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

ABSTRACT

This paper examines the possibility that variations in ceiling height can prime concepts that, in turn, affect the very manner in which people process information. We theorized that a high versus low ceiling can prime the concepts of freedom versus confinement, respectively, and that these concepts, in turn, can prompt people's use of predominately relational versus item-specific processing. Four studies assessed and 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 independent and concrete ideation. Hence, this research sheds light on when and how ceiling height can affect people's responses, and it demonstrates that, at times, conceptual primes can actually affect the type of processing that people use.

Imagine that you are in the market for a sophisticated new coffee table. After browsing several options, you reconsider a leading contender and evaluate how sophisticated it truly appears to be. Might your evaluation of the table differ depending on whether the height of the showroom ceiling is relatively high (i.e., as it is in most contemporary mall stores) versus low (i.e., as it is in most strip mall shops and outlet centers)? More specifically, could the alternative ceiling heights prime certain types of thoughts that affect how you process, elaborate, and ultimately evaluate the table's features?

Much research has shown that exposure to particular objects can prime concepts or networks of associations related to those objects (Aarts and Dijksterhuis 2003; Garcia et al. 2002). For example, the sight of a library can prime thoughts about silence. Other work indicates that such primed concepts can heighten the accessibility of thoughts that spill over and affect people's perceptions or even their overt behaviors (Bargh, Chen, and Burrows 1996; Mandel 2003). Yet, do such effects always occur via concept "spill over"? Or, could the primed concepts at times influence the very type of processing that people use, thereby fostering such outcomes?

Interestingly, certain research hints at the latter possibility (e.g., Kühnen and Oyserman 2002; Monga and John 2006). For example, research investigating self-construal finds that when people are exposed to stimuli that prime the concept of interdependence versus independence, that concept not only activates related aspects about oneself (e.g., one's interdependence on versus independence of others) and thus one's self-construal; such priming also can prompt people more generally to process stimuli differently. Those exposed to an interdependence prime process data in a holistic fashion, coalescing the stimulus items with their context and processing all items as an undifferentiated whole. Yet, those who receive an independence prime process such data via discrete analysis; that is, they regard focal items as detached from their context and

process each element independently from others (Kühnen and Oyserman 2002; Monga and John 2006).

Observations such as these led us to speculate whether even seemingly subtle atmospheric or environmental factors like ceiling height might prime certain concepts, and, in turn, such concepts might shape the very type of processing that people adopt. Investigating this possibility would appear to be important for several reasons. It could contribute to theory by establishing unequivocally whether primed concepts truly can shape the type of processing that people use. In addition, it could shed light on the possible consequences that these ceiling height-primed concepts may have on how consumers categorize, construe and evaluate products. Such inquiry also would be of considerable practical importance. Although ceiling height is an environmental factor that is present in virtually all consumer contexts (e.g., where products are not only purchased but also used), at present, it has yet to be investigated.

This paper aims to develop relevant theory and to examine whether, when, and how ceiling height can affect the very manner in which consumers process information and thus how they respond to products. In brief, we propose that, if sufficiently salient, the presence of a fairly high versus low ceiling can prime a related network of concepts. In the case of a high ceiling, these concepts pertain to notions of freedom; in the case of a low ceiling, they pertain to confinement. In turn, we suggest that these alternative concepts can prompt the use of relational versus item-specific elaboration, respectively. This seems possible because such concepts in fact characterize and thus may activate the kind of processing or information focus that is employed when using the corresponding type of elaboration. That is, relational processing entails attending *freely* or uninhibitedly to multiple, often non-obviously related pieces of data (e.g., the attributes of a single product or those of a group of products/activities; Einstein and Hunt 1980; Hunt and

Einstein 1981) and seizing on commonalities and higher-order abstractions that can be drawn from them. In contrast, item-specific elaboration involves *confining* or restricting one's focus to each item's precise and context specific (i.e., relatively concrete) attributes, processing each independently of others (Hunt and Einstein 1981; Malaviya, Kisielius and Sternthal 1996).

We begin by developing in more detail our theorizing and its conceptual underpinnings. Then we report four studies that systematically assess the tenets and consequences of our theorizing.

CEILING HEIGHT AND TYPE OF PROCESSING

Although researchers have devoted minimal attention to ceiling height, there is reason to believe that a high versus low ceiling height could activate the concepts of freedom versus confinement. Hall (1966), a research pioneer in how environment affects people's sensory experiences, proposed that, spatially, edifices can communicate different semantic associations. He notes that chapels, which are small and contained, are likely to convey the notion of confinement or restrictedness, whereas awe inspiring cathedrals are reminiscent of the freedom and openness of the cosmos. Other researchers offer largely parallel propositions. Moore et al. (1979) proposed that low ceiling heights may encourage quieter, more restricted play, while higher ceilings (e.g., above eight feet) foster more active (i.e., freer) play. Echoing similar sentiments, Kraft (1987) posited that high, downward-looking camera angles, which tend to compress height, convey the notion of passivity; however, low, upward-looking angles, which accentuate height, connote action and thus freedom of movement. Thus, taken together, such logic leads to the contention that relatively high versus low ceilings are likely to prime the concepts of freedom versus confinement, respectively.

Yet, could these concepts, in turn, influence the type of processing that people employ? As noted previously, certain research seems to suggest this possibility. Extant research indicates that

exposure to primes that evoke the concept of interdependence versus independence stimulate a processing mode that treats stimuli and their contexts as undifferentiated wholes as opposed to discrete independent entities (Kühnen and Oyserman 2002; Monga and John 2006). Presumably the effect of such priming on people's processing occurs because the semantic meaning of the primed concept implicates and hence activates the type of processing that ensues. That is, the notion of interdependence implies treating data as a unified whole, whereas the notion of independence implies treating data as detached entities. Indeed, this same process (i.e., where a primed concept semantically implicates the ensuing type of processing) has been observed by others: Sassenberg and Moskowitz (2005) found that priming the concept of creativity (i.e., thinking in a nonstandard way) stimulated a general style of processing that entailed inhibiting automatically activated (e.g., stereotypic) associations**.**

Combining the preceding notions and logic, we reasoned that, as Hall (1966) and others contend, a high versus low ceiling height is likely to prime the concepts of freedom versus confinement, respectively. Moreover, these concepts, in turn, may shape the type of processing that people use, because, similar to how interdependent versus independent primes appear to affect type of processing, the semantic meaning of the primed concepts (i.e., freedom versus confinement) may implicate and thus activate the type of processing that ensues. Specifically, individuals who operate in a relatively high ceiling environment, which presumably primes the semantic concept of freedom, may rely predominately on relational processing. This follows because relational elaboration entails elaborating *freely* or uninhibitedly on multiple pieces of data so as to discern often non-obvious commonalities or abstract points of intersection that they share (Einstein and Hunt 1980). On the other hand, individuals who are in a low ceiling room that primes the concept of confinement may engage predominately in item-specific processing.

This should occur because item-specific elaboration involves *confining* or restricting one's focus to each item independently and concentrating on its precise, context specific (i.e., relatively concrete) attributes (Hunt and Einstein 1981). Figure 1 outlines this sequence of events and theorizing.

Insert Figure 1 about here

We now turn to the first of our four studies. It investigates our theory's initial proposition, namely that ceiling height can prime the aforementioned concepts.

EXPERIMENT 1

Overview and Hypotheses

Experiment 1 sought to examine our initial thesis: When salient, can a high versus low ceiling prime freedom- versus confinement-related concepts? Borrowing a method used by Aarts and Dijksterhuis (2003), we assessed this by developing two tasks that should be sensitive to such concepts. The first assessed whether high versus low ceiling height can activate such freedom- versus confinement-related concepts and thereby influence individuals' current perceived body state (i.e., their feelings of being relatively free versus confined). We expected that individuals would be sensitive to the ceiling height-induced primes. Thus, those in a high (low) ceiling room would report higher (lower) levels of a freedom-related body state, but lower (higher) levels of a confinement-related body state.

A second task involved solving anagrams. Individuals were asked to rearrange the letters of several different anagrams so that each formed a word. In three different conditions, the words that could be formed were semantically related to the concept of freedom, that of confinement, or

they were unrelated to either of these two concepts. If, per our theorizing, a high versus low ceiling can prime concepts associated with freedom versus confinement, individuals in a higher ceiling room should exhibit faster response times (RT) when solving freedom-related anagrams, slower RT when solving confinement-related anagrams, and equivalent RT when solving the unrelated anagrams.

In sum, we propose that, provided ceiling height is salient, a high versus low ceiling should activate concepts related to freedom versus confinement, respectively. Thus:

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

H1b: Individuals in a high versus low ceiling room 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 initially 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 eight feet. The false ceilings looked like the original ones and appeared natural. In addition, to ensure that ceiling height always was salient, we hung three colorful Chinese lanterns from the ceiling, for this should enhance the salience of and thus draw participants' attention to the ceiling height.

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. 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. Ratings on all items were reported on seven-point scales with anchors of 1=not at all and 7=very much.

In a second task, participants received 12 anagrams and were asked to solve them. Three of these anagrams formed words that were related semantically to the concept of freedom, namely, liberated, unlimited, and emancipated. Another three were related to the concept of confinement, specifically, bound, restrained, and restricted. Finally, six were filler words related to neither concept. These words were check, radio, lunch, violin, paper, and cheese.

Procedure. For $5 each, a total of 32 students participated in the study individually. Upon arrival, each was escorted to one of the four rooms and asked to wait for a minute while the study administrator retrieved a consent form. This one minute waiting period was implemented to ensure that participants had time to scan the room and attend to the colorful lanterns, which should draw their attention to the ceiling height. After a minute, the administrator returned with the form and then logged the respondent onto the study website. The initial computer 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.

The anagram task was next. Twelve anagrams appeared on the screen one at a time, and participants' RT when solving them was recorded in milliseconds. The presentation order of the anagrams was randomized. Finally, some demographic questions were asked.

RESULTS

Two participants failed to complete the two tasks, so 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) by 2 (rating index: freedom vs. confinement) within subjects ANOVA was conducted, revealing a significant interaction (F (1,28) = 7.69, $p < .01$). Consistent with H1a, 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. RT 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) X 3 (anagram RT index: freedom, confinement, unrelated) within subject ANOVA revealed a significant interaction involving these two factors (F (2,27) = 5.69, $p < .01$). Planned contrasts found support for H1b. Participants in the high versus low ceiling room exhibited faster RT to freedom-related anagrams (M_{high} = 8038.69, M_{low} = 14187.02; F (1,28) = 4.50, $p < .05$), yet slower RT to confinement-related anagrams (M_{high} = 14988.18, M_{low} = 10168.69; F (1,28) = 5.56, $p < .03$), and comparable RT to unrelated anagrams (M_{high} = 10449.08, M_{low} = 9408.08; $F < 1$).

DISCUSSION

The results of Experiment 1 support the thesis that ceiling height can prime particular concepts. Ceilings that are relatively high appear to activate concepts related to freedom, while low ceilings prime confinement-related concepts.

These findings are informative. However, support for our theorizing requires evidence for two other critical propositions. First, the proposed theory contends that ceiling height-primed

freedom- 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 of and thus people's attentiveness to ceiling height is relatively high.

Experiment 2 extends the previous study by addressing the preceding 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 respondents' ideation. As Einstein and Hunt (1980, pg. 597) 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.

At the same time, differences in such abstractness of ideation induced by ceiling height should be moderated by individuals' attentiveness to the ceiling height. Indeed, if ceiling height goes unnoticed, it is unlikely to activate the freedom- or confinement-related concepts associated with high or low ceiling height and thereby have no effect on type of processing. Thus, we expected that ceiling height would affect people's use of relational or item-specific elaboration only when ceiling height was relatively salient, rendering individuals sufficiently 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 versus item-specific), provided that ceiling height is sufficiently salient. To examine this, we 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 to categorize the items into subgroups based on each item's value on the dimension (e.g., the type of equipment needed). Finally, 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 low ceiling room also should identify more dimensions that are abstract (versus 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, pg. 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) comprised of seemingly disparate items (Isen 1987; Seibt and Forster 2004; Liberman et al. 2002).

A second task that was administered involved evaluating two products. Individuals examined two product photos that were chosen because each depicted a product that was quite sophisticated 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 sophisticated. 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 sophisticated, 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) ones. On the other hand, 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 sophistication (i.e., crude features).

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 high, individuals in a high versus low ceiling room should produce a larger number of shared category dimensions overall, a larger number of dimensions that are abstract (not concrete), and a smaller number of subgroups per each

dimension. Such effects should be absent, however, when the salience of the ceiling height is low.

H3: When the salience of the ceiling height is high, individuals in a high versus low ceiling room should evaluate the target products as more sophisticated, but this effect should be absent when ceiling height salience 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, thereby increasing 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 facilitators were recruited to aid 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 facilitators 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). Using the facilitators' input, 10 sports items were selected: sky surfing, basketball, sailing, swimming, parachuting, boxing, chess, fishing, soccer, and cycling.

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 sophisticated overall appearance, each also featured certain details that were rather crude (e.g., protruding knots in the wood of the coffee table). Four evaluation items that tapped the degree of product sophistication were chosen as the dependent measures. On a 7-point scale, the anchors of the items were crude/polished, course/refined, organic/cultivated design, and rough/sleek. The four items exhibited acceptable reliability levels ($\propto$ = .74 and .80 for coffee table and wine rack, respectively), and thus were averaged to form separate product evaluation indices.

Procedure. Using flyers for recruitment, 111 students participated individually in the study. Each was paid five dollars. 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 the room for about one minute to provide them an opportunity to attend to the lanterns, which served to vary ceiling height salience. When the administrator returned, participants were informed that the study sought their views about several different issues and that two questionnaires with unrelated tasks would be administered.

Participants then received the first questionnaire, which contained only the categorization task. The instructions explained what they were to do with the stimulus items, and this was clarified via an example that used items from a different general category. Specifically, participants were instructed to examine the stimulus list of 10 disparate sports and to identify as many different dimensions as they could that were shared by the full set of items. Then for each

dimension, they were to assign the items into subgroups that captured the values of the items on that dimension, and finally they were to label each subgroup. No time limit was imposed. After this task was completed, the first questionnaire was collected, and participants were told that there would be a minute or so break before they began the second questionnaire. This break was implemented to counteract possible dissipation of the ceiling height prime, as it provided participants another opportunity to attend to the lanterns before they completed the remaining materials. Depending on the placement of the lanterns, this should heighten or limit participants' attentiveness to the room's ceiling height.

After the break, the second questionnaire was distributed, which contained the product evaluation task. Participants were told that they would be shown photos of some products that soon would be available in stores and that their views about these products would be sought. Photos of the two products, a coffee table and a wine rack, were presented. Product order was varied, and participants were allowed unlimited time to examine each photo. After viewing each photo separately, participants evaluated the depicted product on the four items described earlier.

RESULTS

All measures were analyzed as a 2 (ceiling height: high vs. low) by 2 (ceiling height salience: high vs. low) between subject factorial design. Table 1 reports treatment means for all measures.

Insert table 1 about here

Categorization. Participants' responses to the categorization task were coded in three ways: (1) the total number of shared dimensions that participants identified, (2), the degree of abstractness of the dimensions produced by each participant and (3) the average number of

subgroups formed per dimension (note that because this measure is "per dimension," it is not confounded with the total number of dimensions). As we clarify shortly, the second measure was coded using criteria adapted from Semin and Fiedler's linguistic category model (LCM; 1988, 1991). The LCM was employed because it appears to be the only model that specifies precise criteria for determining degree of abstraction.

The LCM distinguishes among four levels of abstraction in language used to describe people and behaviors. Yet, with one exception, the criteria that the model offer to delineate such abstraction levels can be adapted to the kinds of item dimensions that people identified. The sole exception is the model's fourth and most abstract level, which concerns people's dispositions. Because no parallel exists in language used to describe dimensions (versus to describe people and behaviors), we could not use this level. Hence, three levels of abstraction, which ranged from most concrete to most abstract, were adapted from the LCM and used to identify how abstract the identified item dimensions were. Using our own labels, the following elucidates the criteria used to define each of these levels.

The first and most concrete level, labeled objectively interpreted dimensions (OID), consists of dimensions whose interpretation is "easily verified" (Semin and Fiedler 1988, pg. 559), for it is "objective [from] observable events" (Semin and Fiedler 1991, pg. 5). Examples include sports dimensions such as "the physical environment where the sport occurs" and "the number of sport participants," for one can determine quite objectively the value of each sport on such dimensions. 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, pg. 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). We label these as psychological state dimensions (PSD). Examples include item dimensions like "sports I would like/not like to play" and "sports that people feel are challenging." These dimensions are both highly interpretative and decontextualized.

Using these criteria, two judges coded all sports dimensions that were identified into one of these abstraction levels, with OIDs coded as 1, SIDs as 2, and PSDs as 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 (1989). Specifically, the frequencies of OIDs, SIDs (multiplied by 2), and PSDs (multiplied by 3) were summed. This result was then divided by the total number of dimensions identified by each participant. This resulted in a score that ranged from 1 to 3.

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 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, $p < .05$). Yet,

these differences were absent when the salience of the ceiling height was low (*ps* > .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 sophisticated. However, when ceiling height salience was low, such differences in product evaluation were absent (*ps* > .22).

DISCUSSION

Importantly, 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 (independent 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. In addition, those in a high versus low ceiling room evaluated products as more sophisticated when they were largely sophisticated in appearance but did possess some features that were crude. This suggests that they emphasized the commonalities among product features (versus the specifics of each individual feature) when rendering such evaluations. Yet, each of

these outcomes was qualified by the salience of the ceiling height, with the aforementioned evidence of relational and item-specific processing emerging only when ceiling height salience was relatively high, such that individuals noticed the ceiling height and apparently experienced activation of freedom- versus confinement-related thoughts.

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. Evidence also would be bolstered if the freedom and confinement concepts activated by ceiling height were found to mediate outcome measures that reflect people's use of relational and item-specific processing. Experiment 3 seeks to address these issues.

EXPERIMENT 3

Overview and Hypotheses

A number of 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, stimuli were developed that would accommodate taking 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. Then participants engaged in free recall and, subsequently, 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, indicating 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). Finally, individuals rated their current body state on the same freedom- and confinement-related items employed in Experiment 1.

If, per our theorizing, a high versus a low ceiling primes freedom- rather than confinement-related concepts and this in turn encourages relational versus item-specific elaboration respectively, individuals 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 a higher level of 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 superior item recall during cued recall, indicating their dominant reliance on item-specific processing. Hence:

> **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, resulting in high salience of the ceiling height. A 36 item list comprised of 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 participants completed the study individually. Each 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 one 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- and confinement-related items used in experiment 1. Next, participants were instructed to examine carefully the list of 36 multi-category 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

Because relational processing has been shown reliably to promote clustering of items that belong to a common category, clustering of the multi-category items during participants' free recall was assessed using adjusted ratio of clustering (ARC; Hunt and Einstein 1981). ARC scores range from 1.0 to –1.0, where 1.0 indicates perfect clustering and 0 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 greater recall

clustering (i.e., higher ARC scores), indicating the use of greater relational processing (M_{high} = .74, M_{low} = .49; F (1,31) = 4.96, $p < .05$). However, participants in a low versus high ceiling room identified more items during cued recall, indicating greater reliance on item-specific elaboration (M_{high} = 2.80, M_{low} = 3.33; F (1,31) = 4.13, $p < .05$).

In addition, participants' responses to items assessing their current body state replicated those reported in Experiment 1. Indicating that the intended concepts were primed by the room's ceiling height, participants in a high versus low ceiling room reported that they felt a greater freedom-related state (M_{high} = 5.08, M_{low} = 4.14; F (1,31) = 7.92, $p < .01$), but a lower confinement-related state (M_{high} = 2.18, M_{low} = 3.22; F (1,31) = 5.42, $p < .05$).

Mediation analysis. Mediation analyses were conducted to assess whether participants' perceived current body state, which was influenced by the ceiling height-induced freedom- versus confinement-related prime, mediated the effects of ceiling height on type of processing (Baron and Kenney 1986). Results supported our hypotheses. Specifically, ceiling height significantly affected ARC (i.e., clustering) scores (b = .25, $p < .05$), and it influenced participants' freedom-related body state (b = 1.08, $p < .01$). Moreover, the effect of ceiling height on ARC scores was mediated by participants' freedom-related state ($b_{ceiling\ height}$ = .05, p = .69; $b_{freedom}$ = .15, $p < .05$; Sobel: z = 2.00, p < .05). Similarly, ceiling height affected the average number of items recalled per category during cued recall (b = -.54, $p < .05$) and participants' confinement-related bodily state (b = -1.18, $p < .05$). Further, the effect of ceiling height on the cued recall measure was mediated by participants' confinement-related state ($b_{ceiling\ height}$ = -.22, p = .41; $b_{confinement}$ = .25, $p < .01$; Sobel z = -1.86, p < .06). Note that participants' confinement-related body state did not mediate ARC scores ($b_{ceiling\ height}$ = .28, $p < .05$; $b_{confinement}$ = .06, p >

.18), and their freedom-related state did not mediate cued recall ($b_{ceiling\ height}$ = -.77, $p < .05$, $b_{freedom}$ = .24, p > .11).

DISCUSSION

Experiment 3 provides compelling support for our theorizing that ceiling height can induce alternative types of elaboration and that the concepts primed by ceiling height mediate such effects. Specifically, the findings suggest that a relatively high ceiling activated freedom-related concepts and this resulted in enhanced recall clustering, which is a well-established indicator of relational processing. In contrast, a lower ceiling primed confinement-related concepts and this enhanced the average number of items recalled per cued category, a memory measure that is a known indicator of item-specific processing. Thus, the three studies reported so far suggest that the activation of freedom- versus confinement-related concepts mediate the effect of ceiling height on the type of processing that ensues. Moreover, the type of processing that occurs is distinguished by the degree of integrated and abstract ideation that it stimulates.

Still, certain questions remain. First, given that the concept of freedom could evoke more favorable thoughts than that of confinement, could the differences we observed on the types of processing people used be the result of a mood effect, not, as we theorize, the particular semantic associations tied to these concepts? Second, would outcomes such as those that we observed occur if the freedom and confinement concepts were primed independently of ceiling height? Our theorizing suggests this, because, regardless of their source, the activation of the freedom- versus confinement-related semantic concepts should be capable of inducing relational versus item-specific processing and a corresponding inclination to engage in more integrated and abstract (versus independent and concrete) ideation. We explore such questions next.

EXPERIMENT 4

Overview and Hypotheses

This study sought to examine whether the effects that were prompted by ceiling height in Experiment 2 would replicate when individuals were primed directly with the concepts of freedom versus confinement, yet ceiling height was held constant. In addition, we primed the focal concepts using an experience description task that was designed to make these two concepts equivalent in their favorableness.

Experiment 4 employed the same categorization and product evaluation tasks and stimuli used in experiment 2. However, to explore the generalizeability of the effects, we added a second categorization task that presented items from a different product category, namely transportation vehicles. On both of these categorization tasks, we expected that individuals who were primed with freedom- versus confinement-related concepts would reveal similar outcomes as those in the high versus low ceiling rooms in experiment 2.

In addition to the preceding measures, we added a new task called a category membership task. It was intended to provide another indicator of the type of processing individuals used. For this task, participants were provided with a list of items that were good, moderate, and poor exemplars of a general product category (i.e., first furniture and then clothing). Because our theorizing implies that the activation of freedom- versus confinement-related concepts should prompt the use of predominately relational versus item-specific processing, we expected that individuals who received a freedom- versus confinement-related prime would perceive more overlap or shared properties between the somewhat atypical (i.e., poor and perhaps moderate) category exemplars and the general product category. As such, they should be more likely to rate these relatively atypical exemplars as better members of the category. Yet, this outcome seemed

unlikely to emerge for the highly typical, good category exemplars, because the category membership of these exemplars is unambiguous and hence not open to much interpretation. As such, we predicted the following outcomes on this category membership judgment task:

H5: When independently of ceiling height individuals are primed with freedom- versus confinement-related concepts, they should be more likely to perceive poor and moderate category exemplars as better members of the category. Such effect should be absent, however, for clearly good category exemplars.

Method

Stimuli. The freedom- and confinement-related concepts were primed via an experience description task. Individuals in the freedom-related prime condition were told to think back to a situation where they found themselves in an open and unconfined space that made them feel totally carefree and boundless. In contrast, those in the confinement-related prime condition were asked to think back to a situation where they found themselves in a protected and confined space that made them feel totally cozy and snugly content. After recalling a scenario of one of these types, respondents were asked to describe in detail the physical environment in which this experience took place. Note that in developing the preceding instructions, care was taken to portray the scenarios in ways that would be equally favorable, thereby limiting the likelihood that any differences observed in the type of processing people used reflected the favorableness (versus the semantic associations) of the primed concept. Indeed, a pretest conducted on 20 individuals supported this notion. It showed that on 7-point items, the two scenarios described in the instructions were perceived to be equally favorable (F (1,18) = .12, p = .73; $M_{freedom}$ = 5.90; $M_{confinement}$ = 5.70). Further, the same was true of the details that participants used to describe the

physical environment of the actual situation that they recalled (F (1,28) = 1.51, p = .23; $M_{freedom}$ = 6.33; $M_{confinement}$ = 5.93).

The same categorization and product evaluation stimuli employed in experiment 2 were used in this study. However, a second list of items, all transportation vehicles, was also employed in the categorization task. These items included car, bicycle, scooter, truck, airplane, hot air balloon, feet, boat, canoe, and skis.

To develop a category membership task, two lists of items were compiled that belonged to the furniture and clothing categories. Each list contained twelve items of which four were good, moderate, or poor exemplars of the general category. All exemplars came from work by Rosch (1975). For the furniture category, the good exemplars were chair, couch, love seat, and table; the moderate exemplars were cabinet, lamp, stool, and magazine rack, whereas the poor exemplars were stove, clock, fan, and vase. Because the items comprising each exemplar type exhibited a reasonable reliability level ($\propto$s > .70), they were averaged to create good, moderate, and poor exemplar indices. Similar indices were created for the clothing items ($\propto$s > .82), which consisted of pants, suit, sweater, and shirt as good exemplars; shoes, boots, raincoat, and bathrobe as moderate exemplars; and ring, hair band, cane, and watch as poor exemplars.

Procedure. Thirty students participated in the study for $10 each. All did so in small groups of about five people and in a room that always had a relatively low ceiling height of eight feet. Participants received a questionnaire, which first presented the experience description task that primed either freedom- or confinement-related concepts. After identifying an actual experience of the type outlined in the instructions, respondents described in detail the physical environment in which this experience took place.

To gauge whether study participants' perceptions of the two experience descriptions differed in favorableness, which would likely affect their mood, participants completed a 12 item mood check. Half of the items represented a positive mood (e.g., happy and cheerful), while the others represented a negative mood (e.g., downbeat and gloomy). Positive and negative mood indices were created by averaging the six items of each mood type (positive mood index: $\propto = .86$; negative mood index: $\propto = .87$).

After completing the mood check, respondents performed the categorization task, first for the list of sports and then for a list of transportation vehicles. Instructions for this task were the same as those used in experiment 2, asking respondents to identify all dimensions shared by the listed items and then, for each dimension, requesting that they sort the items into labeled subgroups.

To ensure that activation of the primed concepts did not entirely dissipate before they completed the final two critical tasks, all participants completed a word puzzle task at this point. For each participant the puzzle task always reactivated the same concept that was primed previously. Using the guise that this task would relax their minds before they completed the final tasks, participant were asked to locate in a puzzle grid seven words that were associated with either freedom (e.g., liberated, boundless) or confinement (e.g., bound, confined). All words appeared in the grid vertically, horizontally, or diagonally.

At last, participants completed the same product evaluation task and measures employed in experiment 2 (i.e., for a coffee table and a wine rack). This was followed by the category membership task. The latter task was performed twice, first for furniture exemplars and then for clothing exemplars. Participants rated on a 10 point scale the degree to which each exemplar belonged to the stated category (1=definitely does not belong, 10=definitely does belong).

RESULTS

All data were analyzed using a one-way ANOVA in which the primed concept (freedom versus confinement) represented the independent variable. The sole exception concerned responses to the category membership task. This measure was analyzed as a 2 (primed concept: freedom vs. confinement) by 3 (exemplar type: good vs. moderate vs. poor) repeated measure ANOVA. Table 2 reports the treatment means for all measures.

Insert table 2 about here

Mood Check. To assess whether the two primed concepts conveyed by the experience descriptions differed in valence and thus the mood they instilled, separate ANOVAs were performed on the positive and negative mood indices. No treatment effect of the primed concepts emerged on either of the mood indices (*ps* > .40), indicating that the way the concepts were conveyed in this study rendered them comparable in favorableness.

Categorization. Similar to Experiment 1, the dimensions respondents identified for the sports and transportation vehicle items were coded into the following categories: the total number of shared dimensions identified, the degree of abstraction reflected in the dimensions that each respondent identified, and the average number of subgroups formed per dimension. Inter-coder reliability ranged from .87 to .90.

The anticipated main effect of the primed concept emerged on each of these measures. When respondents were primed with the freedom versus confinement concept, they identified a larger number of shared dimensions overall (sports: F (1,27) = 4.04, $p < .05$; transportation: F (1,27) = 4.18, $p < .05$), a greater degree of abstraction in the dimensions identified (sports: F (1,27) =

6.30, $p < .02$; transportation: F (1,27) = 5.24, $p < .03$), and a smaller average number of subgroups per dimension (sports: F (1,27) = 4.63, $p < .05$; transportation: F (1,27) = 4.06, $p < .05$). These results conceptually replicate those from experiment 2.

Product Evaluations. The anticipated main effect of the primed concept also emerged on the evaluation indices for both the coffee table ($\propto = .89$) and the wine rack ($\propto = .77$). Participants who were primed with the freedom versus confinement concept rated each product as more sophisticated (coffee table: F (1,27) = 4.30, $p < .05$; wine rack: F (1,27) = 4.73, $p < .05$). Note that again, these results conceptually replicate those from experiment 2.

Category Membership. A 2 (primed concept: freedom vs. confinement) by 3 (exemplar type: good, moderate, or poor) repeated measure ANOVA on judgments of category membership revealed the anticipated interaction of these factors for each of the two categories (furniture: F (1,27) = 4.06, $p < .05$; clothing: F (1,27) = 4.86, $p < .04$). Further analyses supported our specific predictions. Participants who were primed with the freedom versus confinement concept rated the moderate (furniture: F (1,27) = 5.41, $p < .03$; clothing: F (1,27) = 16.31, $p < .001$) and poor category exemplars (furniture: F (1,27) = 10.71, $p < .001$; clothing: F (1,27) = 9.45, $p < .01$) as better category members. Yet, no treatment effects were expected nor emerged on ratings of the good category exemplars (for both furniture and clothing set, $Fs < 1$).

DISCUSSION

The results from this study extend those of the previous ones. They show that, holding ceiling height constant, exposure to primes that directly activate freedom- versus confinement-related concepts can prompt relational versus item-specific processing, respectively. Such processing was reflected on a variety of measures that captured the degree to which people's responses exhibited integrated and abstract (versus independent and concrete) ideation. These

measures included judgments of exemplars' category membership as well as two that were used in experiment 2, namely, item categorization and product evaluations. Importantly, even though ceiling height was held constant in this study, the outcomes on these latter two measures replicated those observed previously. Further, all of the anticipated outcomes in this study emerged even though respondents perceived the primed freedom- and confinement-related concepts as equal in favorableness. Thus, it appears that these findings cannot be attributed to differences in the perceived favorableness of these concepts.[1]

GENERAL DISCUSSION

The present research adds to our knowledge by showing that ceiling height, a seemingly subtle yet virtually omnipresent environmental factor, can affect the manner in which individuals process information. Further, our research offers a theory that clarifies when and why this happens. Experiment 1 provided support for the first proposition of our theory, namely, that exposure to a high versus low ceiling can prime freedom- versus confinement-related concepts. Experiments 2 and 3 built on this by demonstrating that these ceiling height-induced freedom- versus confinement-related concepts can elicit predominately relational versus item-specific processing, respectively. Experiment 2 showed this by demonstrating how ceiling height affects

[1] A separate study assessed whether the ceiling height manipulations used in our other studies differed in favorableness, as indicated by the mood that they instilled. 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 the same 12 items used in experiment 4. Results revealed no treatment effects on either the positive ($p > .66$) or negative ($p > .13$) mood index. Hence, it is unlikely that differences in the favorableness of the ceiling height-primed concepts or ceiling height per se account for treatment effects observed in any of our studies.

the number and abstractness of dimensions shared by a set of items (i.e., sports) and the number of subgroups into which such items are divided per each dimension. This study also buttressed the preceding thesis by showing that people in a higher ceiling room produced product evaluations that emphasized the commonalities among the product's features as opposed to the implications of a few aberrant features. At the same time, findings on each of these measures revealed an important moderator. Differences emerged in the type of processing that people used only when ceiling height salience and thus respondents' attentiveness to ceiling height was high.

Experiment 3 added even more compelling evidence that the concepts primed by a high (low) ceiling can induce relational (item-specific) processing. It did so by examining two memory measures (i.e., recall clustering and cued item recall) that have been shown repeatedly to be highly reliable indicators of these two types of processing. Moreover, this study bolstered our theory by showing that each primed concept mediated the effect of ceiling height on the appropriate memory measure. Finally, experiment 4 supported our theorizing by showing that the effects produced by ceiling height can be duplicated when, holding ceiling height constant, the concepts of freedom versus confinement are primed directly. It also showed that differences in the favorableness of these two concepts do not appear to account for the effects we observed.

The current research makes several important theoretical contributions. It adds to the priming literature by showing that conceptual primes can influence people's responses in ways beyond simply affecting the accessibility of the thoughts on which such responses are based (i.e., spill over effects): Conceptual primes also can exert influence by determining the very type of processing that people 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 people process

information and thus explain why such people categorize, evaluate or otherwise respond to stimuli differently. Finally, our research adds to work on type of processing by showing that, by activating freedom- or confinement- related concepts, ceiling height can be an antecedent of type of processing. As such, this work identifies an alternative and novel means of varying the type of elaboration people use.

Still, the current research raises a number of provocative research questions. Whereas our research found that the effects produced by ceiling height occurred only when, due to contrivances (i.e., strategically placed lanterns), people were explicitly induced to attend to ceiling height, it seems possible that individuals may react to ceiling height spontaneously if the height of the ceiling were extreme (e.g., a soaring cathedral ceiling or a ceiling in a crawl space). Another question worth studying is whether the prevailing social context in a room can prime alternative concepts that reverse the effects of a high or low ceiling. For example, suppose that one were spending an evening conversing with close friends in a high ceiling room, which should encourage relational processing. Could the intimacy and coziness of the social context, which can characterize and potentially spawn associations to the concept of confinement, dominate and prompt the use of primarily item-specific processing? Likewise, can the size of a room (e.g., large and spacious, which may activate associations to freedom) overwhelm the influence of ceiling height (e.g., a low ceiling that primes the concept of confinement) on the type of processing people use? We hope that future work will explore such questions.

References

Aarts, Henk and Ap Dijksterhuis (2003), "Environment, Situation Norm, and Social Behavior," *Journal of Personality and Social Psychology*, 84 (January), 18-28.

Bargh, John A, Mark Chen, and Lara Burrows (1996), "The Automaticity of Social Behavior: Direct Effects of Trait Concept and Stereotype Activation on Action," *Journal of Personality and Social Psychology*, 71 (August), 230-244.

Baron, Reuben M. and David A. Kenney (1986), "The Moderator-Mediator Variable Distinction in Social Psychology Research: Conceptual, Strategic, and Statistical Considerations," *Journal of Personality and Social Psychology*, 51 (December), 1173-1182.

Battig, William F. and William E. Montague (1969) "Category Norms for Verbal Items in 56 Categories: A Replication and Extension of the Connecticut Category Norms," *Journal of Experimental Psychology Monograph*, 80 (June) part 2, 1-46.

Einstein, Gilles O. and R. Reed Hunt (1980), "Levels of Processing and Organization: Additive Effects of Individual-Item and Relational Processing," *Journal of Experimental Psychology*: *Human Learning and Memory*, 6 (November), 588-598.

Garcia, Stephen M., Kim Weaver, Gordon B. Moskowitz, and John M. Darley (2002), "Crowded Minds: The Implicit Bystander Effect," *Journal of Personality and Social Psychology*, 83 (October), 843-853.

Hall, Edward T. (1966). *Hidden Dimension*, Garden City, NY: Doubleday.

Hunt, R. Reed and Gilles O. Einstein (1981), "Relational and Item-Specific Information in Memory," Journal of Verbal Learning and Verbal Behavior, 20 (October), 497-514.

_____ and Catherine E. Seta (1984), "Category Size Effects in Recall: The Roles of Relational and Individual Item Information," *Journal of Experimental Psychology:*

Learning, Memory and Cognition, 10 (July), 454-464.

Isen, Alice M. (1987), "Positive Affect, Cognitive Processes and Social Behavior," in *Advances in Experimental Social Psychology*, L. Berkowitz (ed.), vol. 20, NY: Academic Press, 204-253.

Kraft, Robert N. (1987), "The Influence of Camera Angle on Comprehension and Retention of Pictorial Events," *Memory and Cognition*, 15 (July), 291-307.

Kühnen, Ulrich and Daphna Oyserman (2002), "Thinking About the Self Influences Thinking in General: Cognitive Consequences of Salient Self-Concept," *Journal of Experimental Social Psychology*, 38 (September), 492-499.

Liberman, Nira, Michael D. Sagristano, and Yaacov Trope (2002) "The Effect of Temporal Distance on Level of Mental Construal," *Journal of Experimental Social Psychology*, 38 (November), 523-534.

Malaviya, Prashant, Jolita Kisielius and Brian Sternthal (1996). "The Effect of Type of Elaboration on Advertisement Processing and Judgment," *Journal of Marketing Research*, 33 (November), 410-421.

Mandel, Naomi (2003), "Shifting Selves and Decision Making: The Effects of Self-Construal Priming on Consumer Risk-Taking," *Journal of Consumer Research*, 30 (June), 30-40.

Meyers-Levy, Joan (1991), "Elaborating on Elaboration: The Distinction Between Relational and Item Specific Elaboration," *Journal of Consumer Research*, 18 (December), 358-367.

Monga, Alokparna and Deborah Roedder John (2006), "Cultural Differences in Brand Extension Evaluation: The Influence of Analytic versus Holistic Thinking," *Journal of Consumer Research*, forthcoming.

Moore, Gary T., Carol G. Lane, Ann B. Hill, Uriel Cohen, and Tim McGinty (1979).

Recommendations for Child Care Centers, Milwaukee, WI: Center for Architecture and Urban Planning Research.

Nussbaum, Shiri, Yaacov Trope, and Nira Liberman (2003), "Creeping Dispositionism: The Temporal Dynamics of Behavior Prediction," *Journal of Personality and Social Psychology,* 84 (March), 485-497.

Rosch, Eleanor (1975), "Cognitive Representations of Semantic Categories," *Journal of Experimental Psychology: General*, 104 (3), 192-233.

Sassenberg, Kai and Gordon B. Moskowitz (2005), "Don't Stereotype, Think Different! Overcoming Automatic Stereotype Activation by Mindset Priming," *Journal of Experimental Social Psychology,* 41 (September) 506–514.

Seibt, Beate and Jens Forster (2004), "Stereotype Threat and Performance: How Self-Stereotypes Influence Processing by Inducing Regulatory Foci," *Journal of Personality and Social Psychology*, 87 (July), 38-56.

Semin, Gün R. and Klaus Fiedler (1988), "The Cognitive Functions of Linguistic Categories in Describing Persons: Social Cognition and Language," *Journal of Personality and Social Psychology*, 54 (April), 558-568.

_____ and _____ (1991), "The Linguistic Category Model, Its Bases, Applications and Range," *European Review of Social Psychology*, 2, 1-30.

TABLE 1

TREATMENT MEANS 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	3.60	3.24	4.39
Average Number of Subgroups Per Dimension	2.40	2.55	2.55	2.27
Degree of Abstraction of Dimensions	1.34	1.33	1.37	1.55
Product Evaluation Task (Degree of sophistication)				
Coffee Table	4.44	4.12	4.11	4.73
Wine Rack	5.95	5.67	5.40	6.10
Number of Respondents	25	29	24	22

TABLE 2

TREATMENT MEANS FOR EXPERIMENT 4

	Confinement Prime	Freedom Prime
Mood Indices		
Positive Mood	3.64	3.29
Negative Mood	2.82	2.73
Categorization Task		
Sports		
Total Number of Dimensions Identified	2.64	3.70
Average Number of Subgroups Per Dimension	2.45	2.05
Degree of Abstraction of Dimensions	1.35	1.61
Transportation Vehicles		
Total Number of Dimensions Identified	2.22	3.25
Average Number of Subgroups Per Dimension	2.54	2.06
Degree of Abstraction of Dimensions	1.48	1.80
Product Evaluation Task (Degree of sophistication)		
Coffee Table	4.57	5.75
Wine Rack	5.23	5.91
Category Membership Judgment Task		
Furniture		
Good exemplars	9.71	9.87
Moderate exemplars	7.07	8.20
Poor exemplars	3.63	4.86
Clothing		
Good exemplars	9.89	9.98
Moderate exemplars	6.76	8.17
Poor exemplars	2.67	3.84
Number of Respondents	15	15

FIGURE 1

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

Ceiling Height	Associations to Activated Concept	Type of Processing Induced	Outcome
High →	Freedom-related →	Relational →	An emphasis on data integration and abstraction
Low →	Confinement-related →	Item-specific →	An emphasis on independently analyzed and specific, relatively concrete data