addition, in this study I test for H2, and expect that a warm (vs. cold) scent will lead to a higher willingness-to-pay for high-status products. It is further expected that scent will impact consumers' willingness-to-pay for high-status products via its effects on social density perceptions.

Method

Design and subjects. One hundred and thirteen (56 male and 57 female; 61.9 % of age 21 and below, 36.3% of age 22-32, and 1.8% of age 33 - 43) undergraduate business students from a large Northeastern university participated in a study that was run as a single factor (ambient scent: cold vs. warm) between-subjects design. Based on the results from the pretest, for the warm scent I used cinnamon, and for the cold scent I used peppermint.

Procedure. I followed the procedure used by Morrin and Ratneshwar (2000; 2003) and used an electric diffuser to emit the ambient scent in the room atmosphere. In both conditions exactly 10 drops of the appropriate essential oil had been placed on the diffuser filter and exactly 15 min of diffusion time was allowed to elapse before the beginning of the first session. In order to keep the scent intensity as constant as possible, the experimenter refilled the filter with 5 drops after every couple of hours of the sessions. The diffuser was hidden behind a cardboard partition in a corner of the room so that it would not be noticed by participants. None of the participants demonstrated in any way any suspicion of the existence of the diffuser. The diffuser emitted the scent quietly and continuously during the experiment sessions thus we addressed the limitation of saliency from study 1.

Participants completed the survey in groups of approximately nine people. The same room was used for all groups. Each participant was seated in front of an individual computer and started the online survey at approximately the same time. The distance between every two participants was approximately the same. Thus, we addressed the limitation of controlling for spatial factors from study 1.

First, participants answered questions on perceptions of social density, namely perceived number of people present in the room (i.e., “Does it seem there are a lot of people around you right now?”) and spaciousness (i.e., “How spacious do you think this room is?”; 7-point scales from 1 = not at all to 7 = very). Next, participants indicated whether there was a person on their right and left side respectively (i.e., “Please, take a look around you and tell us if there is a person on your left/right side”, 1 = yes, 2 = no) which served as control spatial measures. And finally, participants were asked to give an estimate of the number of people in the room (i.e.,

"Please, take a look around you and tell us how many people are in the room right now excluding the experimenter, if present?"). The actual number of people present in the room was also recorded in each session and this measure served as a control spatial variable in the analysis of the social density perceptions.

Next, I followed a procedure by Rucker and Galinsky (2008) and presented participants with an online bidding scenario that asked them to indicate their willingness-to-pay for high-status and low-status products (i.e., "In the next task we are interested in consumers' bidding for products in different contexts. We want to understand the type of reserve prices that consumers set in online auctions (e.g., eBay). In this task we will ask you to indicate what percentage of the price you are willing to pay for several products."). Participants saw a list of ten products, half of which previous research suggests are strongly associated with status (i.e., high-status products: silk tie, executive pen, fur coat, brief case, cuff links) and half of which are weakly associated with status (i.e., low-status products: minivan, washer, dryer, ballpoint pen, sofa; Rucker and Galinsky 2008). Participants were asked to indicate their willingness to pay for the featured products on a sliding scale from 0 to 100 % (i.e., "Please, tell us what percentage of the price you are willing to pay for the following products?"). The chosen product-status association is not necessarily linked to price, i.e., an executive pen is a non-expensive but strongly associated with status item while a washer is an expensive but weakly associated with status item. This task provided a measure of one's power-compensatory consumption pattern and an indirect measure of need for power.

Finally, participants were asked questions about the scent that intentionally came at the end, in order to preempt any demand effects on the main dependent variables. Participants were

asked whether and what (if any) scent they noticed: “Did you notice any smell in the room when you first came in?” (yes, no), and “What smell did you notice” (open-ended question); “Do you notice any smell in the room right now?” (yes, no) and “What smell do you notice?” (open-ended question). At the very end, participants answered demographic questions on gender and age group, and were asked to “share their thoughts about the purpose of the study in a sentence or two” (open-ended question). No one guessed the hypothesis regarding scent temperature, and so we do not consider this further.

Results

Scent perceptions. Approximately half of the participants reported that they remembered noticing a smell when they first came in (46 %, N = 52; note that this question was asked at the very end of the survey so participants had to rely on memory). Approximately half of the participants indicated they noticed any smell at the end of the survey (55.8 %, N = 63). There were no significant differences between conditions on how many participants reported noticing the scent at the beginning or at the end of the survey (*p*s > .10). Only 13 % of the participants in the cold scent condition correctly identified the scent as “peppermint”; and only 24 % of the participants in the warm scent condition correctly identified the scent as “cinnamon”. This is consistent with previous findings which demonstrate that people are often poor at identifying scents correctly (Herz 2009).

Spatial control variables. Although for most of the time the number of people in each session was held the same across conditions, there were slight variations due to limited participation in some study groups. There was a marginally significant difference across conditions on the average number of people present in each group; more in the cold- vs. the warm-scent condition ($M_c = 8.08$ vs. $M_w = 7.60$; $F(1, 111) = 3.59$, $p = .08$). Therefore, I used the record of actual number of people taking the survey at each point of time to create a control variable "Actual Number of People" which I later included as a covariate in the analysis of social density perceptions. Two more spatial covariates were included in this analysis: "Person on the left side" and "Person on the right side". There were no significant differences across conditions on these variables (ps $> .10$). However, having these spatial covariates in the analysis controlled for possible effects due to actual rather than perceived density in the room.

Social density perceptions. Social density perceptions were measured with two scale items on perceived number of people and spaciousness. Perceived number of people was measured with the item "Do you think there are a lot of people around you right now?". An ANOVA with ambient scent as a between-subjects factor and three covariates (Person on the Right Side, Person on the Left Side and Actual Number of People) revealed a significant main effect on perceived number of people such that participants in the cold-scent condition thought there were fewer people around them than participants in the warm-scent condition ($M_c = 3.37$ vs. $M_w = 4.02$; $F(1, 108) = 4.01$, $p < .05$). Of the covariates, only Actual Number of People was

significant ($F(1, 108) = 8.94$, $p < .01$) such that the higher the actual number of people, the more participants thought there were a lot of people around them.

Spaciousness was measured with the item "How spacious do you think this room is?" An ANOVA with ambient scent as a between-subjects factor and three covariates (Person on the Right Side, Person on the Left Side and Actual Number of People) revealed a significant main effect on perceived spaciousness such that participants in the cold-scent condition evaluated the room as more spacious than participants in the warm-scent condition ($M_c = 3.43$ vs. $M_w = 2.85$; $F(1, 108) = 4.75$, $p < .05$). None of the covariates were significant ($p > .10$) and taking them out of the analysis did not change the significance of the effect of scent on spaciousness.

The two items on perceived number of people and spaciousness were highly correlated ($r = -.479$), thus they were combined to form a measure of social density (the measure of spaciousness was reverse-coded). An ANOVA 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) revealed a significant main effect on social density such that participants in the cold-scent condition thought the room was less socially dense than participants in the warm-scent condition ($M_c = 3.97$ vs. $M_w = 4.59$; $F(1, 108) = 5.99$, $p < .05$; figure 7). 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 perceptions of social density. Taking the covariates out of the analysis did not change the significance of the effect.

An additional measure of social density was also created (Biased estimated number of people) by subtracting the actual number of people present in the room from the estimated number of people that people indicated. An ANOVA with ambient scent as a between-subjects

factor revealed a significant main effect on biased estimated number of people such that participants in the cold-scent condition underestimated the number of people in the room (M_c = -1.18 vs. M_w = .14 ; $F(1, 111) = 18.86$, $p < .001$). When the covariates Person on the Right Side and Person on the Left Side were entered in the above analysis, the main effect of scent on biased estimated number of people was still significant (M_c = -1.13 vs. M_w =.11; $F(1, 109) = 16.47$, $p < .001$).

Willingness- to-pay. A factor analysis of the ten product items with varimax rotation produced three factors that explained 77 % of the variance. Three of the five low-status products (washer, dryer, and sofa) loaded on the first factor; four of the five high-status products (silk tie, executive pen, brief case, and cuff links) and one of the low-status product (ballpoint pen) loaded on the second factor. One of the high-status products, fur coat, and one of the low-status products, minivan loaded on the third factor. Based on this factor analysis, the items ballpoint pen, fur coat and minivan were excluded from the future analysis. The rest of the items that loaded as expected were aggregated to create a high-status product type category consistent of four products (executive pen, briefcase, cuff links, and silk tie), with a mean value for willingness to pay for high-status products (Cronbach's alpha α = .86; $M_{\text{high-status products}}$ = 33.43, SD = 26.41), and a low-status product type category consistent of consistent of three products (washer, dryer, and sofa), and a mean value for willingness to pay for low-status products (α=.89; $M_{\text{low-status products}}$ = 52.22, SD = 27.89).

In order to establish how scent affected willingness-to pay for high- and low-status products, I conducted a 2 (scent: cold vs. warm) x 2 (product type: low-status vs. high-status)

mixed-model ANOVA analysis with repeated measures on the product type factor. There was a main effect of scent such that people in the warm (vs. cold) scent condition were willing to pay a higher price for the products regardless of type ($M_{\text{warm-scent}} = 46.93$ vs. $M_{\text{cold-scent}} = 37.65$; $F(2, 111) = 4.54$, $p < .05$). There was a main effect of product type such that participants indicated higher willingness-to-pay for low-status vs. high-status products ($M_{\text{low-status}} = 52.22$ vs. $M_{\text{high-status}} = 33.43$; $F(2, 111) = 51.64$, $p < .001$); a result consistent with previously found effects in the literature and explained by the fact that low-status products were also necessities thus a higher percentage of the their price is more justifiable (Rucker and Galinsky 2008). The interaction between scent and product type was not significant ($F(2, 111) = .14$, $p > .10$). However, deconstructing the effect by product type revealed that for high-status products there was a significant effect of scent on willingness-to-pay such that people in the warm vs. cold scent condition were willing to pay higher price for high-status products ($M_{\text{warm-scent}} = 37.98$ vs. $M_{\text{cold-scent}} = 27.70$; $F(2, 111) = 4.35$, $p < .05$). For low-status products there was no difference on willingness-to-pay between the warm and the cold scent conditions ($M_{\text{warm-scent}} = 55.89$ vs. $M_{\text{cold-scent}} = 47.59$; $F(2, 111) = 2.50$, $p > .10$). The results are depicted in figure 8.

Mediation analysis: social density as a mediator for willingness to pay for high-status products. A bias corrected bootstrap analysis, using 5,000 samples, indicated a significant indirect effect of ambient scent on willingness to pay for high-status products via perceptions of social density (mean-centered) with a 95% CI excluding 0 (a_1 x $b_1 = 2.27$, 95% CI [.15, 6.70]). Thus, social density perceptions mediated the effect of scent on willingness-to-pay for high-status products such that in the warm (vs. cold) scent condition people reported greater social

density and in turn higher willingness-to-pay for high-status products. The same analysis was performed for willingness-to-pay for low-status products. Results showed that perceptions of social density did not mediate the effect of scent on willingness to pay for low-status products with or without the three covariates as 95% CI included 0 (a_1 x b_1 = 1.43, 95% CI [-.61, 5.43]). The results are presented in figure 9.

Discussion

The results from this study replicated the effect of scent on social density perceptions that we observed in study 1, even when the scent was not made salient to the participants and even when spatial factors (e.g., actual number of people) were controlled for. The results showed that people in the warm (vs. cold) scent condition perceived the environment around them as more socially dense, as indicated by subjective perceptions of lesser spaciousness and greater number of people present. Importantly, the scent manipulation biased the more objective estimation of number of people such that even though in reality on average there were slightly more people present in the cold-scent condition than in the warm-scent condition (M_c = 8.08 vs. M_w = 7.60; $F(1, 111) = 3.59$, $p = .08$), participants in the cold-scent condition gave a lower estimated number thus underestimating how many people were in the room. In addition, a probe into how participants judged spaciousness of the room revealed that the social rather than the architectural elements of the environment are taken into consideration when making this judgment. Specifically, when asked how they decided on spaciousness of the room, participants indicated they used the length of the walls (58%, N = 66), and the number of people in the room (53%, N

= 60), but most people used the distance between the people to rate spaciousness (70%, N = 79). These results suggest that the physical distance between people might be a stronger indicator of social density than the number of people or even the size of the room, measured by the walls length. Importantly, results indicate that the non-social elements in the room were not such a common tool to rate spaciousness (13%, N = 15 used the number of windows, and 30%, N = 34 used the number of computers). These results suggest that participants' focus was mostly on the social elements of the environment and also that the results for social density cannot be contributed to non-social clutter in the room (e.g., from more furniture).

The results from this study also supported H2 by demonstrating that people in the warm (vs. cold) scent condition indicated higher willingness-to-pay for high-status products (but not for low-status products) and that this effect was mediated by social density perceptions. Thus, we have a preliminary indication that ambient scent can lead to at least one form of power-compensatory consumption patterns through the spatial bias that it creates. There were no significant differences in the willingness-to-pay for low-status products, which confirms that sense of power is the process driving these results.

In addition, it should be noted that there were no interactions between the scent salience and temperature manipulation on any of the dependent variables. This is particularly important since it demonstrates that the biasing effect of warm and cold scents is not contingent on whether or not the scent is salient and noticeable by participants.

In the next study (study 3), I aim at replicating the effects of scent that differ on the temperature dimension on perceptions of social density but this time with a different warm scent, vanilla, as per the results from the pretest. In addition, in study 3, I test for H3 and H4 or that a

warm (vs. cold) scent leads to additional power-compensatory consumption patterns like higher evaluations of prestige- (vs. performance-) focused ads, and choice of larger assortments, and that these effects are mediated by the social density perceptions.

STUDY 3

Method

Design and subjects. Sixty-six (34 male and 32 female; 63.6% of age 21 and below, 36.4% of age 22-32) undergraduate business students from a large Northeastern university participated in a study that was run as a single factor (ambient scent: cold vs. warm) between-subjects design. The warm scent was vanilla, and the cold scent was peppermint.

Procedure. Similar procedure to the one in study 2 was used with some changes in the questionnaire described below. Participants first answered questions on social density (i.e., "How close do you feel to the person next to you in terms of physical space between you?") and control questions on whether there was a person on their right and left side respectively. Then, participants were asked to give a quick estimate of the number of people in the room (i.e., "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)."). The actual number of people present at any given session was recorded by the experimenter and served as a control variable in the analysis of social density perceptions.

Next, in order to examine power-compensatory consumption patterns, ad evaluations measures were administered. Participants were presented with a scenario in which they were

asked to evaluate two ads, a prestige-focused ad and a performance-focused ad. I followed a procedure similar to that of Rucker and Galinsky (2009) where two ads for the same luxury product (i.e., a BMW car; Appendix A) are created that only differ in their selling strategy. In the first ad, a soft-sell strategy is used such that the ad focus is on the status the product conveys to others while in the hard-sell strategy the ad focus is on the performance value the product offers to the individual (Rucker and Galinsky 2009). Specifically, participants were told to imagine that they work for an ad agency and have to evaluate two ads. Both ads were exactly the same, presenting a picture of a BMW car, and only differed in the slogan they displayed. The tagline for the prestige-focused advertisement read "Prestige. It's yours!". In contrast, the tagline for the performance-focused ad read "Experience a smooth ride". Participants were asked to indicate their preferred choice of either ad (i.e., "Which ad do you prefer to choose?"; 9-point scale, 1= prefer to choose ad A, 9= prefer to choose ad B), which ad they liked more and which ad was more effective (i.e., "Which ad do you like more?"; "Which ad do you think is more effective?"; 9-point scales, 1= like ad A/think ad A is more effective , 9= like ad A/think ad A is more effective). A higher number indicated more positive evaluation of the prestige-focused vs. the performance-focused ad.

Next, participants were presented with a second measure of power-compensatory consumption pattern, assortment choice. I followed a procedure by Inesi and colleagues (Inesi et al. 2011) and presented participants with a scenario in which they had to indicate their preferred choice from a small or a large product assortment. They were shown two pictures of chips assortments, one with 3 products and the other with 15 (Appendix A), and were asked to indicate their choice of assortment ("Consider these two assortments of chips. Please, indicate which assortment you prefer to choose from"; 1 = strongly prefer assortment, 9 = strongly prefer

assortment 2; Inesi et al. 2011). A higher score indicated preference for the larger vs. the smaller assortment. At the end, participants answered the same questions as in study 2 on scent perceptions, demographics and a probe question. As in study 2, no one guessed anything regarding the hypotheses.

Results

Scent perceptions. Approximately half of the participants reported that they remembered noticing a smell when they first came in (57.6 %, N=38). The majority of the participants indicated they noticed any smell at the end of the survey (78.8 %, N=52). There were no significant differences between conditions on how many participants reported noticing the scent at the beginning or at the end of the survey (*p*s > .10). Approximately 15 % of the participants in the cold scent condition correctly identified the scent as "peppermint"; and approximately 21% of the participants in the warm scent condition correctly identified the scent as "vanilla".

Spatial control variables. The same three spatial covariates were used from study 2 (Person on the left/right side and Actual number of people). The only significant differences between the two conditions were on the actual number of people present in the room such that on average there were more people present in any single group in the cold than in the warm scent condition ($M_c = 7.76$ vs. $M_w = 7.03$; $F(1, 64) = 79.45$, $p < .001$).

Social density perceptions. Social density was measured with the item "How close do you feel to the person next to you in terms of space between you?". An ANOVA with ambient scent as a between-subjects factor revealed a significant main effect on social density such that participants in the warm-scent condition reported feeling physically closer to the person next to them than participants in the cold-scent condition ($M_w = 3.64$ vs. $M_c = 2.94$; $F(1, 64) = 4.52$, $p < .05$). Including the three spatial covariates (Person on the Right Side, Person on the Left Side and Actual Number of People) did not change the effect. The results are depicted in figure 10.

As in study 2, I created a more objective variable to measure perceptions of social density (Biased estimated number of people) by subtracting the actual number of people present in the room from the estimated number of people that people indicated. An ANOVA with ambient scent as a between-subjects factor revealed a marginally significant main effect on biased estimated number of people such that participants in the cold-scent condition underestimated the number of people in the room while participants in the warm-scent condition overestimated it ($M_c = .24$ vs. $M_w = -.18$ vs.; $F(1, 64) = 3.23$, $p = .08$).

Ad evaluations. The three items of preferred choice, liking and perceived effectiveness of the ad were highly correlated (preferred choice and liking, $r = .781$, $p < .001$; preferred choice and perceived effectiveness, $r = .689$, $p < .001$, perceived effectiveness and liking $r = .777$, $p < .001$) and were combined to form an index of ad evaluations ($\alpha = .90$). The direct effects of scent on the individual items of the index of ad evaluations were not significant (Fs < 1). However,

there was a significant indirect effect of scent on ad evaluations through social density perceptions.

A bias corrected bootstrap analysis, using 5,000 samples, indicated a significant indirect effect of ambient scent on the ad evaluation index via perceptions of social density (mean-centered) with a 95% CI excluding 0 (a_1 x b_1 = .44, 95% CI [.07, 1.10]). The results are depicted in figure 11. Social density perceptions mediated the effect of scent on ad evaluations such that in the warm (vs. cold) scent condition people reported greater social density and in turn higher evaluations of the prestige-focused ad. Social density also mediated the effects of scent on the individual measures of preferred choice, and liking of the ads (for preferred choice: a_1 x b_1 = .63, 95% CI [.13, 1.48]; for liking a_1 x b_1 = .36, 95% CI [.02, 1.02]).

Assortment choice. The direct effect of scent on assortment choice was not significant (p > .10). However, there was a significant indirect effect of scent on assortment choice through social density perceptions. A bias corrected bootstrap analysis, using 5,000 samples, indicated a significant indirect effect of ambient scent on assortment choice via perceptions of social density (mean-centered) with a 95% CI excluding 0 (a_1 x b_1 = .40, 95% CI [.05, .97]). Social density perceptions mediated the effect of scent on assortment choice such that in the warm (vs. cold) scent condition people reported greater social density and in turn greater preference for the large product assortment. The results are depicted in figure 12.

Discussion

Study 3 served the purpose of replicating the effects of ambient scent on perceived social density with a different warm scent, and also of presenting additional evidence that ambient scent can bias consumption patterns in a power-compensatory direction. In study 3, I once again found support for H1 and showed that ambient scent affected perceived social density: people in the warm- (vs. cold-) scent condition felt physically closer to the person next to them. As per the results in study 2, physical distance between people is the most commonly used way of judging spaciousness or social density of the room, and here in study 3 we see that ambient scent indeed biased this judgment. Importantly, the scent-based spatial bias existed even when actual social density was in the opposite direction. In other words, although in reality there were more people present on average in the cold-scent than in the warm-scent condition, participants still judged social density lower in the cold-scent condition. Thus, in study 3, I demonstrated that the scent-based spatial bias is not attenuated by physical factor in the environment (i.e., actual number of people present).

The results from study 3 also presented additional evidence that scent can lead to consumption patterns in a power-compensatory fashion via the spatial bias of social density that it creates. Although there was no direct effect of scent on evaluations of prestige-focused vs. performance-focused ads and on assortment choice, the results showed that scent affected these variables indirectly through the social density perceptions. The results demonstrated that people in the warm-scent (vs. cold-scent) condition, indicated more preferred choice, liking, and perceived effectiveness for the prestige-focused (vs. the performance-focused) ad, and they also preferred the larger (vs. smaller) assortment of product options. These effects were mediated by

perceptions of higher (vs. lower) social density in the warm- (vs. cold-) scent condition. These consumption patterns are an indication of power-compensatory behavior in which people value prestige qualities of products higher as these qualities serve the purpose of restoring power (Rucker and Galinsky 2009). Preference for more choice also indicates a need to restore power which can be satisfied by having more options available to choose from (Inesi et al. 2011). Importantly, the results showed that social density perceptions are the process through which ambient scent lead to this power-compensatory behavior.

The purpose of the next study is to provide a more direct support for the power mechanism linking social density perceptions to the power-compensatory patterns we observed in studies 2 and 3. In study 4, I seek to find support for H5 and demonstrate that perceptions of high social density lead to power-compensatory patterns through the mediating role of decreased sense of power. Previous research has shown that sense of power driven by physical antecedents (vs. cognitive) is more likely to influence non-conscious experience of power (Huang et al. 2011). Therefore, since I particularly examine power resultant from perceptions of physical factors (e.g., social density), I do not expect social density perceptions to produce effects on consciously experienced power but rather on subliminally experienced sense of power.

STUDY 4

Method

Design and subjects. Sixty-three (31 male and 32 female; 6.3% of age 21 and below, 47.6% of age 22-32, 27% of age 33-43, 14.3 % of age 44-54, and 4.8% of age 55-65) participants from an online panel (Amazon Mechanical Turk) completed a study online that was run as a single factor (social density: high vs. low) between-subjects design. All participants were at least 18-years-old, were located in the United States and received a monetary compensation for their time.

Procedure. In this study, pictures of a store were used in order to manipulate social density perceptions. The literature on social density has established that picture manipulations have ecological validity in testing social density theories, thus I used a procedure similar to the ones from this literature (Hui and Batteson 1992). The pictures in the two social density conditions were identical (same camera angel) and only differed in the number of people present in the store (4 people in the low-density condition and 8 people in the high-density condition; Appendix B). Participants were asked to "take a few minutes to observe the picture" and imagine they were in this store. The text below the pictures in the high-density (low-density) condition read: "The store is packed (pretty empty) with people. There are (aren't) a lot of people around you. People are standing very close to you (far from you). There isn't much (is a lot of) space

around you. There are (aren't) a lot of people for the size of the store and the space is limited (vast)." Participants were asked to: "try to really imagine how that must feel" and to "describe in a couple of sentences, how you are feeling at the moment, in this crowded (spacious) store. Try to use as much detail as possible." This open-ended question in an essay format served as a reinforcement for the picture manipulation of social density. Then, participants were asked to indicate how they were feeling at the moment using four-item, 9-point semantic differentials: open/restrained, crowded/ uncrowded, annoyed/pleased, and calm/excited. The first two items served as a check for the social density manipulation, the third item measured experienced pleasure and the fourth item, arousal.

Next, I measured implicit activation of power with a word-completion task which is frequently used to measure implicit activation of a construct, including that of power (Huang et al. 2011). Participants were instructed to complete five word fragments (i.e., that could be completed as power (lower), king (kind), strong (string), command (commend), and rich (rice) with "the first word that comes to mind" and were given 40 seconds. Each completed word received a score of 1, if it was related to power, or a score of 0, if it was not related to power (e.g., completing "l_ad" as lead = 1, but completing it as load = 0). The number of power-related words generated served as a measure of implicit activation of power such that a higher number of completed power-related words would indicate more active construct of power or higher implicit sense of power experienced (Huang et al. 2011).

Next, participants were asked to imagine that they were still in the crowded (spacious) store on the picture and while there they saw two ads. Participants were presented with a similar ad evaluation scenario as in study 3; however, the two ads were for a different luxury product,

Parker pens (Rucker and Galinsky 2009). The tagline of the prestige-focused ad read "A Wonderful Display of your Status to all those around you." In addition, the ad copy discussed how the product was ''designed to impress" and ''commands respect from others." In contrast, the tagline of the performance-focused ad read "A Wonderful Instrument for Performance whenever you need it." Furthermore, the ad copy stated that the product was "designed for quality," and "provided consistency and quality" (Appendix C). Participants were asked to rate their preferred choice, liking, and perceived effectiveness of the ads (9-point scales, 1 = the prestige-focused ad, 9 = the performance-focused ad; these were reverse-coded for the analysis).

Next, participants were presented with an assortment choice scenario (Rucker, Dubois, and Galinsky 2011). They were asked to imagine they were buying some chocolates (Hershey's kisses) and were provided with six varieties from which they could select any number at a cost $0.01 per chocolate. The varieties were: Almonds, Airdelight, Dark, Caramel, Meltway Center, and Hugs (see Appendix C for a picture of the varieties). I was interested to see how many different varieties participants will choose rather than in the total amount of chocolate chosen. The total number of varieties selected served as the dependent measure indicating choice.

After an unrelated filler task, participants indicated their liking and familiarity with Hershey's kisses (7-point scales, 1 = not at all, 7 = very) which served as control variables for the variety choice.

Next, participants filled out the Personal Sense of Power Scale which measures individual differences in chronic personal sense of power (Anderson, Oliver, and Keltner 2011). The scale measures generally perceived sense of power that individuals feel they have in their social dyadic relationships and in social groups (8-item, 7-point scale; 1=strongly disagree,

7=strongly agree); example items include: “In my relationship with others: I can get people to listen to what I say, I think I have a great deal of power, If I want to, I get to make the decisions”. Reliability for the scale using Cronbach’s alpha was .94. At the end, participants answered questions on demographics and a probe question (no one guessed anything regarding the hypotheses).

Results

Manipulation check. An ANOVA with social density as a between-subjects factor revealed a significant main effect on perceptions of social density such that participants in the high-density condition reported feeling more restrained (vs. open) and more crowded (vs. uncrowded) than participants in the low-density condition (for restrained: $M_{\text{high density}} = 7.34$ vs. $M_{\text{low density}} = 2.03$; $F(1, 61) = 147.12$, $p < .001$; for crowded: $M_{\text{high density}} = 8.28$ vs. $M_{\text{low density}} = 1.52$; $F(1, 61) = 498.35$, $p < .001$). The two items were highly correlated ($r = .885$, $p < .001$) and were combined to form an index of social density perceptions. An ANOVA with social density as a between-subjects factor revealed a significant main effect on perceptions of social density such that participants in the high-density condition reported feeling more socially dense than participants in the low-density condition ($M_{\text{high density}} = 7.81$ vs. $M_{\text{low density}} = 1.77$; $F(1, 61) = 347$, $p < .001$).

Pleasure and arousal. An ANOVA with social density as a between-subjects factor revealed a significant main effect on reported pleasure such that participants in the low-density condition reported feeling more pleased (vs. annoyed) than participants in the high-density condition ($M_{\text{low density}} = 7.16$ vs. $M_{\text{high density}} = 2.44$; $F(1, 61) = 83.70$, $p < .001$). An ANOVA with social density as a between-subjects factor revealed a significant main effect on reported arousal such that participants in the high-density condition reported feeling more excited (vs. calm) than participants in the low-density condition ($M_{\text{high density}} = 5.81$ vs. $M_{\text{low density}} = 3.74$; $F(1, 61) = 11.60$, $p < .001$).

Implicit activation of power. An ANOVA with social density as a between-subjects factor revealed a significant main effect on the number of power-related words such that participants in the low-density condition generated more power-related words than participants in the high-density condition ($M_{\text{low density}} = 2.55$ vs. $M_{\text{high density}} = 1.84$; $F(1, 61) = 4.74$, $p < .05$; figure 13). Including reported pleasure and arousal as covariates did not significantly change this effect ($M_{\text{low density}} = 2.78$ vs. $M_{\text{high density}} = 1.62$; $F(1, 59) = 5.42$, $p < .05$) thus these covariates were left out of the analysis.

Ad evaluations. The three items of preferred choice, liking and perceived effectiveness of the ads were highly correlated (preferred choice and liking, $r = .961$, $p < .001$; preferred choice and perceived effectiveness, $r = .858$, $p < .001$, perceived effectiveness and liking, $r = .835$, $p < .001$) and were combined to form an index of ad evaluations for the Parker pen ads ($\alpha = .96$; with a higher number indicating more positive evaluations of the prestige-focused ad). The direct

effects of social density on the individual items or the index of ad evaluations were not significant (*p*s>.10). However, there was a significant indirect effect of social density on ad evaluations through implicit activation of power.

A bias corrected bootstrap analysis, using 5,000 samples, indicated a significant indirect effect of social density on ad evaluations via the number of power-related words (mean-centered) with a 95% CI excluding 0 (a_1 x b_1 = .29, 95% CI [.02, .98]). Implicit activation of power mediated the effect of social density on ad evaluations such that in the high-density (vs. low-density) condition people generated less power-related words and in turn indicated higher evaluations of the prestige-focused ad (figure 14). Implicit activation of power mediated the effect of social density on the individual measures of ad evaluations as well, i.e., preferred choice, liking, and perceived effectiveness of the Parker pen ad (for preferred choice: a_1 x b_1 = .28, 95% CI [.02, .84]; for liking a_1 x b_1 = .27, 95% CI [.01, .89]; for effectiveness a_1 x b_1 = .30, 95% CI [.01, 1.16]). Including reported pleasure and arousal as covariates did not significantly change any of the above mediation effects. In a separate set of analysis, neither reported pleasure nor arousal mediated the effect of social density on ad evaluations (both 95% CI included 0).

Next, I performed a moderated mediation analysis using Hayes' PROCESS Model 8 (Hayes 2012) in order to establish to what extent the indirect effect of social density on ad evaluations through implicit activation of power was dependent on chronic sense of power (as measured by the Personal Sense of Power Scale; Anderson et al. 2011; $M_{\text{low density}}$ = 4.66, $M_{\text{high density}}$ = 4.42; F < 1). The analysis revealed evidence of a moderated indirect effect found in a marginally significant interaction between social density and chronic sense of power in the model of implicit activation of power (a_1 = -.4565, p = .06). In addition, an estimation of the

conditional indirect effect of social density on ad evaluations through implicit power at three different levels of chronic sense of power (low, medium, and high), revealed that the indirect effect was consistently positive and increased with increasing chronic sense of power. A 95 % bootstrap confidence interval for the conditional indirect effect was entirely above zero for participants at medium and high levels of chronic sense of power (for Medium = .27, 95% CI [.0014, .9189]; for High = .46, 95% CI [.0053, 1.387]), while it included 0 for people low on chronic sense of power (for Low = .03, 95% CI [-.2973, .5999]. Thus, implicit activation of power mediated the effect of social density on ad evaluations except for people low on chronic sense of power.

Assortment choice. The direct effects of social density on assortment choice (the number of chocolate varieties selected) was not significant (*p*s>.10). However, there was a significant indirect effect of social density on assortment choice through implicit activation of power. A bias corrected bootstrap analysis, using 5,000 samples, indicated a significant indirect effect of social density on the number of chocolate varieties selected via the number of power-related words generated (mean-centered) with a 95% CI excluding 0 (a_1 x b_1 = .21, 95% CI [.01, .58]). Implicit activation of power mediated the effect of social density on assortment choice such that in the high-density (vs. low-density) condition people generated less power-related words and in turn selected higher number of chocolate varieties (figure 15). Including total number of chocolates selected, product familiarity and liking as covariates did not significantly change these mediation effects. There were no significant differences across conditions on total number of chocolates selected, familiarity with, or liking of the Hershey's chocolates (*F*s < 1). Including reported

pleasure and arousal as covariates did not significantly change the indirect effect of social density on assortment choice via implicit power. Neither reported pleasure nor arousal mediated the effect of social density on assortment choice (95% CIs included 0).

In addition, I performed a moderated mediation analysis (Hayes' PROCESS Model 8; Hayes 2012) in order to establish to what extent the indirect effect of social density on assortment choice through implicit activation of power was dependent on chronic sense of power. The analysis revealed evidence of a moderated indirect effect found in a marginally significant interaction between social density and chronic sense of power in the model of implicit activation of power (a_1 = -.4395, p = .07). In addition, an estimation of the conditional indirect effect of social density on ad evaluations through implicit power at three different levels of chronic sense of power (low, medium, and high), revealed that the indirect effect was consistently positive and increased with increasing chronic sense of power. A 95 % bootstrap confidence interval for the conditional indirect effect was entirely above zero for participants at medium and high levels of chronic sense of power (for Medium = .21, 95% CI [.0351, .7082]; for High = .41, 95% CI [.0692, 1.1324]), while it included 0 for people low on chronic sense of power (for Low = .01, 95% CI [-.4200, .3286]. Thus, implicit activation of power mediated the effect of social density on assortment choice except for people low on chronic sense of power.

Discussion

In study 4, I found support for H5: the results confirmed that social density perceptions biased consumption patterns in a direction consistent with power-compensatory behavior and that this effect was driven by differences in implicitly activated sense of power. Specifically, the results demonstrated that when in a perceptually more (vs. less) socially dense simulated environment, people experienced less (vs. more) implicitly activated power. Importantly, the results showed that this imbalance in experienced power lead to power-compensatory behavior as evident by higher evaluations of prestige- (vs. performance-) focused ads and a choice of more variety (product options) in the perceptually more (vs. less) socially dense environment. In addition, the results from this study also demonstrated that the indirect effect of social density on ad evaluations and assortment choice through implicit activation of power existed primarily for people at moderate and high levels of chronic sense of power but not for people at a low level of chronic sense of power. These results indicate that experiencing different social density perceptions does lead to implicit power effect for mostly everybody except people who are generally feeling very powerless in their social interactions and influence on others. These results are consistent with the power literature that suggests compensatory behavior is stronger for those for whom power is generally important (Rucker and Galinsky 2009). Thus, in the case of the social density effect on power-compensatory consumption patterns, it is logical that we see the effect for people who generally feel powerful and thus for them power is important to maintain. However, the results also suggest that power imbalance is important for most people, including not only those who are generally feeling very powerful (high chronic sense of power) but also people who are generally feeling moderately powerful as well. Thus, the results confirm that for most people, feeling powerless is generally a negative state that leads to power-compensatory patterns of behavior. In sum, with this study I confirmed that power is indeed the mechanism that

drives the effect of social density perceptions on consumption patterns. Importantly, although we see that social density perceptions affected experienced pleasure and arousal, these two mechanisms did not influence either implicit power or consumption patterns.

In studies 1, 2, 3, and 4, I have demonstrated the theoretical model proposed in this paper and the connections between the proposed main constructs in it (i.e., ambient scent, social density, power, and consumption patterns). The next study's purpose is to provide ecological validity to these lab experiments findings by demonstrating that the same effects occur in an actual shopping environment. Specifically, the purpose of study 5 is to provide real-world evidence that a warm vs. cold ambient scents will lead to power-compensatory buying patterns, as evident by increased purchases of luxury brands and gifts for others. As previously mentioned a lowered sense of power leads people to seek ways to restore power and one way to do that is by acquiring products that demonstrate status (Rucker et al. 2012). Thus, in this study we expect that people in the warm vs. cold scent condition where they experience less vs. more power, will also purchase significantly more luxury brands. In addition, research also suggests that a lower state of power leads people to be more sensitive and attentive to others which in a consumption contexts translates into more purchases of items for others (Rucker et al. 2011; Rucker et al. 2012). Thus, in study 5, we also expect that people in the warm vs. cold scent condition will also purchase more gifts.

STUDY 5

Method

Design and subjects. The field study was run as a single factor (ambient scent: cold vs. warm) between-subjects design. The warm scent was cinnamon, and the cold scent was peppermint. Data were collected from 154 participants (70 male and 84 female) who were customers in an optics store located in a town in the North East. Sixty-five (27 male and 38 female) of the 154 consumers shopped in the presence of the warm scent and 89 (43 male and 46 female) shopped in the presence of the cold scent.

Procedure. The experiment was conducted in an optics store located in an urban shopping area. The retailer sold both sunglasses and prescription glasses for men, women and children. The products sold were in wide ranges of brand varieties and prices. The retailer maintained consistent advertising, pricing and product availability during the study period. The experiment was run for a 22-day period in the months of August and September; with the warm scent present for 11 days, the cold scent for another 11 days, and with one day of no scent between the two conditions in order to ensure dissipation of the previous scent and full ventilation of the store. For the scent manipulation, the procedure used was similar to the ones from published scent research involving field experiments (Herrmann et al. 2012; Spangenberg et al. 2006). The experimental 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 moderate and unobtrusive level, in order to minimize any intensity or pleasantness confound effects. The diffuser was set to 15 sec. on/off timing and the same scent intensity was maintained throughout the two scent-condition periods. The scent machine was turned on at 8 am each day and turned off at 8 pm. Extraneous odors were not present in the store during the study. Data were collected during the operating hours of the store: from 9:30 am to 7:00 pm.

Measures. Sales data were collected and recorded by the retailer on several measures: brands purchases, price of each product purchased, total dollar amount spent by each consumer, whether the item was on sale and the discounted price paid, whether the purchase included an upgrade and the upgrade amount paid, whether the purchase was a gift or not, whether it was a single or a multiple-item purchase (based on the number of items purchases by each consumer). Sale offers included a set discounted price for glasses combining both lenses and frame individual prices (e.g., $29.99). Upgrades included additional amount spent on lenses with transition (for sunlight) or with tint (for glare reduction). The number of purchases served as the unit of the analysis. Only purchase data on sunglasses and prescription glasses were considered while purchase data on lenses when bought without the frames were excluded. The brands of products were rated by the retailer on the luxury dimension on a scale from 1 to 6 (1 = low-end, 6 = luxury). Based on this classification, brands rated highest on the luxury dimension, e.g., 6 (a total of 9 brands, e.g., Tom Ford, Gucci, Michael Kors, Versace, Prada, Jimmy Choo, and Marc Jacobs) and 5 (a total of 7 brands e.g., Armani, Roberto Cavali, Moschino, Swiss Flex, Pro

Design, Ralph Lauren, and Fendi) were grouped to form a luxury brand category. Brands rated at 4 and 3 on the luxury dimension were grouped to form a neutral brand category (a total of 10 brands for rank 4, e.g., Ray Ban, Guess, English Laundry, Viva, and Carrera; a total of 11 brands for rank 3, e.g., Niche, Eddie Bauer, and Harve Benard); and brands rated at 2 and 1 were grouped to form a low-end brand category (a total of 7 brands for rank 2, e.g., Uber, New Millenium, Prell, and Retro; a total of 8 brands for rank , e.g., Zimco, Lido West, Smilen and Capri). The total number of brands was 51 (16 in the luxury category, 21 in the neutral, and 15 in the low-end category).

Results

Brand purchases. The number of brands purchased in the three categories (the luxury category, the neutral, and the low-end category) significantly differed across conditions ($\chi 2$ (1,174) = 5.99, $p < .05$; figure 16). As expected, significantly more purchases from the luxury brand category compared to the other two categories were made in the warm- vs. the cold-scent condition. Specifically, the number of purchases from the luxury brand category accounted for 11.4 % of all purchases in the warm-scent condition compared to only 3.2 % in the cold-scent condition ($\chi 2$ (1,174) = 4.55, $p < .05$). There were no significant differences across conditions in the number of purchases from the neutral brand category (26.6 % of all purchases in the warm-scent condition compared to 37.9 % in the cold-scent condition; $\chi 2$ (1,174) = 2.51, $p > .10$). There were no significant differences across conditions in the number of purchases from the low-

end brand category (62 % of all purchases in the warm-scent condition compared to 58.9 % in the cold-scent condition; $\chi 2$ (1,174) = .171, $p > .10$).

Within the warm-scent condition, significantly more purchases were made from the low-end brand category compared to the neutral brand category ($\chi 2$ (1, 70) = 4.57, $p < .001$), and to the luxury brand category ($\chi 2$ (1, 70) = 27.59, $p < .001$); also, significantly more purchases were made from the neutral brand category compared to the luxury brand category ($\chi 2$ (1, 30) = 4.80, $p < .05$). Similar to the warm-scent condition, within the cold-scent condition, significantly more purchases were made from the low-end brand category compared to the neutral brand category ($\chi 2$ (1, 92) = 4.34, $p < .05$), and to the luxury brand category ($\chi 2$ (1, 59) = 47.61, $p < .001$); also, significantly more purchases were made from the neutral brand category compared to the luxury brand category ($\chi 2$ (1, 40) = 27.92, $p < .001$).

An ANOVA analysis with scent condition and brand category as between-subject factors revealed only a significant main effect of brand category on item price ($F(1, 168) = 59.71$, $p < .001$). Items in the luxury brand category had a higher price than items in the neutral brand category ($M_{lux} = \$256.50$ vs. $M_{neutral} = \$156.88$, $p < .001$) and items in the low-end brand category ($M_{lux} = \$256.50$ vs. $M_{low} = \$61.47$, $p < .001$). Items in the neutral brand category had a higher price than items in the low-end brand category ($M_{neutral} = \$156.88$ vs. $M_{low} = \$61.47$, $p < .001$).

Total dollar amount spent. An ANOVA analysis with scent as a between-subject factor revealed that there were no significant differences across conditions on the total dollar amount spent by each consumer ($M_c = \$108.92$ vs. $M_w = \$132.85$; $F(1, 152) = 1.84$, $p > .10$).

Purchases of items on sale. The purchase was coded as 1 if the item bought was on sale and as 0 if it was at regular price. There were no significant differences across conditions on the number of items bought on sale: 51.6 % in the cold-scent condition and 53.2 % in the warm-scent condition ($\chi 2$ (1,174) = .043, $p > .10$). An ANOVA analysis with scent as a between-subject factor revealed that there were no significant differences across conditions on the dollar amount spent on items purchased on sale (M_c = \$42.44 vs. M_w = \$35.92; $F(1, 89) = 1.39$, $p > .10$).

Purchases involving upgrades. The purchase was coded as 1 if it included an upgrade, and as 0 if it did not. There were no significant differences across conditions on the number of purchases that included an upgrade: 34.7 % in the cold-scent condition and 40.5 % in the warm-scent condition ($\chi 2$ (1,174) = .614, $p > .10$). An ANOVA analysis with scent as a between-subject factor revealed that there were no significant differences across conditions on the dollar amount spent on upgrades (M_c = \$28.12 vs. M_w = \$32.50; $F(1, 62) = 1.21$, $p > .10$).

Gift purchases. The purchase was coded as 0 if the purchase was not a gift and as 1 if it was. As expected, significantly more gift purchases were made in the warm- vs. the cold-scent condition. Specifically, the number of gift purchases accounted for 5.1 % of all purchases in the warm-scent condition compared to 0 % in the cold-scent condition ($\chi 2$ (1,174) = 4.92, $p < .05$; figure 17).

Number of items purchased. The purchase was coded as 0 if the consumer bought only one item (a single-item purchase), and as 1 if the consumer bought more than one item (a multiple-item purchase). Significantly more multiple-item purchases were made in the warm- vs. the cold-scent condition. Specifically, the number of multiple-item purchases accounted for 18.5 % of all purchases in the warm-scent condition compared to 6.7 % in the cold-scent condition ($\chi 2$ (1,154) = 4.99, $p < .05$; figure 18).

Discussion

The results from this field study demonstrate that in the warm vs. cold scent condition people purchased more products from the luxury category compared to the neutral and low-end categories. These results indicate a consumption pattern consistent with power-compensatory behavior where people value and buy not just any type of brands but specifically luxury brands that provide status and prestige. As expected, scent did not affect the number of non-luxury brands purchased (i.e., from the neutral and low-end categories). Although scent did not affect other shopping patterns like total dollar amount spent, items bought on sale, upgrade purchases, scent did influence preference and choice for specific type of products (i.e. luxury).

In addition, we evidenced another typical of a power-compensatory behavior pattern – gift purchases (Rucker et al. 2012). Consistent with a power-compensatory pattern of behavior, the results demonstrate that people made more gift purchases in the warm vs. cold scent

condition. In addition, people in the warm vs. cold scent condition made more multiple-item vs. single-item purchases i.e., they bought more products on a single occasion. Based on the power literature, it can be suggested that this pattern is also consistent with power-compensatory behavior where by buying more vs. fewer products people might see another way of compensating for reduced sense of power.

GENERAL DISCUSSION

The present research demonstrates that ambient scents that differ on perceived temperature (warm and cold scents) can systematically bias spatial perceptions of social density and in turn affect consumption patterns. Across four experiments and one field study, I show that a warm vs. cold ambient scent leads to perceptions of higher social density and as a result people adopt a power-compensatory behavior exhibited through higher willingness-to-pay for high-status products, higher evaluations of prestige- vs. performance-focused ads, preference for more choice, and increased purchases of luxury brands. This research shows that warm and cold scents produce a spatial bias on social density through the semantic temperature associations that they evoke and not through pleasure or arousal mechanisms. In addition, the studies demonstrate that the mechanism for the observed effect of social density perceptions on power-compensatory consumption patterns is through imbalance in implicit sense of power. Importantly, the effect is existent for most people: for those who generally are at high or moderate levels of chronic sense of power but not for people at low level of chronic sense of power.

Implications

The present research carries important theoretical contributions to several streams of research on consumer behavior, as well as significant practical implications for marketing managers. First and foremost, the present paper contributes to scent research by being the only

one that demonstrates systematic effects of scents on consumption patterns like product choice, preferences and actual purchase behavior, independent of scent congruency and context. Most of previous research has focused on scent effects on attitudes and general approach behavior like time or total dollar amount spent in the store (Herrmann et al. 2012). However, existent research has not always been able to replicate the positive effects of pleasant cents and explain this inconsistency. In that sense, the current paper contributes to such understanding, by undertaking a more fine-tuned examination of how scent affects what type of products people value and buy. The current findings might help explain why effects on total spending were not always present in previous studies: here we see that certain characteristics of pleasant scents (i.e., temperature semantic meaning) can systematically affect consumption patterns without necessarily shifting total dollar spending.

Importantly, the present research contributes to a better understanding of the underlying processes that drive scent effects. As previously mentioned most of scent research has been limited to using the SOR model to explain scent effects on consumer behavior (Morrin 2010). In the present paper, I move beyond such evaluative approach and demonstrate that new, perceptual processes like social density can drive scent effects. These findings might also help explain why in previous studies we do not always observe the positive effects of pleasant scents on approach behavior as suggested by the SOR model. The current findings demonstrate that scent affects behavior through cognitive rather than affective routes which is consistent with recent scent work (Chebat and Michon; Krishna et al. 2010a; Morrin and Chebat 2005). However, in the present paper we see that scent semantic congruency is not necessarily needed in order for these cognitive processes to run, as previous research has indicated (Krishna et al. 2010). The present studies show that warm and cold scents evoked temperature associations and lead to social

density bias without the scents being semantically congruent with other factors (e.g., room temperature which was always held constant across conditions or product type). In addition, the present research demonstrates scent effects independent of scent salience, a factor that previous research has suggested might moderate scent effects (Bosmans 2006). In the present studies, we observed that whether the scent was salient or not the effects on social density and consumption patterns were consistently produced by the scent. Therefore, in this paper, I have identified a more generalized effect of scent on behavior and a new perceptual mechanism driving it, thus contributing to a more generalized and unified theory of scent effects. In addition, this paper is one of the few that demonstrates how specific characteristics of scent can produce generalized effects on actual consumption behavior (Herrmann et al. 2012). I demonstrate that scent categorization based on temperature can systematically shape behavioral patterns consumers exhibit in the store.

The present paper also contributes to multisensory research by being the first work to demonstrate effect of the sense of smell on the sense of vision in terms of spatial perception. To the best of my knowledge this is the first paper which shows that something that we smell in the environment can affect how we simultaneously see and feel about space. In addition, I demonstrate for the first time that scent can affect perception in other modalities, without the condition of scent semantic congruency. Thus, I contribute to multisensory research by showing that scents can produce not only a multisensory enhancement (as previously shown with effects of congruent scents on touch perception; Krishna et al. 2010a), but also a multisensory interference. The current studies showed that scents can strongly bias spatial perceptions of social density, thus interfering with visual perception. Importantly, as we see in one of the studies (study 3), this biasing effect was still existent even in the presence of physical spatial

factors that should have attenuated or even eliminated the effect. Specifically, I found that even when in reality there were more people present in the room in the cold (vs. warm) scent condition, people still felt less socially dense.

The present work also extends research on spatial perception by identifying a new environmental factor that can bias how consumers perceive space. Although spatial perception and social density in particular are very important factors for in-store behavior, more knowledge on this topic is currently needed in consumer research (Krishna 2008; Machleit et al. 2000). The present work contributes to this knowledge by demonstrating how spatial judgments can systematically bias consumption patterns of actual behavior in the store. So far, limited research has looked beyond evaluative effects and into actual purchase behavior as a result of spatial judgments. The present paper integrates the two streams of research on spatial judgments and power in consumer behavior in order to extend existent knowledge.

Particularly, I also extend research on power by identifying an ambient factor in the retail environment as an antecedent of power. So far, power research in consumer behavior has focused primarily on the consequences of power for consumption behavior (Rucker et al. 2012). Given that research has established that power is a malleable state that can easily be manipulated, it is important to identify factors that can do so in the store environment where most purchasing decisions are made. In this work I show that a subtle manipulation of an atmospherics factor such as ambient scent can implicate sense of power and subsequent behavior. In addition, I demonstrate that these effects are true for most people with the exception of those with a low chronic sense of power – which is consistent with previous research examining the interplay of externally manipulated power and chronic sense of power (Rucker et al. 2012).

The present paper also carries several important managerial implications. Firstly, the current research is particularly relevant to practitioners because it presents real retail data that supports the results from the experimental lab work. In existent scent research, there is still limited real-world evidence for the scent effects on purchase behavior (Herrmann et al. 2012), and in that sense, the current paper presents significant contribution. Importantly, the findings from the current studies provide practitioners with concrete insights on how different categories of scents work – findings that can ultimately be translated into specific guidance for retailers' strategy. For instance, social density perceptions can be easily manipulated by the retailer with a subtle and relatively inexpensive application of ambient scents in the store environment. There are certain store spaces (e.g., elevators) or times (e.g, busy shopping periods) when actual social density can be quite high – in these circumstances, retailers might want to apply cold scents in order to create impression of lower density and neutralize any negative effects. In addition, the present findings present managers with important insight on how different scent characteristics can shape consumer preferences and choices in the store. These findings can guide the choice of particular pleasant scents to use in the store in a way consistent with the retailer's goals and strategy. In addition, the current findings are not only relevant to retail and services but might also have implications for the fragrance industry. For instance, some perfumes can incorporate cold components in order to make their owner feel or appear more powerful (e.g., a masculine perfume).

Limitations and future research

The present research examines the effects of the temperature scent category on consumer behavior. This scent categorization has been previously established theoretically (Herz 2009; Krishna et al. 2010a), and is present in practice where temperature is one scent attribute that is commonly used to describe and categorize commercially available scents (e.g., by ScentAir). However, research has suggested that scents might evoke several different associations at the same time (Herz 2010); for instance a cinnamon scent might bring associations with warmth but also ones with other concepts (e.g., Christmas). In addition, along with commonly held associations, a particular scent might bring associations relevant only to the particular individual (e.g., related to a personal memory; Herz 2010). Although research has established that the temperature associations are quite strong and consistent across individuals (Herz 2009), it is still important to disentangle their consecutive effects on behavior from other associations. In the current studies, I did not measure other more specific associations from warm and cold scents, which is one limitation that future studies can address.

Future studies can also examine the biasing effect of warm and cold scents on social density perceptions and consumption at more extreme levels of actual social density. In the present studies, I tested the effect with number of people ranging from 5 to 20, keeping the actual social density at a moderate level. It would be interesting to see whether and how the observed here effects might change when there is no social presence (e.g., only one person) or a very high level of social presence in the store (e.g., extremely crowded store). It could be expected that at extreme levels, the two factors, actual social density and scent, can interact to produce different than the observed here effects. For instance, in a cold-scented and no-social-density environment we might see that people actually feel less vs. more powerful since the lack of social presence alone can make people feel that way.

In the present paper, I explored the effects of a limited number of warm and cold scents as per the pretest. Future studies can provide additional support for the current theoretical model and demonstrate that the effects hold across a wider variety of warm and cold scents. In addition, an emerging trend for companies is to develop signature scents that encompass several distinct scent components (e.g., a mixture of several pure scents) rather than one pure scent (e.g., vanilla). It will be interesting to see whether the observed here effects will differ for more complex vs. simple scents, having warm and cold components.

The present paper shows a new phenomenon in which the scent temperature category biases spatial perception of social density and consumption. The goal that I accomplish with four lab studies and a field experiment is to demonstrate step-by-step the newly proposed links between each construct in the theoretical model describing the phenomenon. Thus, by having this important foundation, future studies can explore how different moderating factors might interact to change the established herein effects. For instance, one potential moderator could be personal space standards or thresholds. Specifically, the appropriate personal space standards might vary across cultures such that in some (e.g., collectivist vs. individualist) cultures vs. others less personal space is acceptable and appropriate. We might expect that in individualist cultures perceptions of high social density might have a stronger effect on power while in collectivist cultures the effect might be weaker to non-significant.

Future research can also explore other potential moderators like store type (e.g., discount vs. high-end store) in relation to the expectations about actual social density that it creates or store popularity in relation to the actual social density in the store (e.g., more people in the store might lead to perceived popularity). Clearly, there are many directions for future research that

can extend the present findings and contribute to further exploration of the phenomenon that was introduced here.

FIGURE 1: THEORETICAL MODEL

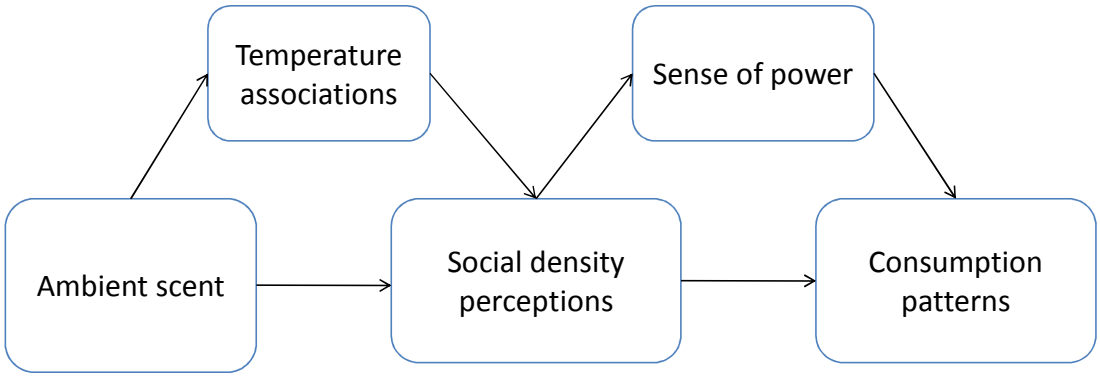


FIGURE 2

SCENTS TEMPERATURE ASSOCIATIONS (PRETEST)

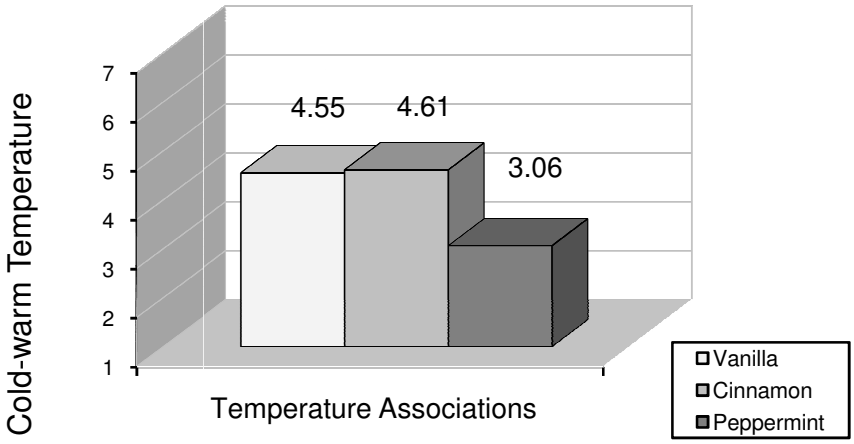


FIGURE 3

SCENTS FAMILIARITY RATINGS (PRETEST)

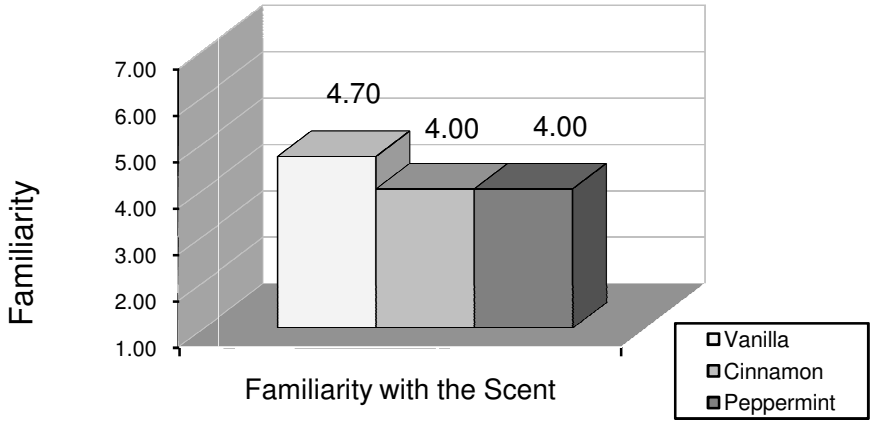


FIGURE 4

THE EFFECT OF AMBIENT SCENT ON SCENTS TEMPERATURE ASSOCIATIONS WITH WARM (STUDY 1)

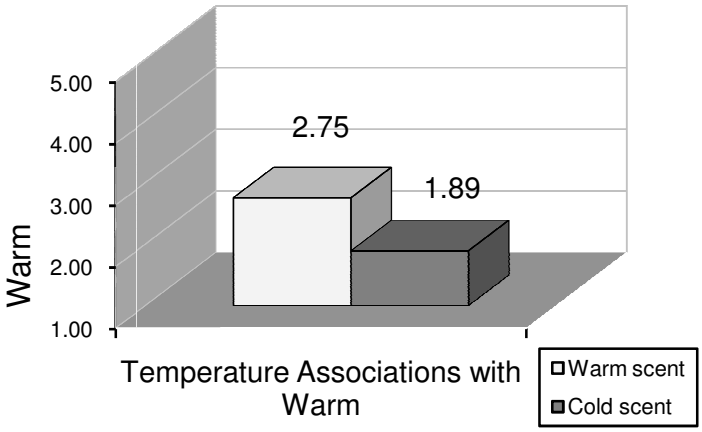


FIGURE 5

THE EFFECT OF AMBIENT SCENT ON THERMAL STATE PERCEPTIONS (STUDY 1)

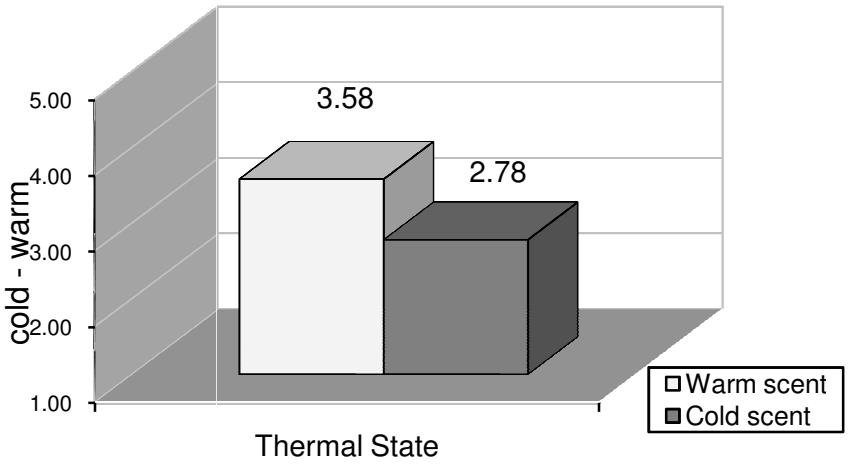
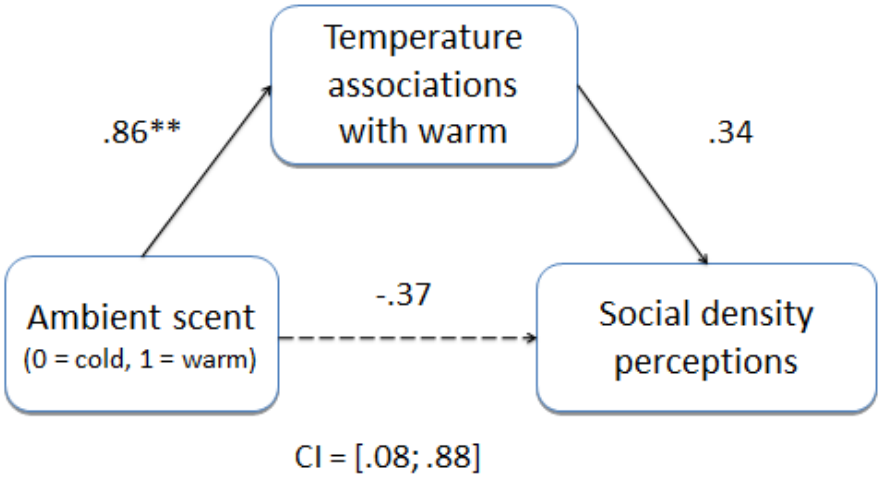


FIGURE 6

THE EFFECT OF AMBIENT SCENT ON SOCIAL DENSITY PERCEPTIONS VIA TEMPERATURE ASSOCIATIONS WITH WARM (STUDY 1)



Note: * = $p < .05$; ** = $p < .01$; *** = $p < .001$.

FIGURE 7

THE EFFECT OF AMBIENT SCENT ON SOCIAL DENSITY PERCEPTIONS (STUDY 2)

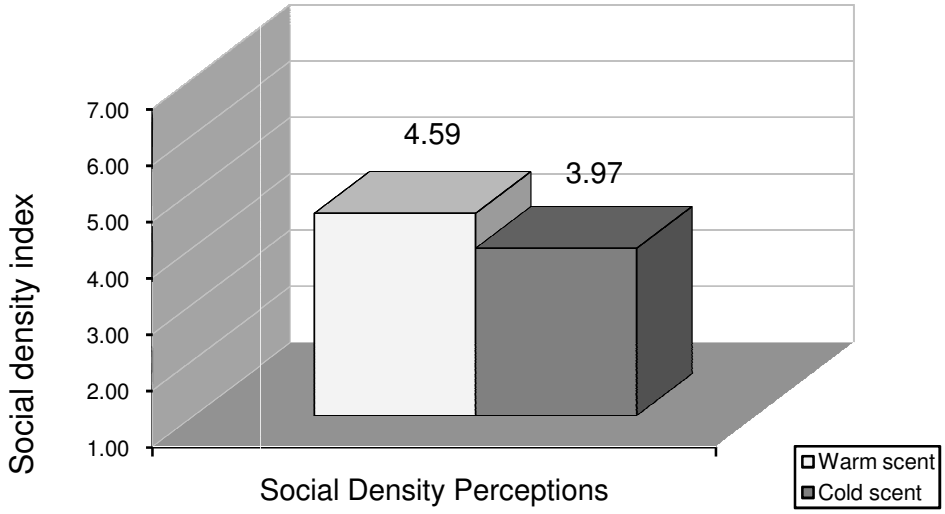


FIGURE 8

THE EFFECT OF AMBIENT SCENT ON WILLINGNESS-TO-PAY (STUDY 2)

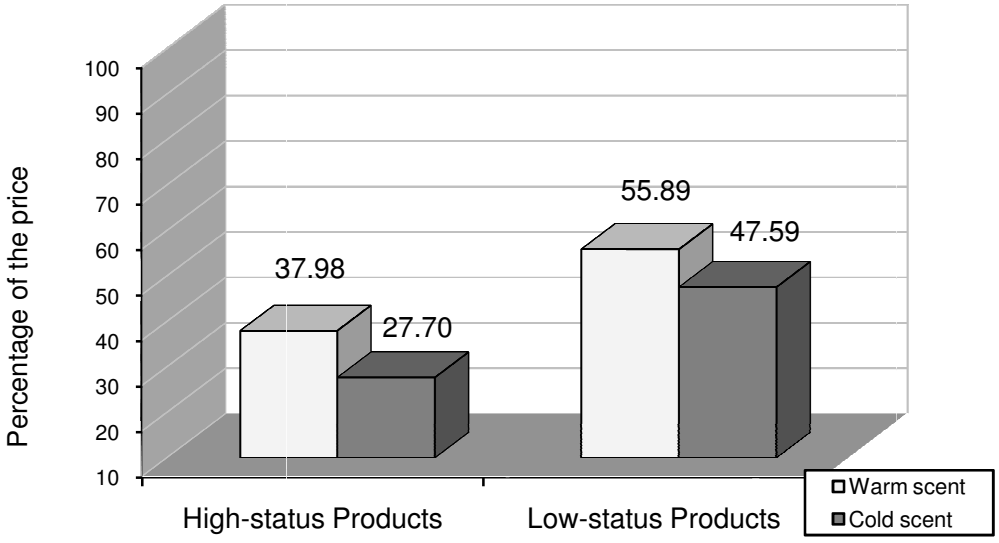
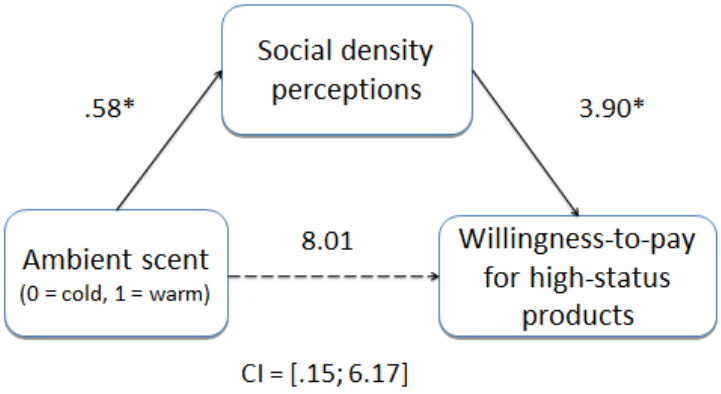
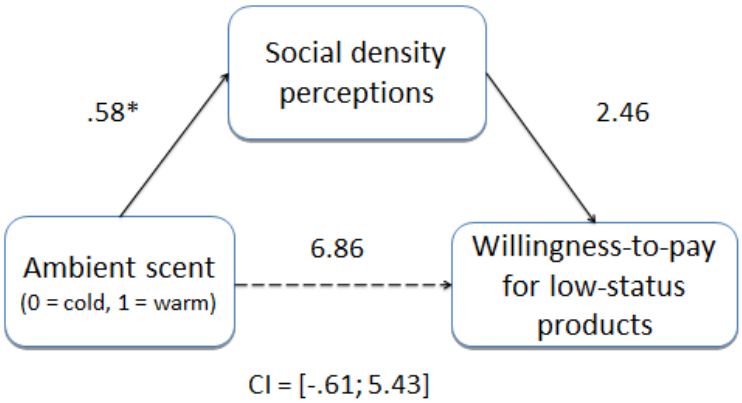


FIGURE 9

THE EFFECT OF AMBIENT SCENT ON WILLINGNESS-TO-PAY VIA SOCIAL DENSITY PERCEPTIONS (STUDY 2)



Note: * = $p < .05$; ** = $p < .01$; *** = $p < .001$.



Note: * = $p < .05$; ** = $p < .01$; *** = $p < .001$.

FIGURE 10

THE EFFECT OF AMBIENT SCENT ON SOCIAL DENSITY PERCEPTIONS (STUDY 3)

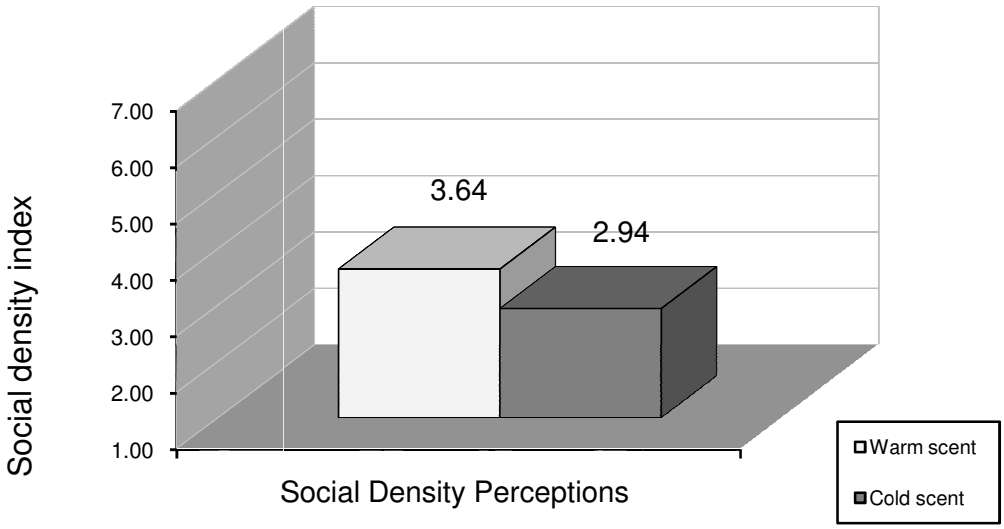


FIGURE 11

THE EFFECT OF AMBIENT SCENT ON AD EVALUATIONS VIA SOCIAL DENSITY PERCEPTIONS (STUDY 3)

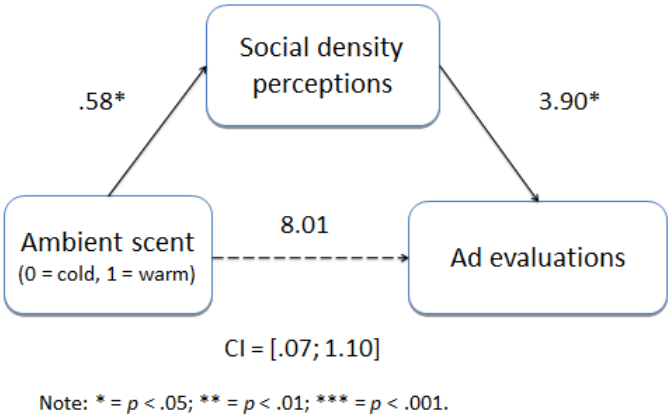


FIGURE 12

THE EFFECT OF AMBIENT SCENT ON ASSORTMENT CHOICE VIA SOCIAL DENSITY PERCEPTIONS (STUDY 3)

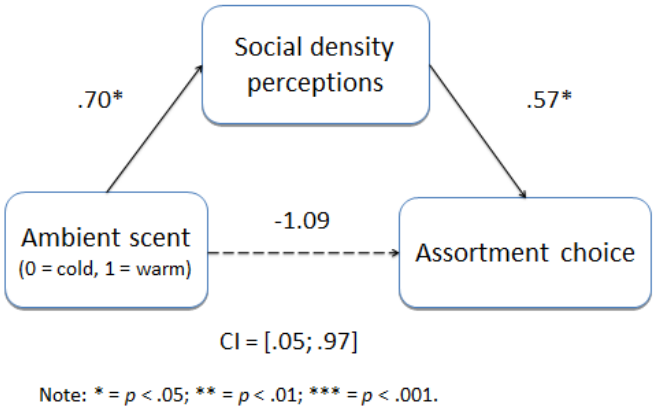


FIGURE 13

THE EFFECT OF SOCIAL DENSITY ON IMPLICIT ACTIVATION OF POWER (STUDY 4)

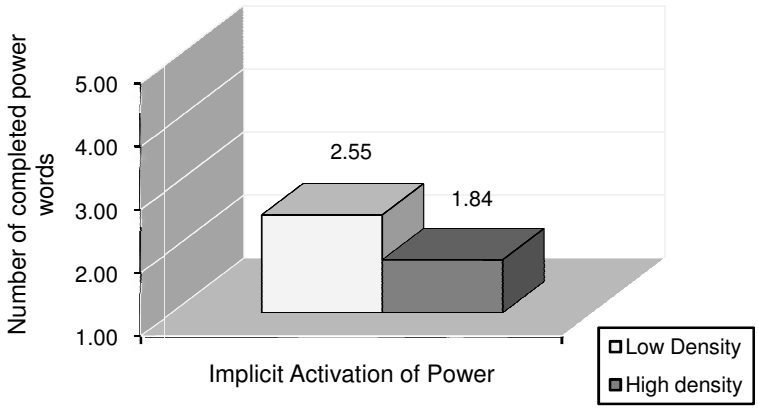


FIGURE 14

THE EFFECT OF SOCIAL DENSITY ON AD EVALUATIONS VIA IMPLICIT ACTIVATION OF POWER (STUDY 4)

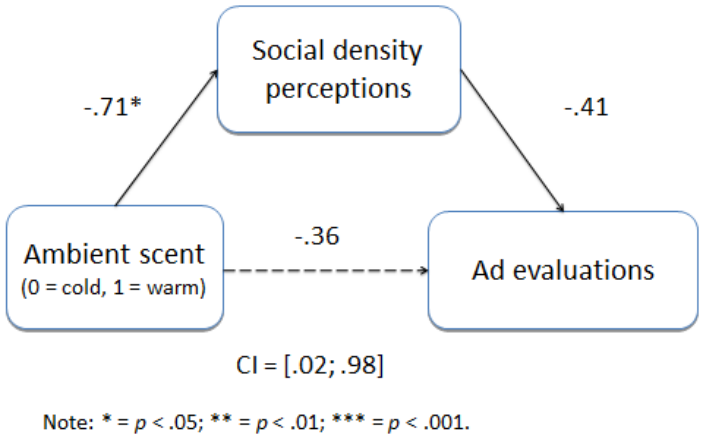
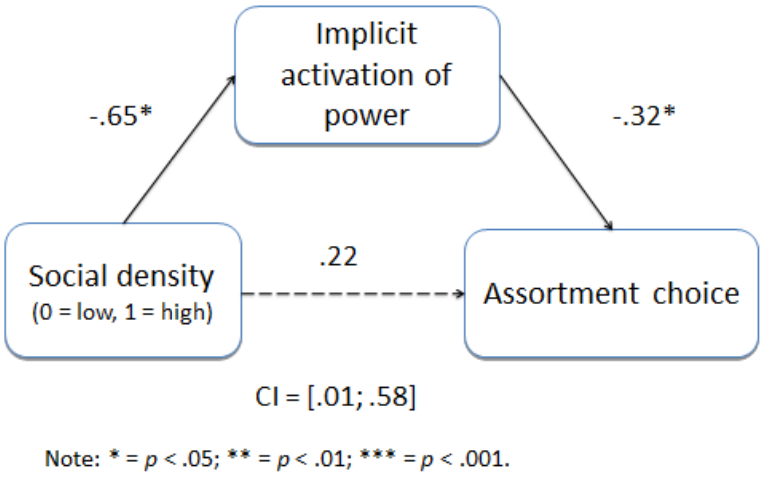


FIGURE 15

THE EFFECT OF SOCIAL DENSITY ON ASSORTMENT CHOICE VIA IMPLICIT ACTIVATION OF POWER (STUDY 4)



Note: * = $p < .05$; ** = $p < .01$; *** = $p < .001$.

FIGURE 16

THE EFFECT OF AMBIENT SCENT ON BRAND PURCHASES (STUDY 5)

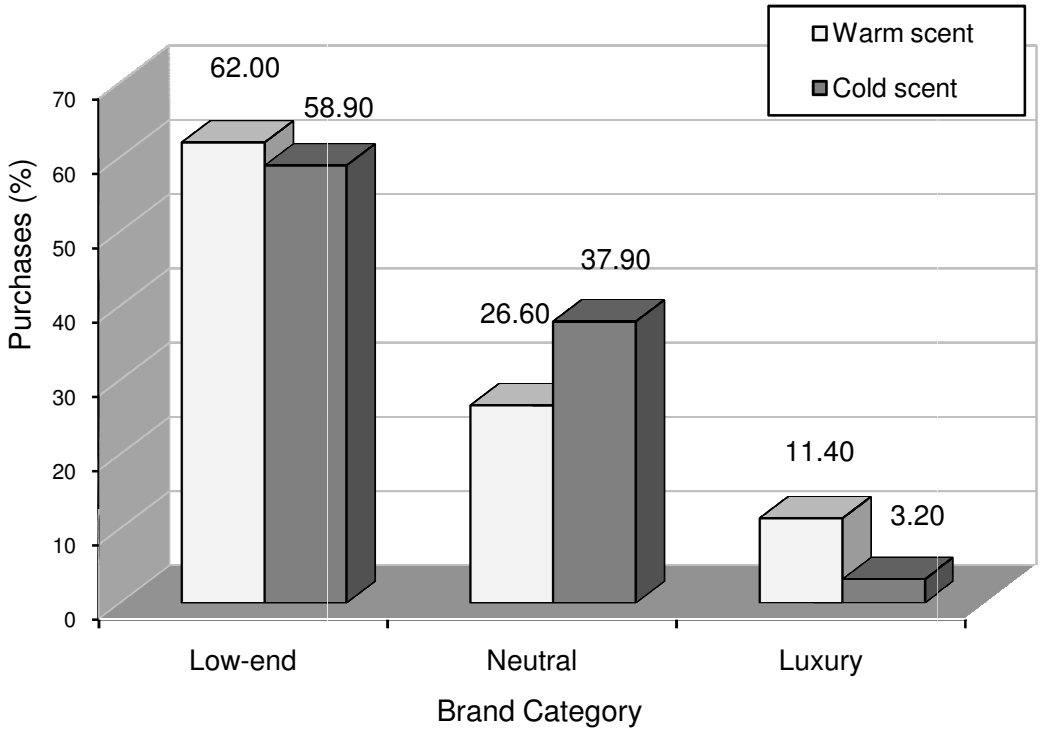


FIGURE 17

THE EFFECT OF AMBIENT SCENT ON GIFT PURCHASES (STUDY 5)

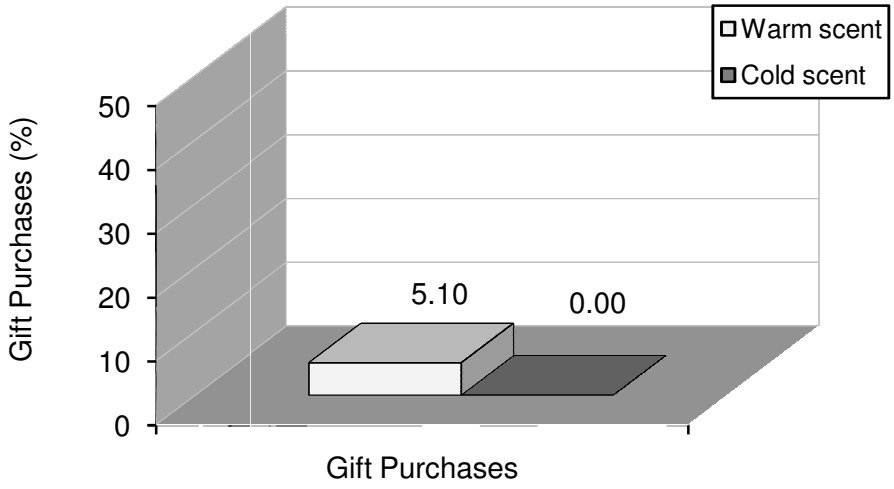
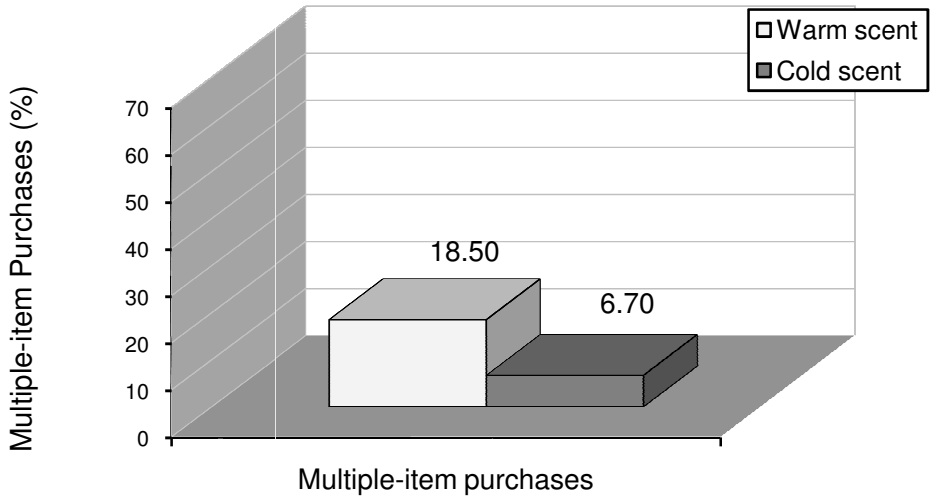


FIGURE 18

THE EFFECT OF AMBIENT SCENT ON MULTIPLE-ITEM PURCHASES (STUDY 5)



APPENDIX A

STUDY 3: STIMULI FOR AD EVALUATIONS

Performance-focused ad

Prestige-focused ad

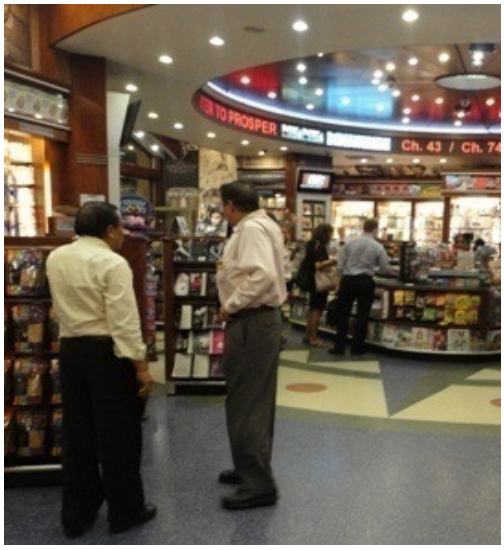
STUDY 3: STIMULI FOR ASSORTMENT CHOICE

Small assortment

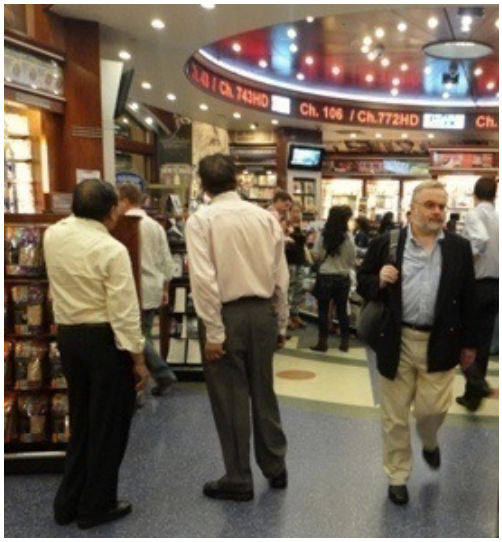
Large assortment

APPENDIX B

STUDY 4: STIMULI FOR SOCIAL DENSITY MANIPULATION



Low social density condition



High social density condition

APPENDIX C

STUDY 4: STIMULI FOR AD EVALUATIONS

Performance-focused ad

Prestige-focused ad

STUDY 4: STIMULI FOR ASSORTMENT CHOICE

Hershey's chocolate varieties

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