Research Article

COMPARISON, GROUPING, AND PREFERENCE

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Abstract—*How does the attractiveness of a particular option depend on comparisons drawn between it and other alternatives? We observe that in many cases, comparisons hurt: When the options being compared have both meaningful advantages and meaningful disadvantages, comparison between options makes each option less attractive. The effects of comparison are crucial in choice problems involving grouped options, because the way in which options are grouped influences which comparisons are likely to be made. In particular, we propose that grouping focuses comparison, making within-group comparisons more likely than between-group comparisons. This line of reasoning suggests that grouping should hurt, and we observe that it does: An option is more likely to be chosen when alone than when part of a group.*

How does the attractiveness of a particular option depend on comparisons drawn between it and other alternatives? One notion, embodied by the classical theory of the consumer, holds that the subjective value of an option is a function of only that option. According to this view, an option's attractiveness does not depend on comparisons drawn between it and other alternatives.

A psychological analysis, however, suggests that comparisons between options may be crucial. Suppose you are considering a weekend in Las Vegas; or, alternatively, suppose you are considering either a weekend in Las Vegas or a weekend in Los Angeles. When both cities are under consideration, the evaluation of Las Vegas will likely include comparisons drawn between it and Los Angeles. However, when only Las Vegas is under consideration, such comparisons are much less likely to arise. The attractiveness of a weekend in Las Vegas may therefore be different in these two cases.

In this article, we investigate the consequences of comparisons. We suggest that comparisons typically serve to decrease the attractiveness of the options being compared. In the previous example, the comparison between Los Angeles and Las Vegas is likely to make prominent aspects of each city that are not shared by the other. In particular, comparison will bring to mind both relative advantages and relative disadvantages of each option. For instance, the availability of gambling is an advantage for Las Vegas compared with Los Angeles, but the availability of beaches is an advantage for Los Angeles compared with Las Vegas. At the same time, the absence of gambling is a disadvantage for Los Angeles, and the absence of beaches is a disadvantage for Las Vegas.

Drawing on much research on loss aversion (Kahneman, Knetsch, & Thaler, 1990; Kahneman & Tversky, 1984; Knetsch & Sinden, 1984), we suggest that an aspect brought to mind by comparison looms larger when perceived as a disadvantage than when perceived as an advantage, a pattern that may be called comparative loss aversion (cf. Tversky & Kahneman, 1991; Tversky & Simonson, 1993). In our example, the absence of beaches reduces the attractiveness of Las Vegas more than the presence of beaches increases the attractiveness of Los Angeles. An implication of comparative loss aversion is that, in many cases, comparisons hurt. Whenever the options being compared all have meaningful advantages and disadvantages relative to one another, the attractiveness of a given option will decrease as it is compared with other options.

Of course, it is well known that, in certain cases, comparisons can make options more attractive (e.g., Hsee & Leclerc, 1998; Simonson, 1989). For example, following Huber, Payne, and Puto (1982), Simonson and Tversky (1992) asked some participants to choose between receiving $6 or receiving an attractive Cross pen. Other participants chose between the $6, the Cross pen, and a Zebra pen clearly inferior to the Cross. More participants chose the Cross pen from the expanded choice set than from the original binary choice set. Evidently, the presence of the clearly inferior pen increased the attractiveness of the superior Cross pen.[1] The comparison between the Cross pen and the less attractive pen appears to have benefited the Cross pen. This result is not unexpected given our analysis. In a comparison, the Cross pen gains advantages over the Zebra pen, but it does not suffer any disadvantages. As a result, the Cross pen becomes more attractive when compared with the Zebra pen.

Although comparison will sometimes reveal that one option has only advantages and no disadvantages with regard to another option, in many cases comparison will reveal both advantages and disadvantages of each option. In these cases, comparative loss aversion implies that comparisons will hurt: The attractiveness of any option will decrease as it is compared with other options. We tested this prediction in the following experiment.

EXPERIMENT 1

Method

Participants were 343 visitors to a popular science museum who completed a short packet including several unrelated questionnaires in return for a payment of $2. They answered questions about three categories of consumer goods and services; each category included four items. One category consisted of 1-year subscriptions to the magazines *Time, People, Business Week,* and *The New Yorker.* A second category included videotapes of the movies *Speed, Braveheart, The Lion King,* and *Forrest Gump.* Round-trip flights from the San Francisco

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1. If both the Cross pen and the $6 were less attractive in the triple than in the binary case, but the Cross pen was devalued less, it would be seen as relatively more attractive. However, related work by Wedell (1991) suggests that the Cross pen indeed is more attractive (in an absolute sense) in the expanded choice set than in the original binary choice set.

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Bay Area to Seattle, Los Angeles, Las Vegas, and San Diego formed the third category.

To manipulate the degree of comparison between items, we examined three different assessments of the options' attractiveness. In an *isolated* assessment, participants were presented with just one item (of the four possible items) from a particular category and indicated the highest price they would be willing to pay for that item. In an *accompanied* assessment, participants were presented with all four items from one of the categories and indicated the highest price they would be willing to pay for each of the four items. Finally, in a *ranked* assessment, participants were presented with all four members of one of the categories, indicated which item was their favorite and priced it, then indicated which item was their second favorite and priced it, and so on for all four items.

We assumed that comparisons would be unlikely in isolated assessments (because only one item was present), more likely in accompanied assessments (because multiple items were present), and essentially required in ranked assessments (because determining one's favorite entails comparison). Thus, if comparisons hurt, we expected isolated prices to exceed ranked prices, with accompanied prices falling somewhere in between.

The study proceeded as follows. First, all participants made an isolated assessment of one item. Later, some participants made either accompanied or ranked assessments of the four items from another category. Across different participants, all items were evaluated in each of the isolated, accompanied, and ranked formats.

Results and Discussion

The results are consistent with the prediction that comparisons hurt. Across all items, the mean isolated price, $59 (SE = 3.1)$, was substantially greater than both the mean accompanied price, $49 (SE = 4.0, z = 2.54, p < .05)$, and the mean ranked price, $46 (SE = 4.6, z = 2.85, p < .01)$.[2]

Table 1 presents the results for each of the 12 individual items. In accord with comparative loss aversion, an ordinal analysis at the item level revealed that mean isolated prices exceeded mean accompanied prices for 10 items ($p < .02$ by binomial test[3]) and exceeded mean ranked prices for 11 items ($p < .01$). Furthermore, mean accompanied prices exceeded mean ranked prices for 10 of the items ($p < .02$). Indeed, the predicted ordering isolated > accompanied > ranked was the modal ordering of item-wise mean prices. In the case of *Business Week,* for instance, the mean isolated price ($22.83) was about $2 more than the mean accompanied price ($20.64), which was about $2 more than the mean ranked price ($18.61). This ordering was observed for 9 of the 12 items, substantially more than the 2 items expected if comparisons were irrelevant (as predicted by the classical theory of

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2. A standard error was calculated for the mean price in each category, within subjects for the accompanied and ranked assessments and between subjects for the isolated assessments. Overall standard errors were calculated assuming independence across categories, which ignores positive dependence of judgments within subjects. This assumption yields conservative test statistics and was made for computational and presentational simplicity.

3. For purposes of presentational simplicity, these tests assume independence of the mean ratings for all pairs of items. Relaxing this assumption (to account for the within-category price correlations) does not qualitatively affect the test results.

the consumer) and each possible ordering were equally likely ($p < .001$).

In summary, we found that the predicted ordering isolated > accompanied > ranked was robust. Note that the size of the isolated-versus-accompanied effect appeared greater than the size of the accompanied-versus-ranked effect. This difference is consistent with our discussion earlier. In this experiment, we varied two factors that affect the degree of comparison between options. First, we varied the presence or absence of additional options (contrasting isolated and accompanied assessments). Second, holding the number of options constant, we varied the presence or absence of an explicit request to identify favorite options (contrasting accompanied and ranked assessments). The large discrepancy between isolated and accompanied assessments and the smaller discrepancy between accompanied and ranked assessments suggest that the mere presence of additional options may engender a significant degree of comparison, even in the absence of an explicit request to identify favorite options. This argument recalls some well-known findings in perception. For example, the same circle appears larger when accompanied by small circles and

Table 1. *Means (and standard deviations) of prices for Experiment 1*

Item	Assessment		
	Isolated	Accompanied	Ranked
Round-trip			
Los Angeles	$130.97	$94.75	$92.84
	(77.9)	(45.6)	(50.2)
Seattle	$206.27	$137.67	$131.00
	(101.6)	(74.1)	(63.6)
Las Vegas	$116.30	$116.79	$105.95
	(61.9)	(66.3)	(42.9)
San Diego	$119.00	$113.13	$106.42
	(67.5)	(46.9)	(55.4)
Average	$143.14	$115.58	$109.05
		(48.6)	(42.5)
Subscription			
Time	$24.29	$23.67	$19.54
	(12.2)	(11.8)	(13.9)
People	$21.42	$15.96	$15.09
	(14.2)	(8.5)	(11.4)
Business Week	$22.83	$20.64	$18.61
	(13.6)	(13.6)	(14.4)
New Yorker	$21.86	$18.69	$19.93
	(10.0)	(11.2)	(15.1)
Average	$22.60	$19.74	$18.29
		(9.5)	(12.2)
Videotape			
Speed	$10.16	$9.67	$9.32
	(4.6)	(5.3)	(4.6)
Braveheart	$10.17	$12.04	$12.75
	(6.7)	(5.6)	(7.2)
Lion King	$12.62	$12.10	$9.27
	(7.5)	(6.2)	(4.1)
Forrest Gump	$13.02	$12.14	$10.93
	(6.9)	(6.0)	(5.0)
Average	$11.50	$11.49	$10.57
		(5.0)	(4.3)

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appears smaller when accompanied by large circles. Put in terms of our introductory example, Las Vegas in isolation and Las Vegas accompanied by Los Angeles cast two very different impressions of Las Vegas, even if one is not explicitly asked to identify a favorite destination.

GROUPING AND CHOICE

The measures used in the previous experiment—isolated, accompanied, and ranked assessments—are all direct measures of options' attractiveness. Such direct assessments are important, but we are also concerned with the attractiveness of options when people choose among them rather than evaluate them individually. An important question, then, concerns the role of comparisons in choice.

In many choice problems, the way in which the options are grouped dictates which comparisons are more or less likely to be made. Consider a choice between four different restaurants. Such a choice can arise in an ungrouped format in which each restaurant is considered individually. For example:

Ungrouped Problem: Which of the following do you prefer?
  Seafood restaurant
  Italian restaurant
  Mexican restaurant
  Thai restaurant

In contrast, perhaps because one of the restaurants requires a drive but the others are within walking distance, or because one of the restaurants is the usual location and the others are departures from the normal routine, or for some other reason, such a choice can also arise in a grouped format. For example, three of the options may be grouped together while the fourth is alone:

Grouped Problem: Which of the following do you prefer?
  Seafood restaurant
  Your choice of either Italian, Mexican, or Thai restaurant

We suggest that choice problems involving grouped options are the rule rather than the exception. Indeed, although groupings based on idiosyncrasies of the particular choice situation (such as those mentioned) are extremely common, options are perhaps most often grouped on the basis of similarity or category membership (e.g., domestic vs. imported cars).

How might grouping affect comparisons? The classical theory holds that the subjective value of an option is a function of only that option, and therefore requires that the grouping of options have no effect on choice. For instance, choices in the grouped and ungrouped problems presented earlier must be consistent, according to this theory. As before, however, a psychological analysis suggests otherwise. There is a great deal of evidence that people often accept and consider choice problems in the form in which those problems are presented (Tversky & Kahneman, 1986; Thaler, 1985). Although it may in principle be straightforward to ignore the grouping and treat a grouped problem as if it were ungrouped, people are unlikely to do so. Instead, the grouping of the options may well influence the manner in which they are evaluated. In particular, we propose that grouping focuses comparison, making within-group comparisons (those between two grouped options) more likely than between-group comparisons (those between a grouped option and the lone option).

Two observations support this notion. First, grouping creates differences in psychological distance; the grouped options are psychologically clustered together and separated from the lone option. To the extent that proximity facilitates comparison, as suggested by the contrast between isolated and accompanied assessments in Experiment 1, we expect a greater degree of within-group comparisons than between-group comparisons. Second, choosing a favorite from within the group and comparing only that option with the lone alternative is a natural procedure in grouped choice problems. To the extent that people follow this procedure, the favorite that emerges from the within-group comparisons will at some point be compared with all the other options, whereas the lone option will be compared only with the favorite from the group.

Comparative loss aversion implies that the greater degree of within-group comparisons will sharply reduce the attractiveness of each of the grouped options. However, because of the lesser degree of between-group comparisons, the attractiveness of the lone option will not decrease as much. As a result, we predicted that grouping would hurt in choice situations: An option would be more likely to be chosen when alone than when part of a group. We tested this prediction in Experiment 2.

EXPERIMENT 2

Method

Students at Stanford and San Jose State universities were presented with a series of grouped choice problems, each involving four options. Nine choice problems were studied; they are described in Table 2. The problems were presented on several different occasions; different participants received different sets of problems. Participants were informed that the experimenters had randomly grouped together three of the options in each problem, and were asked to indicate preference for either the lone option or their choice of one of the three grouped options. Participants choosing the grouped options were not asked to indicate their preference among these options. Every decision problem appeared in four formats, with a different lone option in each format. For half the participants, the lone option was listed first, and for the other half, the group was listed first.

We refer to the proportion of participants preferring the lone option as the "lone-option choice share." To measure the effect of grouping, for each problem we computed the sum of the lone-option choice shares across the four problem formats. We denote this sum by S. Note that if grouping had no effect on choice, S should be 100%; each lone option's share should correspond to its share in an ungrouped choice, and those four shares are constrained to sum to 100%. However, our hypothesis that grouping focuses comparison, in tandem with comparative loss aversion, predicts that an option is less attractive when part of a group than when by itself. Consequently, we predicted a tendency to choose the lone option and therefore that S would exceed 100%.

Results and Discussion

The results, presented in Table 2, support this prediction. Across the nine problems, the average S was 116%, significantly greater than 100% ($z = 3.61$, $p < .001$). This pattern is quite robust; we have also observed S to be greater than 100% using two variations of the present

Table 2. *Sum of lone-option choice shares for Experiment 2*

Problem	Options	*n*	Sum (%)
Restaurant	Seafood, Mexican, Italian, Thai	180	123
Entree	Chicken, beef, fish, pasta	105	116
Fast food	KFC, McDonald's, Taco Bell, Jack in the Box	144	93
Video	*Home Alone, Star Wars, Dances With Wolves, Kramer vs. Kramer*	145	116
Snacks	Doritos, Butterfinger, Hershey's Kisses, M&Ms	143	105
Saturday activity	Biking, rollerblading, shopping, hiking	105	100
Drink	Fruitopia, Gatorade, iced tea, apple juice	250	125
Gift	Briefcase, bicycle, camera, TV	250	118
Dessert	Chocolate cake, ice cream, cheesecake, fruit salad	251	125
Average			116

Note. "Sum" represents the sum of the proportion of participants preferring the lone option across the four problem formats.

experimental method. Moreover, the observation of *S* greater than 100% in these variations appears to rule out two potential alternative explanations.

In one variation, we had participants reject (rather than choose) either the lone option or the three grouped options. This variation pitted a comparison-based analysis against the possibility of a lone-option bias—that is, a general tendency to mark the lone option as one's response. Because in this variation a lone-option bias would lead to rejection rather than choice of the lone option, a lone-option bias predicted that *S* would be less than 100%. In contrast, because the difference between choosing and rejecting is irrelevant to a comparison-based analysis, this account continued to predict *S* greater than 100%. The data, which indeed revealed *S* greater than 100%, supported the comparison-based analysis over the possibility of a lone-option bias.

In a second variation, we had participants choose among aversive rather than attractive options (e.g., various chores). This variation pitted a comparison-based analysis against what may be called the polarization hypothesis—that there is a tendency to exaggerate the value of the lone option, whether it is positive or negative. Polarization implies that attractive options will appear more attractive when alone than when grouped, and that aversive options will appear more aversive when alone than when grouped. Thus, polarization predicted *S* less than 100% for aversive options. In contrast, a comparison-based analysis implies that because of the greater degree of comparison within the group, any option—whether attractive or aversive—is more attractive when alone than when part of a group. This account, then, continued to predict *S* greater than 100%. The data, which indeed revealed that *S* was greater than 100% for aversive options, supported a comparison-based analysis over polarization.

GENERAL DISCUSSION

We have investigated the role of comparisons in the assessment of options' attractiveness, and the effect of grouping on choice. We began with two assumptions. First, comparisons emphasize the advantages and disadvantages of options under consideration. Second, disadvantages are given greater weight than advantages. These two assumptions jointly imply that whenever the options under consideration have both meaningful advantages and meaningful disadvantages, comparisons hurt. The results of Experiment 1 supported this prediction.

Extending this logic, we hypothesized that grouping focuses comparison. As a result, within-group comparisons should be more likely than between-group comparisons. Thus, if comparisons hurt, the grouping of options should have a systematic effect: Grouping should hurt, so that the same options are less likely to be chosen when grouped than when lone. The results of Experiment 2 supported this prediction.

If comparisons hurt, there should be situations in which either of two options is acceptable to the decision maker, but neither is acceptable when the two are jointly presented. Indeed, Tversky and Shafir (1992) presented data suggesting that such situations are common. In their study, participants agreed to fill out a questionnaire for $1.50 (the default). Later, half of the participants were offered the opportunity to receive, instead of the $1.50, a metal pen; three quarters chose to trade the cash for the pen. The other half of the participants were offered the opportunity to receive either the metal pen or two plastic pens; in this case, less than half chose to trade the cash for either pen. Evidently, the presence of an additional pen option made the metal pen, which was acceptable in isolation, unacceptable. Note the importance of comparison and grouping in this case. We suggest that in the three-option choice set, comparisons hurt the two pen options, which were naturally grouped and compared with one another, but did not strongly affect the attractiveness of keeping the default cash.

In contrast to our analysis, Tversky and Shafir's (1992) account of their results rests on the notion of conflict. These authors wrote that "when each option has significant advantages and disadvantages, people often experience conflict that makes choice aversive" (p. 358). They argued that situations of high conflict lead people to avoid choices and maintain default options (e.g., the $1.50). Thus, Tversky and Shafir based their analysis on the manner in which conflict affects the tendency to make or avoid a choice, whereas we note that comparisons may decrease the value of each option by emphasizing its advantages and disadvantages.

Although the two approaches may be complementary and often make similar predictions, it is important to note that a comparison-based approach makes predictions about many situations to which the conflict-based approach does not naturally apply. First, although a conflict-based account requires a special role for default options that allow one to avoid difficult decisions, a comparison-based approach has no such requirement. A comparison-based approach can therefore make predictions about choice situations in which no default option is available. Second, and more important, unlike a conflict-based

approach, a comparison-based approach applies not only to choice tasks but also to direct evaluations of attractiveness, such as rating tasks or the pricing tasks of Experiment 1. Because direct evaluations of the attractiveness of individual items are quite common, the comparison-based approach is more widely applicable than the conflict-based approach.

In sum, the two approaches can be contrasted in terms of both level of analysis and psychological foundation. The comparison-based approach is focused at the level of the individual item, and rests on the perceptual notion that an option casts a different impression when isolated than when compared with other options. In contrast, the conflict-based approach is focused at the level of the aggregate choice situation, and rests on the notion that making a choice may be aversive.

We close with a number of observations regarding the importance of grouping in choice. The same options can often be grouped in different ways. For example, consider choosing between three cars: One is a Japanese sedan, the second is a Japanese sports car, and the third is an American sports car. Our findings suggest that the American car is more likely to be chosen when the cars are grouped by country of origin (because it is the only American option) and less likely to be chosen when the cars are grouped by body style (because it is in the sports-car group). Similarly, the Japanese sedan is more likely to be chosen when the cars are grouped by body style and less likely to be chosen when the cars are grouped by country of origin. Thus, a person's choice of cars may depend critically on the particular grouping that he or she encounters. Indeed, salespeople have been known to emphasize the relative merits of Japanese and American cars, or the virtues of sedans and sports cars, in an attempt to guide the consumer toward a particular purchase.

The observation that the same set of options may yield systematically different choices under different groupings is reminiscent of well-documented failures of description and procedure invariance. The principle of description invariance requires that the way in which a problem is described not affect choice. Research on framing, however, shows that choices depend systematically on the way a problem is described (e.g., Camerer, 1995; Tversky & Kahneman, 1986). The principle of procedure invariance requires that the method by which preferences are elicited not affect the observed preference ordering. Work on preference reversals, however, shows that preferences depend systematically on the way they are elicited (e.g., Grether & Plott, 1979; Shafir, 1993; Slovic, 1995). One could say that the principle of grouping invariance requires that the way options are grouped

not affect choice; we find, however, that grouping has a systematic effect.

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