Lateral Generalization: The Role of Context-dependent Relations in Facilitating Price Inferences

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First Version: July 2012

Current Version: June 2014

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CONTRIBUTION STATEMENT

Prior research has studied consumers' price beliefs primarily as reference prices learned from experience or, less frequently, as inferences from fixed product characteristics (e.g., the manufacturer's costs). We identify a novel separate mechanism which may often influence consumers' price beliefs, particularly in low-information environments, a *lateral generalization* from the prices of other products. In this process, consumers infer an unknown price of a target product from the known prices of referent products, to the degree that there is an identifiable link between the target and referent products, facilitating the generalization inference. The present work has two central aims. First, we find that the prices of a broad range of products, both in the same category and in other categories, can influence estimated prices of a target product, as well as willingness-to-pay for the product. Second, we identify the situations where such inferences will and will not occur. Across our studies, we identify a wide range of contextual factors, including uninformative mere groupings, differing prior similarity judgment tasks, the attribute range represented in a choice set and even temporal distance (an external contextual factors not generally associated with similarity), which can all facilitate or impede lateral generalizations. Our findings suggest that changes in constructed similarity cause differences in consumers' price inferences and valuations that are not explained by prior theories of either reference price formation or consumer inferences.

ABSTRACT

In seven studies, we find that people use a novel process of lateral generalization from the known prices of referent products, when estimating prices or valuing a target product. In particular, lateral generalization is facilitated by a prompted link or perceived similarity between the target product and referent products. Given that the basis of subjective similarity is malleable, consumers' price inferences are affected by factors that impact perceived similarity. Across the studies, we use mere-grouping manipulations, direct manipulations of perceived similarity and indirect contextual manipulations (e.g., temporal framing) that affect similarity to vary the relevant basis of generalization inferences. We find that consumer can infer prices from a broad range of products, both within and across categories, but only if a relevant basis of lateral generalization, such as perceived similarity, is present. Our results suggest that contextual factors such as the temporal context can affect how consumers reason about prices via a previously unidentified inferential mechanism, impacting estimates and valuations indirectly via changes in similarity.

Consider a consumer who is trying to estimate a reasonable price to pay for a blender. A large literature on reference prices suggests that previously seen prices for the same blender, if available in memory, will influence her price expectations (Winer 1986; Hardie, Johnson, and Fader 1993). However, she will likely encounter many alternative sources of information as well, such as the prices of other blenders that are similar on some product attributes but different on other attributes. So, as she shops or walks through the store, she will see the prices of many other products sold there, many of which will have some similarities with the blender. Some products may be constructed in similar ways or may operate similarly (such as a ceiling fan or a cement mixer), even though these items come from different product categories. Other products may be physically very different but used together in the same tasks with the blender (such as a mug or a spatula). Despite a voluminous literature on price expectations and judgments, fairly little is known about when and how products in the broader set of potential comparisons will impact consumers' price estimates and willingness to pay. In this paper, we explore the constructed nature of perceived similarity between items and the resulting generalizations which consumers can make from known prices to estimate unknown prices and form valuations.

We introduce a novel *lateral generalization* account of how consumers form price inferences in such contexts. We propose that consumers will potentially use information from a wide range of referent products to generate a price estimate or valuation of a target product, when they identify commonalities in features or relations between a referent and target product. The perception of the two as related will serve as the *basis* of this generalization from one product to another. Changes in the basis of similarity judgments can therefore play an under-recognized role in consumers' price inferences and valuations. Seven studies suggest that (i) direct manipulation of the perceived link between products, (ii) manipulations of consumers' basis for similarity judgments, and (iii) manipulations of the decision context (e.g., purchase timing) that affect perceived similarity can all impact consumers' price estimates and valuations.

The next section presents our theoretical framework. First, we discuss prior work on consumer inferences and introduce an account of how consumers make lateral generalizations, from one product to another. We then discuss research on similarity processes, focusing on the malleability of consumers' basis for similarity judgments, and the impact of such shifts in similarity for lateral generalization. In the first study, we find that price estimates for a target product (blender) differ by being visually grouped together with one of two other products (ceiling fans or a set of mugs). In the subsequent two studies, we examine how changing the way similarity is evaluated (comparative vs. associative relations) impacts price inferences for a target product, using a more direct salience manipulation in Study 2 and an indirect manipulation, via temporal context, in Study 3. In Study 4, we extend both findings to price estimation for a diverse set of products, when the price of a single referent product is available for each target product.

Next, we extend these findings from cross-category price comparisons to inferences based on the prices of products within the same category, again using a non-informative mere-grouping manipulation (Study 5). We find that people's valuation of a product can be a function of the perceived similarity to the ideal product in a given category. This perceived similarity (and, in turn, the willingness to pay) can be manipulated via either a more direct range-frequency manipulation (Study 6) or an indirect manipulation using temporal context (Study 7). We discuss the implications of our findings for the literatures on price beliefs and consumer inference, and propose a variety of ways that our findings can be applied to better understand consumer assessments under the influence of contextual factors.

THEORETICAL DEVELOPMENT

Consumers' price expectations and valuations are central, and widely studied, inputs into consumer decision making. The most common approach in consumer behavior is to think of consumers as having a reference price, such that consumers experience "sticker shock" when actual prices diverge sufficiently from the reference price, particularly for price increases (Winer 1986; though see Bell and Lattin 2000). These reference prices can be fairly sophisticated and comprehensive (see Mazumdar, Raj and Sinha 2005, Cheng and Monroe 2014 for recent reviews), with the reference price for a given product potentially varying by store (Thaler 1985), location or brand, and even incorporating beliefs about the firms' cost structure (Bolton, Warlop and Alba 2003). The reference price view of consumer decision making assumes that consumers retrieve from memory detailed information that they have learned about the prices of specific products that depend on sizes, formulation, brand, and purchase location.

While learning and memory processes about product-specific information undoubtedly inform inferences about some products—particularly for frequently-viewed prices and price-sensitive consumers (Wakefield and Inman 1993)—not all consumer inferences rely on this kind of information. One reason is that the sheer volume of information one would have to learn is daunting. For example, based on Nielsen household panel data, the median household purchases approximately 500 unique products a year, in the grocery store alone. Studies have found that consumers often spend little time viewing information about choice options (Hoyer 1984) and often exhibit poor recall of prior prices (Dickson and Sawyer 1990, Estelami, Lehmann and Holden 2001). Also, consumers often make initial choices when they are relatively new to a product or category and are likely operating with limited information, and then base subsequent choices on this initial decision. For these reasons, it is important to understand how consumers reason about prices when they are operating in a limited information setting, without substantial learning or memory of highly diagnostic information to rely on.

Consumers' inferential processes.

A separate literature (reviewed in Kardes, Posavac and Cronley 2004) has studied how consumers make inferences about incomplete or unavailable information. This literature, largely focused on product features and quality, has identified two types of consumer inferences, inductive and deductive. The distinction between inductive and deductive inferences, in this literature, is about how specifics are related to generalities, and is associated with, but not identical to, the distinction between probabilistic vs. deterministic conditional reasoning (Anderson 2005).

Inductive inferences, in this literature, are about inferring from specific cues to a more general evaluation, often using one or more cues about a product (e.g., its brand, country of origin, or a brand feature) to make broader judgments. Consumers may infer the unknown quality of a product from its price (Broniarczyk and Alba 1994), warranty (Boulding and Kirmani 1993), brand (Keller 1993), or from other cues. This kind of inference generally requires that consumers know something about the relationship between a specific cue and the more general evaluation being made about the item (e.g., higher-priced items are tend to be of higher quality).

In contrast, deductive inferences, in this literature, are made by using broader (e.g., categorical) information to infer specifics. So, a consumer who knows that a generic drug was made in the United States, which regulates the ingredients to be equivalent in generic and branded drugs, may therefore make deductive inferences about the quality of the generic drug, by applying the known properties of the category "U.S. generic drugs". These kinds of inferences, using the information about a category infer unknown specifics of a product, can be made even when the inference is not deterministic, such as when the durability of a product is inferred from an overall favorable evaluation (Sanbonmatsu et al 1991) or the liking of a sub-brand is inferred from the parent brand (Keller 1993).

We propose that consumers reasoning about prices also use a third type of inference—lateral generalization—which is largely unstudied in the consumer decision-making literature. In this type of inference, the unknown properties of one item are inferred from the corresponding property of another item. So, instead of judgments where general properties are inferred from specific features (i.e., inductive generalization) or specific features are inferred from category properties (i.e., deductive generalization), in lateral generalization, specific features are inferred from observing other instances of specific features.

Consider again our motivating example of a consumer forming a price expectation about a blender. If she remembers seeing the price of this blender or other equivalent blenders, she is likely to have an established reference price. If she observes that the blender has attractive packaging and comes in designer colors, she may infer a higher price via induction, since such cues are often correlated with higher prices. If she observes that a wealthy friend with expensive tastes owns it, she may make a deductive inference that the blender is in a higher price category. We propose that she may also make a lateral generalization, such that her price estimate for the blender is directly affected by the prices of other products she encounters in the decision environment.

Price Inference via Lateral Generalization.

Our proposed inferential process is grounded in the literature on analogy in cognitive psychology. Analogical inference can occur when a mapping relation is found between the base case and the target case. If the decision-maker realizes the relevance of the mapping, known aspects of the base case can then be inferred to be present in the target case as well. The mapping relations can be obvious or subtle, and therefore analogical inference can either be fairly rapid or may require deliberation or insight. Such analogical reasoning has been found to facilitate using known products to make sense of new products (Moreau, Lehmann and Markman 2001), using one's own preferences to make sense of the preferences of other consumers who make differing choices (Orhun and Urminsky 2012), and to facilitate problem-solving (Gick and Holyoak 1980), as when MBA students use prior cases to select the best negotiation strategies in a novel setting (Thompson, Gentner, & Loewenstein 2000).

Similarity plays a key role in these kinds of analogical inferences (see Holyoak 2012 for a recent review). In analogical inference, even superficial similarities between the base and target can serve as a cue to the decision maker to consider other shared relations between them. We note that the role of similarity is different in analogical inference than in induction or deduction (as described above), where similarity can suggest a correlational rule (similar packaging suggests similar target market) or category-property rule (similar materials implies similar costs to manufacture), which the consumer then applies.

When generalizing from one product to inform the price one should expect or be willing to pay for another, the relevant structural relation is sometimes self-evident (e.g., adding features or functionality to a base product should increase its price). But in other cases, the basis for generalization is less clear, and in these cases, the perceived similarity between two products can inform both *how* and *whether* to generalize from base to target. So, we propose that lateral generalization will be contingent on consumers perceiving a basis of similarity between the base and target products.

The Constructed Nature of Perceived Similarity.

Similarity has often been studied as a fixed relationship between products, determined by features of the products under consideration. In particular, this kind of "fixed" similarity, defined as shared category membership or overlap in features, can facilitate inductive and deductive inference (Kardes et al 2004), via the correlational rules associated with the similar features or the deterministic implications of shared category membership. However, we propose that lateral generalization is facilitated by the subjective sense that the base and target products are related, without needing to access specific correlational or deterministic rules to base the inference on. So, lateral generalization would be facilitated by the subjective perception of similarity, potentially independent from what the basis of perceived similarity was for the consumer.

Research suggests that perceived similarity, rather than being a fixed property of two items, can be thought of as malleable and constructed, influenced by the specific relations that form the basis of comparison. This malleability has been found in studies that manipulated either the information presented (Pan and Lehmann 1993; Dhar and Glazer 1996) or the order of stimuli presentation in comparison (Dhar and Simonson 1992) and categorization (Moreau, Markman and Lehmann 2001) tasks. Changes in the range of an attribute dimension (Parducci

1965), can also alter perceived similarity, holding objective information constant. Building on this idea, Dhar and Glazer (1996) find that the attraction effect in choice can be understood by how the placement of choice options in multi-attribute space impacts the perceived similarity between choice options. Beyond the perception of individual features, the conceptual structure that defines correspondence between features, such as the role that each feature plays relative to the others, shapes perceived similarity (Medin, Goldstone and Gentner 1993; Markman and Gentner 1993).

In addition to these *comparative* approaches to similarity—accounts that rely on comparisons of features and relations within the stimuli—relationships between the stimuli and *external* concepts can play a role in *associative* similarity judgments. The notion of goal-derived categories (e.g., diet foods, things to take out of your home in the event of a fire, or places to on a winter vacation; Barsalou 1985, Ratneshwar et al. 2001) can be interpreted as relying on such associative judgments (i.e., the shared relevance of an active goal). Wisniewski and Bassok (1999) provide a direct demonstration that comparatively dissimilar items which share a thematic association (e.g., two things that often appear in the same consumption episode, like apple pie and ice cream) are seen as more similar than those without such a relation (apple pie and jello). In particular, such thematic relations have long been noted in children's inferences (Inhelder and Piaget 1964), but have more recently been found in adults' reasoning when the underlying associations are meaningful and useful for the task at hand (Lin and Murphy 2001). The basis of associative similarity judgments can also be malleable (e.g., due to relevance for active goals, Ratneshwar et al. 2001).

This literature implies an important distinction between *comparative* types of similarity, defined by comparing features and the relations among features internal to each stimulus (that includes taxonomic similarity), and *associative* similarity, defined by the degree of external relations and associations between different stimuli. By this definition, thematic relations, such as physical, temporal, causal and goal-defined co-occurrence can all be seen as forms of associative similarity. In our initial example, the blender may be seen as *comparatively* similar to a ceiling fan, because they share several features and relations, such as having an electric motor and multiple blades, and operating via a motor which turns the blades. On the other hand, the blender can also be seen as *associatively* similar to a drinking mug, in that they are often co-located in the same physical place (the kitchen) and are used jointly in many consumption episodes towards a common goal.

Perceived similarity can be affected by not only the inputs that are used to evaluate either comparative or associative similarity, but also by whether comparative or associative similarity processes are used. The relative influence of comparative versus associative similarity on subjective judgments varies across people. Systematic individual differences in the tendency to rely on comparative vs. associative similarity have been found (Gentner and Brem 1999, Simmons and Estes 2008). Also, the influence of comparative versus associative similarity can be manipulated via changes in what is being compared and in accessible background information (Estes 2003; Jones and Love 2007).

The Role of Constructed Similarity in Price Generalization Inference.

We have proposed that whether or not lateral price generalization occurs is determined by whether or not two products are seen as related. This characterization yields novel testable predictions which are distinct from other, better known forms of inference. In following studies, we manipulate whether or not base products with known prices are seen as related to a target product with an unknown price, and test for the influence of the base product prices on price judgments of the target product.

First, in Study 1, we directly manipulate relatedness with a non-informative cue, and measure price inferences. Then, in Studies 2 and 3, we manipulate the basis of perceived similarity, first through direct activation and then via temporal horizon, and test for lateral generalizations. In Study 4, we provide a more detailed replication across a larger set of cross-category product inferences. We then directly manipulate relatedness of within-category comparisons and measure lateral generalization inferences in Study 5. Lastly, in Studies 6 and 7, we manipulate attribute-based similarity within a category, both directly and via temporal horizon, and test the effect of lateral generalization on willingness-to-pay. Where relevant, we distinguish our pattern of results from those that would be generated by inductive and deductive inferences, magnitude priming (Adaval and Monroe 2002, Adaval and Wyer 2011), anchoring (Krishna et al 2006, Nunes and Boatwright 2004) and assimilation (Kan et al 2014).

STUDY 1: MERE CATEGORIZATION AND PRICE INFERENCE

This first study tests how a non-informative cue that highlights different relations affects the use of external information in making price estimates. We predict that grouping together one vs. another pair of potentially similar products will increase how much price estimates for the target product incorporate the grouped product's price (as opposed to the non-grouped product's priced).

Method.

Participants (*N* = 118 native English-speaking adults) completed an online survey for a nominal cash payment and passed an attention check. In the survey, they viewed a mock newspaper circular ad, shown in Figure 1, which featured four types of products: a blender, two ceiling fans, two mug sets and an outdoor furniture set. The mugs and ceiling fans were chosen because each has a potential basis of similarity with the target item, the blender. The ceiling fans are a potential comparative match, based on the common features, such as having an electric motor and rotating blades, while the mugs are a potential associative match, in that they co-occur in many consumption episodes. In the ad image, boxes grouped pairs of product types together. Prices were shown for all of the products (mug sets were $15 and $20, ceiling fans were $80 and $140, the furniture set was $399), except the blender. Participants read a scenario in which the price had been accidentally left off the circular by the printer and were asked to estimate the price.

In the thematic grouping condition, the thematically-related items on the left side of the image (the blender and the mugs) were in one box, and the items on the right side of the image (the ceiling fans and the furniture) were in the other box. In the associative grouping condition, the associatively-related items on the top half of the image (the blender and the ceiling fans) were in one box and the items on the bottom half of the image (the mugs and the furniture) were in the other box. As shown in Figure 1, only the boxes varied across the conditions –the layout, images and all other information were otherwise exactly the same in both conditions. This manipulation does not affect the determinants of "fixed" similarity, or the treatment of similarity often presented in consumer behavior research, as determined by product category membership and feature overlap).

We predicted that grouping the blender in the same box with different products in the two conditions would prompt different perceived relations between the base and target products, and that lateral generalization would therefore be more likely to occur for products within the same grouping. Given that the ceiling fans were more expensive than the mugs, we predicted that this difference would, in turn, cause participants to estimate a higher price when the blender is grouped with the ceiling fans (comparative grouping condition) than when it is grouped with the lower-priced mugs (associative grouping condition).

Results and discussion.

The estimated price of the blender was significantly higher in the comparative grouping condition, when paired with the more expensive ceiling fans, than in the associative grouping condition, when paired with the cheaper mugs (M_C = \$52.84, SD = 20.6 vs. M_A = \$43.07, SD = 20.2; $t(116) = 2.60$, $p = .01$). There was no direct or moderating effect of response time or self-rated knowledge about blenders, suggesting that the findings were not driven by less expert consumers viewing the groupings to be more informative, nor by our participants using the boxes as a quick, effort-minimizing heuristic for their estimation.

STUDY 2: SIMILARITY TYPE AND PRICE INFERENCE

Next, we extend our investigation from the effect of differential grouping to test how highlighting one basis of similarity (comparative or associative) affects the use of external information in making price estimates. Based on our proposed lateral generalization process, if similarity between the product being estimated and the available comparison product shifts, the degree to which the price of each referent impacts the estimate is likely to shift as well. So, we predict that making associative (as opposed to comparative) similarity more accessible will increase the degree to which price estimates for the target product incorporate the associatively similar referent product's price (as opposed to incorporating the comparatively similar referent's price).

Method.

We conducted an online survey with adult native English-speakers (aged 18 to 65) who received a nominal cash payment, yielding 65 complete surveys. This study used a two-condition, between-subjects design, where we manipulated which of two possible bases of similarity (comparative vs. associative) was accessible to participants. To develop our manipulation of the type of similarity people would use in making judgments, we randomly selected 15 items from a set of 30 item triads that Simmons and Estes (2008) used to distinguish taxonomic similarity—a specific operationalization of *comparative* similarity—from thematic similarity—a specific operationalization of *associative* similarity.

These items were used to construct two batteries of 15 similarity judgment questions (see Appendix A). Participants were shown the target word, and then asked to choose which of two options was more similar to that target word. In the *comparative* similarity condition, one of the options was the taxonomically similar word from the triad, and one was a dummy (low-similarity) word. For example, participants were asked whether “bee” was more similar to “butterfly” or more similar to “moose”.

In the *associative* similarity condition, the same target words were used, and participants were asked to choose between the thematically similar word and a low-similarity dummy word. In this condition, participants were asked to judge whether “bee” was more similar to “honey” or “maple syrup”. The order of the responses (similar vs. dummy word) was varied across the questions, and the order of the questions was rotated. We anticipated that, in choosing their answers, participants would use *comparative* similarity processes in the first condition (bee and butterfly), but *associative* similarity processes in the second condition (bee and honey), which would then carry over to their subsequent reasoning.

In the next section of the survey, participants were told to imagine they were considering three products, a blender (the target item), a ceiling fan (a comparative match), and a 4-pack of hot/cold mugs (an associative match). The products were described in words, and no pictures were shown to isolate differences in conceptual representation of these products, rather than superficial differences in appearance of the products. Participants were then provided with prices for both the ceiling fan ($80) and the mugs ($20), and asked to estimate how much the blender cost. After making their choice, on a new page of the survey, they rated the similarity of the blender to both of the items on a one (“Not at all similar”) to seven (“Very similar”) scale.

Next, they were presented with the other 15 items from the Simmons and Estes (2008) battery, this time choosing between the taxonomically similar and the thematically similar option in each triad, to assess the degree to which comparative relations (useful for judging taxonomic similarity) or associative relations (useful for judging thematic similarity) were more accessible. Lastly, they completed the “Need for Cognition” scale, (Cacioppo, Petty and Kao, 1984) and answered several demographic questions.

Results and Discussion.

Manipulation Check. As people choose the clearly more similar option in each of the questions in the initial task, their basis for doing so will be different in the two conditions, highlighting either comparative (i.e, taxonomic) or associative (thematic) relations as the basis for similarity. Across participants and items, the intended item was chosen as more similar 98% of the time in each condition.

Similarity. We have argued that when people use associative (rather than comparative) relations as the basis for similarity judgments, they will evaluate the blender as relatively more similar to the mugs. A 2 (similarity type: comparative vs. associative) x 2 (match: comparative vs. associative) mixed-model ANOVA finds the predicted interaction ($F(1,63) = 4.29$, $p < .05$). The blender is seen as more similar to the mugs than to the ceiling fan in the associative condition ($M_{MugA} = 3.07$, $SD = 1.33$ vs. $M_{FanA} = 2.32$, $SD = 1.31$; $t(27) = 2.63$, $p < .05$) but not in the comparative condition ($M_{MugC} = 2.51$, $SD = 1.33$ vs. $M_{FanC} = 2.65$, $SD = 1.34$; $t < 1$). The ANOVA found no significant main effects of comparative versus associative similarity condition ($F < 1$) nor of match to mug versus fan ($F(1,63) = 2.07$, $p > .1$).

Price Estimation. Recall that participants saw two potentially relevant products' prices: the associative match, the mugs, and the comparative match, the ceiling fan (which costs more than the mugs). In the associative condition, when the low-priced mugs are seen as more similar to the blender than is the higher-priced ceiling fan, we expect that the low price referent provided by the mugs will draw down the price estimates for the blender. As expected, participants in the associative condition gave lower price estimates for the blender than did those in the comparative condition (M_A = \$39.46, $SD = 9.75$ vs. M_C = \$44.59, $SD = 9.99$; $t(63) = 2.07$, $p < .05$).

This study suggests that when different types of similarity are activated, both judgments of similarity and price inferences are affected, such that people differentially incorporate price comparisons to associatively versus comparatively similar items with known prices. We emphasize that this difference in price inferences is not due to seeing the prices of different products (Nunes and Boatwright 2004, Krishna et al 2006). Participants in both conditions saw the *same* prices for the *same two products*. In this study, the manipulated difference in the *basis of perceived similarity* shifted people's inferences.

The manipulation of similarity type had no effect on the response times for the price estimation task or the similarity judgments, or on self-reported need for cognition. Also, there is no effect of time spent on the task or need for cognition on either the estimated price or on relative similarity. This suggests that the difference in similarity and in inferred price observed across the two conditions is not explained by deep versus superficial thinking. Rather, the price shifts occur because of changes in how similarity is perceived.

Supporting this interpretation, we observed a shift in the type of similarity used after making the price estimate on unrelated tasks. At the end of the survey, participants were presented with the second similarity task based on Simmons and Estes (2008), in which they were asked to choose between thematically (i.e., associatively) and taxonomically (i.e., comparatively) similar words. While this measure may also capture trait-like individual differences, the manipulation in this study shifted people's responses on these items. Participants in the associative similarity condition chose the thematically similar options (e.g., bees and honey) more often than those in the comparative similarity condition (M_A = .24 thematic, SD = .25 vs. M_C = .13 thematic, SD = .18; t (63) = 2.06, $p < .05$).

STUDY 3: TEMPORAL CONTEXT AND PRICE INFERENCE

The previous study manipulated the basis of similarity directly. In this study, we investigate whether contextual factors can induce a similar shift in the basis of similarity used, with the same consequences for price inferences. We manipulated temporal context by describing a scenario in which a consumer will purchase three goods, either in three days (near future condition) or in six months (distant future condition). Participants were then asked to judge the similarity between each of the two referent goods (mugs and ceiling fans) and the target good (blender). Participants then estimated the price of the target good (the blender).

According to construal level theory (Trope and Liberman 2010), contextual factors that induce a sense of psychological distance (including but not limited to time) prompt a higher level of abstraction in subsequent judgments. Therefore, when people are thinking about concepts at great psychological distance (e.g., in a distant future context), they tend to think of them in abstract, holistic, and gist-like terms. In contrast, when thinking of concepts at greater psychological proximity (e.g., in a near future context), people think in more concrete, more detailed terms. Consequently, people in an abstract state of construal are more likely to recognize more distant, abstract relationships as a basis of similarity, and are also likely to put more emphasis on attributes with abstract or intangible benefits in evaluating similarity. In contrast, people in a more concrete state of construal are more likely to emphasize relationships between concrete features as a basis of similarity and will put more emphasis on attributes with concrete tangible benefits in evaluating similarity.

There is some recent evidence that construal level can shift *how* people judge similarity. Day and Bartels (2008) asked participants to estimate the similarity of pairs of events, such as visiting the dentist and joining a health club (which are both health-promotion behaviors) or visiting the dentist and getting a tattoo (which share the concrete features of a reclining chair, needles and pain). The authors found that pairs of events sharing abstract commonalities (e.g., dentist and health club) were judged more similar with greater temporal distance while the opposite trend held for pairs sharing low-level concrete features (e.g., dentist and tattoo).

In Study 3, we predict that temporal context will affect the basis of lateral generalizations in price inference indirectly, via changes in perceived similarity. Thinking about a near future purchase will engender a detail-focused assessment, highlighting comparative similarity. In contrast, thinking about a distant future purchase will engender a more thematic, gist-focused assessment, highlighting associative similarity. When thinking about the near future, the comparative relationships among concrete features will be represented, while the more distant associative relations are more likely to be recognized when thinking about the more distant future. So, we expect that manipulating temporal context will lead to similar effects on price estimates as those observed in Study 2, due to the shift in perceived similarity.

In contrast, we do not expect temporal context to generally have a direct influence on the prices people expect and are willing to pay in the in the absence of a specific match between concreteness or abstractness of the strongest product attributes and the construal level (Agrawal, Trope and Liberman 2006). We assume that the blender is seen as having similar levels of concrete (feasibility) and abstract (desirability) benefits (Liberman and Trope 1998). (Although the distinction between types of attributes—those that convey desirability vs. those that convey feasibility—is not central to the current study, we will make use of this distinction in the design of Studies 6 and 7). We do not expect temporal framing to have a large impact on the inferred value of the blender in the absence of comparison prices.

To test this assumption, we also conducted a pretest, in which participants were asked to estimate the price of the blender without any referent goods. We expect that when participants read about a future (vs. present) decision, there will be no direct effect on their valuation in the absence of prices for comparison products (i.e. in the pre-test), but thinking more abstractly will facilitate associative similarity assessments, and they will be more influenced by prices of the associatively (vs. comparatively) similar referents in the main study.

Pretest.

Fifty seven undergraduates estimated the price of a blender, either in 3 days or in six months, as part of an unrelated study. They read a scenario equivalent to the one in the main study (described below), except that all references to the ceiling fan and mugs were removed and no similarity questions were asked. There were no significant differences between the six months (M = \$51) and three days conditions in the pre-test (M = \$45, $t < 1$). We conclude that temporal context did not have a direct effect on price estimates for the target product.

Method.

Fifty native-English speaking adult participants completed the main study online in return for a nominal cash payment. This study used a two-condition (temporal context: near vs. distant future), between-subjects design. They read a scenario about a consumer who will purchase a ceiling fan (a comparative match), a set of hot/cold thermal mugs (an associative match), and a blender either in three days (near future) or six months (distant future), between-subjects. Participants rated the similarity of the items and estimated the price of the blender. The stimuli were described in words, and no pictures were shown.

Results.

Similarity. A 2 (time: near vs. distant future) x 2 (match: comparative vs. associative) mixed-model ANOVA finds the predicted interaction ($F(1,48) = 10.82$, $p < .01$). In the distant future, the associative match (i.e., the mugs) is judged as being more similar to the blender than the comparative match (i.e., the ceiling fan) is ($M_{\text{Mug}} = 3.29$, $SD = 1.65$ vs. $M_{\text{Fan}} = 1.96$, $SD = .84$, $t = 4.06$, $p <.001$), whereas the reverse holds directionally for the near purchase ($M_{\text{Mug}} = 2.23$, $SD = 1.19$, vs. $M_{\text{Fan}} = 2.59$, $SD = 1.26$, $t = .90$, $p = .38$). The ANOVA also revealed a marginal main effect of match (comparative vs. associative, $F(1,48) = 3.50$, $p < .10$) and no main effect of temporal context ($F < 1$).

Price Inference. If perceived similarity influences the basis of lateral generalization, then participants will estimate a lower price for the blender when it's purchased in six months—and perceived as more similar to the less expensive mugs—than when it's purchased in three days—and perceived as more similar to the more expensive ceiling fan.

Consistent with predictions, people inferred that the blender would be less expensive when purchased in the distant future than when purchased in the near future ($M_{\text{Distant}} = \$39.46$ vs. $M_{\text{Near}} = \$61.41$, $t(48) = 3.29$, $p < .01$). We note that, based on the pre-test, the difference in estimated price induced by the timing manipulation cannot be attributed to a direct effect of temporal context (e.g., due to beliefs in future price changes or any direct effect of construal level). This study suggests that temporal context affects perceived similarity and thereby impacts estimated prices when referents with known prices are available.

STUDY 4: PRICE INFERENCE FROM A SINGLE COMPARISON PRODUCT

Next, we replicate and extend the previous study in several ways. In the preceding studies, we have focused on a specific set of products, which we will now generalize to a larger set. In Studies 2 and 3, participants were asked to estimate the price and to rate similarity in the same experimental context (prices were asked first in Study 2 and similarity first in Study 3). This raises the question of whether the findings might be influenced by self-generated validity (Feldman and Lynch 1988). So, in this experiment we first conduct an extensive pre-test to confirm the effect of temporal context on similarity judgments among one group of participants, and then examine the influence of both an individual difference measure of predominant similarity type and manipulated temporal context on price estimates among a second group of participants from the same population, in the main study.

In the similarity pretest, participants rated the similarity between pairs of goods in two blocks of tasks. Participants rated the similarity of each of 14 target goods to a corresponding referent good, which either represented an associative match or a comparative match (see Table 1 for a list of the target items and the referent items), as well as of four control pairs of unrelated goods.

Please insert Table 1 around here

Then, in Study 4, price estimates for the same products were collected in a series of repeated tasks. Unlike in the prior studies, in this study we provided participants with a series of target goods, each paired with only one referent (either associatively or comparatively related, varied across target items). In the previous studies, participants could have been reasoning based on which of the two referents presented to them seemed more similar. Since participants only saw one referent in when estimating the price of each target item, this study extends our test of lateral generalization in price inference to a between-subjects design.

We predict that how much people incorporate the referent's price in their estimates will depend on the degree of perceived similarity for the pair of items. In both the similarity pre-test and the price estimation study, we measured the tendency to spontaneously use associative similarity and also separately manipulated temporal context as a between-subjects factor. Participants read about a consumer who will win a small prize in the state lottery and will consider purchasing two goods in three days (near future condition) or in a year (distant future condition). So, both studies use a 2 (temporal context, between-subjects) x 2 (match: comparative vs. associative, within-subjects) mixed design.

Our prediction is that perceived similarity and price inferences will be jointly determined by both temporal context and the participants' propensity to consider associative similarity. In the similarity pre-test, we will confirm that the target is judged as more similar to its comparative match when the goods are described as being purchased in the near future, rather than the distant future, consistent with what we found in Study 3. Also, we will confirm that the target is judged as more similar to the associative match in the distant future conditions than in the near future conditions. Also, we anticipate that participants who have more of a tendency to spontaneously consider associative similarity (vs. comparative) will judge associative matches as more similar and comparative matches as less similar, controlling for temporal context.

We expect these shifts in perceived similarity, arising from temporal context, to correspond to shifts in estimated prices in Study 4. In particular, when the target good is paired with a comparative match (whether cheaper or more expensive than the target), the increased similarity to the comparative match in the near future (relative to the distant future) should translate to price estimates for the target good that are closer to the referent's price. We expect the opposite pattern when the target is paired with its associative match. In that case, because we expect the associative match to be perceived as more similar in the distant future than in the near future, we expect participants to estimate prices for the target good that are more similar to the referent's price in the distant future than in the near future.

We expect analogous effects based on differences in participants' tendency to consider associative similarity, such that estimates among those with a higher tendency to consider associative similarity will be more affected by the price of associative matches and less affected by the price of comparative matches. We also note that in the manipulation checks in Study 2, participants chose more of the comparative than associative pairings in both conditions. This suggests that comparative similarity may be more generally accessible, and differences in perceived similarity may therefore hinge primarily on whether associative similarity is prompted, either spontaneously or by the temporal context. We will test this by looking at the interaction of the spontaneous measure (i.e., trait-like differences in the consideration of associative similarity) and the manipulated temporal context.

Method.

We pretested whether individual price estimates were affected by the temporal context (in one week or in one year) among 58 native-English speaking online participants. For the similarity pre-test, we collected data from 99 native-English speaking students at a large Midwestern university, who were randomly assigned to one of two similarity conditions. In the main study, we recruited 108 native-English speaking students at the same university, who were assigned to one of four conditions and asked to make price inferences, in a 2 (temporal context: near vs. distant future, between-subjects) x 2 (pairing: comparative match vs. associative match, repeated-measures) design.

In the similarity pre-test, participants rated the similarity between pairs of goods in two blocks of tasks. In the first block, participants rated the similarity of each of 14 target goods to a corresponding referent good, which either represented an associative match or a comparative match. On every other trial, they received an associative pair or a comparative pair. In the second block of trials, they rated the similarity of each target good again, this time matched with the other referent good. So, the pairing of the target to associative and comparative matches varied as a within-subjects repeated-measures factor (see Table 1 for the target and referent items).

In Study 4, participants were given the price of one referent good (either the comparative or associative match) and asked to estimate the price of the target good for each of 14 trials. For seven of the trials, we paired a target good with its comparative match; for the other seven trials, we paired a target good with its associative match. As in the similarity pre-test, on every other trial, participants saw either an associative pair or a comparative pair. However, in the main study participants saw only one pair for each target good (counterbalanced across subjects). For each of the fourteen items, the referent goods were identically priced, such that half were more expensive than the target good and half were less expensive. For example, a rice cooker was paired with either a more expensive, $800 gas water heater (comparative match, with features in common, such as having a cylindrical metal body and operating by heating water) or with an $800 dining table (associative match, in that they co-occur in consumption episodes).

The 14 target products, along with the two referent products and the price point of the referent products, are listed in Table 1. We also included four control target-referent products, two designed to be extremely dissimilar (e.g., barbecue grill and headphones) and two designed to be extremely similar (e.g., tennis racquet and racquetball racquet), regardless of the basis of similarity used. In the main study, we rotated which of the two referents each target product was paired with, so that all combinations were tested. In the analyses, we collapsed across the rotation conditions.

To measure individual differences in the tendency to evaluate associative similarity, participants in the main study also completed the full Simmons and Estes (2008) battery of thematic (i.e., associative) versus taxonomic (i.e., comparative) similarity choices at the end of the study (after all of the price inference tasks), and we coded the proportion of thematic matches chosen (referred to here as the thematic similarity, or TS, index). A high TS index is interpreted as a high propensity to recognize associative similarity and a low TS index is interpreted as a propensity for comparative relations to dominate similarity judgment.

Results and Discussion.

Timing Pretest. We conducted a pretest for the possibility of a direct effect of temporal framing (in one week vs. in one year) on price estimates of the target products, as in Study 3. Such an effect could occur either if the difference in temporal context were to induce a main effect of construal level on valuation or if participants held a belief that prices will change over time (e.g., inflation). Averaging the estimates of the 14 products for each person, we find no significant differences between estimates in a year or in a week, between-subjects (M_{Week} = \$165, SD = 86 vs. M_{Year} = \$175, SD = 108; $t(56) < 1$). In a separate question, participants also rated their belief about prices for these products changing over the next year. Participants were split on whether prices would increase (46%), stay the same (33%) or decrease (21%). Given the weak differences observed, we conclude that people's price estimates for these products are not directly influenced by temporal context.

Similarity Pretest. For each person, we calculate an associative similarity score as the average of all 14 evaluations of the similarity of the target product to the associatively related referent. We also calculate a comparative similarity score, as the average of the 14 similarity evaluations of the similarity of the target to the comparatively related referent. Relative assessment of associative similarity (over comparative) was calculated as the difference between the associative and comparative similarity scores for each person. We assess the impact of both the individual difference measure of the tendency to use associative similarity (TS index) and the manipulation of temporal context on the assessments of product similarity.

First, we confirm that the TS index (proportion of choices of the thematically—or, associatively—similar option rather than the taxonomically—or, comparatively—similar option in the battery of Simmons and Estes items) did not differ based on the temporal context (M_{week} = .17, *SD* = .21 vs. M_{year}=.22, *SD* = .25; $t(97) = 1.2$, $p = .24$) that had been presented earlier in the survey. Therefore, we will use this measure as an individual difference variable in Study 4, largely independent of Study 4's manipulation of temporal context.

The TS index predicts the participants' relative (associative vs. comparative) similarity assessments in a simple regression ($\beta = 1.8$, $t = 4.2$, $p < .001$), indicating that participants who are more likely to spontaneously use thematic similarity (per the TS index) tend to rate associatively matched products as more similar than comparatively matched products, on average. In particular, this effect is driven by the impact of TS index on the similarity of associative matches, (e.g, rice maker and dining room table) ($\beta = 1.7$, $t = 2.4$, $p < .05$), whereas judgments of the similarity for comparative matches (e.g., rice maker and water heater) are less affected by the individual difference ($\beta = -0.14$, $t < 1$).

Next, we find that the manipulation of temporal context (week vs. year) also affects which product pairs are seen as more similar. As predicted, associative matches were viewed as significantly more similar in the distant future than in the near future (M_{week} = 4.2, *SD* = 1.6 vs. M_{year} = 3.5, *SD* = 1.5; $t(97) = 2.2$, $p < .05$), whereas comparative matches were judged to be of approximately equal similarity in the near future and distant future (M_{week} = 4.4, *SD* = 1.6 vs. M_{year} = 4.3, *SD* = 1.6; $t < 1$, *n.s.*). The impact of the timing manipulation on these differences in similarity (ΔM_{week} = -.98, *SD* = .9 vs. ΔM_{year} = -.17, *SD* = 1.1; $t(97) = -3.9$, $p < .01$) represents a significant interaction between temporal context and similarity type.

Study 4: Price Inference. We predict that the differences in the predominant type of similarity revealed in the similarity pre-test will affect lateral generalization—the degree to which estimates are influenced by the price given for the referent product. When the target product is seen as more similar to the referent product, the price estimate for the target product will be more similar to the known price of the referent product. To perform this analysis, for each participant *i* and trial *j*, we first calculated the degree of difference between each participant's estimate and the referent price (shown in Table 1) for the trial as:

$$\text{Deviation}_{ij} = |\text{estimate}_{ij} - \text{price}_j|/\text{price}_j$$

We first calculate the absolute difference between each price estimate and the referent price, and then standardize the absolute differences (to account for the varying price ranges) by dividing by the referent price. For example, an estimated price of $200 for the rice cooker (which was paired with an $800 item) would yield a deviation score of |200 – 800|/800, or .75. We will report results using these relative deviations, so that the generally larger deviations from higher price reference products do not over-weight some products over others in the analysis. However, our results replicate using non-standardized (absolute) deviations as well.

Next, we calculated for each participant the average relative deviation given for the 7 comparative matches that participant assessed, and compared it to the average relative deviation given for the 7 associative matches that the person viewed. It should be noted that we rotated, between-subjects, which products were presented with comparative matches and which were presented with associative matches. For each product, the index includes a roughly equal number of pairings with an associative or a comparative referent.

This study simultaneously tested for two different factors that can impact the basis of similarity: differences in the propensity to use associative similarity in judgment (as in Study 2) and a manipulation of temporal context (as in Study 3). First, we analyze the effect of the individual difference propensity for associative similarity (TS index) and then the interaction of the individual difference and the manipulation of temporal context. Since we are interested in how shifts in the basis of similarity affect differential lateral generalization, we relate these factors to the *relative deviation score*: the average deviation score for associative matches minus the average deviation score for comparative matches.

As in the similarity pre-test, the TS index did not differ based on the temporal context (M_{week} = .36, SD =.06 vs. M_{year}=.37, SD = .08, $t < 1$) used in the price estimation task in Study 4, suggesting that it captures an individual difference, independent of the manipulation. We also observe that the majority of matches were to the comparatively similar options ($M < .5$) rather than the associatively similar options, as in the pre-test.

Across conditions, participants with a higher TS index (higher tendency to incorporate associative similarity) had lower deviation in their price estimates from the associative referent matches (β_{TS} = -5.6, t = 2.7, $p < .01$) and directionally more deviation for comparative referent matches (β_{TS} = 2.9, t = 1.4, p = .16). Overall, the relative deviation scores indicated more associative lateral generalization for those with higher TS (β_{TS} = -8.5, t = 2.3, $p < .05$), as shown in the spotlight analysis in Figure 2. Based on Johnson-Neyman bounds, the differences in deviation scores between comparative and associative referent matches are significant for participants with a TS Index above .45 (the 86th percentile).

In other words, those participants with a low tendency to identify associative similarity give price estimates that are closer in value to those of *comparatively* similar referent products' prices (rather than to the prices of associatively similar products). As the tendency to choose thematic similarity in the word tasks increases, however, the pattern reverses and participants tend to give estimates that are closer to the prices of *associatively* similar referents (rather than to the prices of comparatively similar referents).

Summarizing across a wide range of products, we find that individual differences in the tendency to use thematic similarity determine which reference prices affect estimates of the target product's price: For people who are more likely to identify associative similarity, the prices of associatively similar referent products have a stronger influence on estimates; for those who are less likely to identify associative similarity, prices of comparatively matched products have a stronger influence on price estimates.

Please insert Figure 2 around here

Next, we consider the effect of manipulating temporal context. The results of the similarity pre-test indicate that associative matches are seen as more similar in the future than they are in the present. The similarity of comparative matches, however, did not differ between the present and the future. Therefore, we predict that in a year, associative matches should have a bigger influence on price estimates than comparative matches. Given that our participants express a strong overall tendency to identify comparative similarity regardless of temporal context, we anticipate that the effect of time may be most pronounced for people who would otherwise not tend to use associative similarity.

To test this prediction, we regressed the relative deviation scores (difference in price deviation scores for associative versus comparative matches) by (i) temporal context (week vs. year), (ii) the TS index, and (iii) their interaction. In addition to significant main effects of the manipulation and the TS index, the predicted interaction is found ($\beta_{\text{TS x Time}} = 16.9$, $t = 2.2$, $p < .05$). For those respondents who tend not to use associative similarity (i.e., who are below the median on the TS index), price estimates are more influenced by an associatively similar referent in a year than in a week. The price estimates of low TS-participants are closer to the prices of the associative referents (as indicated by lower deviation scores) in a year ($M_{\text{year}} = 2.02$, $SD = 1.54$ vs. $M_{\text{week}} = 2.86$, $SD = 1.42$; $t(58) = 2.19$, $p = .03$). Conversely, these participants' price estimates are closer to the prices of the comparative referents (as indicated by lower deviation scores) in a week than in a year ($M_{\text{week}} = 1.60$, $SD = 1.20$ vs. $M_{\text{year}} = 2.43$, $SD = 1.77$, $t(58) = 2.08$, $p = .04$). However, for those above the median in the tendency to use associative similarity—those respondents who recognize *both* associative and comparative similarity—temporal context does not affect the deviation score for associative or comparative matches (both ps > .10).

As can be seen in Figure 3, among those who are low in use of associative similarity, framing the purchase occasion as occurring a year from now (as opposed to in a week) reduces deviations from the price of an associatively similar referent product, but increases deviations from the price of a comparatively similar referent product. This is consistent with our argument that the basis of similarity can shift and, in turn, affect the lateral generalization— the degree to which each type of referent product influences price estimations. We find lateral generalization across a range of products, even when the notion of similarity has not been explicitly suggested to the participant in the study. How much a consumer generalizes from the price of a specific product depends on whether the potential basis of generalization (e.g., comparative vs. associative match) is highlighted by the combination of temporal context and individual differences (e.g. TS Index).

Please insert Figure 3 around here

As an important test of boundary conditions, we also included two price estimation tasks in which the referent was highly (literally) dissimilar and two for which the referent was highly (literally) similar, regardless of the basis of similarity (see Table 1). Any price inferences observed for these tasks should be unaffected by temporal context or by individual differences in the tendency to use associative similarity (TS index). Using analyses parallel to those described above, we confirmed that the similar referents influenced price estimates more than the dissimilar referents (e.g., yielded lower deviation scores). These analyses confirmed that neither the individual differences in the TS index, nor our manipulation of temporal context, nor the interaction of these two factors had any effects on either the similar-referent or dissimilar-referent price estimates. This test of boundary conditions suggests that the differences in observed lateral generalization in this study are due to differences in what's used as basis of similarity, rather than an influence of either TS index or temporal context on the degree to which general similarity is used in price inferences.

The studies presented so far suggest that price inferences, from a product with a known price to a different product with an unknown price, depend on which basis of similarity a person is likely to use, and that these lateral (i.e., product-to-product) generalizations are therefore influenced by factors that impact the basis of perceived similarity. In these studies, we have used cross-category comparisons, between products that share a limited basis of similarity (e.g., blenders and either ceiling fans or mugs). In many cases, however, consumers may have information about other products within the category, to serve as a basis of inference.

We agree with the prior literature that same-category products are likely to provide a stronger basis of inference than different-category products, in general (Nunes and Boatwright 2004, Krishna et al 2006). However, the preceding studies suggest that the degree of generalization across products from different categories depends on whether consumers perceive a basis for the generalization. We also propose that even within-category inferences will depend on the degree to which consumers perceive a basis for the generalization. In the next three studies, we investigate when lateral generalization of price inferences will occur for within-category target and referent products.

STUDY 5: WITHIN-CATEGORY GROUPING AND PRICE INFERENCE

Method.

In this study, we investigate price inferences within a single category (laptop computers), using a grouping manipulation, as in Study 1, to directly manipulate which product is seen as related to the target. Participants were native English-speakers (N=165) who completed an online survey and passed an attention check. In the survey, they viewed a mock ad for computers. Four laptops were presented, as shown in Figure 4, varying in size (small vs. large) and visual design (plain black vs. silver accents). Prices were shown for two of the computers— the large silver computer was $1400 and the small black computer was $400. The missing price for the other two was denoted by "$CALL".

To manipulate the grouping, the four computers were shown in two sets of two computers, as denoted by a box around the two paired computers. In the design-focus condition, the two black computers on the left side of the page were in one box, while the two silver computers on the right side of the page were in another box. Conversely, in the size-focus condition, the two larger computers on the top of the page were in one box, while the two smaller computers on the bottom of the page were in the other box. As shown in Figure 4, only the boxes varied across the conditions—the layout and all other information were otherwise exactly the same in both conditions.

Participants were asked to estimate the unspecified prices of the large black computer and the small silver computer. They were then asked to explain what information they took into account in making their estimates. After completing a set of unrelated questions, they answered demographics and rated their knowledge about computers.

We predicted that enclosing different pairs of computers into the boxes would prompt different categorizations, impacting the inferred prices. We predicted that in the size-focus condition, when the two large computers were grouped together, participants would be more likely to base their price inference on the size attribute. As a result, the relative price of the large black computer (relative to the smaller silver computer) would be higher, given that it is grouped with the more expensive large silver computer. Conversely, in the design-focus condition, participants would be more likely to base their price inference on the design attribute, resulting in a lower relative price for the large black computer (relative to the smaller silver computer).

Results and discussion.

Two participants mentioned basing their price estimates on the visual grouping and were excluded from further analysis. As predicted, the estimated price of the large black computer was significantly higher when paired with the $1400 computer in the design-focus condition than when paired with the $400 computer in the size-focus condition (M_{design} = $946, *SD* = 422 vs. M_{size} = $798, *SD* = 423, $t(161) = 2.24$, $p = .03$). Similarly, the estimated price of the small silver computer was marginally higher when paired with the $1400 computer in the size-focus condition than when paired with the $400 computer in the design-focus condition (M_{size} = $1093 *SD* = 439 vs. M_{design} = $970, *SD* = 480, $t(161) = 1.70$, $p = .09$). A within-between ANOVA reveals a significant interaction ($F(1,161) = 5.18$, $p = .02$).

We tested several potential moderators. First, there was no direct or moderating effect of response time, suggesting that the findings were not driven by some people using the boxes as a faster heuristic for their estimation. Second, the effect of the manipulation is marginally stronger for those high in knowledge about computers ($\beta_{\text{Version x Know}} = -114.2$, $t = 1.9$, $p = .065$). This is consistent with prior literature suggesting that expertise facilitates analogical inference (Novick, 1988).

Lastly, we note that this study tests consumers' inferential processes in a somewhat information-impoverished setting. In a follow-up study ($N = 101$), we added several additional attributes (screen size, hard drive size, memory and processor speed) that are diagnostic for direct price inferences, as opposed to lateral generalization, and the effect of the grouping manipulation was eliminated. This suggests that lateral generalization occurs when more direct inferences are not facilitated by information in the decision context.

STUDY 6: PERCEIVED SIMILARITY TO AN IDEAL PRODUCT AND WILLINGNESS TO PAY

The results of Studies 2 through 4 suggest that shifts in perceived similarity affect how the prices of products in other categories affect price estimates for products. Study 5 provides initial evidence that manipulating the perceived relatedness of two products, via grouping, facilitates lateral generalization, even within a single category. Next, we investigate how perceived similarity affects lateral generalizations within a given category. In the following studies, we will also extend our investigation from the prices that people expect (i.e., price estimates) to those that they're willing to pay (i.e., their reservation prices).

Prior research has suggested that contextual factors can shift the perception of comparative similarity within a category, and we propose that such a shift will have consequences for how the price of a referent product influences the estimated prices of target products in the same category. Prior research has investigated how an "ideal" option (high-valued on all the relevant attributes) influences perceived similarity (Medin, Goldstone and Markman 1995; Kaplan and Medin 1997). Building on this research, we predict that people will have a higher reservation price for a product when it seen as more similar to a high-priced ideal product, compared to when the product seems less similar to the ideal product.

We will manipulate perceived similarity via the subjective distance on an attribute dimension in this study, and via temporal context in Study 7. In both studies, we will contrast features that relate to practical concerns (e.g., the durability of the product) and those features that relate directly to the enjoyment of consuming the product. This distinction is closely linked to an early distinction drawn in the literature on construal level theory between "feasibility" and "desirability" (Liberman and Trope 1998). In those terms, desirability is about the value of an experience (e.g., "that's a fun car to drive"), whereas feasibility is about the ease or difficulty of achieving the experience (e.g., "but it's always in the repair shop").

This study will use changes in the comparisons prompted by the consideration set (e.g., merely by manipulating the attributes of a clearly inferior option) to manipulate how similar to the ideal a target product seems to be. We will then test the consequences of this shift in similarity for valuations of the target product.

Pretest.

We ran a pretest to select a product category where we could identify features that are uniquely related to pragmatic feasibility considerations versus desirability considerations. As part of a larger study, 82 participants were shown a set of product categories and presented with two attributes for each and were asked to rate "to what extent does this attribute determine the product's desirability" versus "to what extent does this attribute determine the product's feasibility" on a one (desirability) to six (feasibility) scale. On the basis of this pretest, we selected bicycles described by durability and ride feel for the main study. In particular, participants distinguished durability (M = 4.77) from ride feel ratings (M = 2.77, paired-t (81) = 8.34, $p < .001$) along the feasibility and desirability dimensions. Durability was rated significantly above the midpoint of the scale (and seen as determining the product's feasibility; $t(81) = 8.31$, $p < .001$) and ride feel was rated significantly below the middle of the scale (seen as determining desirability; $t(81) = -4.34$, $p < .001$).

Method.

One hundred thirteen participants completed this study. This study uses a two-condition between-subjects design, manipulating the perceived range of either the durability ratings or the ride-feel ratings by changing the attribute values of an inferior option, while holding all other options constant (illustrated in Figure 5). Participants were asked to imagine buying a bicycle in the intermediate future (in six weeks). Then, they were shown the durability and ride feel ratings for four bikes, including an ideal bike K and an inferior bike J, with known prices.

The ideal bike K had high scores for both durability and ride feel. In the extended durability condition, item J was inferior due to a very low rating on durability while in the extended ride-feel condition, item J was inferior due to a very low rating on ride feel. Only the ratings for Bike J differed across conditions – all other information was held constant. Note that participants were not presented with a figure—they were presented only with a table with Bikes K, L, M and one of the rows for Bike J, depending on the condition. We have numbered the three alternative formulations of Bike J here for expository purposes only—respondents always saw the inferior bicycle labeled as Bike J.

Please insert Figure 5 around here

Participants rated the similarity on a nine point scale between the ideal product in the category (Bike K) and each of three other products. Then, they indicated their willingness to pay for the ideal product, whose price was known, and both target products, whose prices were unknown. Target Bike L matched the ideal product (Bike K) on the attribute that determined its desirability (ride feel) but was inferior on the pragmatic, feasibility dimension (durability). Target Bike M matched the ideal product on the feasibility dimension but was inferior on the desirability dimension. Bike J's low score extends the range on one dimension (either durability or ride feel, depending on the condition) and should therefore make the target bike that scores high on that dimension seem more similar to the ideal (cf. Parducci 1965). We anticipated that Bike L (the more desirable, less practical option) would seem more similar to the ideal and be higher valued in the extended durability condition and that Bike M (the less desirable, more practical option) would seem more similar to the ideal product and would have higher valuation in the extended ride-feel condition.

Results and Discussion.

Please insert Figure 6 around here

Similarity ratings. A 2 (condition: extended ride-feel vs. durability) x 2 (product: Bike L vs. Bike M) mixed ANOVA finds a significant interaction ($F(1,111) = 8.18$, $p < .01$), confirming that the manipulation shifted relative perceived similarity. We also found a significant main effect of which bike is being compared to K ($F(1,111) = 36.32$, $p < .001$), with Bike L being judged more similar to Bike K and Bike M being judged as less similar to Bike K, in both conditions. There was no main effect of manipulating the attribute values of the inferior option Bike J (e.g., extending ride-feel vs. durability, $F < 1$).

As can be seen in the left panel of Figure 6, the significant interaction is driven by two directional patterns. First, the high feasibility, low desirability Bike M is seen as directionally more similar to the ideal Bike K in the extended ride-feel condition (when Bike J has low ride-feel, $M_{\text{ext-Ride}} = 5.96$) than in the extended durability condition (when Bike J' has low durability, $M = 5.58_{\text{ext-Durability}}$). Conversely, the high desirability, low feasibility Bike L is seen as directionally more similar to the ideal Bike K in the extended durability condition ($M_{\text{ext-Durability}} = 6.63$) than in the extended ride-feel condition ($M_{\text{ext-Ride}} = 6.34$). We conclude that the manipulation was successful in shifting the perceived similarity of the two products to the ideal product.

Willingness to pay. We predicted that the observed differences in similarity between the two conditions will result in different price inferences, and therefore different valuations. The manipulation of the inferior option J does shift the relative willingness to pay for the two target products. A 2 (condition: extended ride-feel vs. durability) x 2 (product: Bike L vs. Bike M) mixed ANOVA finds the predicted interaction ($F(1, 111) = 6.15$, $p < .05$) as well as a main effect of the product ($F(1, 111) = 23.39$, $p < .001$), but no main effect of the manipulation ($F < 1.5$, $p > .1$).

Overall, consumers had a higher valuation for the desirable Bike L than for the feasible Bike M. The difference was fairly small in the extended ride-feel condition ($M_{\text{BikeL}} = \$676$, $SD = 263$ vs. $M_{\text{BikeM}} = \$644$, $SD = 271$, $t(55)=1.48$, $p = .15$), where both bikes were seen as similar to ideal Bike K. However, in the extended durability condition, where Bike L was seen as more similar to the high-priced Bike K than was Bike M, the difference in valuation was much larger ($M_{\text{BikeL}} = \$655$, $SD = 285$ vs. $M_{\text{BikeM}} = \$557$, $SD = 251$, $t(56) = 6.03$, $p < .001$). We have argued that this occurs because manipulating the range shifts the perceived similarity to the more expensive ideal product, impacting the degree to which the price of the ideal bike is incorporated into the judgment of willingness to pay.

To further test this interpretation, we ran a mediation analysis using each participant's difference in rated similarity (ΔSim_{LM}= rated similarity of Bike L to the ideal - rated similarity of Bike M to the ideal) and each participant's difference in buying prices for the focal products (ΔWTP_{LM} = willingness to pay for Bike L - willingness to pay for Bike M). First, we confirm that the range manipulation (extending ride-feel vs. durability) impacts the difference in similarity (β = .68, t = 2.9, p < .01) in a simple regression. Second, we confirm that the range manipulation impacts the difference in willingness to pay (β = 66.3, t = 2.5, p < .05) in a simple regression. Lastly, in a multiple regression predicting difference in willingness to pay, we find a significant effect of difference in similarity (β = 34.5, t = 3.4, p < .01) and a non-significant effect of the attribute range manipulation (β = 42.9, t = 1.6, p = .11). Overall, we find a significant indirect effect of the range manipulation on differences in willingness to pay via the difference in similarity (β = 23.4, bootstrap 95%CI = [6.8, 53.6], Sobel test Z = 2.2, p < .05).

This study suggests that the perceived similarity of a target product to an ideal product drives people's valuations, by directly manipulating similarity, via the location of the inferior option in the consideration set. These findings imply that lateral generalization can operate within a category, based on how the attributes contribute to perceived similarity, and extends from price inferences to how much people are willing to pay.

STUDY 7: IMPACT OF TEMPORAL CONTEXT ON SIMILARITY TO AN IDEAL PRODUCT AND WILLINGNESS TO PAY

Next, we provide another test of the lateral generalizations in Study 6, hold the consideration set constant and instead manipulating the temporal context. We anticipate that temporal context can have a corresponding effect on perceived similarity and, because of differences in similarity, on willingness-to-pay.

Prior research has suggested that temporal context can impact people's willingness to pay. In particular, if thinking about products in the distant future increases the subjective value of the desirability benefits (relative to the pragmatic benefits), then consumers' willingness to pay for products whose benefits are predominantly defined by desirability (vs. pragmatic) attributes may be correspondingly affected by temporal context. In particular, willingness to pay will be higher when construal level (abstract vs. concrete) matches the dominant benefits (desirable vs. feasible, as found in Agrawal et al. 2006). In this understanding of temporal context, however, the perceived relationship between the target product and any comparison or referent products will not be affected, and the change in valuation will not depend on perceived similarity.

If, however, temporal context also induces a representational change (Day and Bartels 2008), temporal context could affect valuation indirectly, due to shifts in which attributes form the basis of similarity judgments, and therefore which products within a category are seen as more similar. In this view, if thinking about the near future makes pragmatic feasibility considerations more prominent as a basis of similarity, the products that perform similarly on dimensions relating to the practical use of the product should be perceived as relatively more similar in the near future than in the distant future. In contrast, if thinking about products in the distant future leads to a focus on desirability, then products that are similarly enjoyable should be perceived as relatively more similar in the distant future than in the near future.

Method.

One hundred twelve participants filled out a brief questionnaire in exchange for a nominal cash payment. This study used a two-condition (temporal context: near vs. distant future), between-subjects design. Participants were asked to imagine buying a bicycle either in a week (near future condition) or in a year (distant future condition). Then, they rated the similarity (on a nine point scale) of an ideal product in the category (Bike K, with the highest ratings on both durability and ride feel) and each of three other products. As in Study 6, the exact attribute rating values were provided to the participants (see Figure 5). (Providing the actual values helps to control for possible effects of temporal context on different interpretations that might occur with more natural feature descriptions.) Participants then indicated their willingness to pay for the ideal product and both target products. Prices for the ideal product (Bike K) and for the inferior option (Bike J) were provided, and the prices of the target items (Bikes L and M) were not known.

The products were described such that Bike J was dominated by all three competing products. Bike L matched the ideal product (Bike K) on the desirability attribute (ride feel) but was inferior on the pragmatic, feasibility dimension (durability). Conversely, Bike M matched the ideal product on the feasibility dimension but was inferior on the desirability dimension. The test of our hypothesis was whether Bike L (the more desirable, less practical option) and Bike M (the less desirable, more practical option) would be perceived as relatively more or less similar to the relatively expensive ideal product, and whether these similarity relations would then affect people's willingness to pay for Bikes L and M.

Results and Discussion.

Similarity ratings. As can be seen in the left panel of Figure 7, in the near future, the high feasibility, low desirability bike is seen as more similar to the ideal than the low desirability, high feasibility bike. In the distant future, the pattern reverses. A 2 (condition: near vs. distant future) x 2 (product: Bike L vs. Bike M) mixed ANOVA finds two main effects and the predicted interaction. Most importantly, for present purposes, the perceived relative similarity of the two target products to the ideal shifted over time, as revealed by the significant interaction term ($F(1,110) = 14.7$, $p < .001$). The similarity of Bike L (the high desirability option) to the ideal Bike K was higher in one year than in one week ($M_{\text{week}} = 4.4$, $SD = 1.4$, $M_{\text{year}} = 5.4$, $SD = 1.3$, $t(110) = 4.05$, $p < .001$). Conversely, the similarity of Bike M (the high feasibility option) to the ideal Bike K was directionally higher in one week than in one year (M_{week} = 5.4, *SD* = 1.5, M_{year} = 5.2, *SD* = 1.4, *t*(110) = 0.95, *p* = .34).

Please insert Figure 7 around here

Willingness to pay. As predicted, temporal context shifts the relative willingness to pay for the two target products. A 2 (condition: near vs. distant future) x 2 (product: Bike L vs. Bike M) mixed ANOVA finds only the predicted interaction ($F(1, 110) = 6.36$, $p < .05$) and no main effects for product or temporal context (both *p*s > .1). As can be seen in the right panel of Figure 7, this significant interaction is driven by two directional patterns. Willingness to pay increased with timeframe for the more desirably Bike L, but declined with timeframe for the more feasible Bike M. As a result, in the near future, people are willing to pay more for the high feasibility, low desirability Bike M than the low desirability, high feasibility Bike L (M_{WTP_M} = \$611, *SD* = 267 vs. M_{WTP_L} = \$546, *SD* = 261, *t*(54) = 3.0, *p* = .004), but not in the distant future (M_{WTP_M} = \$576, *SD* = 292 vs. M_{WTP_L} = \$593, *SD* = 295, *t*(56) = 0.69, *p* = .50).

The similarity of each bike to the ideal product in the option set plays a key role in the valuation, such that valuation changes as the temporal context shifts the perceived similarities to the ideal. In the near future, the more feasible bike is seen as more similar to the ideal bike and consumers are willing to pay a higher price for it, compared to the less feasible but more desirable bike. In contrast, when consumers consider the distant future, they see both bikes as approximately equally similar to the ideal bike and they are willing to pay similar amounts for the two bikes. We have argued that this occurs because psychological distance (in this case, temporal delay) shifts the basis of lateral generalization—favoring durability as a basis for the near future decision and ride feel as a basis for a distant future decision. As a result, the temporal context changes which of the two products is seen as more similar to the ideal, and thereby impacts the degree to which the price of the ideal bike is incorporated into the judgment of willingness to pay.

To further support this interpretation, we ran a mediation analysis using each participant's difference in rated similarity (ΔSim_{LM}= rated similarity of Bike L to the ideal - rated similarity of Bike M to the ideal) and each participant's difference in buying prices for the focal products (ΔWTP_{LM} = willingness to pay for Bike L - willingness to pay for Bike M). First, we confirm that the timing manipulation (week vs. year) impacts the difference in similarity (β = 1.3, t = 3.8, p < .001) in a simple regression. Second, we confirm that the timing manipulation (week vs. year) impacts the difference in willingness to pay (β = 80.8, t = 2.5, p = .01) in a simple regression. Lastly, in a multiple regression predicting difference in willingness to pay, we find a significant effect of difference in similarity (β = 23.5, t = 2.7, p = .009) and a non-significant effect of the timing manipulation (β = 50.5, t = 1.5, p = .13). Overall, we find a significant indirect effect of the timing manipulation on differences in willingness to pay via the difference in similarity (β = 30.3, bootstrap 95%CI = [10.8, 60.9], Sobel test Z = 2.2, p < .05).

These results suggest that temporal context can systematically change the willingness to pay for products characterized by feasibility versus desirability benefits. In Studies 6 and 7, temporal context affects valuation by changing the underlying perceived similarity within the option set, between the target products and the ideal product. This supports our proposition that temporal context can affect valuation indirectly, due to representational change, rather than by directly affecting the perceived value of attributes. This interpretation is supported by our mediation results.

GENERAL DISCUSSION

In this paper, we have argued that consumers' price inferences and valuations for a target product can be affected by a wide range of potential referent products with known prices. These lateral generalization effects are distinct from prior findings about price influences and reference prices (Cheng and Monroe 2013), in that consumers' inferences depend on whichever basis of generalization and similarity is highlighted in context. The bases of generalization in our studies were affected by a wide range of factors: uninformative groupings (Studies 1 and 5), having made prior similarity judgments (Study 2), the attribute range represented in a choice set (Study 6) and even external contextual factors not generally associated with similarity, such as temporal distance (Studies 3, 4 and 7).

The resulting inferences, from the known price of one product to the unknown price of a target product, can occur both across categories and within categories. However, unlike priming, anchoring, assimilation or other related processes studied in the reference price literature, lateral generalization requires a relation between referent and target. This link often involves highlighting a basis of shared similarity (Studies 2, 3, 4, 6 and 7), but can also occur from a more directly prompted relation, such as a shared grouping, even if the grouping does not lead to differences in perceived similarity (Studies 1 and 5). People may generalize prices from one product to a quite different product (e.g. from a ceiling fan or mugs to a blender), when such a relation, or shared basis of similarity, is present in the decision context. Likewise, people may not generalize prices much from one product to another even within the same category (e.g., from one laptop to another, or from one bike to another) when no such link is present or when the context highlights the dissimilarities between the products.

This paper has focused on price inferences and has used a range of direct and indirect manipulations of the bases of similarity. However, we believe that the impact of shifts in similarity on decision making remains highly understudied. Next, we highlight several key implications of our findings, suggesting directions for future research.

Implications for Reference Prices.

Our studies investigated idea way in which how reference prices might be generated that is substantially different from most prior literature. Past approaches have primarily assumed that reference prices are generated either through a learning process of repeatedly observing the price for a given product (e.g., a weighted average of prior prices, Winer 1986), or in conjunction with external cues, such as external reference price claims (Biswas and Blair 1991). In contrast, we find that estimated prices can also be influenced by the prices of other products, consistent with Krishna et al 2006 and Nunes and Boatwright 2004. In particular, our studies find that such price influences occur in specific circumstances, when there is a perceived basis for a lateral generalization from one product to another, and which of the broader set of product prices influences a consumers price expectations are predictably shaped by contextual factors.

These findings point to a largely underappreciated limitation of reference price models. For frequently-purchased, well-known products, consumers are likely to construct and remember the product-specific or even product/store-specific reference prices. In such situations, consumers should have no reason to engage in lateral generalization to infer prices. However, in many cases, consumers may not have stable reference prices, either because of sparse information, limited cognitive effort, or lack of time and attention. Potentially as a result, consumers often have high rates of error in their price beliefs (Dickson and Sawyer 1990, Estelami, Lehmann and Holden 2001). The predominant reference-price model is silent on how consumers without stable reference prices form the beliefs they need to reason about prices. Our results suggest that consumers generalize broadly from other cues in the environment that seem to share a basis of inference. While we have focused on the prices of other products as lateral cues in this paper, consumers may also use different types of inferences when other cues are available, such as top-down inferences from category cues, including store type (Hamilton and Urminsky 2014).

Implications for Consumer Inferences.

Beyond prices, consumers use inferential reasoning for a wide range of decision inputs when evaluating products or forming expectations (Kardes et al 2004). We believe that the kinds of lateral generalization processes we've examined may serve as a means of inference for a broad range of product characteristics. In the same way that we have detailed for price inferences, consumers may be more or less likely to infer the quality or ethicality of one product from another, both within and across categories, depending on which of two or more bases of similarity are perceived in a situation. For example, a consumer may infer the healthiness or number of calories in a less-known food item from the characteristics of another better-known referent food, when it is merely grouped with the referent food or when it shares non-diagnostic similarities with the referent food. At the same time, consumers may underweight information from other referent foods which are more diagnostic, if they are not seen as sharing a basis of generalization.

Similarity-based lateral generalizations may also play a role in how brands are evaluated. Recent work suggests that contextual factors can impact the weight put on brand fit versus quality (Meyvis, Goldsmith and Dhar 2012) and the degree to which brands can extend (Ahluwalia 2008). Fit (generally operationalized as similarity between the original brand the brand extension) is an important attribute that impacts new product acceptance (Aaker and Keller 1990), and recent research has found that both comparative and associative similarity play a key role in how brand fit is evaluated (Estes, Gibbert, Guest and Mazursky 2012). However, we propose that fit may also play an important secondary role in consumer inferences across co-branded products. High perceived fit could facilitate and low perceived fit could impede generalizations from known attributes (potentially both positive and negative) of branded products to less known products marketed under the same parent brand. Our findings suggest that contextual factors may also moderate which types of brand extensions are seen as maintaining fit, and thereby affect the inferences that are made from known products to the new brand extension.

Lastly, the relationship of an item to an ideal version is a key component of similarity judgment and has been proposed as a potential key factor in other judgments (Barsalou 1985, Kahneman and Miller 1986, Medin, Goldstone and Markman 1995), although little empirical evidence bears on this supposition. Studies 6 and 7 examine this issue directly and find that the perceived similarity to a category ideal impacts willingness to pay, holding constant the objective features of the products. Perceived similarity to the ideal is malleable, shifting with the range of attribute values or even temporal context. In our studies, we explicitly present an ideal product in the option set. However, in general, the consideration of such ideals may be spontaneously prompted by recalled products or by ideals implied by the combination of the best attribute values present in the choice set, yielding inferences for various attributes.

Implications for Theories of Similarity and Mindset.

Our findings also have broader implications for understanding how contextual factors and mindsets can affect judgments and decisions. In Studies 3, 4 and 7, we indirectly manipulated the basis of similarity used via differences in temporal framing, reflecting the fact that many consumer decisions involve choices that unfold over time. Given that lateral generalization depends on shifts in similarity, we would predict that other dimensions of psychological distance, such as social distance, probability, or hypotheticality might produce similar effects. In fact, our findings suggest that the psychological-distance-based effects of such factors on decision making might be thought of as either a direct effect of construal level (e.g., as changing the weights given to features that characterize desirability and feasibility, which has been widely studied), or as a heretofore underappreciated indirect effect, via shifts in similarity among either the explicit choice options themselves or between choice options and spontaneously generated comparison items.

We induced differences in construal level as a means to investigate the effect of contextual factors on shifts in similarity in Studies 3, 4 and 7. However, we anticipate that a similar approach could reveal that other contextual factors can influence lateral generalization as well. For example, incidental mood has been found to have implications for similarity judgments (Gasper and Clore 2002, Murray et al. 1990). Incidental mood has also been found to affect choice (Raghunathan and Pham 1999) and evaluation (Pocheptsova and Novemsky 2009; Martin, Harlow, and Strack 1992; Schwarz and Clore 1983). This raises the question of when it is that mood impacts decisions directly, and when it might exert an influence on decisions indirectly, via the effect of shifts in similarity on consumer inferences. Further motivating this question is recent work indicating that incidental mood can impact the degree of abstraction or concreteness in subsequent reasoning (Labroo and Patrick 2008).

Beyond these specific examples, our approach has general implications for the recent proliferation of research on mindsets (see Wyer 2008 for a recent review). A mindset can be characterized as knowledge activation that occurs in performing a specific task, which then spills over to subsequent decision processes (Xu and Wyer 2007). The knowledge activation process has been studied as the activation of specific items in memory (e.g., facts, goals or heuristics). We argue that the circumstances which give rise to knowledge activation can also highlight different sets of relations between items, and thereby activate different bases of similarity and generalization. Differences in mindset can therefore affect how similarity is constructed, and the impact of mindset on choices may operate via the effect of perceived similarity on inferential reasoning.

Similarity processes are fundamental to how we perceive, structure, and assess information. Far from being a stable property of objects, similarity is best understood as constructed, sensitive to contextual cues and which specific basis of judgment is accessible in mind. This paper illustrates how understanding shifts in perceived similarity can explain differences in how consumers form price inferences. Given that similarity underlies cognition in general, and decision making often relies on context-specific inferences, similarity-facilitated lateral generalization may be implicated in many other frequently encountered tasks and in the effects of contextual factors on a wide range of decisions and choices.

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TABLE 1: PRODUCT STIMULI FOR STUDY 4

Target	Associative Match	Comparative Match	Match-item price ($)
Test Stimuli			
Kitchen sink	Gas Oven	Bathtub	850
Laptop	Keyboard	MP3 player	45
Snow shovel	Winter gloves	Soup ladle	15
Pillowcase	Alarm clock	Sun dress	35
Dresser	Night stand	Filing cabinet	75
Meat carver	Rotisserie oven	Sawzall	140
Blender	Toaster	Pencil sharpener	25
Snowmobile helmet	Ski gloves	Hard hat	25
Wash cloth	Bar soap	Beach towel	10
Baby monitor	Crib	Teleconf. phone	250
Desk lamp	Printer	Chandelier	120
Rice cooker	Dining table	Gas water heater	800
Hi-Def TV	Blue-Ray player	LCD monitor	120
Shower head	Toilet brush	Hose nozzle	15
Control Stimuli			
Tennis racquet	Racquetball racquet		35
Clothes dryer	Thesaurus		6
Grill	Headphones		275
15" cutting board	12" cutting board		20

FIGURE 1: GROUPING MANIPULATION IN NEWSPAPER CIRCULAR

Comparative Grouping Condition

Thematic Grouping Condition

FIGURE 2: EFFECT OF TENDENCY TO USE ASSOCIATIVE SIMILARITY ON LATERAL PRICE GENERALIZATIONS

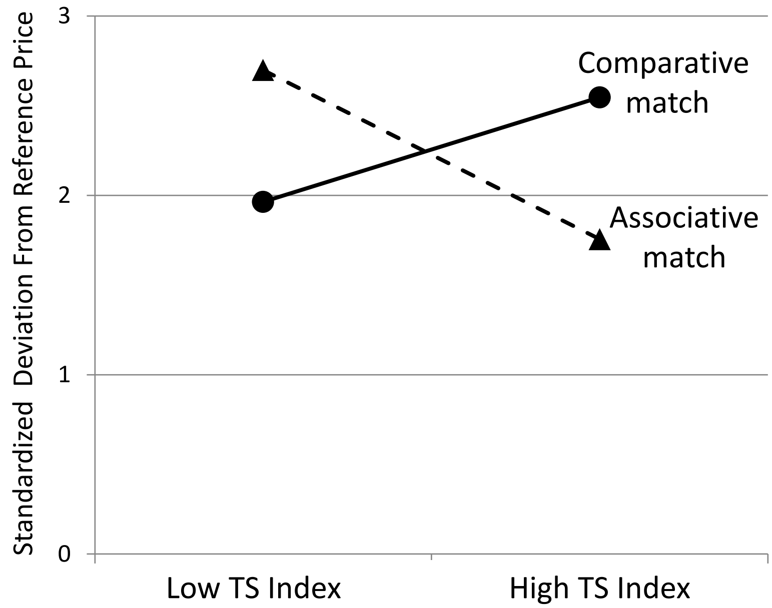


FIGURE 3: IMPACT OF TEMPORAL CONTEXT ON LATERAL GENERALIZATION AMONG THOSE LOW IN USE OF ASSOCIATIVE SIMILARITY

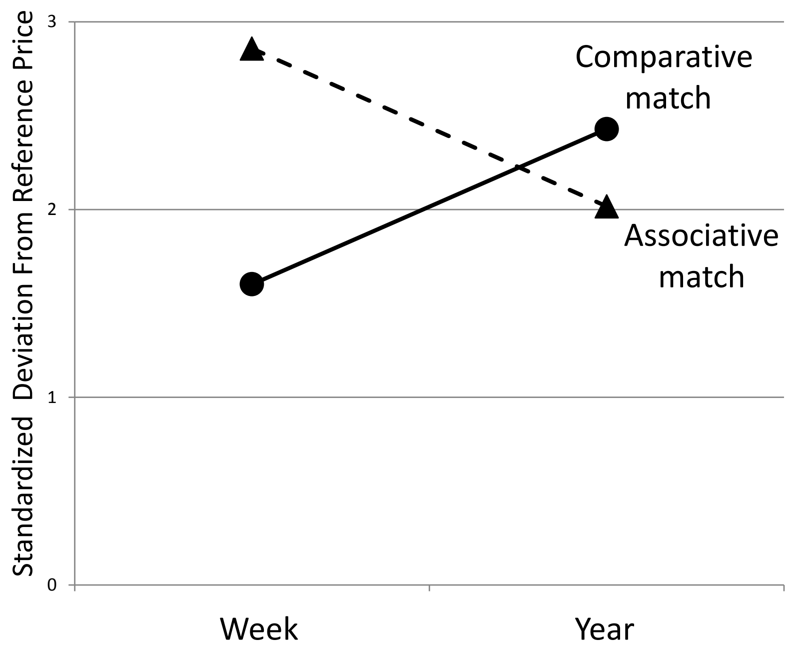


FIGURE 4: GROUPING MANIPULATION IN LAPTOP AD

Size-Based Grouping Condition

Design-Based Grouping Condition

FIGURE 5: STIMULI FOR STUDIES 6 AND 7

	Durability Rating	Ride Feel	Retail Price
Bike J (extended durability, Study 4)	1.2	9.3	$350
Bike J' (extended ride feel, Study 4)	8.5	1.2	$350
Bike J'' (Study 5)	4.4	3.7	$350
Bike K	8.5	9.3	$1,300
Bike L	6.7	9.3	?
Bike M	8.5	6.8	?

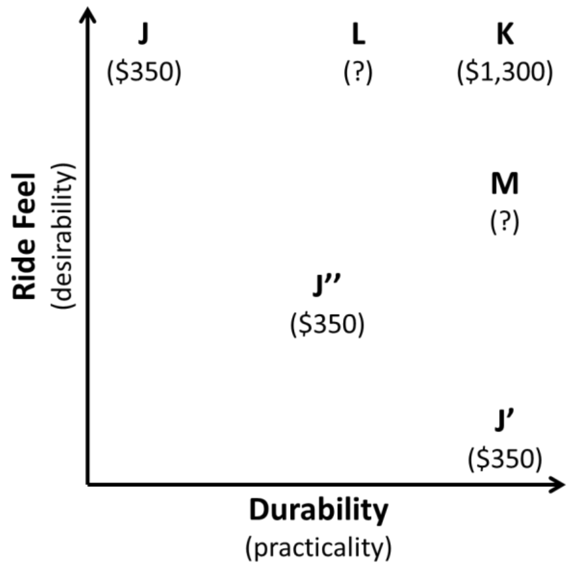


FIGURE 6: EFFECTS OF OPTION SET ON SIMILARITY AND WILLINGNESS TO PAY IN STUDY 6

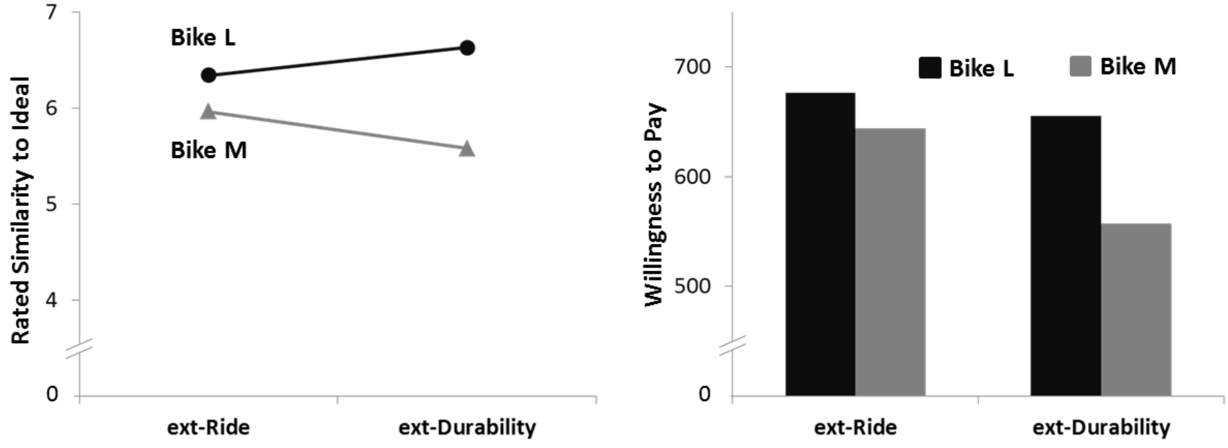
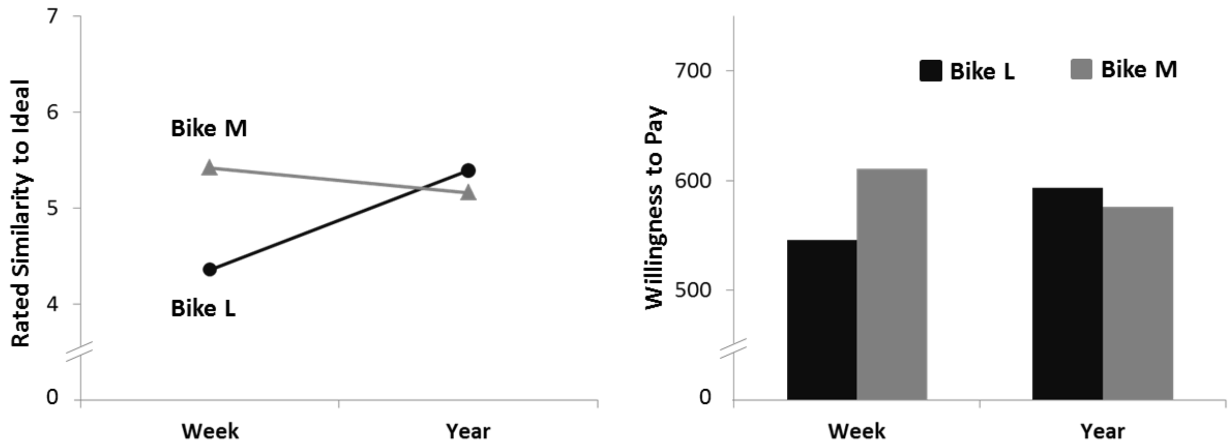


FIGURE 7: EFFECTS OF TIME ON SIMILARITY AND WILLINGNESS TO PAY IN STUDY 7



APPENDIX A: MANIPULATION STIMULI FOR STUDY 2

	Taxonomic		Thematic	
Target	Similar	Dummy	Similar	Dummy
Bee	Butterfly	Moose	Honey	Maple syrup
Cake	Cookie	Soup	Birthday	Independence day
Cow	Pig	Ostrich	Ranch	Soccer field
Dog	Cat	Elephant	Bone	Potholder
Dust	Soot	Paint	Broom	Paintbrush
Fur	Hair	Veins	Coat	Socks
Knight	Soldier	Plumber	Armor	Hard hat
Monkey	Primate	Reptile	Banana	Apple
Needle	Pin	Chopstick	Thimble	Sponge
Oyster	Clam	Jellyfish	Pearl	Diamond
Prison	Jail	Library	Criminal	Teacher
Robe	Cloak	Vest	Bath	Soap
Sheep	Goat	Giraffe	Wool	Silk
Shirt	Jacket	Belt	Tie	Belt
Squirrel	Rat	Snail	Nut	Rose

APPENDIX B: TABLES OF STATISTICAL RESULTS

Table 1: Regression Predicting Estimated Price of Blender (Study 1)

Source	β	SE β	Wald	*p*
Constant	49.162	2.349	20.932	.000
Version[a]	-6.144	2.349	-2.616	.010
Response Time[b]	15.317	17.021	0.900	.370
Version x Response Time	-14.702	17.021	-.864	.390

Table 2: Regression Predicting Estimated Price of Blender (Study 1)

Source	β	SE β	*t*	*P*
Constant	47.920	1.889	25.363	.000
Version[a]	-4.860	1.889	-2.572	.011
Knowledge[c]	1.116	1.899	0.588	.558
Version x Knowledge	-1.348	1.899	-.710	.479

Table 3: Regression Predicting Relative Similarity[d] Judgments (Study 2)

Source	β	SE β	*t*	*p*
Constant	0.306	0.216	1.416	.162
Version[b]	0.444	0.216	2.055	.044
Response Time[b]	-0.103	0.224	-0.459	.648
Version x Response Time	0.129	0.224	.575	.567

Table 4: Regression Predicting Relative Similarity[d] Judgments (Study 2)

Source	β	SE β	*t*	*p*
Constant	0.302	0.218	1.388	.170
Version[b]	0.438	0.218	2.012	.049
Need For Cognition[e]	0.040	0.217	0.186	.853
Version x NFC	0.053	0.217	.242	.810

Table 5: Regression Predicting Price Estimate (Study 2)

Source	β	SE β	*t*	*p*
Constant	37.202	3.508	10.604	.000
Version[b]	-7.198	3.508	-2.052	.044
Response Time[c]	-35.765	25.590	-1.398	.167
Version x Response Time	-37.759	25.590	-1.476	.145

Table 6: Regression Predicting Price Estimate (Study 2)

Source	*β*	SE *β*	*t*	*p*
Constant	41.960	1.259	33.337	.000
Version[b]	-2.591	1.259	-2.059	.044
Need For Cognition[e]	0.198	1.256	0.158	.875
Version x NFC	0.768	1.256	.612	.543

Table 7: Regression Predicting Similarity Difference[f] (Study 4 – Similarity pre-test)

Source	*β*	SE *β*	*t*	*P*
Constant	-1.026	.129	-7.977	.000
TSIndex[g]	1.830	.439	4.170	.000

Table 8: Regression Predicting Associative Similarity[h] (Study 4 – Similarity pre-test)

Source	*β*	SE *β*	*t*	*P*
Constant	3.394	.204	16.628	.000
TSIndex[g]	1.694	.697	2.432	.017

Table 9: Regression Predicting Comparative Similiarity[i] (Study 4 – Similarity pre-test)

Source	*β*	SE *β*	*T*	*P*
Constant	4.420	.206	21.489	.000
TSIndex[g]	-.137	.702	-.195	.846

Table 10: Regression Predicting Associative Standardized Deviance Score (Study 4)

Source	*β*	SE *β*	*T*	*P*
Constant	4.291	.766	5.599	.000
TSIndex[g]	-5.553	2.036	-2.728	.007

Table 11: Regression Predicting Comparative Standardized Deviance Score (Study 4)

Source	*β*	SE *β*	*T*	*P*
Constant	1.157	.778	1.487	.140
TSIndex[g]	2.941	2.066	1.424	.157

Table 12: Regression Predicting Relative Standardized Deviance Score (Study 4)

Source	β	SE β	*T*	*P*
Constant	3.134	1.398	2.243	.027
TSIndex[g]	-8.494	3.712	-2.288	.024

Table 13: Regression Predicting Associative Unstandardized Deviance Score (Study 4)

Source	β	SE β	*T*	*P*
Constant	307.1	36.3	8.459	.000
TSIndex[g]	-257.2	96.4	-2.668	.009

Table 14: Regression Predicting Comparative Unstandardized Deviance Score (Study 4)

Source	β	SE β	*T*	*P*
Constant	172.5	36.7	4.704	.000
TSIndex[g]	92.9	97.4	.954	.342

Table 15: Regression Predicting Relative Unstandardized Deviance Score (Study 4)

Source	β	SE β	*T*	*P*
Constant	134.5	62.9	2.139	.035
TSIndex[g]	-350.1	167.0	-2.096	.038

Table 16: Regression Predicting Associative Standardized Deviance Score (Study 4)

Source	β	SE β	*T*	*P*
Constant	6.215	1.255	4.951	.000
TSIndex[g]	-10.561	3.395	-3.111	.002
Time[j]	-3.082	1.581	-1.949	.054
Time x TSIndex	7.897	4.227	1.868	.065

Table 17: Regression Predicting Comparative Standardized Deviance Score (Study 4)

Source	β	SE β	*T*	*P*
Constant	-1.056	1.266	-.834	.406
TSIndex[g]	8.601	3.423	2.513	.014
Time[j]	3.569	1.594	2.239	.027
Time x TSIndex	-8.975	4.262	-2.106	.038

Table 18: Regression Predicting Relative Standardized Deviance Score (Study 4)

Source	*β*	SE *β*	*T*	*P*
Constant	7.271	2.271	3.202	.002
TSIndex[g]	-19.162	6.142	-3.120	.002
Time[j]	-6.651	2.860	-2.325	.022
Time x TSIndex	16.872	7.648	2.206	.030

Table 19: Regression Predicting Associative Unstandardized Deviance Score (Study 4)

Source	*β*	SE *β*	*T*	*P*
Constant	385.5	59.7	6.459	.000
TSIndex[g]	-456.1	161.4	-2.826	.006
Time[j]	-126.9	75.2	-1.688	.094
Time x TSIndex	316.3	200.9	1.574	.119

Table 20: Regression Predicting Comparative Unstandardized Deviance Score (Study 4)

Source	*β*	SE *β*	*T*	*P*
Constant	71.0	59.9	1.186	.238
TSIndex[g]	360.5	161.9	2.227	.028
Time[j]	161.8	75.4	2.146	.034
Time x TSIndex	-420.3	201.6	-2.085	.040

Table 21: Regression Predicting Relative Unstandardized Deviance Score (Study 4)

Source	*β*	SE *β*	*T*	*P*
Constant	314.5	102.4	3.070	.003
TSIndex[g]	-816.6	277. 0	-2.948	.004
Time[j]	-288.7	129.0	-2.238	.027
Time x TSIndex	736.5	344.9	2.136	.035

Table 22: Regression Predicting Standardized Deviance Score For Similar Control Matches (Study 4)

Source	*β*	SE *β*	*T*	*P*
Constant	.819	.811	1.011	.315
TSIndex[g]	-.154	2.192	-.070	.944
Time[j]	-.461	1.021	-.452	.652
Time x TSIndex	1.765	2.730	.647	.519

Table 23: Regression Predicting Standardized Deviance Score For Nonsimilar Control Matches (Study 4)

Source	*β*	SE *β*	*T*	*P*
Constant	80.185	38.000	2.110	.037
TSIndex[g]	-37.543	102.765	-.365	.716
Time[j]	-30.248	47.858	-.632	.529
Time x TSIndex	77.634	127.954	.607	.545

Table 24: Regression Predicting Unstandardized Deviance Score For Similar Control Matches (Study 4)

Source	*β*	SE *β*	*T*	*P*
Constant	25.5	27.1	.940	.349
TSIndex[g]	-8.9	73.4	-.121	.904
Time[j]	-14.2	34.2	-.414	.680
Time x TSIndex	55.5	91.4	.607	.545

Table 25: Regression Predicting Unstandardized Deviance Score For Nonsimilar Control Matches (Study 4)

Source	*β*	SE *β*	*T*	*P*
Constant	704.5	318.1	-2.968	.003
TSIndex[g]	-245.1	860.3	-2.006	.047
Time[j]	-528.1	400.6	-1.298	.196
Time x TSIndex	1500.0	1071.2	-.010	.992

Table 26: Regression Predicting Difference in Estimated Prices (Study 5)

Source	*β*	SE *β*	Wald	*p*
Constant	-200.4	67.5	-2.968	.003
Version[a]	-135.4	67.5	-2.006	.047
Response Time[b]	-323.3	249.1	-1.298	.196
Version x Response Time	-2.5	249.1	-.010	.992

Table 27: Regression Predicting Difference in Estimated Prices (Study 5)

Source	*β*	SE *β*	*t*	*P*
Constant	-138.4	60.3	-2.297	.023
Version[a]	-122.7	60.3	-2.036	.043
Knowledge[c]	-7.7	61.3	-.126	.900
Version x Knowledge	-114.2	61.3	-1.862	.065

Table 28: Regression Predicting Difference in Relative Similarity of Bikes to Ideal[k] (Study 6)

Source	β	SE β	t	P
Constant	-.303	.376	-.806	.422
Extended Attribute[l]	.678	.237	2.860	.005

Table 29: Regression Predicting Difference in Relative Willingness to Pay for Bikes[m] (Study 6)

Source	β	SE β	t	P
Constant	-34.771	42.393	-.820	.414
Extended Attribute[l]	66.289	26.741	2.479	.015

Table 29: Regression Predicting Difference in Relative Willingness to Pay for Bikes[m] (Study 6)

Source	β	SE β	t	P
Constant	-24.333	40.667	-.598	.551
Extended Attribute[l]	42.915	26.503	1.619	.108
Relative Similarity[k]	34.493	10.248	3.366	.001

Table 30: Regression Predicting Difference in Relative Similarity of Bikes to Ideal[k] (Study 7)

Source	β	SE β	t	P
Constant	-1.055	.240	-4.385	.000
Time[j]	1.291	.337	3.831	.000

Table 31: Regression Predicting Difference in Relative Willingness to Pay for Bikes[m] (Study 7)

Source	β	SE β	t	P
Constant	-64.70	22.87	-2.829	.006
Time[j]	80.85	32.06	2.522	.013

Table 32: Regression Predicting Difference in Relative Willingness to Pay for Bikes[m] (Study 7)

Source	β	SE β	t	P
Constant	-39.95	24.13	-1.656	.101
Time[j]	50.53	33.23	1.521	.131
Relative Similarity[k]	23.48	8.83	2.659	.009

Key for variables used in regressions:

[a] Version = -1 for comparative grouping (blender with ceiling fan),
Version = 1 for associative grouping (blender with mugs)
[b] Z-scored response time
[c] Z-scored knowledge rating on three point scale
[d] Relative similarity = Similarity of Blender to Mug – Similarity of Blender to Fan
[e] Z-scored Need For Cognition scale rating (Cacioppo, Petty and Kao, 1984)
[f] Average rated associative similarity – average rated comparative similarity
[g] Percent of thematic pairings chosen (between 0 and 1)
[h] Average similarity (on a 1 to 10 scale) for the 14 associative matches
[i] Average similarity (on a 1 to 10 scale) for the 14 comparative matches
[j] Time =0 if one week, 1 if one year
[k] Similarity of L to K – Similarity of M to K (both on nine-point rating scales)
[l] Extended attribute = 1 if Bike J is low in ride-feel, 2 if Bike J is low in durability
[m] Willingness-to-pay for Bike L - Willingness-to-pay for Bike L