



On Southbound Ease and Northbound Fees: Literal Consequences of the Metaphoric Link
between Vertical Position and Cardinal Direction

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Forthcoming in the *Journal of Marketing Research*



AUTHOR NOTE

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ABSTRACT

Consumers are influenced by the metaphoric relationship between cardinal direction and vertical position (i.e., “north is up”). People think it will take longer to travel north than south (Study 1), that it will cost more to ship to a northern than to a southern location (Studies 2 and 6), and that a moving company will charge more (Studies 3a and 3b) for northward movement than for southward movement. Furthermore, people have greater intention to visit stores advertised to be south (vs. north) of a reference point (Study 4), especially when ease of travel is important (Study 5).

Keywords: time perception, price perceptions, embodied cognition, perceptual symbols, intuition

“Well it's all up from Florida... and it's roll back down to St. Petersburg”

- “Dusty Old Fairgrounds” (Dylan 1973)

“I always like going south. Somehow... it feels like going downhill.”

- Spoken by Treebeard, (*Lord of the Rings: The Two Towers* 2002)

Forecasts of travel time, travel ease, and travel costs influence consumer decision making, including the choice of travel routes and destinations (Bell, Ho, and Tang 1998). In his review of consumer travel behavior, Hubbard (1978) discusses the economic assumption that people try to minimize travel, but research indicates that consumers' actual behavior often diverges from that standard. For example, research shows that consumers prefer a route that continuously progress towards a final goal, even if it takes longer than an alternative (Soman and Shi 2003). Furthermore, when shown a map featuring a number of stops on a possible shopping trip, consumers minimize the distance between stores even when it means traveling further from home and lengthening the total trip distance (Brooks, Kaufmann, and Lichtenstein 2004).

Even when perfectly accurate maps are provided, people are biased in their estimations of time and distance. Consumers frequently underestimate travel distances in part because they encode travel times instead (Kang, Herr, and Page 2003). In addition, people may underestimate travel distances because they rely on heuristics that overemphasize direct distance (Raghubir and Krishna 1996). For example, in one study, consumers were shown a line map and asked to estimate the path distance between two points. When participants counted out loud during this task they made fewer adjustments from the direct line distance estimation, and judged the overall travel distance to be shorter than did participants who were not counting out loud. Indeed, many

studies show that consumers use a variety of psychological mechanisms to assess time and distance, and that these mechanisms often lead to counter-normative assessments.

This paper extends these findings by identifying an independent and thus far undocumented influence on consumers' travel-related judgments. Specifically, we show that the metaphors that people use to describe spatial relations can affect their judgments of travel time, ease, and costs.

Cardinal Direction and Vertical Position

Consider the quotes that open this paper. Whether making reference to living “up north” or “down south,” people often use the language of vertical position to describe cardinal direction. As the Dylan (1973) quote suggests, moving north is often described as moving up, and moving south is often described as moving down. The second quote, spoken by a character in Tolkien's trilogy, contains the same sentiment while implying that traveling south actually *feels* like going downhill.

Of course, travelers heading south are no more likely to be going downhill than those traveling north. Nevertheless, we suggest that a lifetime of exposure to the metaphoric link between cardinal direction and vertical position may cause people to associate northbound travel with uphill travel and southbound travel with downhill travel. As a result, consumers may expect northbound travel to be longer, costlier, and more difficult than southbound travel.

On the surface, this hypothesis diverges from sensible intuition, but recent research (e.g., Barsalou 1999; Zhong and Liljenquist 2006) suggests that people often behave as though metaphor-based associations are literal. Below we briefly review theory and research consistent with this notion, identify the few ways in which it has already influenced our understanding of

consumer behavior, and describe how it can be used to make predictions about consumer judgment.

The Effect of Metaphors on Perception and Judgment

Metaphor usage can change perceptions, causing people to treat figurative language as though it is literal. This thesis derives in large part from Perceptual Symbol Systems Theory (PSS; Barsalou 1999), which suggests that knowledge is represented as perceptual symbols rather than as propositions or feature lists. According to PSS, knowledge is encoded, stored, and retrieved in terms of how it is perceived. As a result, perceptually associated concepts are encoded, stored, and retrieved as if they are, in fact, associated. Thus, because “north” is frequently above “south” on maps and in sentences (in both the northern and southern hemispheres), people’s memories may falsely indicate that “north” is physically above “south.” Importantly, these memories may guide people’s judgments and decisions about travel time, travel ease, and travel costs.

Impressive evidence supports PSS. For example, people are faster to identify the relationship between two words (e.g., basement and attic) when the word presentation is consistent with their spatial relationship (e.g., attic above basement; Zwaan and Yaxley 2003). PSS also applies to abstract concepts. For example, people associate vertical position with power: When presented with pairs of occupations (e.g., professor and student) people are faster to identify related words when the high powered role is physically above the low powered role (Schubert 2005). Furthermore, people associate vertical position with valence. People are faster to identify positive words when they are presented on the top of a computer screen, and faster to identify negative words when they are presented on the bottom of the screen (Meier and

Robinson 2004). Dozens of studies demonstrate that spatial cues influence perceptual symbols, which can, in turn, influence judgments of power, time, respect, and valence (for reviews, see Barsalou, Simmons, Barbey, and Wilson 2003; Niedenthal, Barsalou, Winkielman, Krauth-Gruber, and Ric 2005).

Metaphoric language and experience can thus determine the way people encode and retrieve knowledge; as a result, they may treat metaphors quite literally. In support of this, one set of studies found that metaphors linking cleanliness with morality can cause people to literally attempt to “wash away their sins.” People who recalled an unethical (vs. ethical) deed showed a stronger preference for cleaning products, and washing their hands made them feel as though their morality had been restored (Zhong and Liljenquist 2006).

The Effect of Metaphors on Consumer Behavior

Despite a substantial influence in experimental psychology, PSS and related theories have been largely unexplored in consumer research. One exception that has indirectly drawn upon the PSS framework is research examining how consumers think and speak about their experiences. For example, Zaltman and his colleagues (Zaltman and Coulter 1995) have attempted to understand consumer cognition by studying the metaphors consumers use when speaking about advertising, brands, and products. Consistent with Barsalou (1999), these researchers argue that thoughts are represented as images rather than words. Furthermore, they argue that these images appear in our metaphoric language, and that we can gain insight into mental representations by examining people’s choice of metaphor. This theory has received some support from consumer research. For example, people used elaborate metaphor, as well as bodily movement, to convey their hedonic experience of an art museum (Joy and Sherry 2003).

If metaphors influence mental representations, then metaphors may influence judgments and decisions. Investigating this possibility would advance existing research in two ways. Most obviously, this would be the first substantive effort to apply PSS to consumer behavior. Furthermore, these findings would advance our understanding of PSS. Despite the breadth of findings in this domain, existing support for PSS has primarily been restricted to differences in processing latencies (e.g., Meier and Robinson 2004) or relatively inconsequential judgments (e.g., Schubert 2005). Indeed, one of the only investigations of PSS on judgments was a recent finding suggesting that people judged animals with more respect when they were given a higher vertical position on a computer monitor (i.e., Schubert 2005, Study 6). As intriguing as this finding is, it was only observed for high-respect animals, and, as the author suggests, it may not extend to targets that are more explicitly understood. Investigating the tenets of PSS within the domain of consumer behavior allows us to determine if these effects hold for conscious judgments that have potentially real consequences.

Applied to the topic of this article, PSS suggests that thinking about cardinal direction may conjure the well-learned associations between cardinal direction and vertical position. Thus, “North” may evoke memories that are consistent with its being “above” South, and “going from South to North” may evoke memories consistent with traveling upward. Reliance on these memories may cause people to judge northbound travel as proceeding uphill and southbound travel as proceeding downhill; and, because gravity makes uphill travel more onerous, people may judge northbound travel as more effortful, more difficult, more time-consuming, and costlier than southbound travel. On this basis, we make the following predictions:

- H1: Consumers associate “north” with “up” and “south” with “down.”
- H2: Consumers will expect northbound travel to take longer than southbound travel.

- H3: Because northbound travel is believed to be more difficult, consumers will expect northbound services (e.g., shipping a package to a northern location) to cost more than southbound services.
- H4: Because southbound travel is believed to be easier, consumers will express greater intentions to visit a store that is south of a reference location than a store that is north of a reference location.
- H5: The effects of cardinal direction on shopping intentions will be reduced when ease of travel is less important.
- H6: The effects of cardinal direction on consumers' judgments will be reduced when the association between cardinal direction and vertical position is disrupted.

We test these hypotheses in seven studies.

Preliminary Study

Although the primary focus of the paper was to investigate how consumers' judgments are influenced by cardinal direction, it was important to first investigate whether people associate vertical position and cardinal direction in the manner that we hypothesized (H1). To accomplish this, we administered a version of the Implicit Association Test (IAT; Greenwald, McGhee, and Schwartz 1998). The results of this study (N = 41), which is described in the Web Appendix, revealed that people very strongly associate "north" with "up" and "south" with "down." The remainder of the paper investigates the consequences of this association.

STUDY 1

Going uphill is harder than going downhill, so it often takes longer to go up than to go down. If the metaphoric link between cardinal direction and vertical positions leads consumers to think that north is physically above south, then they may expect northbound travel to take longer than a southbound equivalent. In Study 1 participants judged the travel time of a northbound or southbound bird. Consistent with H2, we expected them to estimate that northbound travel would take longer.

Method

Undergraduate participants (N = 78) read the following information about the migration patterns of a fictional species of bird:

The *Ariely Gull*, a relative of the albatross, conducts one of the great navigational feats in the animal kingdom. The *Ariely* spends most of the year in the severe cold of the arctic [Antarctic], within a few miles of the North [South] Pole. Once a year though, in the coldest temperatures of the Northern [Southern] winter, the bird starts a migration south [north] to Frederick's Island, an isolated volcanic outcropping on the equator in the Pacific Ocean, a journey of more than 3,500 miles. The *Ariely Gull* spends less than a month on the island before migrating north [south] again, where it hunts and nests in the icy polar climate.

We told approximately half of the participants that the bird originated at the North Pole, and we told the remainder that the bird originated at the South Pole. Participants then estimated how long it would take the bird to travel to the equator and how long it would take to return. Neither question specified the units of time to be used in responding.

Results and Discussion

If people judge south-to-north travel as more difficult than the north-to-south equivalent, they should also judge it to take longer. Consistent with our predictions, participants thought that the bird would take longer to go from pole to equator when it was traveling from the South Pole ($M = 41.1$ days) than when it was traveling from the North Pole ($M = 21.1$ days), $t(76) = 2.69$, $p = .009$. Furthermore, although most participants reported identical return times (59%, 46 of 78), those who did not were more likely to think the return trip would take longer when the bird originated in the North Pole (67%, 12 of 18) than when the bird originated in the South Pole (8%, 1 of 14), $\chi^2 = 11.57$, $p < .001$. This finding provides the first evidence that information about cardinal direction can influence judgments of travel time.

In the following studies we advance our thesis, in both theory and in application, by examining the direct consequences of these psychological processes for consumers' judgments and choices. As detailed in the introduction, consumer behavior offers a unique opportunity to test the judgmental processes predicted by PSS. Past research in this area has typically documented judgmental changes by observing variation in response latencies or by observing modest alterations in the assessment of ambiguous stimuli. These measures are often chosen because the effects of metaphors on judgment are assumed to be subtle, and quickly corrected by conscious mechanisms. In contrast, we contend that the link between cardinal direction and vertical position operates on completely explicit judgments, and the domain of consumer decision making offers an ideal context for testing this claim. Toward this aim, the next three studies were designed to test H3, which predicts that consumers will expect to pay more for northbound services than for equivalent southbound services.

STUDY 2

If consumers think that it is harder to go north than to go south, then they may expect prices for northbound services to be higher than prices for southbound services (Bolton, Warlop, and Alba 2003). In Study 2, we varied information about cardinal direction, and we asked people to estimate shipping costs between two different cities. Consistent with H3, we predicted that people would expect northbound shipping to be more expensive than southbound shipping.

Method

Undergraduates (N = 54) completed a “Shipping Cost Questionnaire” as part of a longer experiment, and were told that we were “trying to get a sense of people’s knowledge and intuitions about shipping and delivery costs.” After a brief cover story about the importance of transportation commerce, participants were told that we had identified three U.S. cities, and that “although it is quite possible that you have visited one or two of these towns, it is unlikely that you have visited all three. Regardless of your personal experience, please answer the question using your intuitions and experience about shipping.” The three cities (Baron Town, Aakerton, and Slovicberg) were not real places, but participants were not told this.

The critical manipulation was the presence or absence of geographical context. For approximately half of the participants, the town names were printed horizontally on the page with no context at all. For the remaining participants the three cities were identified within a line drawing of the continental U.S., with Baron Town identified as being roughly in the middle of the country, and Aakerton and Slovicberg identified as being approximately equidistantly north or south of there (see Figure 1). Participants receiving this added geographical context either saw a version with Aakerton to the north or a version with Aakerton to the south.

All participants were told to imagine that they were in Baron Town and to identify which of the other two towns would be more expensive to ship to.

Results and Discussion

When participants had some geographical context, they were more likely to identify Aakerton as the more expensive shipping destination when it was north (58%, 7 of 12) than when it was south (14%, 2 of 14), $\chi^2 = 5.54, p = .018$, of Baron Town. When no geographical context was present, estimates fell roughly in the middle of these two estimates (33%, 9 of 27). It seems that consumers judge northward movement as being more difficult. As a consequence, they think that it would be more expensive to ship an item in that direction.

STUDY 3A

Study 2 found an effect of cardinal direction in a situation in which people were forced to choose between options. This allowed us to observe condition differences even if the association between vertical position and cardinal direction exerts no more than a tiebreaking influence. To test whether the metaphor exerts more than a tiebreaking influence, Study 3a manipulated cardinal direction and asked people to estimate costs.

Method

Undergraduates (N = 81) at a private northeastern university participated in an experiment on Moving Costs. They began by reading a paragraph asking them to imagine themselves moving between two cities in New Mexico (a state our participants had very little familiarity with) in order to pursue a recent job promotion. All participants were instructed to

imagine that the cities were about 20 miles apart, that they were moving from one one-bedroom apartment to another, and that they were hiring a moving company to pack and move their belongings. For about half the participants, the scenario described the move as being 20 miles to the north, whereas for the remainder the move was 20 miles to the south. All participants then answered two questions about the cost of the move. The first question presented participants with a 7-point scale anchored at \$500 on the low end, and then increasing in \$500 increments to \$3500. The subsequent item asked participants to answer an open-ended version of the same question.

Because our manipulation was very subtle and therefore easily ignored, we included a measure at the end of the study designed to identify those participants who did not read the instructions carefully (Oppenheimer, Meyvis, and Davidenko 2007; also see Simmons and Nelson 2006, Study 12).

Results and Discussion

We excluded 13 participants who failed the measure of attention, and three more who failed to answer the second question, leaving us with final samples of 68 and 65 for the two dependent variables.¹ As we predicted, participants who imagined moving north indicated a higher price on the scale ($M = 2.82$) than those who imagined moving south ($M = 1.94$), $t(65) = 2.83, p = .006$. This difference was further reflected in the open-ended prices, as participants expected the move north to be 80% more expensive ($M = \$1,550$) than the move south ($M = \857), $t(62) = 2.23, p = .030$.

Participants thought it would cost more to move north than to move south. Although one could argue that the effects observed in Study 2 were attributable to reliance on a tiebreaking

strategy, this criticism cannot apply to the effect of cardinal direction on ratings and prices observed in this study.

Though Study 3a suggests that these effects are not limited to a tiebreaking strategy it is difficult to assess the real impact of the manipulation relative to other variables. Furthermore, given the peculiarity of the findings, we thought that it was important to replicate the results. Study 3b used a very similar paradigm with a different population of students. In addition, we manipulated both cardinal direction and the distance of the move. This allowed us to compare the effect size of the cardinal direction manipulation to the effect size of the moving distance manipulation.

STUDY 3B

Method

Undergraduates (N = 119) from a large western public university completed this study as part of a larger experimental session in partial fulfillment of a course requirement. We replicated the design of Study 3a with a few changes. First, data from Study 3a suggested that price estimates were generally clustered towards the low end of the scale, so we used a new range of scale values in an effort to encourage participants to use the full scale. When estimating moving costs, participants first reported their response on a 7-point scale ranging from “less than \$100” to “\$1300 and over.” Second, on the off chance that there was something about New Mexico that increased the likelihood of finding the effect, we eliminated this piece of information and made reference to the two cities without a specific state reference. Third, because of the circumstances of the experimental administration we could not administer the check on whether participants read the instructions. Finally, and most importantly, we orthogonally manipulated the cardinal

direction of the move (approximately half the participants imagined a move from north to south and the remainder imagined a move from south to north) and the distance of the move (approximately half the participants imagined a 200-mile move whereas the remainder imagined a 2000-mile move). All participants estimated how much the move would cost, first on the 7-point scale described above and then again by providing an open-ended cost estimate.

Results and Discussion

We replicated the primary findings of Study 3a, as people thought that it would cost more to move north than it would to move south ($M_s = \$966$ vs. $\$731$), $F(1, 113) = 6.59$, $p = .012$.² Furthermore, and much less interestingly, people thought that it would cost more to move 2000 miles than it would to move 200 miles ($M_s = \$1,042$ vs. $\$554$), $F(1,113) = 41.03$, $p < .001$. The interaction of distance and cardinal direction was not significant, $F(1, 113) = 1.69$, $p = .20$.

It is worth mentioning that the overall design of our dependent measures in studies 3a and 3b (a rating scale immediately preceding an open-ended measure) might artificially constrain the open-ended cost estimates. Nevertheless, these estimates are useful for quantifying the size of the cardinal direction effect in terms of the size of the distance effect. Indeed, the distance effect suggests that participants in this study priced a move at approximately \$0.27 per mile. When considered in those terms, it seems that participants expected a move north to be worth about 870 miles more than an equivalent move south. Thus, information about cardinal direction seems to have a consequential and substantial influence on price expectations.

STUDY 4

If consumers think that it is harder to go north than it is to go south, then they may be more persuaded by marketing communications framing a retail location as south rather than north of a reference location. Study 4 tested this hypothesis by manipulating a coupon's framing of a store location and asking people to report their likelihood of redeeming the coupon. Consistent with H4, we expected consumers to express greater intentions to redeem the coupon when the store's location was advertised to be south of a reference location rather than north of a reference location.

Method

In a larger experimental session, undergraduates (N = 171) at a private northeastern university were shown a copy of a coupon for \$1 off of any purchase at "Ashley's Ice Cream." An instruction, written in a smaller font at the bottom of the coupon, described the location of the ice cream shop in one of two ways. For some participants the store's location was described as one block north of a reference street, whereas for the remaining participants it was described as being one block south of a reference street. The location described was real, but in a different city than the participants. The coupons are shown in Figure 2.

Participants used 9-point scales to report how likely they would be to use the coupon (1 = *very unlikely*; 9 = *very likely*), whether a trip to the shop would be worth the effort (1 = *definitely NOT worth the effort*; 9 = *definitely worth the effort*), and how difficult they anticipated it would be to get to the ice cream shop (1 = *not at all difficult*; 9 = *very difficult*).

Results and Discussion

The three measures were highly correlated ($\alpha = .76$). We reverse scored the “difficulty” item and averaged the measures so that higher numbers indicated greater intentions to visit the shop to redeem the coupon. As predicted, participants expressed greater intentions to redeem the coupon when it described the shop as being to the south rather than to the north of a reference location ($M_s = 6.31$ vs. 5.67), $t(169) = 2.10$, $p = .038$.

Despite the subtlety of the manipulation, consumers nevertheless showed a preference to visit the southern rather than the northern location. Moreover, this study showed that the mere framing of a location as north or south of some reference location can affect intentions to shop there. Thus, marketing communications that emphasize that a store is south of some reference point may be particularly effective, as they suggest that such stores may be conveniently reached.

Though southward locations may be preferred when convenience is important, one might expect this effect to disappear when quality is a more important consideration than convenience. Indeed, there are many consumption situations in which people are quite willing to expend extra effort for what might be a better product. If people were shopping for an item that was not worth exerting considerable effort to acquire, they may, as Study 4 suggests, take the “easy” route and go south. However, if it is worth exerting effort to acquire an item, people may care less about convenience, and therefore give less weight to cardinal direction when choosing a shopping destination.

In Study 5, we tested this possibility by asking people to choose between northern and southern stores when shopping for either a special or a routine good. We expected people shopping for a special item to care much more about product quality than about shopping convenience. Thus, consistent with H5, we expected participants to choose to shop at the

“easier” southern location when they imagined shopping for a routine replacement good but not when they imagined shopping for a special, high-quality good.

STUDY 5

Method

Undergraduates (N = 105) at a private northeastern university completed a questionnaire about “Advertising and Shopping Decisions,” which showed two advertisements ostensibly taken from the Topeka, Kansas phone book for electronics stores in that region. Topeka was chosen for these stimuli because most participants were unfamiliar with that region of the country. The advertisements were very similar, but the stores differed slightly in their geographical placement: one store was 5 miles north of Topeka, whereas the other was 5 miles south (see Figure 3). Store names (Electronic Solutions and Intelligent Electronics) and position on the page (Left vs. Right) were counterbalanced, and did not exert any main or interactive effects on the dependent measure.

After examining the two advertisements, participants were told to assume that they were in the center of Topeka, and they were given one of two possible shopping goals. Approximately half of the participants were asked, “If you wanted to buy a battery for your digital camera, and you knew that both stores carried the item, which would you drive to?” The remaining participants answered a similar question, except that they were given the goal of purchasing a “state-of-the-art digital camera” instead of a camera battery.

We predicted that when seeking a relatively routine replacement item like a battery, people would choose the store that was easiest to get to, and therefore choose the store to the

south. However, when seeking a more unique item, people would be less sensitive to travel convenience and would not show any effects of geographical position.

Results and Discussion

Consistent with H5, people were more likely to choose the southern store when shopping for a camera battery (68%, 34 of 50) than when shopping for a digital camera (47%, 29 of 55), $\chi^2 = 4.59, p = .032$. Furthermore, the pattern of results matched our predictions exactly, as battery-buying participants showed a south-store preference, $\chi^2 = 6.48, p = .011$, whereas camera-buying participants showed no preference one way or the other, $\chi^2 = .16, p = .69$.

This study suggests that the metaphor linking cardinal direction to vertical position influences choices only when travel ease is important. People chose the “easy” southern store when shopping for a replacement item, but were indifferent when shopping for a high-quality item.

It could be argued that these results are consistent with a process entirely independent of the association between vertical position and cardinal direction. Perhaps people just think north is “higher quality,” and make choices consistent with that belief. However, this explanation cannot account for the results of any of the previously reported studies. Moreover, as we show in study 6, intuitions about southbound travel ease guide judgments even when southern locations are associated with higher quality.

STUDY 6

Our next study had two specific goals. First, we wanted to address an alternative account for the findings presented thus far. Although our theory suggests that people prefer to travel to southern stores and expect southbound services to offer lower prices because they implicitly believe that southern locations are easier to get to, it is possible that these results are instead driven by the belief that southern locations are less expensive than northern locations. In Study 6 we did two things to try to rule out this possibility. First, we investigated the effects of cardinal direction on shipping cost expectations in a geographical context (the state of Florida) in which southern locations are believed to be *more* expensive. Second, we not only measured whether people thought it would be more expensive to ship north or to ship south, we also measured whether people thought there were differences in the cost of living between northern and southern Florida. We predicted that people would believe it was more expensive to ship north than south (because of the belief that north is up), even while maintaining the belief that the southern location had a higher cost of living than the northern location (because it is more expensive to live in southern Florida).

Our second goal was to uncover part of the underlying process that we hypothesize underlies our effects. We have argued that when people think in terms of cardinal direction it activates a memory that suggests that north is up. If that is the case, then stimuli that directly interfere with that memory should diminish the effects that we have described thus far. To test this possibility we manipulated the orientation of the map participants were asked to judge. Approximately half of the participants saw a right-side-up map of Florida, with north oriented to the top of the page. The remaining participants saw an upside-down map of Florida, with north oriented to the bottom of the page. Consistent with H6, we expected participants who viewed the right-side-up map to believe that it would be more expensive to ship northbound than to ship

southbound. However, we expected this effect to be weaker among participants who viewed the upside-down map.

Method

Undergraduates (N = 203) at a large western public university were approached on campus and asked to complete a brief questionnaire about transportation and geography. The questionnaire began by stating that we were interested in how “geographical information influenced judgments of transportation and living expenses.” It further detailed that we were going to ask about two (fictitious) towns in Florida (Deaconsville and Ferguson), and that a map of Florida was provided for reference. The position of each town was counterbalanced between participants. For some of the participants this map depicted Florida as it is traditionally shown, namely with north towards the top of the page. For the remaining participants the image was rotated 180 degrees so that south was towards the top of the page (Figure 4 depicts the stimuli). For all participants we explained that “this map is presented with [North/South] to the top of the page; the map is presented in this way to minimize irrelevant influences of the geographical features.” Beneath the map we asked two questions. First, participants were asked whether it would be more expensive to ship goods from Ferguson to Deaconsville or more expensive to ship from Deaconsville to Ferguson. Second, participants were asked which town they thought was “more expensive to live in, factoring in housing prices, groceries, etc.”

Results and Discussion

When north was to the top of the page most people thought that it would be more expensive to ship north than to ship south (66.0%; 66 of 100), $\chi^2 = 10.24$, $p = .001$, but there was

no such effect when the map was rotated, as slightly fewer people thought it would be more expensive to ship north than to ship south (48.5%; 50 of 103), $\chi^2 = .09$, $p = .77$, resulting in a significant effect of map rotation on the influence of cardinal direction information, $\chi^2 = 6.34$, $p = .012$. This is perfectly consistent with H6. The town names did not influence any of these effects.

It could be argued that some of the previous effects reflected a belief about general cost of living differences (i.e., it is more expensive to live in the north) than any effect of the metaphoric belief that north is uphill. On the contrary, even though the map's orientation significantly affected shipping cost estimates, people in this study thought that the southern town was a more expensive place to live regardless of whether the map was drawn with north to the top of the page (64.0%; 64 of 100), $\chi^2 = 7.84$, $p = .005$, or with south to the top of the page (60.2%; 62 of 103), $\chi^2 = 4.28$, $p = .039$.

Taken together, these findings considerably advance the central thesis of this paper. First, and most critically, when a map depicted northern locations to be *below* southern locations, the effect of cardinal direction on shipping cost expectations was eliminated. This result is consistent with the idea that the observed effects originate in the metaphoric association between cardinal direction and vertical position. Second, these findings further demonstrate that the effects are not simply due to a belief that southern locations are less expensive than northern locations, as participants in both conditions believed that the southern location was more expensive.

GENERAL DISCUSSION

We reported seven studies demonstrating that the metaphoric association between cardinal direction and vertical position is pervasive and consequential. Indeed, information about

cardinal direction can affect consumers' judgments of time, effort, and cost. Specifically, because they associate north with up and south with down, consumers expect northbound travel to be more time-consuming (Study 1), less convenient (Studies 4 and 5), and costlier (Studies 2, 3a, 3b, and 6) than southbound travel.

In addition to demonstrating the main effects of cardinal direction on consumers' judgments, we also identified two moderators of these effects. First, we found that people do not prefer the inferred convenience of southern locations when they are in the market for an expensive, high-quality good, presumably because ease of travel is unimportant in this case (Study 5). Second, we found that presenting people with an upside-down map eliminates the effect of cardinal direction on shipping cost expectations (Study 6). This finding strongly suggests that the metaphoric association between cardinal direction and vertical position is responsible for the effects we have observed. Indeed, when the belief that "north is up" is disrupted, the effect of cardinal direction on consumers' judgments is disrupted as well. Taken together, this research suggests that metaphoric associations can meaningfully affect conscious, consequential judgments.

This research also leaves some open questions. First, although our research shows that people's judgments and decisions reflect a belief that north is physically above south, we do not know whether this belief is mediated by the activation of a visual representation. On the one hand, PSS suggests that frequent exposure to maps that depict north above south may cause people to encode, and subsequently retrieve, a visual representation that is consistent with this relationship. On the other hand, metaphoric associations need not evoke visual representations in order to exert powerful effects on judgment (Zhong and Liljenquist 2006). Indeed, it is possible for people to learn the metaphoric association between cardinal direction and vertical position

without ever seeing a map. For example, repeatedly listening to speech implying that north is above south may reinforce the belief that northern locations are uphill and that northbound travel is therefore difficult. Consistent with PSS, our view is that frequent exposure to maps probably leads to the creation of a visual representation that is retrieved when people think about cardinal direction. However, the effects described in this paper are not dependent on this unconfirmed assumption, as they should hold even if the association between cardinal direction and vertical position is not perceptual in nature. We look forward to future research that more closely examines the nature of metaphoric representations.

Second, our research has not yet explored all of the boundaries of our effects. For example, if people judge northbound travel to be difficult because they believe that upward travel is difficult, then manipulations that make upward travel seem easier (e.g., having people hold helium balloons) may make northbound travel seem easier. It is also possible that our effects would vary by location. Even though our studies found the same effects using participants from east coast and west coast universities, it is possible that people living elsewhere, especially in places with physical barriers (e.g., mountains) to the south, would have different associations between cardinal directions and vertical orientation. Or perhaps more generally, it may be the case that there are individual differences in the strength of the associative link between cardinal direction and vertical position. In general, people who exhibit a weaker association between “north” and “up” should be less likely to show the effects we have documented here.

Marketing Implications

Throughout this paper we considered how the metaphoric link between cardinal direction and vertical position shapes consumers’ judgments and choices. Although consumer research has

largely ignored the interaction between metaphors and mental representation, it is interesting to consider these findings in light of some of the qualitative research that has been conducted in similar domains. As described in the introduction, Zaltman and his colleagues (e.g., Zaltman and Coulter 1995) suggest that analyzing metaphor usage provides insights into consumers' thoughts. We extend this insight by suggesting that changing the metaphors consumers use may change consumers' thoughts. Consider, for example, consumers' perceptions of time. Researchers have suggested that there are individual differences in consumer *timestyles*, characterized by the metaphors people use to describe the passage of time. Whereas some people think of time as a "map," helping to guide their progress towards a goal, others think of it as a "river" pulling them along in different directions beyond their own control (Cotte, Ratneshwar, and Mick 2004). Though these metaphoric timestyles may be stable and generally characteristic of how people perceive the world, the current work suggests that a change of metaphor may also change perceptions. For example, consumers who typically perceive time as a river may feel more efficacious in their goal pursuits when prompted to describe time as a map (for related research also see Boroditsky 2001).

For marketing managers, our findings make clear prescriptions for the construction of promotional materials. Firms that rely on a customer base that maximizes ease while minimizing expense should try to frame their location to reflect a southern direction, or at least a downward vertical position (Study 4). Though it is doubtful marketing managers are drawing upon PSS, there is evidence that some have already put this concept to work. The enticement to "Come on down!" is quite prevalent in the price-driven world of discount merchandise, a prevalence that possibly reflects the slogan's success.

Alternatively, when we consider how quality-seeking consumers judge the goods they receive from luxury firms, then the firm may want to use the opposite strategy. Study 5 showed that people do not favor a southern location when considering purchasing an expensive product. But this finding only scratches the surface. If it is harder to go north, then people might expect to find higher quality in northern-framed locations (Kruger, Wirtz, Van Boven, and Altermatt 2004; Morales 2005). Although this is an admittedly speculative possibility, when customers are shopping for quality, perhaps the best enticement should instead be to “Come on up!”

Beyond the specific relationship between cardinal direction and vertical position that we have investigated, we believe that marketing managers can greatly benefit from more generally applying perceptual models of cognition. If consumer thoughts are fundamentally perceptual, then marketers should not merely try to understand the abstract content of consumers’ thoughts, but also to understand and affect the perceptual basis of those thoughts. As has been noted by market researchers (e.g., Underhill 1999) and psychologists (e.g., Barsalou 1999), our physical relationship with our environment may not be incidental to how we think about our environment. Rather, it may define how we think about it.

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FOOTNOTES

1. Including the 13 participants who failed the measure of attention weakens the results, but the hypothesized effects remain significant (both $ps < .05$).
2. Two participants were excluded who estimated that the move would cost \$5,000 (one each from the northbound and southbound conditions). Though this estimate is not wholly inaccurate, it was nevertheless some 3 standard deviations above the mean.

FIGURE 1: AN EXAMPLE OF THE MAP USED IN STUDY 2

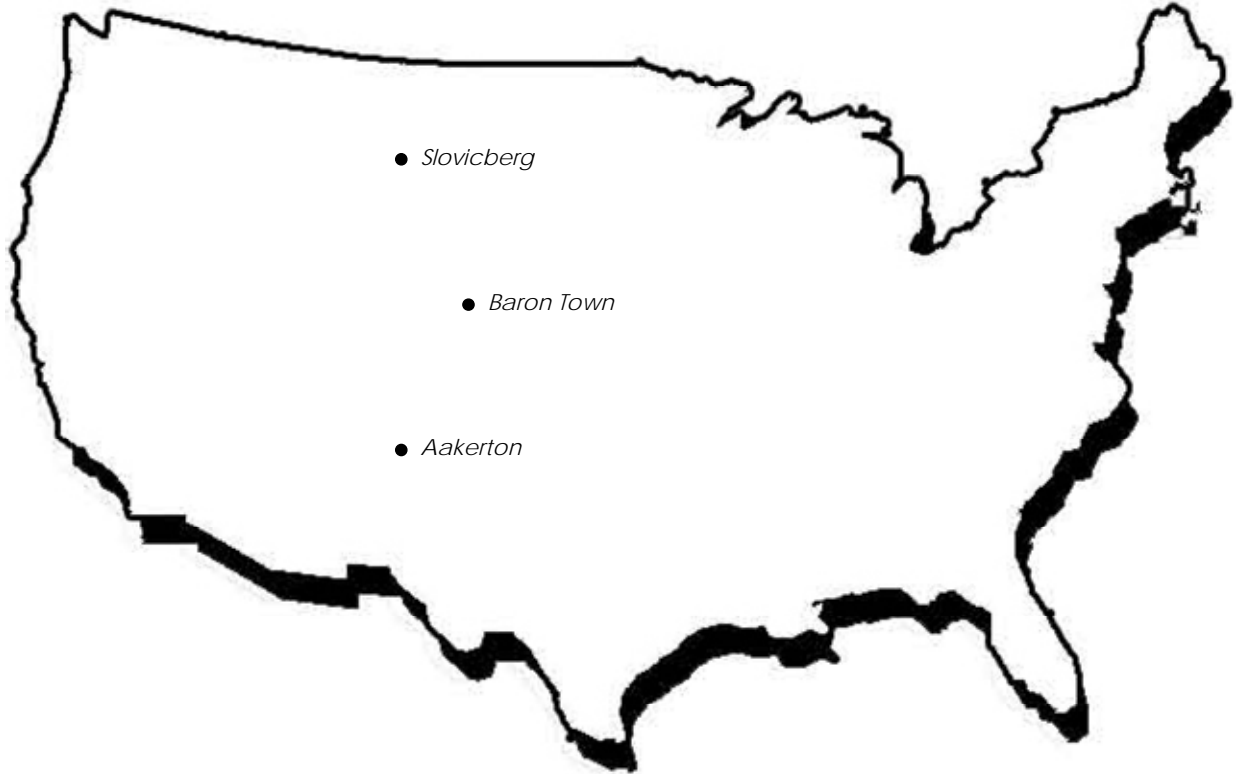


FIGURE 2: THE NORTH- AND SOUTH-FRAMED COUPONS USED IN STUDY 4



FIGURE 3: THE EFFECTS OF CARDINAL DIRECTION AND PURCHASE TYPE ON STORE CHOICE (STUDY 5)

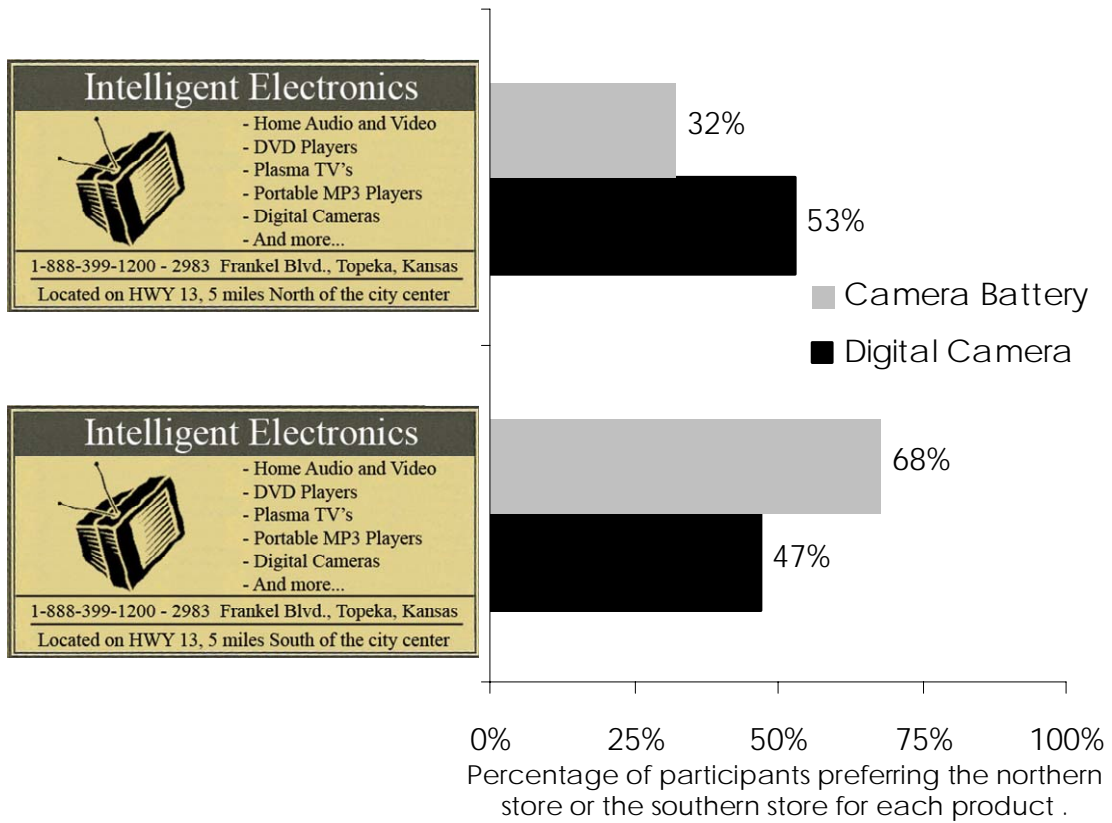
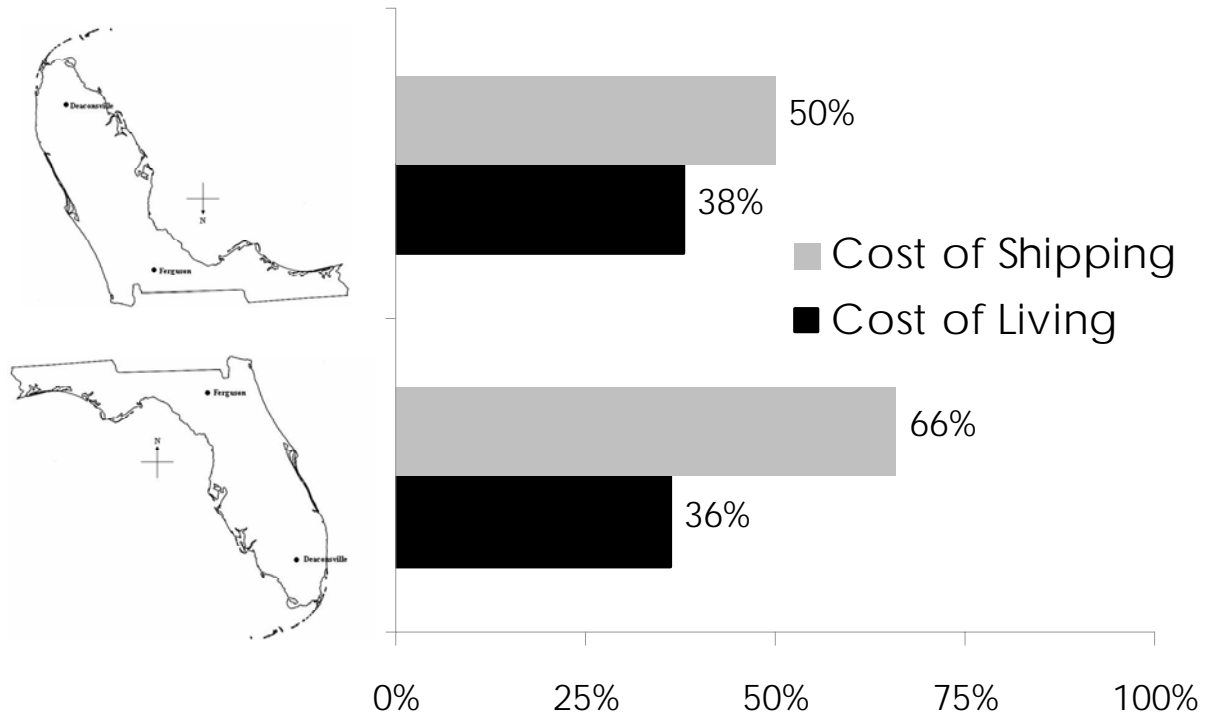


FIGURE 4: THE EFFECT OF MAP ORIENTATION ON PERCEPTIONS OF SHIPPING AND LIVING COSTS (STUDY 6)



Percentage of participants reporting that the northern city was more expensive on each measure.

TABLE 1: THE IMPLICIT ASSOCIATION TEST PROCEDURE

<i>Block</i>	<i># of trials</i>	<i>Trial type</i>	<i>Concepts</i> <i>(“North/Up” before “South/Up”)</i>	<i>Concepts</i> <i>(“South/Up” before “North/Up”)</i>
Step 1	20	Practice	South vs. North	South vs. North
Step 2	20	Practice	Down vs. Up	Up vs. Down
Step 3	20	Critical Practice	South or Down vs. North or Up	South or Up vs. North or Down
Step 4	40	Critical Test	South or Down vs. North or Up	South or Up vs. North or Down
Step 5	20	Practice	Up vs. Down	Up vs. Down
Step 6	20	Critical Practice	South or Up vs. North or Down	South or Down vs. North or Up
Step 7	40	Critical Test	South or Up vs. North or Down	South or Down vs. North or Up

Note. Concepts listed on left were categorized by pressing the “Z” key. Concepts listed on the right were categorized by pressing the “/” key.

On Southbound Ease and Northbound Fees: Literal Consequences of the Metaphoric Link between Vertical Position and Cardinal Direction

Leif D. Nelson and Joseph P. Simmons

WEB APPENDIX

Undergraduates ($N = 41$) completed the Implicit Association Test (IAT) procedure in exchange for \$10.00. The procedure involves seven steps (summarized in Table 1). In each step, participants are sequentially presented with stimuli on the computer screen, and their task is to quickly and accurately judge whether the focal stimulus relates to one concept (or pair of concepts) vs. another. In our experiment, the concepts were “North,” “South,” “Up,” and “Down.” The stimuli were words or symbols that were obviously related to one of these concepts (described below). Each stimulus appeared on the screen until the participant responded and the next stimulus appeared immediately thereafter.

The critical comparison in the IAT task involves trials on which participants have to categorize stimuli as belonging to one of a pair of concepts. For example, in our task, one subset of the critical trials asked participants to categorize the stimuli as being related to either “North or Up” vs. “South or Down” while another subset of critical trials involved categorizing the stimuli as being related to either “South or Up” vs. “North or Down.” If people associate “North” with “Up” and “South” with “Down,” then they should be faster to categorize the stimuli when the North/Up concepts are paired than when the South/Up concepts are paired.

Our IAT procedure was standard (Greenwald, McGhee, and Schwartz 1998). For approximately half of the participants ($n = 17$), the ordering of the procedure was as follows. In the first step, participants quickly categorized words as belonging to the concept “North” (i.e.,

Canada, Maine, Minnesota, North) or the concept “South” (i.e., *Florida, Mexico, South, Texas*).

In the second step, participants categorized stimuli as belonging to the concept “Up” (i.e., *Above, Top, Up, ↑*) or the concept “Down” (i.e., *Below, Bottom, Down, ↓*). The remaining steps mixed the two procedures so that participants were asked to categorize words from both lists. For the other subset of participants ($n = 24$), the latter stages of the procedure were completed in an alternative ordering (see Table 1 for details).

For each trial, the computer recorded the participant’s reaction time (RT) to categorize the stimulus as well as whether the stimulus was categorized correctly (e.g., *Maine* as “North”) or incorrectly (e.g., *Canada* as “South”).

Results and Discussion

We “scored” the IAT according to the steps outlined in Greenwald, Nosek, and Banaji (2003): by eliminating outlier trials, computing standardized response latency scores for each participant, and replacing incorrect response times. Next, we averaged the resulting values for each of the critical blocks to create a “D score” (Greenwald et al. 2003) for each participant, a measure that closely resembles Cohen’s (1977) measure of effect size (d). For our purposes, a higher D score indicated a stronger association between “North” and “Up” than between “South” and “Up.”

If people implicitly associate cardinal direction and vertical position, then the average D score should significantly exceed zero. Consistent with this, *all* participants showed a D score above zero (the values ranged from .33 to 2.80), and the average D score was significantly greater than zero ($M = 1.23$), $t(40) = 15.20$, $p < .001$. Thus, people implicitly associate “north” with “up” and “down” with “south.”