The Influence of Ceiling Height: The Effect of Priming on the Type of Processing That People Use

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This article demonstrates that variations in ceiling height can prime concepts that, in turn, affect how consumers process information. We theorized that when reasonably salient, a high versus low ceiling can prime the concepts of freedom versus confinement, respectively. These concepts, in turn, can prompt consumers' use of predominately relational versus item-specific processing. Three studies found support for this theorizing. On a variety of measures, ceiling height–induced relational or item-specific processing was indicated by people's reliance on integrated and abstract versus discrete and concrete ideation. Hence, this research sheds light on when and how ceiling height can affect consumers' responses.

There appears to be widespread belief that ceiling height can affect the quality of indoor consumption experiences. Fischl and Gärling (2004) found that ceiling height ranked among the top three architectural details that influenced consumers' psychological well-being. Much anecdotal evidence also supports this view. A home development company that uses design ideas inspired by the guru of transcendental meditation maintains that homes with higher ceilings induce clearer and improved thinking, more energy, and better health among residents (Bivins 1997). Airplane manufacturers seem to concur that higher ceilings can enhance consumers' consumption experience, even if the increased height is only illusory. Such manufacturers use numerous techniques to engender the illusion of increased vertical space or volume in plane interiors, including repositioning overhead baggage bins, installing gently arched illuminated ceiling panels, and affixing wavy mirrors on the bulkheads beneath overhead storage bins (Lunsford and Michaels 2002).

Despite such anecdotal evidence that ceiling height exerts a critical influence on consumers, we were unable to uncover any theory or research that explains how, when, and why ceiling height might exert an effect. This article seeks to address this issue by investigating the thesis that ceiling height may affect the very manner in which consumers process information and thus how they respond to products. To illustrate, suppose that you were shopping for a sleek new coffee-table and paused to evaluate how sleek one of the contenders truly appeared to be. We propose that different types of concepts might be activated or primed by the showroom ceiling if it were relatively high, as it tends to be in most contemporary mall stores, versus low, as it is in most strip mall shops and outlet centers. Relatively high ceilings may prime thoughts related to freedom, whereas lower ceilings may prompt those that pertain to confinement. We suggest that, in turn, these alternative concepts may affect the particular manner in which consumers process information, namely, whether they rely on relational or item-specific processing. Finally, the type of processing that is used could alter how consumers elaborate and ultimately evaluate the table's features.

The preceding notion that ceiling height might prime certain concepts or networks of associations that then affect how people process product information is quite novel. Clearly, it is well established that exposure to particular objects can prime concepts that are related to them (e.g., Aarts and Dijksterhuis 2003; Garcia et al. 2002) and that the heightened accessibility of such primed concepts can spill over and affect people's perceptions or even their overt behaviors (Bargh, Chen, and Buorlaaar7ps; Mandel 2003). However, it is typically assumed that such occur

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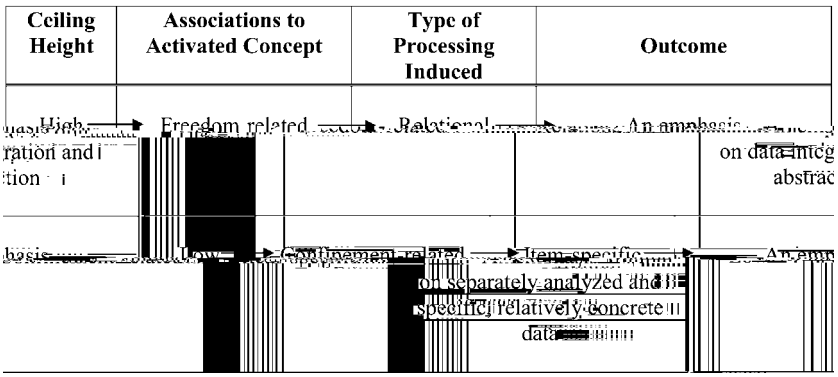
John Deighton served as editor and Gavan Fitzsimons served as associate editor for this article.

Electronically published June 1, 2007

FIGURE 1

MODEL OF THE MECHANISM BY WHICH CEILING HEIGHT CAN AFFECT TYPE OF PROCESSING



sterhuis (2003), we assessed this question by developing two tasks that should be sensitive to these two concepts. The first assessed whether high versus low ceiling height can activate such freedom-related versus confinement-related concepts and thereby influence individuals' current perceived body state (i.e., their feelings of being relatively free vs. confined). Because we expected that individuals would be sensitive to the ceiling height–induced primes, those in a room with a fairly salient high (low) ceiling would report a higher (lower) freedom-related body state but a lower (higher) confinement-related body state.

A second task involved solving several anagrams by rearranging their letters so that each formed a word. In three different conditions, the words that could be formed were semantically related to the concept of freedom, related to that of confinement, or unrelated to either concept. If, per our theorizing, a fairly salient high (low) ceiling primes freedom-related (confinement-related) concepts, individuals in a higher ceiling room should exhibit faster response times (RT) when solving freedom-related anagrams, slower RT when solving confinement-related ones, and equivalent RT when solving unrelated anagrams. More specifically:

H1a: Individuals in a room with a fairly high versus low ceiling should experience higher levels of a freedom-related body state but lower levels of a confinement-related body state.

H1b: Individuals in a room with a high versus low ceiling should exhibit faster RT when solving freedom-related anagrams, slower RT when solving confinement-related anagrams, but equal RT when solving anagrams unrelated to either concept.

Method

Stimuli. Experiment 1 was conducted in four rooms that were identical except for ceiling height. Although each room had a 10-foot ceiling, a professional engineer installed false ceilings in two of the rooms. This was done by fashioning new ceilings out of foam board and lowering the rooms' ceiling height to 8 feet. Eight- to 10-foot ceilings were selected because they are common in both residential and commercial settings. The false ceilings looked natural. Further, to make the ceiling height reasonably salient, we hung three colorful Chinese lanterns (on average, 14 inches in diameter) from the ceiling, which should enhance participants' attentiveness to the ceiling height. Sample pictures of the rooms are presented in appendixes A (fig. A1) and B (fig. B1).

The study was computer administered and consisted of two tasks. In the first, participants were asked to rate the degree to which six different items reflected their current body state (from 1 = not at all to 7 = very much). Three of these items reflected freedom-related feelings, namely, a sense of being free, unrestricted, and open. The other three items, which tapped confinement-related body states, queried individuals' sense of being encumbered, inhibited, and confined.

In a second task, participants received and were asked to solve 12-1.11 d,r9624 0 -420tes, th00g anag(The).9(c 0 -m(eceivedwords

screen informed participants that they would be asked to complete several unrelated tasks.

Respondents began by rating their current body state on each of six randomly presented items. Three items were freedom related, and three were confinement related. Next, for the anagram task, 12 randomized anagrams appeared on the screen, one at a time. Participants' RT when solving them was recorded in milliseconds. Finally, demographic questions were asked.

RESULTS

Because two participants failed to complete the tasks, their responses were excluded from further analysis. Thus, data from 30 respondents were analyzed for each task.

Body State Assessment. Each respondent's ratings on the three freedom-related items were averaged to form a freedom body state index ($\propto = .71$). The same was done for the confinement-related items, forming a confinement body state index ($\propto = .84$). A 2 (ceiling height: high vs. low) × 2 (rating index: freedom vs. confinement) within-subjects ANOVA was conducted, revealing a significant interaction ($F(1, 28) = 7.69$, $p < .01$). Consistent with hypothesis 1a, individuals in a high versus low ceiling room reported being in a higher freedom body state ($M_{high} = 5.11$, $M_{low} = 4.29$; $F(1, 28) = 4.48$, $p < .05$) but a lower confinement body state ($M_{high} = 1.89$, $M_{low} = 3.00$; $F(1, 28) = 7.69$, $p < .01$).

Anagram Solving. Response times to the three freedom-related anagrams were averaged to form a freedom anagram RT index. Similar computations were performed to create both a confinement anagram RT index and an unrelated anagram RT index. A 2 (ceiling height: high vs. low) × 3 (anagram RT index: freedom, confinement, unrelated) within-subjects ANOVA revealed a significant interaction involving these two factors ($F(2, 27) = 5.69$, $p < .01$). Planned contrasts supported hypothesis 1b. Participants in the high versus low ceiling room exhibited faster RT to freedom-related anagrams ($M_{high} = 8{,}038.69$, $M_{low} = 14{,}187.02$; $F(1, 28) = 4.50$, $p < .05$) yet slower RT to confinement-related anagrams ($M_{high} = 14{,}988.18$, $M_{low} = 10{,}168.69$; $F(1, 28) = 5.56$, $p < .03$) and comparable RT to unrelated anagrams ($M_{high} = 10{,}449.08$, $M_{low} = 9{,}408.08$; $F < 1$).

DISCUSSION

The results of experiment 1 support the thesis that ceiling height can prime particular concepts. When salient, relatively high ceilings appear to activate concepts related to freedom, while low ceilings prime confinement-related concepts. Yet, while these findings are valuable, support for our theorizing requires evidence for two other propositions. First, the proposed theory contends that ceiling height–primed freedom-related versus confinement-related concepts should stimulate the prevailing use of relational versus item-specific processing, respectively. Second, these effects of ceiling height are deemed likely to emerge only when the salience and thus people's awareness of ceiling height is reasonably high (i.e., people are cognizant of their surroundings, including ceiling height, and are not preoccupied with proximate matters).

Experiment 2 extends the previous study by addressing these issues. Specifically, it examines whether a high versus low ceiling height can affect individuals' reliance on relational versus item-specific processing, respectively, which in this study is indicated by the degree of integration and abstractness of participants' ideation. As Einstein and Hunt (1980, 597; emphasis added) note, because relational processing requires the encoding of shared relations between items that often possess minimal, if any, commonalities, it fosters "the *abstraction* of similarities." In other words, identifying such between-item relations generally entails discerning higher order, abstract points of intersection among the items. In contrast, item-specific processing entails the encoding of the context-specific details possessed by each individual item. As numerous researchers have proposed (Nussbaum, Trope, and Liberman 2003; Semin and Fiedler 1991), such a focus on the context-specific aspects of items fosters relatively concrete ideation.

Yet, importantly, differences in such abstractness of ideation induced by ceiling height should be moderated by individuals' awareness of the ceiling height. Indeed, if, ceiling height goes unnoticed (e.g., consumers are preoccupied with proximate matters), it is unlikely to activate the concepts primed by high or low ceiling height and hence produce no effect on type of processing. Thus, ceiling height should affect people's use of relational or item-specific elaboration only when it was relatively salient, rendering individuals reasonably attentive to it.

EXPERIMENT 2

Overview and Hypotheses

Experiment 2 assessed whether a high versus low ceiling height prompts individuals to employ alternative types of processing (i.e., relational vs. item specific), provided that ceiling height is sufficiently salient. To examine this, we varied ceiling-height salience and devised two different tasks that we reasoned would be sensitive to the type of processing participants used.

The first was a categorization task in which participants received a list of disparate items within a broad category (i.e., different sports). They were asked first to identify as many dimensions as they could that were shared by the items (e.g., equipment required for the sport, as some sort of apparatus was needed for each sport). Then, for each dimension, they were requested to categorize the items into subgroups based on each item's value on the dimension (e.g., the type of equipment needed). Last, they provided descriptive labels for all the subgroups.

The type of processing individuals used was expected to

be manifested on several indicators. First, individuals in a high versus low ceiling room should identify a larger number of shared dimensions. This follows because these individuals' proposed greater reliance on relational versus item-specific elaboration should prompt them to discern more connections among the disparate stimulus items. Second, those in a high rather than a low ceiling room also should identify more dimensions that are abstract (vs. concrete) in nature. This should ensue because the relational elaboration presumably favored by those in a high versus low ceiling room should foster "general relationships abstracted from the instances" (Einstein and Hunt 1980, 597). In contrast, the item-specific elaboration favored by those in a lower ceiling room should spawn more context-specific, precise associations to each item, and these reflect relatively concrete ideation (Liberman, Sagristano, and Trope 2002; Semin and Fiedler 1991). Third, due to their greater reliance on relational versus item-specific elaboration, individuals in a high versus low ceiling room should assign the stimulus items (i.e., sports) into fewer subgroups per dimension. This follows because relational processors' more extensive search for shared and more abstract relations among items should prompt the production of more inclusive categories (i.e., fewer subgroups) comprising seemingly disparate items (Isen 1987; Liberman et al. 2002; Seibt and Forster 2004).

A second task, one of more direct consumer relevance, entailed evaluating two products. Individuals examined two product photos that were chosen because each depicted a product that was quite sleek and streamlined in appearance, except for a few of its features that were relatively crude. Participants were asked to evaluate the degree to which each product was sleek. We reasoned that individuals in a high versus low ceiling room, who presumably favor the use of relational versus item-specific processing, would evaluate the products as more sleek, for their relational processing should encourage sensitivity to the shared aspects of the product features, causing individuals to largely disregard the few aberrant (i.e., crude or nonsleek) ones (Meyers-Levy and Malaviya 1999). However, those in a low ceiling room, who presumably rely primarily on item-specific processing, are likely to be more sensitive to each product's discrete and specific product features, which would include the limited number that do not imply product sleekness (i.e., crude features; Meyers-Levy and Malaviya 1999).

Still, as noted earlier, each of the preceding predictions is based on the qualification that individuals are sufficiently attentive to the ceiling height such that the intended types of concepts are primed. Hence, the following two-way interactions are expected:

H2: When the salience of the ceiling height is relatively high, individuals in a high versus low ceiling room should produce a larger number of shared category dimensions overall, a larger number of abstract (not concrete) dimensions, and a smaller number of subgroups per dimension. Such effects should be absent, however, when ceiling-height salience is low.

H3: When the salience of the ceiling height is relatively high, individuals in a high versus low ceiling room should evaluate the target products as more sleek, but this effect should be absent when the salience of the ceiling height is low.

Method

Stimuli. Ceiling height was manipulated in the same manner as in experiment 1, and each participant completed the study individually in a relatively high (10 foot) or low (8 foot) ceiling room. In addition, the salience of the ceiling height was varied via the placement of three colorful lanterns. In the ceiling height high-salience condition, the lanterns were suspended from the ceiling, as this could attract participants' attention to the ceiling height. In the ceiling height low-salience condition, the lanterns were at or near eye level, with two on the table at which participants were seated and one on the floor.

Stimuli were developed for two tasks. For the categorization task, two research assistants aided in the selection of the stimulus items. Each was supplied with an extensive list of sports and asked to identify as many different dimensions as they could that were shared by the sports, even though the value of the sports on such dimensions might vary (e.g., for the dimension of the equipment required, alternative values included an aircraft, a ball, a sailboat, etc.). Examples of items from a different category were provided to clarify what was meant by the terms "dimensions" and "values." Using the definitions identified by previous researchers (Semin and Fiedler 1988, 1991), the research assistants were encouraged to identify both relatively concrete dimensions that could be verified objectively (e.g., the equipment required for the sports) and those that were abstract, defined as ones that were subjective and could not be readily verified (e.g., the intensity of the sport). Employing such input, 10 sports items were selected (i.e., sky surfing, basketball, sailing, swimming, parachuting, boxing, chess, fishing, soccer, and cycling) because these sports vary on a number of abstract and concrete dimensions.

For the second task, product evaluation, photos of a coffee-table and a wine rack were used. These were selected based on the comments of individuals in a small focus group, who agreed that while each product possessed a sleek or streamlined overall appearance, each also featured certain details that were rather crude (e.g., protruding knots in the wood of the coffee-table; see sample product photo in app. C, fig. C1). Four evaluation items that tapped the degree of product sleekness were chosen as the dependent measures. On a seven-point scale, the anchors of the items were rough/sleek, crude/polished, coarse/refined, and organic/cultivated design. The four items exhibited acceptable reliability levels ($\alpha = .74$ and .80 for coffee-table and wine rack, respectively) and thus were averaged to form separate product evaluation indexes.

Procedure. A total of 100 Rice University students were recruited to participate individually in the study in

TABLE 1

TREATMENT MEANS AND STANDARD DEVIATIONS FOR EXPERIMENT 2

	Low ceiling-height salience		High ceiling-height salience	
	Low ceiling	High ceiling	Low ceiling	High ceiling
Categorization task (sports):				
Total number of dimensions generated	3.54^{b}	3.60^{b}	3.24^{b}	4.39^{a}
	(.92)	(1.18)	(1.03)	(1.40)
Average number of subgroups per dimension	2.40^{ab}	2.55^{b}	2.55^{b}	2.27^{a}
	(.47)	(.42)	(.63)	(.22)
Degree of abstraction of dimensions	1.34^{b}	1.33^{b}	1.37^{b}	1.55^{a}
	(.26)	(.24)	(.26)	(.20)
Product evaluation task (degree of sophistication):				
Coffee-table	4.44^{ab}	4.12^{b}	4.11^{b}	4.73^{a}
	(1.02)	(1.07)	.85)	(1.12)
Wine rack	5.95^{a}	5.67^{ab}	5.40^{b}	6.10^{a}
	(.68)	(.96)	(1.02)	(.49)
Number of respondents	25	29	24	22

NOTE.—Means within the same row that do not share a common superscript differ at $p < .05$.

exchange for $5. Upon arrival, participants were escorted to a high (10 foot) or low (8 foot) ceiling room. As in experiment 1, at the start, each participant was left alone in

so we could not use this level. Hence, three levels of abstraction, ranging from most concrete to most abstract, were adapted from the LCM and used to identify how abstract all identified dimensions were. Using our own labels, the following elucidates the criteria we used to define each level.

The first and most concrete level, labeled objectively interpreted dimensions (OID), consists of dimensions whose interpretation is "easily verified" (Semin and Fiedler 1988, 559), for it is "objective [from] observable events" (Semin and Fiedler 1991, 5). Examples include sports dimensions such as "the physical environment where the sport occurs" and "the number of sport participants," for the value of each sport on such dimensions can be determined quite objectively. The second level, labeled subjectively interpreted dimensions (SID), consists of dimensions that are less verifiable (Semin and Fiedler 1988) and thus require considerable "interpretation beyond [the] description" (Semin and Fiedler 1991, 5). These are exemplified by sports dimensions like "intensity level of sport" and "age of sport participants" because interpreting the value of each sport on these items is a more subjective judgment that is open to variable interpretation. At the third, highly abstract level are dimensions that reflect one's psychological (i.e., emotional or mental) state in relation to the items (e.g., sports). Labeled as psychological state dimensions (PSD), examples include "sports I would (not) like to play" and "sports that people feel are challenging." These dimensions are both highly interpretative and decontextualized.

Using these criteria, two trained judges who were blind to the experimental conditions coded all identified sports dimensions into one of these abstraction levels, with coding OIDs = 1, SIDs = 2, and PSDs = 3. Interjudge reliability was high ($r = .94$). Then each participant's overall value of dimension abstraction was determined using the same formula employed by Semin and Fiedler (1988). Specifically, the frequencies of OIDs, SIDs (multiplied by two), and PSDs (multiplied by three) were summed. This result was then divided by the total number of dimensions identified by each participant. This produced a score that ranged from one to three.

The predicted two-way interaction of ceiling height and ceiling-height salience emerged on each of the dependent measures, namely, total number of dimensions identified ($F(1, 95) = 5.69$, $p < .02$), the degree of abstraction of the dimensions ($F(1, 95) = 4.00$, $p < .05$), and the average number of subgroups formed per dimension ($F(1, 95) = 5.97$, $p < .02$). Further, planned contrasts revealed that, as anticipated, when the salience of the ceiling height was relatively high (i.e., the lanterns hung from the ceiling and thus increased attentiveness to ceiling height), participants in the high versus low ceiling condition produced a larger number of dimensions ($F(1, 95) = 11.93$, $p < .001$), greater abstraction in the sports dimensions that they identified ($F(1, 95) = 6.00$, $p < .05$), and a smaller average number of subgroups per dimension ($F(1, 95) = 4.73$, $p < .05$). These differences were absent, however, when the salience of the ceiling height was low (p's $> .21$; lanterns were placed at or near eye level, thereby limiting attention to the ceiling height).

Product Evaluations. An interaction of ceiling height and ceiling-height salience also emerged on evaluations of both the coffee-table ($F(1, 95) = 5.67$, $p < .02$) and the wine rack ($F(1, 95) = 8.50$, $p < .01$). Planned contrasts revealed that, as predicted, when the salience of the ceiling height was high, participants in high versus low ceiling rooms evaluated both the coffee-table ($F(1, 95) = 4.55$, $p < .05$) and the wine rack ($F(1, 95) = 8.11$, $p < .01$) as more sleek. However, when ceiling-height salience was low, such differences in product evaluation were absent (p's $> .22$).

DISCUSSION

The results of this study build on those of experiment 1, which showed that a high (low) ceiling height can prime thoughts that relate to the concept of freedom (confinement). Experiment 2 adds to this by showing that such ceiling-height-primed thoughts can prompt relational (item-specific) processing, as indicated by the degree to which people's responses reflect heightened use of fairly integrative and abstract (discrete and concrete) ideation. Specifically, individuals who completed the study in a high versus low ceiling room appeared to rely predominately on relational elaboration and therefore identified more dimensions shared by a number of rather dissimilar items, exhibited a greater degree of abstraction in the dimensions they identified, and sorted these items into fewer and thus more inclusive subgroups per dimension. Further, and of more direct relevance to consumer settings, those in a high versus low ceiling room evaluated products as more sleek when they were largely sleek in appearance but did possess some features that were crude. This suggests that individuals emphasized the commonalities among product features (vs. the specifics of each individual feature) when rendering their evaluations. Yet, critically, each of these outcomes was qualified by the salience of the ceiling height, with evidence of relational and item-specific processing emerging only when ceiling height was salient, such that individuals noticed the ceiling height and apparently experienced activation of freedom-related versus confinement-related thoughts.[1]

[1]Importantly, in a separate study, we assessed whether the ceiling-height manipulations used in this and the previous study produced any differences in participants' mood. Using the same ceiling height (high vs. low) and ceiling-height salience (high vs. low) conditions employed in experiment 2, 64 participants' mood was assessed on 12 items, with half of the items representing a positive mood (e.g., happy and cheerful) and the others representing a negative mood (e.g., downbeat and gloomy). As expected, treatment effects were absent on both the positive ($p > .66$) and negative ($p > .13$) mood index. Further, in a different study, we fully replicated our findings on all measures in experiment 2 by priming individuals directly with the concepts of freedom vs. confinement but holding ceiling height constant. Measures verified that our manipulations of the two primed concepts were perceived to be equally favorable and did not affect respondents' mood. Thus, taken together, the results of these two studies suggest strongly that neither differences in the favorableness of the ceiling-height-primed concepts nor ceiling height per se are likely to account for the treatment effects observed in any of our studies.

While the findings of experiment 2 are provocative, they are not without limitations. Some might be more convinced that ceiling height truly prompts alternative types of processing if we used firmly and repeatedly established indicators of relational and item-specific processing. Also, evidence for our theorizing would be bolstered greatly if the freedom and confinement concepts activated by ceiling height were found to mediate measures that reflect people's use of relational and item-specific processing. Experiment 3 seeks to address these issues.

EXPERIMENT 3

Overview and Hypotheses

Previous studies have shown repeatedly that relational and item-specific processing produce different and reliable effects on particular memory measures, namely, recall clustering and cued recall (e.g., Hunt and Seta 1984). Thus, we developed stimuli that would allow us to administer such measures. As in experiment 1, participants completed the study in either a high or low ceiling room, but the salience of the ceiling height was always high, as the lanterns always hung from the ceiling. All participants began by receiving a list of 36 items from six different categories. Later, participants engaged in free recall and then cued recall of the items. The free recall task enabled the assessment of recall clustering of same-category items (i.e., successive recall of such items, which indicates that shared categories were discerned), a measure that has been shown repeatedly to be a reliable indicator of relational processing (e.g., Hunt and Seta 1984; Meyers-Levy 1991). The cued recall task allowed assessment of the number of items recalled per category when category labels were provided. This measure is a proven indicator of item-specific processing (e.g., Hunt and Seta 1984; Malaviya et al. 1996). Finally, individuals rated their current body state on the same freedom-related and confinement-related items used in experiment 1.

If, per our theorizing, a fairly salient high versus a low ceiling primes freedom-related rather than confinement-related concepts and this, in turn, encourages relational versus item-specific elaboration, respectively, people in a high versus low ceiling room should report a higher level of a freedom-related body state, reflecting sensitivity to the high ceiling (i.e., freedom) prime. Further, they should exhibit greater recall clustering during free recall, indicating their prevailing use of relational processing. In contrast, those in the low versus high ceiling room should report a higher level of a confinement-related body state, reflecting sensitivity to the low ceiling (i.e., confinement) prime, and they should produce superior item recall during cued recall, indicating their dominant reliance on item-specific processing. As such, mediation effects can be specified:

H4: When the salience of ceiling height is high, individuals in a high versus low ceiling room should exhibit greater recall clustering during free recall; further, this effect should be mediated by these individuals' heightened freedom-related body state. However, individuals in a low versus high ceiling room should recall more items per category in a cued recall task; this effect should be mediated by their heightened confinement-related body state.

Method

Stimuli. The same high (10 foot) or low (8 foot) ceiling rooms were employed as were used in experiment 1. Also like experiment 1, the lanterns always hung from the ceiling, rendering the ceiling height fairly salient. A 36-item list comprising six items from each of six different categories (e.g., fruits, birds) was created for this study. The items and categories were taken from Battig and Montague (1969). All items were listed in a random order, but no consecutively presented items belonged to the same category.

Procedure. Thirty-four Rice University participants completed the study individually. Each participant was assigned randomly to either a high or low ceiling room, and as in the previous studies, each was left alone in the room for 1 minute while the experimenter retrieved a consent form. The study began by asking participants to rate their current body state on the same six freedom-related and confinement-related items used in experiment 1. Next, participants were instructed to examine carefully the list of 36 multicategory items, for they were told they would make use of them later. Then, to clear memory, participants completed some filler questions. This was followed by an unaided, free recall task that asked participants to record as many of the 36 items as they could. A cued recall task followed. Participants were provided the names of the six represented categories and asked to recall all items from the list, recording each item below its appropriate category name.

RESULTS

Memory and Body State Measures. Because relational processing has been shown reliably to promote clustering of items that belong to a common category, clustering of the multicategory items during participants' free recall was assessed using adjusted ratio of clustering (ARC; Hunt and Einstein 1981). The ARC scores range from 1.0 to −1.0, where 1.0 indicates perfect clustering and zero indicates chance clustering. In addition, item-specific processing has been found to prompt heightened item recall when individuals are cued with the items' category names. Thus, cued recall was assessed by calculating the average number of items recalled per each of the six represented categories.

Results obtained on both memory measures supported the proposition that individuals in a high (low) ceiling room engaged primarily in relational (item-specific) elaboration. Specifically, during free recall, those in a high versus low ceiling room exhibited more recall clustering (i.e., higher

exhibit different responses compared to participants in the high salience/high ceiling height condition.

To assess the plausibility of both of these rival accounts, we conducted an ancillary study. As in experiment 2, ceiling height and ceiling-height salience were manipulated, but in this study we ensured that the low point of the ceiling-hung lanterns was always identical in the high salience/high and low ceiling-height conditions (i.e., the low point of the lanterns was always 6 feet, 7 inches from the floor). Our dependent measures included the product evaluation task and the memory measures that were used in experiments 2 and 3, respectively, as well as separate positive and negative mood indexes (see n. 1 for more details). In addition, we asked our 60 participants how (*a*) comfortable and (*b*) at ease they were, how (*c*) pleasant and (*d*) agreeable they currently felt, and how (*e*) pleasant and (*f*) comfortable it was sitting in the room. Results revealed that participants' responses on the mood and on the six additional comfort- or pleasantness-related affective measures were equivalent across treatments. Hence, treatment-induced differences in mood or affective feelings do not seem to provide a viable account of our findings. Moreover, despite the constant low point of the ceiling-hung lanterns in both of the high ceiling-height salience conditions, the outcomes observed on the product evaluation and memory measures fully replicated those that were reported in experiments 2 and 3. Thus, the second rival explanation, which concerned the low point of the lanterns, also can be ruled out.

The current research makes several important theoretical contributions. It adds to the priming literature by showing that conceptual primes can influence consumers' responses in ways beyond simply affecting the accessibility of the thoughts on which such responses are based (i.e., spillover effects): such primes also can exert influence by determining the very type of processing that consumers employ (i.e., relational or item specific). Further, the present work contributes to the literature on atmospherics by offering a theory that illuminates when and how ceiling height, a neglected atmospheric variable, can affect the manner in which consumers process information and thus explain why such consumers categorize, evaluate, or otherwise respond to stimuli differently. Finally, our research adds to work that suggests ways by which different types of processing might be induced (e.g., Malaviya et al. 1996; Malaviya, Meyers-Levy, and Sternthal 1999). It shows that, by activating freedom-related or confinement-related concepts, ceiling height can be an antecedent of type of processing. Thus, ceiling height represents an alternative and novel means of varying people's type of elaboration.

Although our research focused on only specific measures that were capable of shedding light on how and why (i.e., the mechanism by which) ceiling height can affect consumers' responses, our theory suggests intriguing implications about how consumptions contexts with relatively high or low ceilings are likely to affect assorted consumer behaviors. For example, because our theory suggests that people in a higher ceiling room should rely greatly on more abstract, relational (vs. item-specific) elaboration, it follows that they may solve various consumption-related problems by thinking of nontraditional, more creative ways to use products. Hence, such consumers may realize that they can simply, say, substitute baking soda and water for expensive silver

individuals presumably noted these lanterns but proceeded to focus their attention on the study materials, never noticing the ceiling height. Assuming that this reasoning is accurate, we expect that consumers will react to ceiling height spontaneously if the height is extreme (e.g., a soaring cathedral ceiling or a ceiling in a crawl space), because such extremity itself should make ceiling height salient. Yet, a pertinent practical question emerges: in typical stores with high and low ceilings, ones where there are no lanterns to render ceiling height salient, will consumers notice the ceiling height and respond as we predict? Although at present this remains an empirical question, we suspect that they will, particularly upon first entering the store. Retail anthropologist Paco Underhill (1999; ABC *20/20* 1999) has found that upon entering a store, consumers reliably slow down or pause within 25 feet of the store entrance and attempt to get their bearings by visually scanning the store broadly, indeed, perhaps noticing the ceiling height. This is all the more likely in stores that, as many do, hang store merchandise high on the walls or possess distinctive (e.g., contrasting-colored) ceiling molding, lighting, signage, artwork, a clock, or other decorative or functional items high on walls. Such items are likely to draw consumers' attention to ceiling height, as our lanterns did. Hence, the effects that we observed may well occur in true consumer contexts.

In the present research, investigation focused on the concepts and types of processing that ceiling heights of either 8 feet or 10 feet stimulated. We examined these particular ceiling height levels for two reasons. First, both the American National Standards Institute and an online investigation of the ceiling heights of numerous residential properties indicated that 8–10-foot ceilings are the norm among middle-class American residences. Second, our examination of store ceiling heights in both some typical neighborhood shopping areas and modern urban malls revealed that ceiling heights in the 8–10-foot range are common in the retail domain as well. While the research we have reported sheds light on the cognitive consequences (i.e., primed concepts and types of processing) produced by rooms with 8 foot and 10 foot ceilings, important questions remain. One concerns whether, under certain circumstances, a high versus low ceiling could actually prime concepts that are the opposite of those that we theorized and observed, namely, confinement versus freedom, respectively (see Park et al. [2001] for some consideration of this possibility). A second question is whether rooms with more extreme (i.e., extremely low or high) ceiling heights prime somewhat different concepts and processes than the ones that we found. Although we suspect that any such alternative concepts that might be primed would simply embody more distal associations to the freedom-related or confinement-related conceptual networks that we discuss (e.g., extreme expanses like the Grand Canyon might also prime distally and more abstractly related associations about one's origins, possible other life forms, or spiritual forces), at present it remains uncertain whether our findings generalize to these sorts of extreme spatial volume contexts. We hope that future work will explore this and many other important issues.

APPENDIX A
FIGURE A1

SAMPLE PHOTO OF ROOM WITH HIGH SALIENCE,
HIGH CEILING HEIGHT

APPENDIX B
FIGURE B1

SAMPLE PHOTO OF ROOM WITH HIGH SALIENCE,
LOW CEILING HEIGHT

APPENDIX C
FIGURE C1

SAMPLE PRODUCT (COFFEE-TABLE) USED IN EXPERIMENT 2

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