

# Spatial Metaphor and Real Estate: North–South Location Biases Housing Preference

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## Abstract

Metaphors are used to help people understand abstract concepts in terms of perceptual experiences (e.g., “feeling high” or “feeling down”). A consequence of this strategy is that metaphor can bias perception and decision making. For example, consistent with metaphors for affect and spatial perception (up = good, down = bad), people more readily identify positive things when high in location. North and south are abstract concepts, which are also tied by metaphor to spatial perception (north = up, south = down). Based on this, the authors hypothesized that, by virtue of a shared mapping with up and down, north and south may have affective associations (north = good, south = bad) that bias decisions related to housing in terms of location preference and expectations of where others live. The authors found convergent support for this hypothesis across four studies using correlational (Studies 1 and 2) and experimental (Studies 3 and 4) data.

## Keywords

embodiment, metaphor, consumer, real estate, north, south, judgment, decision making, north–south bias

Consumer behavior is affected by factors that have little to do with the objective quality of a particular product. For example, prior research shows that people will consume more food when it is served in larger containers (Wansink & Kim, 2005), in-store background music biases product choice (North, Hargreaves, & McKendrick, 1999), and a product’s position can affect its attractiveness (Valenzuela & Raghuram, 2009). Consumer decision-making and resulting behavior are often irrational.

One of the most impactful consumer decisions people make in terms of dollars spent is related to where they will live. In the United States, the average consumer spends approximately 34% of annual income on housing (U.S. Department of Labor, 2008), a proportion of income that is greater than any other category of expense. While housing choices are affected by characteristics that rationally relate to value (e.g., square footage, distance to schools, and year of construction), we hypothesized for the first time that relative latitude (i.e., latitude relative to a city’s center) will bias consumer judgments in this critical context. We further theorized that this “north–south bias” is likely tied to repeated use of vertical metaphor to understand cardinal direction.

## Conceptual Metaphor and Embodiment

Metaphors (e.g., referring to a sad mood as “feeling down”) are frequent in everyday discourse (Gibbs, 2006), and are understood to facilitate communication. A bolder claim is that people think, feel, and behave in metaphoric terms (Lakoff & Johnson, 1999); that is, metaphor influences how we see the

world and in turn biases many decisions that we make. Lakoff and Johnson (1999) are the foremost proponents of this view, which is termed the metaphor representation perspective (Crawford, 2009). This view is especially relevant when considering abstract reasoning. We learn about things using our senses (e.g., snow is cold and wet). Abstract concepts (e.g., good and bad), however, cannot be directly perceived through the senses. In order to make sense of such abstractions, people use sensory-based metaphors that place abstract concepts in a physical realm (e.g., looking up is “feeling up”).

These abstract–concrete mappings can begin in childhood through scaffolding in which sensorimotor experiences ground the later acquisition of abstract thinking (Barsalou, 2008; Williams, Huang, & Bargh, 2009). Eventually, such associations allow individuals to represent abstract concepts in a physical manner, and the associated metaphors likely reinforce such representations. Thus, abstract knowledge is likely to co-opt more basic sensory–perceptual representations (i.e., embodiment).

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The examination of language can uncover metaphors, but such work cannot examine the automaticity, subtlety, or scope with which people think and behave in metaphoric terms. In other words, metaphors likely have significant predictive value in terms of social behavior (Landau, Meier, & Keefer, 2010). Indeed, Meier and Robinson (2004) revealed that valence-verticality metaphors can predict affective behavior. **They found that people are more efficient at determining that a stimulus (e.g., the word “hero”) has a good meaning if that stimulus is presented in the upper (vs. lower) portion of a screen. Thus, vertical space is a perceptual representation for the concepts of good and bad.** Therefore, when engaging in evaluative behavior, people unwittingly activate vertical-space perceptions in a manner consistent with metaphor (good is up; bad is down). These findings suggest that we not only speak in metaphoric terms, but we think in metaphoric terms as well. Related effects have been shown in areas that involve abstract-perceptual domains such as power and size (Schubert, Waldzus, & Giessner, 2009), person-perception and physical warmth (Williams & Bargh, 2008), and morality and cleanliness (Schnall, Benton, & Harvey, 2008).

This research suggests that metaphor representation can provide a unique perspective on social behavior. Yet, typically, the research in this area reveals that concrete domains (e.g., spatial perception) guide the representation of abstract concepts (e.g., good and bad). Such metaphoric associations likely develop through repeated early experiences (e.g., a baby looks up at a loving parent), but evidence for learned associations for irrelevant domains would suggest that metaphor can also influence behavior in areas that move beyond covarying experience. We examine this prediction in the present studies. In short, we use metaphor theory to predict a bias in housing-related decisions on the basis of cardinal direction.

### *North = Up and South = Down*

Cardinal directions are important tools for reading maps and describing locations (Robinson, Morrison, Muehrcke, Kimerling, & Guptaill, 1995). For example, people might describe the location of an espresso bar by saying that it is “one mile north of 40th Avenue and Stewie Street.” This description allows individuals to visualize and locate the business in question.

Printed maps of cities make heavy use of cardinal directions, and are typically constructed such that north is at the top and south is at the bottom (Pickles, 2004; Robinson et al., 1995). The frequency with which individuals are exposed to this representation may contribute to the linguistic tendency to use north and south in describing verticality. North, for example, is described as being higher in vertical space (e.g., “we’re headed up north”), whereas south is described as being lower in vertical space (e.g., “we’re headed down south”). North and south do not actually relate to verticality, yet a robust tendency to associate north with up and south with down has been demonstrated at both explicit (Carreiras & Gärling, 1990; Sholl & Egeth, 1981) and implicit (Nelson & Simmons, 2009) levels. For example, Nelson and Simmons (2009) conducted a series of

studies to examine whether people perceive north as up and south as down. In one study, they used the implicit associations test (Greenwald, McGhee, & Schwartz, 1998) and found **that people implicitly associate north with up and south with down. Other studies revealed that people believe more effort is required to travel to a northern versus southern location because northern locations are “higher” and more difficult to reach.**

### *Does North = Good and South = Bad?*

Nelson and Simmons’ (2009) studies were specific to uncovering a link between north–south and up–down as well as the effort associated with traveling to such locations. We extended this model by hypothesizing that the documented associations between north–south and up–down, might in turn lead to evaluative preferences through metaphor. Our theoretical extension was based, not only on the work of Nelson and Simmons (2009), but also on the ubiquity of previously established links between valence and verticality (up = good and down = bad; Meier & Robinson, 2004). That is, we hypothesized that, even though people do not have direct physical experiences with north as good and south as bad, a consequence of the tendency to perceive north as up and south as down may be that these cardinal directions take on affective significance. As a result, we further hypothesized that north–south direction would bias housing-related decisions.

In metaphoric terms, anecdotal evidence reveals that north is associated with positivity and south is associated with negativity. In some areas of the United States, terms like “southie,” “southside,” “movin’ on up,” and “uptown” suggest that northern areas of cities are more affluent and attractive relative to southern counterparts. The poet and song writer, Billy Joel, famously sang of love between a working class, “downtown” man, and his wealthier “uptown” girl from her “high-class” world (Sony Music Entertainment, 2009). Another songwriter, Jim Croce, tells us that “the south side of Chicago is the baddest part of town” (in the song, “Bad, Bad, Leroy Brown”; Croce, 2007). In the current studies, we sought to test whether empirical data would support a hypothesized **(a) association between cardinal direction and valence**, and (b) that cardinal direction would resultantly bias housing-location decisions.

### *The Current Studies*

We predicted that a consequence of using north and south as verticality descriptors is the development of affective connotation consistent with metaphor. As a result, we predicted that northern areas of a city would be perceived as more positive than southern areas. We tested our hypothesis at the city level, a level at which north–south/good–bad metaphors are most prevalent as well as a level at which most people have personal experience navigating map space.

In four studies, we use multiple methodologies to examine our hypotheses. First, we set out to determine if “north” is perceived as more positive than “south.” In Study 1, we asked participants to rate the terms “north” and “south” and expected that participants would rate “north” as more positive

than “south.” Second, we examined whether this affective connotation would bias housing-location choices. In Study 2, we asked participants where they **would live in a city if they could live anywhere**. Participants were presented with a map of a fictitious city with lines drawn around the city limits. We expected that participants would choose to live significantly north of the map’s midpoint. Third, we tested the causal factor in our hypothesis, which is that north is more positive than south because north is typically depicted as up. In Study 3, we used the same design from Study 2, **but randomly assigned participants to a condition where north was depicted on the bottom (vs. top) of a map**. We expected a preference for northerly areas of a city to be eliminated. Finally, we examined consequences of a north-good and south-bad expectation in terms of stereotypes. In Study 4, we randomly assigned people to determine where a wealthy versus poor person would live. We expected that participants would perceive a wealthy person to live further north than a poor person.

## Study 1

We conducted an initial examination of our hypothesis in Study 1. If north and south have taken on affective significance, we hypothesized that people would rate the term “north” as more positive than the term “south.”

## Participants

Participants were 99 individuals (72 females) with a mean age of 32.19 ( $SD = 11.47$ ) years. We recruited participants via an online study using Amazon.com’s Mechanical Turk. Participants were paid \$.05.

## Procedures

Participants completed questionnaires that were unrelated to this study. Later, we told participants that we were interested in ratings of various concepts. They were asked to rate the meaning of eight words (1 = *very negative* to 9 = *very positive*). Embedded into this list were the words “north” and “south” and filler words to disguise our true purpose (e.g., “ice cream”).

An instruction check was used to ensure that the online participants read instructions and attended to the study details (Oppenheimer, Meyvis, & Davidenko, 2009). We excluded participants who did not answer the instruction check accurately. Initial and unrelated questionnaires provided information about two occupations that can vary by gender. At the end of the survey, we asked participants to list these occupations. In all 13 participants did not answer this question accurately and were excluded (new  $N = 86$ ).

## Results and Discussion

Participants rated north ( $M = 5.71$ ;  $SD = 1.23$ ) as more positive than south ( $M = 5.14$ ;  $SD = 1.38$ ),  $t(85) = 2.66, p = .01, d = .29$ . These results reveal that north and south have taken on affective significance in a manner consistent with metaphor. Thus,

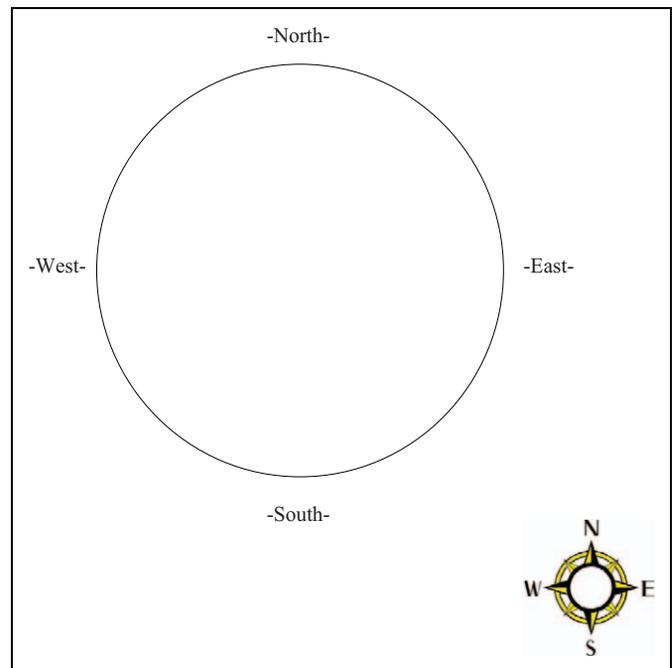


Figure 1. Map used in Studies 2 and 3.

frequent conceptual metaphors (e.g., valence-verticality) may create learned associations in otherwise irrelevant domains (e.g., cardinal directions). In Study 2, we sought to determine if this bias could affect one’s decision of where to live in a city.

## Study 2

We asked participants where they would live in a fictional city if they had the choice to live anywhere. We hypothesized that people would prefer to live significantly north of a city’s center because “north” is more positive than “south.”

## Method

### Participants

Participants were 28 undergraduates (24 females) with a mean age of 18.86 ( $SD = .59$ ) years.

### Procedures

We presented the map shown in Figure 1 on a paper questionnaire. The distance between the northern and southern points was the same as the distance between the western and eastern points, which was 11 centimeters. We told participants that the map represents a city and the lines indicate the border around the city limits. We asked them to imagine that they were moving to this city, that they could live anywhere they wanted, and to select their preferred location by placing an “x” on the map.

## Results and Discussion

We recorded the north–south and west–east locations (in centimeters) where participants chose to live. Next, we converted

these measurements into scores that allowed us to determine the distance from the map's midpoint. The resulting scores ranged from 5.50 centimeters (most northern and western points) to  $-5.50$  centimeters (most southern and eastern points) with a midpoint of zero.

In all studies, we wanted to determine if the influence of north–south location was significant even when controlling for west–east location. In Study 2, we tested if north–south location differed from zero while controlling for west–east location. To examine this question, we used a multiple regression analysis with west–east location as a predictor and north–south location as the criterion. This analysis allowed us to determine if the average north–south location was significantly different from zero while controlling for west–east location. In a regression analysis, a significant regression coefficient for the constant reveals that the mean score on the criterion is significantly different from zero. As predicted, the regression coefficient for the constant was **positive and significant, 1.15** ( $SE = .36$ ),  $t = 3.18$ ,  $p < .01$ . The effect of west–east location was not significant,  $\beta = -.27$ ,  $t = -1.45$ ,  $p = .16$ . **Thus, participants' average north–south location choice was in the northern direction and significantly different from zero.**

### Study 3

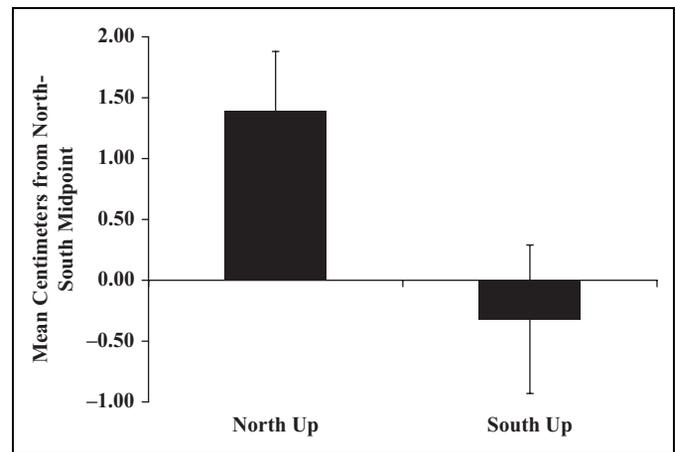
Study 1 showed that people believe “north” is more positive than “south” and Study 2 revealed that people chose to live in a hypothetical city's northern area. In Study 3, we set out to determine why north is more preferred than south. We hypothesized that the up–down depiction of north–south (and the relevant valence-verticality metaphor) creates this bias. Thus, we predicted that reversing the up–down depiction would reduce/eliminate the tendency to prefer north over south. Indeed, blocking metaphor/embody effects offers theoretical support (e.g., Feroni & Semin, 2009; Meier, Schnall, Schwarz, & Bargh, 2011; Strack, Martin, & Stepper, 1988).

We used the same procedure from Study 2, but in Study 3 participants were randomly assigned to one of two conditions. The control condition was identical to Study 2. In the experimental condition, we told participants that the city they would live in was located in a place with different cardinal directions. We told them that in this place, south is up, north is down, east is left, and west is right. All participants were asked to choose where they would live. We hypothesized that this variation would interfere with participants' representation of north and south as good and bad, which would in turn cause their location choices to be in a less northerly direction than participants' choices in the control condition.

## Method

### Participants

Participants were 50 undergraduates (30 females) with a mean age of 20.41 ( $SD = 1.34$ ) years.



**Figure 2.** Mean location choices in centimeters from the north–south midpoint as a function of condition, Study 3 (positive numbers = a higher location on the map).

### Procedures

We presented the map shown in Figure 1 in a paper questionnaire. Participants were randomly assigned to one of two conditions, the control condition ( $N = 26$ ) or the experimental condition ( $N = 24$ ). Participants in the experimental condition were presented with the same map, but with cardinal directions in the opposite locations.

## Results and Discussion

We recorded the north–south and west–east locations (in centimeters) where participants chose to live and converted these measurements to scores that allowed us to determine the distance from the map's midpoint. We computed these scores so that positive scores (0 to 5.50 centimeters) indicated up and left on the map and negative scores (0 to  $-5.50$  centimeters) indicated down and right on the map. We used a multiple regression analysis to examine the impact of map condition on participants' north–south locations, while controlling for west–east locations. The effect of west–east location was significant,  $\beta = -.28$ ,  $t = -2.09$ ,  $p = .04$ , but was not of interest. Importantly, the effect of map condition was significant,  $\beta = .28$ ,  $t = 2.11$ ,  $p = .04$ . As shown in Figure 2, participants in the control condition chose a higher location on the map ( $M = 1.38$ ;  $SD = 2.50$ ) than participants in the experimental condition ( $M = -.32$ ,  $SD = 2.99$ ). We next sought to determine if north–south locations significantly differed from zero in each condition. In other words, we determined if the regression coefficient for the constant differed from zero in each condition while controlling for west–east locations. The regression coefficient for the constant was significantly different from zero in the control condition,  $t = 1.99$ ,  $p = .05$ , but not in experimental condition,  $t = -.93$ ,  $p = .36$ . In combination with Studies 1 and 2, the results of Study 3 reveal that northern areas of a hypothetical city are more desired than southern areas because north is depicted on top.<sup>1</sup>

## Study 4

In Study 4, we sought to determine if the north–south bias could have consequences for the perceptions of others. We expected that a north–south bias would be reflected in stereotypes about where wealthy and poor people live in a hypothetical city. We randomly assigned participants to a description of an individual who was low or high in socioeconomic status (SES) and then asked them to estimate where this individual lived. We hypothesized that participants would believe that a person high in SES lived further north than a person low in SES.

### Participants

Participants were 87 undergraduates (57 females) with a mean age of 19.61 ( $SD = 1.39$ ) years.

### Procedures

Participants were presented with a paper questionnaire. We used a different map of a fictional city (see Figure 3). The map was different so we could ensure the effects from Studies 2 and 3 were not specific to a certain geographical shape. The map boundaries measured 11.60 centimeters in both north–south and west–east directions.

We randomly assigned participants to one of two SES conditions. We told participants about an individual named Bennett. In one condition ( $N = 40$ ), we told them about a high SES “Dr. Bennett,” whereas in the other condition ( $N = 47$ ) we told them about a low SES “Mr. Bennett.”

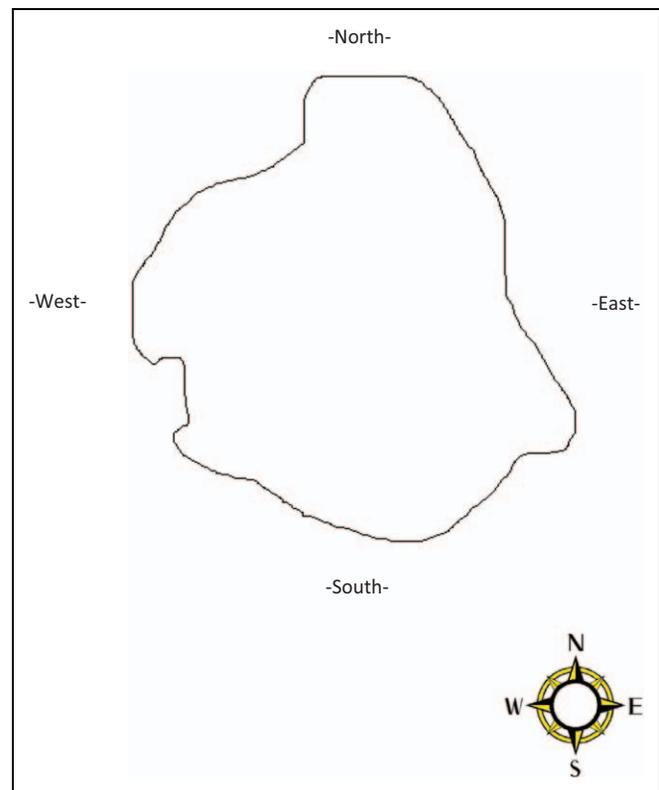
**Low SES Condition:** Mr. Bennett is unemployed. He was born and raised in the city he now calls home. He struggles to pay the rent each month, and dropped out of high school before graduation. He enjoys a good hot dog and a six pack of beers when he can.

**High SES Condition:** Dr. Bennett is a wealthy business man who has travelled the world. He inherited a significant amount of money from a Great Aunt, and was educated at the best schools growing up. He enjoys fine dining and going to the theater on weekends.

After reading a description, participants were asked to draw an “x” on the map to indicate where they thought this individual lived.

## Results and Discussion

We calculated the position of participants’ estimates on two dimensions, north–south and west–east. Estimates were converted into scores that indicated the distance from the midpoint or city center. The resulting scores ranged from 5.80 centimeters (most northern or western point) to  $-5.80$  centimeters (most southern or eastern point) with a midpoint of zero. We used a multiple regression analysis to examine the impact of SES condition on participants’ north–south locations while

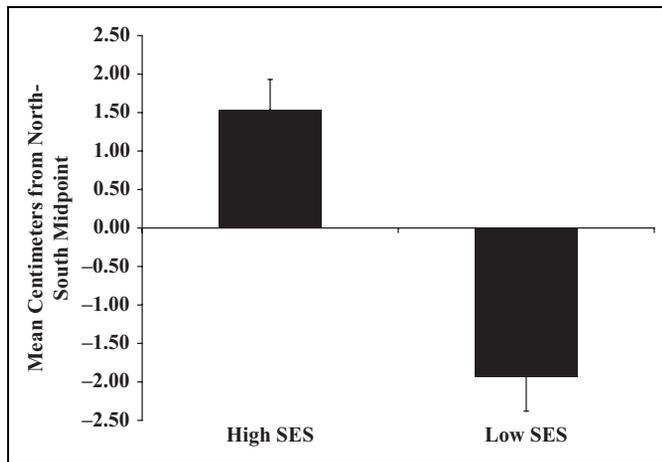


**Figure 3.** Map used in Study 4.

controlling for west–east locations. The effect of west–east location was not significant,  $\beta = .03$ ,  $t = .31$ ,  $p = .76$ . Importantly, the effect of SES condition was significant,  $\beta = .54$ ,  $t = 5.71$ ,  $p < .01$ . As shown in Figure 4, we found that estimates of where the person high in SES lived were further north ( $M = 1.54$ ;  $SD = 2.87$ ) than estimates of where the person low in SES lived ( $M = -1.93$ ;  $SD = 2.69$ ). We next sought to determine if north–south locations significantly differed from zero in each condition while controlling for west–east locations. The regression coefficient for the constant was significantly different from zero in the high SES condition,  $t = 3.49$ ,  $p < .01$ , as well as the low SES condition,  $t = -4.76$ ,  $p < .01$ . Thus, participants believed a high SES individual was more likely to live in a northerly area of a city, whereas they believed a low SES individual was more likely to live in a southerly area of a city. Such results suggest that a north–south bias might lead to stereotypical thinking about affluent areas of a city.<sup>2</sup>

## General Discussion

Across four studies, we used metaphor representation theory (Lakoff & Johnson, 1999; Landau et al., 2010) to predict a previously unidentified bias in housing-related decisions, a consumer decision context of nearly unparalleled significance. Our results revealed convergent support for the hypothesized north–south bias in relation to housing-related preferences. Participants rated “north” as more positive than “south” and preferred to live in a more northerly area of a city



**Figure 4.** Mean estimates in centimeters from the north–south midpoint as a function of SES condition, Study 4 (positive numbers = a more northerly estimate).

(Studies 1 and 2), yet, this second effect was eliminated when north was depicted on the bottom of a city map (Study 3). This effect supports the theorized mechanism that north is perceived as more positive than south because it is typically depicted as up and hence becomes associated with positivity. The north–south bias was further shown to influence perceptions of others as participants assumed that a person high in SES was more likely to live in the northern area of a city (Study 4).

In addition to uncovering a north–south bias, the results advance the metaphor representation theory perspective more broadly. Our results suggest that conceptual metaphors can influence behavior in domains that are not directly related to specific experiences. That is, it appears that the north–south bias is driven by more indirect mappings between cardinal direction and verticality (north = up, south = down) and between verticality and valence (up = good, down = bad). Furthermore, our findings suggest that the metaphor representation perspective has value for predictions in more applied social contexts. Below, we discuss some implications in terms of consumer-related behavior and stereotypes, as well as for future research.

### Implications for Consumer-Related Behavior and Stereotypes

Our results could have implications for actual real estate as home values in northerly areas of a city could be more expensive than their southern counterparts. Furthermore, the results could have implications for consumer behaviors that are not directly related to real estate. Marketers may consider the potential advantages of using terms like “north,” “northern,” or “up north” when possible to imbue stores or products with added positivity. For example, when purchasing certain products, participants may perceive a store located in a northerly area of a city to be better, and more worthy of their patronage. The salience of a northern location could be especially influential in the context of online purchases, which do not require the purchaser to travel, but do require the purchaser to choose from a large number of

merchants with similar prices. A subtle mention of a northerly location could help drive preference among shoppers confronted with an extensive range of similar options.

While a north–south bias could benefit marketers, the bias is unlikely to benefit individuals who live in southern areas of a city. The strength of the results of Study 4 suggests that there is a robust tendency to perceive less affluent people to live in the southern area of a city. Such an expectation could likely bring to mind the negative stereotypes that go along with reduced affluence (e.g., less intelligence and motivation; Cozzarelli, Wilkinson, & Tagler, 2001).

### Future Research Considerations

While our results revealed a consistent impact of north–south location on housing-related judgments, there are some issues that warrant future consideration. For instance, it is possible that our results are specific to the United States, and other cultures with similar understandings of spatial location. Some cultures have different frames of reference in terms of cardinal direction (Majid, Bowerman, Kita, Haun, & Levinson, 2004); in such cases, north might be relevant to the person in one culture but to an object in another. In the latter cases, north might not feel like “up,” and resultantly, might not always mean “good.”

One might also consider the influence of participants’ place of residence, and/or upbringing. Most of the participants in our studies (2–4) were students at a private northeastern college, which primarily attracts students from the northeastern part of the United States (e.g., Massachusetts, New Jersey, and New York). It might be that north is considered more desirable in these studies because our participants were primarily raised in northern areas of the United States. However, evidence against this hypothetical limitation was found in Study 1, which included participants that were from locations across the United States (using Amazon’s Mechanical Turk), yet, we still found that “north” was rated as more positive than “south.”

In sum, this research offers important theoretical and applied contributions, including: (a) uncovering a north–south affective bias, (b) revealing that conceptual metaphor can influence areas through indirect association, and (c) demonstrating that the north–south bias has behavioral consequences. The studies advance the metaphor representation literature significantly to the extent that the behavioral consequences documented were shown in a consumer context of the highest order in terms of financial significance.

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## Notes

1. We ran a multiple regression analysis that included the interaction term (condition by west–east location) in the analysis. The interaction was not significant ( $p = .70$ ), but the main effect of condition was significant ( $p = .04$ ).
2. We ran a multiple regression analysis that included the interaction term (condition by west–east location) in the analysis. The interaction was not significant ( $p = .21$ ), but the main effect of condition was significant ( $p < .01$ ).

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