Seeking Freedom through Variety

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This article examines the effect of spatial confinement on consumer choices. Building on reactance theory and the environmental psychology literature, we propose that spatially confined consumers react against an incursion to their personal space by making more varied and unique choices. We present four laboratory experiments and one field study to support our theorizing. Study 1 demonstrates that people in narrower aisles seek more variety than people in wider aisles. Study 2 indicates that this effect of confinement in narrow aisles also extends to more unique choices. Study 3 shows that perceptions of confinement exert their strongest influence on people who are chronically high in reactance. Study 4 suggests that influencing perceptions of confinement is sufficient to evoke variety seeking. Finally, the field study uses crowding as a proxy for confinement and finds a positive relationship between crowding and variety seeking in real grocery purchases.

The physical attributes of a retail space can influence the behaviors and judgments of its customers. In *Why We Buy: The Science of Shopping*, bestselling author Paco Underhill observes that consumers often maneuver away from a product they have been looking at while browsing in a store if their personal space is disturbed by constant bumping or brushing by other customers or displays (Underhill 1999). Similarly, Hui and Bateson (1991) report that approach and avoidance behaviors in a service encounter can be explained by crowding, as can satisfaction (Bitner 1992; for a review see Turley and Milliman [2000]). These observations hint that physical space can influence not only customers' judgments of the retail experience but also the actual choices that customers make. In this article, we examine whether, how, and why the amount of physical space that a consumer has—as determined by aisle width or customer density—can affect his or her choices.

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Most research examining the impact of retail environment factors, or "atmospherics" (Kotler 1973), on consumer choices has focused on intangible variables, such as background music (Milliman 1982; North, Hargreaves and McKendrick 1999), smell (Mitchell, Kahn, and Knasko 1995), color (Gorn et al. 2004), and noise (Page 1977; Siegel and Steele 1980). We extend this pursuit by exploring an ever-present tangible factor: physical space.

Drawing on recent research in environmental psychology (Meyers-Levy and Zhu 2007a, 2007b) and classic research on reactance theory (Brehm 1966), we propose that a relatively small, physically restrictive space activates feelings of confinement and consequently a perceived threat to one's freedom. As a result, threatened individuals are likely to exhibit reactance in the form of acts aimed at regaining their freedom. In Western societies, choices, particularly unique and different choices, are viewed as ways to express one's freedom (Kim and Drolet 2003, 2007). Therefore, we hypothesize that people in relatively small confining spaces will tend to display greater variety seeking in their choices. Four laboratory studies and one field study provide support for our hypothesis. Our studies suggest a number of counterintuitive practical implications, including the potential benefit of smaller retail spaces when new and unique products are promoted.

THEORETICAL BACKGROUND

Physical space can affect people's cognition and behavior (Williams and Bargh 2008). The anthropologist Edward T. Hall (1966), a pioneer in the investigation of human uses of space, coined the term *proxemics* to describe the set of measurable distances between people as they interact. Hall suggests that social distance between people is reliably cor-

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related with physical distance. Thus, the closest acceptable physical distance for interactions among acquaintances is 4–7 feet (1.2–2.1 meters); for interactions among good friends, it is 1.5–2.5 feet (45–75 centimeters). Violations of one's "proxemic bubble" are likely to cause tension and discomfort and can evoke reactance (Edney, Walker, and Jordan 1976). Reactance is a motivational state that is aroused when people perceive threats to their freedom; consequently, it produces behaviors aimed at reasserting this freedom (Brehm 1966; Wicklund 1974). For instance, shoppers who receive unsolicited advice from recommendation agents tend to react by making choices that contradict the recommendation (Fitzsimons and Lehmann 2004; Zemack-Rugar, Fitzsimons, and Lehman 2008), consumers may reject incentive programs because these are perceived as a firm's attempt to influence their buying behavior (Kivetz 2005), and people who are told that an alternative has been eliminated from consideration react by rating the eliminated option to be more attractive (Worchel and Brehm 1971). Violations of personal space also lead to similar freedom-restoring behaviors. For example, Albert and Dabbs (1970) demonstrate that people are less likely to accept a persuasive message as their distance from the persuader decreases because they feel a threat to their personal space. Likewise, Wicklund (1974) reports that refusal to respond to personal questions increases as the distance between the interviewer and interviewee decreases.

Although the study of proxemics is concerned with personal space as measured or manipulated by distance between people, architectural elements can engender similar effects on cognition (Hall 1966; Meyers-Levy and Zhu 2007b; Smith and Lawrence 1978). Hall (1966) writes that physical edifices can imply different meanings or arouse different sensations due to the volume of the space they occupy. For instance, while chapels are likely to make people feel confined or restricted due to their small and contained spaces, cathedrals are likely to make people feel open and free due to their large space. Meyers-Levy and Zhu (2007a) build on this proposition by manipulating physical space using various ceiling heights. They demonstrate that individuals in a room with a lower versus higher ceiling are more likely to feel confined, encumbered, and inhibited. Such feelings consequently affect the way that they process stimuli.

The research reviewed here suggests that spatially constraining people—by crowding them with others or using architectural elements—leads them to feel confined and consequently to exhibit reactance. How might such reactance due to spatial constraints influence consumer behavior? We reason that in shopping contexts reactance will be revealed in consumers' product choices. Specifically, we argue that consumers will demonstrate a heightened tendency to seek variety as a means to reassert their freedom. In Western cultures (where all of our studies were conducted), people predominantly possess an independent self-view, striving to be unique and different from others (Markus and Kitayama 1991). This desire to be unique drives consumers to make more varied choices, even at the expense of lower overall enjoyment (Ariely and Levav 2000; Ratner, Kahn, and Kahneman 1999). In addition to serving as a vehicle to project uniqueness (Ratner and Kahn 2002), choice in Western cultures is viewed as a form of exertion of control over and mastery of one's environment (Snibbe and Markus 2005; Stephens, Markus, and Townsend 2007) and as a way to self-express and assert freedom (Kim and Drolet 2003). In fact, Kim and Drolet (2003) find that Westerners are more likely than Asians to seek variety and to make unique choices as a form of self-expression. Consequently, we conjecture that individuals might attempt to regain freedom by making more varied and unique choices. This leads us to the hypothesis that we test in this article: relatively confining spaces will lead to greater variety seeking.

We test our hypothesis in four laboratory experiments and in one secondary data analysis of actual grocery store purchases. In the four lab studies, we use aisle width to manipulate spatial confinement. Study 1 establishes the basic effect that spatial confinement can lead to heightened variety seeking. Study 2 extends study 1 by demonstrating that spatial confinement also leads to a greater likelihood of selecting unique alternatives. Study 3 finds support that reactance is the underlying mechanism driving the observed choice effects. Study 4 further extends our theorizing by demonstrating that perceived spatial confinement can lead to greater diversification in choices, even when the width of the aisle is held constant across experimental conditions. In the fifth study, the field analysis, we use customer density in a store as a proxy for spatial confinement, and we find convergent evidence and external validity for our laboratory results.

STUDY 1: THE EFFECT OF CONFINEMENT ON VARIETY SEEKING

In our first study, we test the effect of a confining space on the extent of variety seeking in people's choices. We manipulate confinement by varying the width of the aisle where participants are presented with their choice alternatives. We predict that more confining spaces will prompt participants to make more varied choices.

Method

Eighty participants from the University of British Columbia were recruited to participate in this and a series of other unrelated studies in exchange for course credit. Participants first completed the series of other studies in one room and then were asked to go to a second room for checkout and to receive candy bars as additional thanks for their participation. A research assistant greeted them at the entrance to the room; each participant completed the experiment individually.

We randomly assigned participants to one of two conditions, wide aisle ($n = 41$) or narrow aisle ($n = 39$). In the wide aisle condition, we placed a divider in the room and formed an aisle that was 7 feet wide by 15 feet long (the room dimensions were 15 feet 5 inches [length] by 11 feet [width] by 10 feet [height]). At the end of the aisle was a table with six bowls containing six different popular candy bars (Nestle Aero milk chocolate, Snickers, Kit Kat, Twix,

Hershey's Creamy Milk Chocolate with almonds, and Reese's Peanut Butter Crunch). The table size was the same for both conditions, and the table was placed in the same spot in the aisle for the two conditions. Each bowl contained 10 candy bars in order to eliminate any perceptions of shortage. In the narrow aisle condition, the room was set up identically, except that the divider was placed such that it formed an aisle that was only 3 feet 6 inches wide (see fig. 1 for a diagram of the experimental setup). Participants were instructed to proceed down the aisle and to choose three candy bars of any kind, in any combination they pleased, as the research assistant waited by the door. Having made their selections, they walked back to the research assistant's table, and the assistant recorded their selections. Participants were also asked to complete a short manipulation check questionnaire in which they were asked to rate the extent to which they felt that the aisle was wide and the extent to which they felt that the aisle was narrow (on 7-point scales). Participants were then thanked and debriefed.

Results

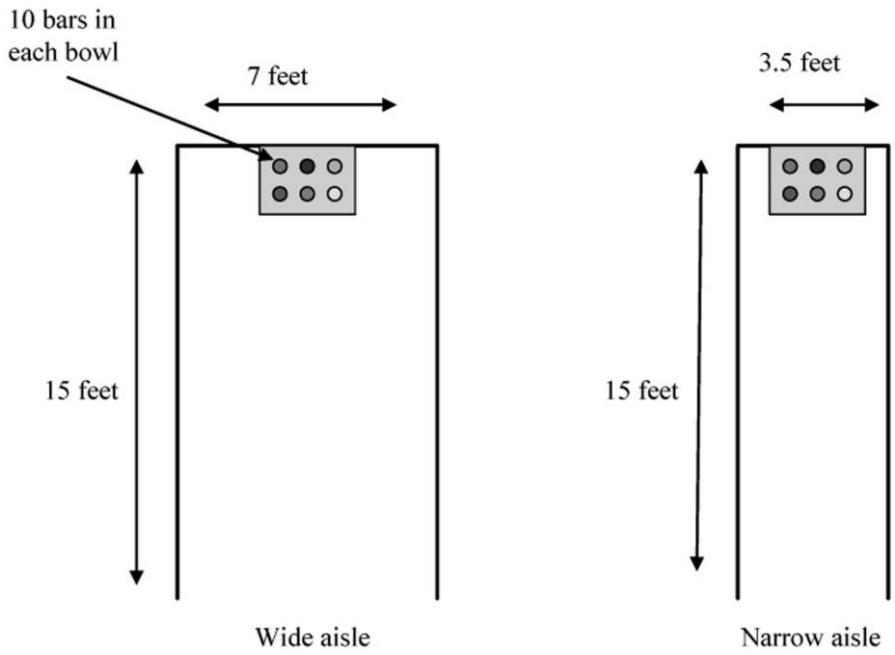
The manipulation check results confirmed that the aisle was indeed rated as more narrow in the narrow aisle condition ($M = 4.59$) than in the wide aisle condition ($M = 2.88$; $F(1, 78) = 28.94$, $p < .0001$) and rated as wider in the wide aisle condition ($M = 5.02$) than in the narrow aisle condition ($M = 3.28$; $F(1, 78) = 37.30$, $p < .0001$). Most importantly, participants in the narrow aisle condition chose a greater variety of candy bars than their wide aisle counterparts ($M = 2.90$ vs. $M = 2.66$, respectively; $F(1, 78) = 4.73$, $p < .05$; $\eta_p^2 = .057$). We also find a positive and significant correlation between the narrowness rating of the aisle and variety ($r = .27$, $p < .05$). This hints at a link between our participants' sense of spatial confinement and their choices.

Discussion

The results of this study provide initial evidence that a relatively confining space can lead to greater variety seeking. We suggest that this effect is a consequence of the reactance evoked by the narrow aisle. A number of questions arise from this result and its interpretation. First, does the aisle width manipulation alter individuals' mood states, which in turn affect their variety seeking behavior? Second, does our aisle width manipulation indeed influence individuals' feelings of confinement? Third, are participants in the narrow aisle condition simply making more random choices, which yield more variety but do not represent true variety seeking? Fourth, what evidence can we offer to demonstrate that reactance is the underlying process driving the observed variety seeking effect? We address the first three questions in the next study, study 2, by taking explicit measures of mood and confinement-related feelings and by making people's decisions financially consequential to them (the latter is true for study 5 as well). We address the third and fourth ques-

FIGURE 1

STUDY 1: SETUP



NOTE.—Color version available as an online enhancement.

tions in study 3, in which we measure individuals' chronic reactance and examine whether it moderates our observed effect.

STUDY 2: THE EFFECT OF CONFINEMENT ON THE MARKET SHARE OF LESSER KNOWN BRANDS

Study 1 demonstrated that people tend to seek variety when they are more physically confined. In study 2, we instantiate variety in a different way, by testing whether participants in a narrow aisle condition are more likely to select lesser-known, more unique brands. We use familiar and unfamiliar charities as "brands" in this study. Making unique choices, as in the case of variety, is viewed as a form of self-expression and freedom (Kim and Drolet 2003, 2007; Snibbe and Markus 2005). Thus, we expect that participants in the narrow, constraining aisle condition will be more likely to choose brands that they are less familiar with. In addition to using a different measure of variety seeking, in this study we measure participants' feelings of confinement and general mood states. The former should attest to the effectiveness of our manipulation in evoking feelings of confinement.

Method

Subjects and Design. One hundred and fifteen undergraduate participants from the University of British Columbia were recruited for this study. Of these, 40 happened to be drawn from a subject pool in exchange for course credit and 75 were paid $10.00 for their participation. The procedure was similar to that of study 1. Participants completed a set of unrelated studies in one room and then were sent to a second room to complete the experiment; the experiment was run individually for each participant. Confinement was again manipulated by varying aisle width. In the second room, we created a narrow aisle 3 feet 6 inches in width (narrow aisle, $n = 56$) and a wide aisle of 7 feet in width (wide aisle, $n = 59$), to which participants were randomly assigned (the room dimensions were 26 feet 7 inches [length] by 24 feet [width] by 11 feet [height]). A research assistant greeted participants at the entrance to this room and asked them to proceed down one of the two aisles to a table, where they were asked to take a seat and complete a short questionnaire.

Procedure. The first task in this questionnaire assessed participants' current mood states. The participants were presented with 10 randomly ordered adjectives and asked to indicate the extent to which each adjective described their current mood or body state. Three of these adjectives represented positive moods (happy, excited, and lighthearted), another three represented negative moods (sad, distressed, and downbeat), and the remaining four pertained specifically to confinement-related body states (confined, cramped, inhibited, and encumbered). Each item was assessed on a 1 (not at all) to 7 (very much) scale.

Next, all participants completed a willingness-to-donate task. They were told that many nonprofit organizations seek donations from individuals, and they were presented with a list of six such organizations in order to judge their likelihood of donating to each. Each charity name included a short description. While three of these charities (Canadian Red Cross, Aids.org, and National Breast Cancer Foundation) are well known, the other three (Arthritis Foundation, Children Awaiting Parents, and the Sjogren's Syndrome Foundation) are less known. Participants indicated their likelihood to donate to each charity at that moment in time on a 1 (not at all) to 7 (very much) scale. A pretest with 15 participants from the same population had confirmed that our participants were more familiar with the three better-known charities than with the three lesser-known ones. The pretest participants were presented with the same list and description of the six charities and asked to indicate their familiarity with each on a 1 (not at all) to 7 (very much) scale. For the purposes of analysis, we created two indices, one for the three well-known charities ($\alpha = .84$) and one for the three lesser-known ones ($\alpha = .81$). The results indicated greater familiarity with the well-known charities ($M = 3.67$) than with the lesser-known ones ($M = 1.38$, $t(14) = 6.30$, $p < .0001$; $\eta_p^2 = .74$).

Having completed the willingness-to-donate task, those who had participated in the experiment for course credit were dismissed (we could not request them to donate any of their own money to the charities). The remaining 75 who participated in the study for payment were informed that they would have a chance to donate their payment to one, some, or all of the charities they had considered. In this regard, we asked them to answer three additional questions: (1) whether they would be willing to donate any or all of their $10.00 payment to any of the charities; (2) if so, how much of their $10.00 they would donate; and (3) how they would allocate their donation among the six charities. Participants were then paid ($10.00 minus their stated donation) and debriefed.

Results

Mood and Body States. We began by examining whether our aisle manipulation affected participants' mood and body states. We first created three indices by averaging the three positive mood items (positive mood index, $\alpha = .72$), the three negative mood items (negative mood index, $\alpha = .76$), and the four confinement-related adjectives (confinement index, $\alpha = .86$). A one-way ANOVA revealed that the aisle width manipulation did not affect positive ($M_{\text{wide}} = 3.99$; $M_{\text{narrow}} = 4.07$; $F < 1$) or negative mood ($M_{\text{wide}} = 2.54$; $M_{\text{narrow}} = 2.75$; $F < 1$). However, confirming the effectiveness of our manipulation, those in the narrow aisle condition ($M = 3.39$) reported a greater degree of confinement-related body states than those in the wide aisle condition ($M = 2.79$; $F(1, 113) = 5.58$, $p < .02$; $\eta^2_p = .05$). There was no interaction between any of the mood indices and whether the subject was participating for credit or for pay ($p > .17$).

Willingness-to-Donate. In order to analyze this dependent variable, we created two indices that summarized

the average ratings for the three familiar charities ($\alpha = .75$) and the three unfamiliar charities ($\alpha = .77$). Next, we analyzed the data using a 2 (aisle width: wide or narrow) × 2 (charity type: familiar or unfamiliar) mixed ANOVA, with aisle width as a between-subjects factor and charity type as a within-subjects factor. The analysis revealed a significant two-way interaction ($F(1, 113) = 10.08$, $p < .01$), which we decomposed into two simple contrasts to test our hypothesis. Specifically, the aisle width manipulation did not affect donation intentions for familiar charities ($M = 4.70$ vs. $M = 4.37$ for the wide aisle and narrow aisle conditions, respectively; $F(1, 113) = 2.06$, $p > .15$) but did significantly affect donation intentions to the less familiar charities ($M = 3.74$ and $M = 4.24$, respectively; $F(1, 113) = 3.97$, $p < .05$); thus, the narrow aisle increased participants' intention to donate to lesser-known charity brands. There was no interaction between willingness-to-donate and type of participant (i.e., for credit or for pay; $p > .42$).

Donation Amount and Allocation. Next we examined the donation rates by respondents who were paid for their participation. The total number of participants who donated was 26, with statistically identical donation probabilities in both conditions (narrow aisle: 35.9%, or 14 out of 39 people; wide aisle: 33.3%, or 12 out of 36 people). This suggests that the overall category choice, that is, the likelihood of choosing a product, is not sensitive to aisle width. Note that there was also no significant difference in the total donation amount pledged by those in each group who indicated that they would donate ($M = \$4.86$ and $M = \$5.17$ for narrow aisle and wide aisle conditions, respectively; $F < 1$).

Importantly, however, we did observe a significant treatment effect of aisle width on the allocated donation amount. We analyzed the data via a 2 (aisle width) × 2 (charity type) mixed design, with the latter (amount allocated to either charity type) as a within-subjects factor. The two-way ANOVA revealed a significant interaction term ($F(1, 24) = 5.96$, $p < .03$). Further analyses revealed that the total amount allocated to the three familiar charities was \$4.29 in the wide aisle condition, but only \$1.93 in the narrow aisle condition, a marginally significant difference ($F(1, 24) = 3.41$, $p < .08$). Most interesting, the amount donated to unfamiliar charities in the narrow aisle condition ($M = \$2.93$) significantly exceeded the amount donated to these charities in the wide aisle condition ($M = \$0.88$; $F(1, 24) = 5.79$, $p < .03$). In other words, the narrow aisle prompted more variety seeking by increasing the market share of the lesser-known, unique brands (charities), but it did not affect overall category-level choice (i.e., the total donation amount).

Discussion

Study 2 extends the results of study 1 by offering a different instantiation of variety seeking, namely, the choice of more unique, lesser-known brands. While people in the narrow aisle condition did not differ in their category-level choice (i.e., donation likelihood and total donation amount), they were more likely to allocate their donation to the unfamiliar charities. Furthermore, our body state measures confirm that the narrow aisle evoked greater feelings of confinement but did not affect positive and negative moods. Finally, the results cast doubt on the alternative that the behavior we observe by participants in the narrow aisle condition was random because seeking variety in this case was associated with a financial cost.

STUDY 3: INDIVIDUAL DIFFERENCES IN REACTANCE AND THE CONFINEMENT EFFECT

We have interpreted our results in studies 1 and 2 in light of reactance theory: participants react against the physical confinement by seeking variety in their choices. In the current experiment, we test the effect of reactance directly by measuring participants' chronic reactance tendencies using the Hong Psychological Reactance Scale (Hong and Faedda 1996). The Hong scale assesses individuals' chronic tendency to experience reactance. We anticipate that the effect of aisle width on variety seeking will be particularly acute for those who score high on this scale. Once again, we create a sense of confinement by varying the width of the aisle.

Method

Eighty-two participants from Columbia University were recruited in exchange for a \$5.00 payment. The procedure was similar to that of study 1. Participants were randomly assigned to a wide aisle (7 feet; $n = 39$) or a narrow aisle (3 feet 6 inches; $n = 43$) condition. A table was placed at the end of the aisle. Unlike study 1, in this study participants were seated at the table and asked to complete a series of tasks, including the focal choice task. The choice task entailed selecting any combination of five candy bars out of nine possible brands (Milky Way, Aero, Kit Kat, M&Ms, Hershey's Almond, York Peppermint Patty, Oh Henry, Reese's Peanut Butter Cups, and Mr. Goodbar) by marking where appropriate on a questionnaire sheet. Participants were told that they would receive their choices following the experiment. The final task of the experiment was the Hong Psychological Reactance Scale (Hong and Faedda 1996), which was presented to participants as a separate study. Sample items in this scale are "When something is prohibited, I usually think, 'That's exactly what I am going to do'" and "I become angry when my freedom of choice is restricted." After completing the scale, participants were thanked, paid, and given their chocolate selections.

Results

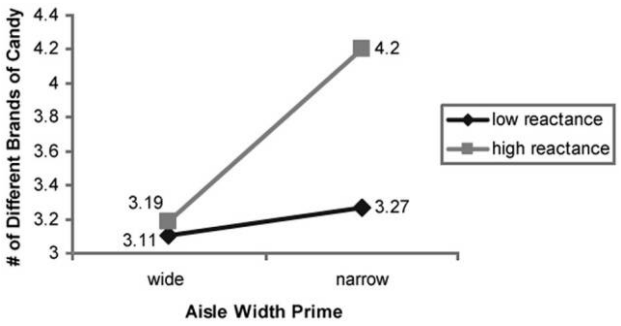
In order to test our hypothesis that the confinement manipulation would exert the greatest effect on highly reactive people, we used the procedures outlined by Aiken and West (1991) to test and decompose our predicted interaction using multiple regression. First, participants' reactance scores were mean-centered by subtracting the mean reactance score

from all observations. Second, we contrast-coded the aisle width factor and created the interaction term of aisle width by (mean-centered) reactance score. Next, we regressed the number of different candy brand choices on aisle width, mean-centered reactance score, and the interaction between these two variables.

The analysis revealed our expected main effect of aisle width ($\beta = .291$, $t = 2.73$, $p < .01$), such that participants in the narrow aisle condition chose a greater variety of candy bars than those in the wide aisle condition ($M = 3.67$ vs. $M = 3.15$, respectively). More important, this main effect was qualified by a significant interaction of aisle width by reactance ($\beta = .041$, $t = 2.00$, $p = .05$), which we probed further using a spotlight analysis. To this end, reactance was plotted at one standard deviation above and below the mean, which enabled us to observe the simple effect of aisle width for high versus low reactance participants (for details on this procedure, refer to Irwin and McClelland [2003]). As can be seen in figure 2, decomposition of the interaction term at one standard deviation above and below the mean revealed that there was a significant effect of the aisle width manipulation for participants high in reactance ($\beta = .505$, $t = 4.82$, $p < .001$) but not among those low in reactance ($\beta = .077$, $t = 0.73$, $p > .46$). In particular, for highly reactive participants, the narrower aisle led to greater variety seeking in candy choices than did the wider aisle.

FIGURE 2

STUDY 3: EFFECT OF AISLE WIDTH AND REACTANCE ON CANDY VARIETY



NOTE.—Low and high reactance plotted at one standard deviation below and above the mean. Color version available as an online enhancement.

Discussion

The data and moderation analysis suggest that reactance is the underlying psychological factor driving our observed choice patterns. The effect of confinement on variety seeking was accentuated among highly reactant participants and attenuated among participants who were low in reactance. This result is also important in light of the potential alternative explanation that the greater variety that we have observed in the narrow aisle conditions is due to random choices. If the candy choices had been random, we would not have observed the interaction with reactance and our (predicted) pattern of simple effects.

STUDY 4: PERCEIVED CONFINEMENT AND VARIETY SEEKING

In the previous studies, we manipulated confinement by creating two aisles that were of radically different widths; participants actually experienced different levels of confinement in each condition. The current study tests whether the effect of confinement on variety seeking can be achieved by manipulating perceived confinement rather than actual confinement. Thus, we place participants in the same aisle, but we vary whether or not they are prompted to think about confinement-related feelings. In other words, we test whether varying attention to confinement—even in the same physical space—is sufficient to produce reactance and therefore lead to greater variety seeking. We set the aisle width at approximately 5 feet and expected that participants who had been prompted to think about confinement-related feelings and concepts would exhibit greater variety seeking than participants who had not been primed.

Method

Eighty-four participants from Columbia University were recruited in exchange for a $5.00 payment. Participants were seated in an aisle approximately 5 feet wide that was created using large gray divider panels. They were given a clipboard with a series of ostensibly unrelated studies, which included two priming tasks (inserted at two different points in the study packet). In the confinement prime group ($n = 41$), the two tasks were intended to draw participants' attention to confinement. Specifically, the first task asked participants to rate how narrow, confined, and constraining the aisle was, as well as their estimate of its width. The second task was a scrambled sentence task that required participants to form six four-word sentences, each out of a list of five words. The target sentences were associated with confinement concepts such as, "I need more room." In the control group ($n = 43$), participants were asked about their college experience, and the scrambled sentence task included target sentences that are unrelated to confinement, such as "She listened to music."

After completing the scrambled sentence task, participants were asked to choose three highlighter pens, in any combination, out of six possible colors (purple, orange, blue, pink, green, and yellow). The choice task was presented as part of the questionnaire, but participants were told that they would receive their selections following the experiment. After completing the choice task, participants were thanked, paid, and given their chosen highlighters.

Results

The results suggest that a perception of confinement is sufficient to induce variety in people's choices. Participants in the confinement prime condition selected a greater variety

of colors than their control condition counterparts (M = 2.85 vs. M = 2.62, respectively; t = 1.94, p = .055).

Discussion

This experiment is noteworthy because it suggests that simply varying perceptions of confinement rather than actual physical confinement appears to evoke reactance and variety seeking. The fact that a perception is sufficient to generate our effect raises the question of what would happen if people perceived their space to be wide. Although the correlation between perception of width and variety seeking that we report in study 1 suggests a response to this question, in order to examine this issue experimentally, we added a condition (n = 36) to the current study, where the priming tasks induced participants to think about how the aisle they are in is wide, open, and expansive. Participants' degree of variety seeking in this "wide" prime condition did not differ from that of those in the control condition (t = .08, NS), and it was less than that of those in the confinement prime condition (t = 1.76, p = .08).

STUDY 5: CONFINEMENT EFFECTS IN THE MARKETPLACE

Studies 1–4 demonstrate the effect of actual spatial confinement on variety seeking in laboratory conditions. Our next study aims to conceptually replicate this effect in a real world purchase context. For this purpose, we obtained data of actual purchases over the course of a month in a select number of grocery stores belonging to a large U.S.-based supermarket chain. As this is a secondary data analysis, where we could not manipulate the actual width of the aisles, we use a proxy measure for physical confinement: customer density in the store during the time of a given transaction. Density and/or crowding are commonly considered instantiations of spatial confinement in the crowding literature (Stokols 1972). We predict that increasing customer density, presumably creating greater feelings of confinement, should lead to more variety seeking in customers' grocery purchases.

Data

The data include all the transactions completed in January of 2006 by customers at 455 stores that belong to a major U.S. supermarket chain. The list of stores was randomly determined from the chain's entire set of locations. The 455 stores were distributed over 18 states and 432 unique postal codes. Our initial data set included 172,165,395 transactions, with each transaction defined as a purchase made by an individual in a unique category. So, for instance, if a customer had purchased two bags of pretzels, this was coded as one transaction because both items are in the same category; if the customer had purchased one bag of pretzels and one can of soda, this was coded as two transactions because each item belongs to a different category. Each customer was distinguished by a unique identifier, such that it was possible to ascertain the contents of the customer's entire shopping basket (i.e., all his or her transactions) on any given purchase occasion. The data set included all purchases in all categories available in each of our sampled stores. (According to the company furnishing the data, all UPCs [universal product codes] available in a store are purchased at least once in the course of a month.) Each transaction was time-stamped and included the purchase price, any markdown amount, and the number and identity of each UPC purchased in the category. From the data set, we were able to compute the number of categories available in a given store, the number of UPCs in a given store, and the average markdown amount for each category sold. As we are interested in variety seeking behavior, we only included transactions that contained two or more items in a category (whether or not they had the same UPC), thus resulting in 94,110,967 usable transactions out of the original total.

Analysis

Our dependent variable was a variety seeking index that captured the extent of variety in a transaction. For each customer, this was computed by dividing the number of unique UPCs purchased in a category by the total number of UPCs purchased in that category. In other words, if on a given purchase occasion a customer had purchased two raspberry and three strawberry yogurts, his or her degree of variety for that category would be 2/5. Maximal variety, that is, if the customer had purchased five yogurts of five different flavors, was 1. In order to conduct an ordinary least squares regression using this variety index, we used its log odds, log(variety/(1 − variety)), as the dependent variable. (Note that, in cases of maximal variety, this calculation would be impossible because of a division by zero. Thus, all variety indexes that equaled 1 were converted to 0.999, a common practice when using log odds.) The index was regressed on a series of independent variables, including our customer density measure (details below).

Our independent variables included a number of store, category, and customer control variables. The *store variables* included the total number of categories sold in the store, the store's total monthly sales, whether it is in an urban or rural area as defined by the U.S. Census, and the store's total selling area in square feet. The *category variables* included the total number of UPCs available in that category, the category's mean price, and the mean markdown in the category. The *customer measures* included the total basket size in dollars, the time of day in which the purchase was made (for this purpose we created a number of dummies—a 6-hour block beginning at midnight, a 4-hour block beginning at midnight, and a weekday/weekend variable), the percent of people in the store's zipcode whose income is above $75,000 according to the U.S. Census, and the percent of people in the store's zipcode who are college educated. The customer variables are critical because they can help rule out the alternative explanation that any variety seeking that we find is due to customers in more crowded stores possessing unique characteristics that cause them to be variety seekers. In this regard, the basket size variable

TABLE 1

STUDY 5: INDEPENDENT VARIABLES USED IN THE REGRESSION MODEL

Customer variables:
- Basket size in dollars
- Percent with income > $75,000 in zipcode
- Percent college educated in zipcode
- Time-of-day dummy

Category variables:
- Total number of UPCs in category
- Category mean price
- Category mean markdown

Store variables:
- Total number of categories sold in that store
- Store monthly sales in dollars
- Total selling area in square feet
- Rural/urban dummy

Confinement variable:
- Number of customers at time of target transaction/ Total selling area in square feet

is intended to control for the fact that customers who purchase more products are perhaps more likely to make varied purchases. The time-of-day dummy is intended to control for the fact that different profiles of customers make their purchases at different times. Finally, the demographic variables are intended to control for the possibility that wealthier and more educated customers will be more likely to preference test by seeking variety. Indeed, recent research documents an association between social class and making more unique choices (Stephens, Markus, and Townsend 2007). Although clearly this list is imperfect, we believe that it eliminates a significant proportion of the alternatives that may account for a variety seeking effect. See table 1 for a summary list of the control variables.

Finally, our critical independent variable is a measure of customer density. This was computed by dividing the total number of customers who completed transactions during the hour of the target transaction by the total selling space in square feet. So, for instance, if a given transaction occurred at 2:12 p.m., then the numerator of the customer density measure is the number of customers who completed a transaction between 2:00 p.m. and 2:59 p.m. Hence, a customer completing his or her transaction at 2:48 p.m. would be assigned the same density measure.

Next, we conducted a regression for each category in which we regressed our variety seeking index on the independent variables described above (we ran separate regressions for each time-of-day dummy). Our prediction was that customer density would be positively related to the variety seeking index.

Results

We analyzed a total of 705 categories. Table 2 presents the results of the analysis using the different time block dummy variable (6-hour block, 4-hour block, and weekend/weekday). The results support our hypothesized link between confinement and variety seeking: 73%, 67%, and 68% of the categories had a positive customer density coefficient for the 6-hour block, 4-hour block, and weekday/weekend blocks, respectively. Of these positive coefficients, approximately half were significant at conventional alpha levels of .05. In contrast, only about a quarter of the negative, hypothesis-disconfirming coefficients were significant (note that these represent no more than 8.5% of the total number of categories in the analysis). Table 3 presents the results for a list of categories that have been studied in past marketing research about variety seeking. It is noteworthy that 16 of the 18 categories yield positive and statistically significant customer density coefficients, confirming our hypothesis. In addition, table 4 documents 10 other notable categories where the customer density coefficient is positive and significant.

In order to ascertain the statistical robustness of the pattern of results, we conducted a meta-analysis using the sum of *Z*'s method (see Cooper and Hedges 1994, 222). This method allows us to combine the magnitude and direction of the statistical significance of the customer density parameter for all the 705 categories. A positive and significant *Z*-score indicates that the pattern of positive density coefficients is significant. The data indeed support our hypothesis that spatial confinement (in this case, more crowded stores) is associated with greater variety seeking: the *Z*-scores were 53.65, 37.66, and 59.56 for the 6-hour, 4-hour, and weekday/weekend blocks, respectively.

In addition, we probed our results further by partitioning the data according to deciles of customer density. We then conducted the same 705 category-level regression analyses detailed above for each decile (using the 6-hour time dummy), and computed the *Z*-scores as a way to characterize and test the significance of the pattern of positive versus negative customer density coefficients for each decile block. We expected to find larger *Z*-scores in the higher deciles, that is, the deciles that contained higher customer densities. Figure 3 plots the *Z*-scores for each decile. As can be seen from the graph, the *Z*-scores are small and sometimes not significant in the lower ranges of customer density but are larger and highly significant in the upper ranges of customer density.

TABLE 2

STUDY 5: OVERALL RESULTS FOR FIELD DATA

	Positive density β		Negative density β		
Time dummy	Significant (%)	Not significant (%)	Significant (%)	Not significant (%)	*Z*-score
6 hour	37 (262)	36 (250)	6 (44)	21 (148)	53.65
4 hour	32 (223)	35 (249)	8 (53)	25 (179)	37.66
Weekend	39 (272)	29 (207)	8 (58)	24 (168)	59.56

NOTE.—The table reports the results for regressions conducted using the various dummy variables for time of day. Numbers in parentheses represent the raw number of categories. The last column reports the results of the meta-analysis for each set of regressions.

This supports the hypothesized positive association between customer density and variety seeking.

Discussion

The result of this field study offers a real-world instance of how confinement affects variety seeking and is intended to complement the laboratory studies that we conducted. Although any secondary data analysis is always vulnerable to potential alternative explanations, we have attempted to sidestep such pitfalls using the customer variables that were at our disposal. The shape of the plot we obtain when we disaggregate the data into deciles buttresses our conjecture of a causal link between crowding and variety seeking. It is clear from the "hockey stick" shape of the plot that the highly crowded moments are driving our results. Note that, by including basket size in our model, we control for the possibility that shoppers decided to abandon the store earlier during the more crowded times, a tendency that has been alluded to elsewhere (Grossbart et al. 1990). In our data the correlation between customer density and basket size, both in dollars and in number of items, was actually positive and quite low (.037 and .031, respectively, $p < .0001$ in both cases; for this analysis we needed to include the entire data set, including transactions containing single purchases). In other words, customer density appears to have a very small effect on overall purchase likelihood.

GENERAL DISCUSSION

In this article, we test the hypothesis that spatially confined consumers react against an incursion to their personal space by making more varied and unique choices. We present the results of four experiments and one field study. The first experiment documents our basic effect: people placed in a narrow, confining aisle seek greater variety in their candy bar choices than people placed in a wide aisle. We also document a significant correlation between people's ratings of space and their choices. In the second experiment, we show that the same manipulation of space leads to greater variety and more unique choices in donation decisions. Furthermore, we show that the link between our effect and variety seeking is not due to differences in mood. Finally, this experiment also shows that, while spatial confinement affects product choice, it does not affect the likelihood of overall category purchase. Experiment 3 links our findings in the first two studies with psychological reactance. We find that confinement exerts the strongest effect on choices for participants who score high on a chronic reactance scale. Our fourth experiment shows that the effect of confinement on choices can also be achieved simply by altering people's perceptions of confinement rather than actual confinement. Finally, our field study buttresses our experimental results using real grocery purchases. We find a positive relationship between store crowding—a proxy for confinement—and variety seeking in a significant proportion of categories sold.

From a theoretical perspective, our work can be viewed in the context of research on store atmospherics (Kotler 1973) and environmental psychology. With few exceptions (see, e.g., Harrell, Hutt, and Anderson 1980; Hui and Bateson 1991), previous consumer research has focused on intangible atmospheric variables. Furthermore, the few papers that have investigated the effect of tangible, fixed physical elements have focused primarily on judgments, such as satisfaction ratings (see Turley and Milliman [2000] for a review; Meyers-Levy and Zhu 2007b). To our knowledge, this article is the first investigation into physically tangible, spatial factors on actual consumer decisions. Our results suggest that the extensively studied notion of contextual influence on consumer decisions can be extended to environmental/physical context factors as well. In addition to extending research on environmental psychology in marketing and expanding the purview of context effects on choice, our empirical finding also

TABLE 3

STUDY 5: BETAS OF CUSTOMER DENSITY AND STANDARD DEVIATIONS FOR CATEGORIES PREVIOUSLY STUDIED IN THE MARKETING LITERATURE

Category	β	SD
Cold Cereal	9.17****	.93
Hot Cereal	5.52*	2.37
Carbonated Soft Drinks	38.67****	.84
Refrigerated Yogurts	7.37****	.61
Main Meal Commercial Fresh Bread	38.48****	3.76
Lunch, Commercial Fresh Bread	25.76****	1.10
Breakfast Commercial Bread	23.70****	2.47
Rolls	6.18**	2.00
Fruit Snacks	11.47****	2.82
Salty Snack	35.88****	10.34
Ready to Serve Soup	16.19****	1.23
Frozen Fruits	35.31****	13.40
Coffee	35.26****	6.98
Beer	40.47****	2.10
Main Meal Loaves	25.53****	3.08
Cheese Snacks	33.72****	8.08
Canned Fish	−4.11**	1.42
Cigarettes	−9.41**	3.51

*$p < .05$.
**$p < .01$.
****$p < .0001$.

TABLE 4

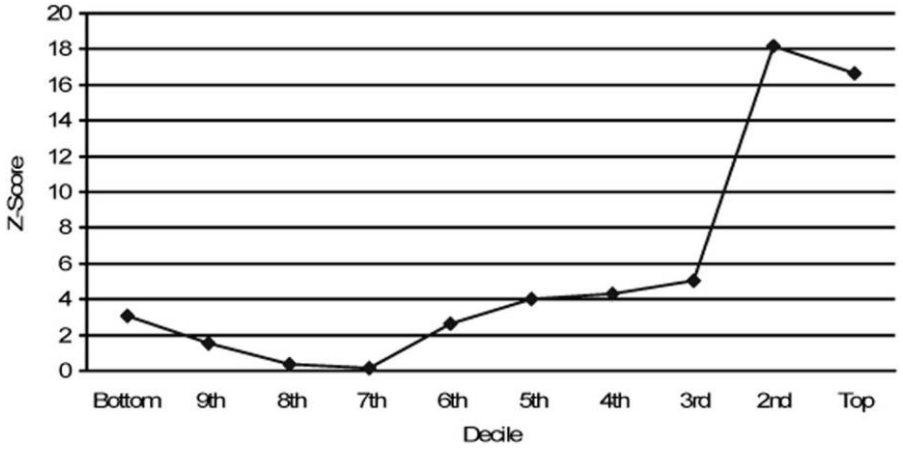
STUDY 5: BETAS OF CUSTOMER DENSITY AND STANDARD DEVIATIONS FOR OTHER NOTABLE CATEGORIES IN THE DATA

Category	β	SD
Microwave Prepared Foods	26.40****	6.18
Jams/Jellies/Preserves	16.46****	3.12
Potato Chips	28.43****	2.30
Dessert and Ice Cream Toppings	31.18****	6.22
Natural/Gourmet Juices and Drinks	23.38*	10.93
Canned Prepared Beans	18.00****	2.16
Frozen Juice	29.83****	6.05
Canned Chili	8.94**	3.03
Dips and Salsa	50.49****	4.67
Deli Cheese	27.59****	2.52

*$p < .05$.
**$p < .01$.
****$p < .0001$.

FIGURE 3

STUDY 5: PLOT OF *Z*-SCORES FOR EACH DECILE OF CUSTOMER DENSITY



presents a novel consequence of reactance and a novel antecedent for variety seeking.

The managerial implications of our research are potentially important for store stocking decisions and for new product introduction. In grocery settings, manufacturers pay substantial sums for shelf placement. Our results suggest that, in larger, less crowded stores, manufacturers should be less keen to deliver a wide variety of products in a category and should instead focus on stocking a few of their better-known or dominant product offerings. In contrast, manufacturers should prefer to deliver a greater variety to more crowded stores, as customers in those stores will be more likely to diversify their choices in a category. Similarly, manufacturers who engage in a multibrand strategy (e.g., Procter and Gamble) should offer their lesser-known brands in the more crowded stores or, where possible, in relatively narrow store aisles. Finally, although intuitively one might think that more spacious environments are more desirable in retail settings (see, e.g., Harrell et al. 1980), the results of study 2 suggest that a smaller (but still passable) space might be beneficial when promoting new and unique products.

Our findings also raise a number of interesting questions that merit future research. First, is our observed effect culture specific? Different cultures have differently sized proxemic bubbles. Westerners expect a certain (relatively high) degree of personal space, and as a result they may be more apt to view spatial confinement as a perceived threat to freedom. In contrast, the proxemic bubble of East Asians or Middle Easterners is considerably smaller (Altman, Rapoport, and Wohlwill 1980), making the kind of confinement that we create in our experiments seem less threatening. Thus, it is likely that our manipulations would only be effective in Western cultures. And even in the event that feelings of confinement were evoked, Easterners would be unlikely to respond by seeking variety, because, unlike Westerners, they are unlikely to view such an act as a way to assert freedom of choice (Kim and Drolet 2003). Future research might examine the cross-cultural applicability of our findings and the effect of spatial confinement in Eastern cultures.

Second, although our focus here is on variety seeking, spatial constraints might affect other choice variables as well. For instance, customers in narrower aisles may be more or less susceptible to certain kinds of promotions, such as compromise alternatives or store-promoted goods. Third, spatial constraints and the reactance they evoke may affect personal selling situations. Fitzsimons and Lehman (2004) report that reactance leads consumers to reject offers made by recommendations agents; spatial constraints might lead to a similar rejection. Fourth, might spatial constraints affect the evaluation of certain kinds of products and in that way influence their choice? For instance, it is possible that the reactance evoked by the confining aisles in our studies made certain options, such as lesser-known charities, more attractive. As populations grow and urban areas become more crowded, the need to understand the effect of spatial constraints on consumer decisions will become acute.

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