

CHOOSING THE HARD WAY: FEATURE MATCHING,
CONTINUOUS DIMENSIONS, AND MAXIMIZING IN DECISIONS

by

ITAY CHANG

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Approved: Sara Hodges, Ph.D.
Primary Thesis Advisor

Feature matching is a cognitive tool humans use when comparing two items with distinct features along a continuous dimension. Past studies on feature matching have found evidence for both a feature-cancellation effect and a direction-of-comparison effect: When choosing between two objectively similar items, people will change their ratings and preference depending on the valence of shared and unique features as well as the order in which they view the items. Ooi (2004) built on this research by finding that adding prices as a choice dimension does not significantly affect feature-cancellation and direction-of-comparison effects. This present study aims to replicate past feature-cancellation and direction-of-comparison effects, increase the price disparity that was used in Ooi (2004) to see if that will cause price to have a significant effect, and add maximizing tendencies as a possible moderator of feature-cancellation, direction-of-comparison, or potential price effects. Past maximizing studies have found that maximizers experience less satisfaction both during and after the decision-making process (Iyenger, Wells, & Schwartz, 2006; Schwartz et al., 2002). Four hundred and thirty-five college student participants were asked to rate two objectively similar restaurants. Results of this study successfully replicated past direction-of-comparison effects but did not replicate past feature-cancellation effects.

The results also found that participants had a significant preference for the cheaper restaurant. Last, participants' maximizing scores did not significantly affect feature-cancellation, direction-of-comparison, or price effects.

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Choosing the Hard Way: Feature Matching, Continuous Dimensions, and Maximizing in Decisions

Feature matching is a process that humans use when comparing two items along a continuous dimension (e.g., which comedian is funnier, which restaurant is better) and when the descriptions of two items are made up of sets of features. When engaging in this process, people “cancel” out common features shared by both items and focus on features that are unique to one item or the other (Hodges, 1997; Houston & Sherman, 1989). For example, imagine a person is choosing between two hotels to stay at on their vacation. They know that Hotel A has comfortable beds and rooms that smell like cigars. They know that Hotel B has comfortable beds and loud noises late at night. By using feature matching, they would cancel out the common feature (comfortable beds) and focus on the unique feature (rooms that smell like cigars vs. loud noises late at night). Rationally, they should choose the hotel that has the most desirable (or in this case, least undesirable) unique feature, because the shared feature doesn’t help them decide. Thus, feature matching can be a rational strategy, but research on feature matching has shown that there are some interesting other effects of using feature matching, some of which are less rational.

Feature matching only applies when comparing items along a continuous dimension (such as “hotel desirability” with those items’ placement along that continuum determined by multiple features. It also seems to be the case that people don’t resort to feature matching to compare two items on a dimension for which there is a known, objective score for the two items on the dimension on which they are being compared. For example, one would not use feature matching to determine if Kevin Hart or Dwayne “The Rock” Johnson is taller (although the average person shouldn’t need any decision aids in determining this one!).

Because there is a “canceling” out of common features and a focus on unique features, people’s perceptions of their options will be influenced disproportionately by the valence of the unique features. Going back to the previous hotel example, both hotels share a common, positive feature and have unique, negative features. A person using feature matching would care less about the common features and give more attention to the unique features. Because the unique features happen to be negative in this scenario, people would have a relatively more negative view of both hotels. The reverse is also true: options that have common, negative features and unique, positive features will be seen as relatively more positive.

Because feature matching is used in comparative judgments (i.e., option 1 vs. option 2), there is a direction of comparison, which is where some of the interesting effects of feature matching emerge. Think of the phrase “you look just like your mother.” In this situation, the mother is used as the baseline (also called the referent) that the child (target) is being compared against (Hodges, 2005). In instances where there is no clear direction of comparison (think the Hotel A vs. Hotel B example), researchers have found that people tend to use the first option they encounter as a referent (Agostinelli, et al., 1986; Hodges, 1998; Houston et al., 1989).

There are also disproportionately influenced outcomes that emerge from the combined effects of feature valence with direction of comparison. This is because humans can’t begin the feature matching process until they have seen at least two options: People can’t compare the features of Hotel A to anything if they have not seen the features of Hotel B yet. Therefore, only after seeing the second option can humans begin to feature match, which means that features from the second option are mapped onto the features from the first option. However, the order in which the two options are presented is often random, but that random ordering, combined with feature matching, produces perceived preferences among choices that may be objectively equal.

When the common features of the second option are mapped out onto the first option and canceled out, the chooser is left with only unique features – and a disproportionately heightened focus of the unique features of the second option, because it is only after seeing both options that they can identify features as unique.

Going back to our hotel example, if people first see Hotel A and then Hotel B, they match the comfortable beds of Hotel B up with the comfortable beds of Hotel A. However, people can't match the loud noises late at night of Hotel B with rooms that smell like cigars of Hotel A because they are not the same feature. Thus, they are stuck with thinking of the unique, negative feature of both hotels, but particularly those of Hotel B, because it's only after seeing both hotels that they can identify the loud noises at night as a feature unique to one of the hotels. The result is rating Hotel B more negatively than Hotel A. Yet, if they saw Hotel B first and Hotel A second, they are stuck with thinking of the unique, negative feature of Hotel A and will rate Hotel A more negatively than Hotel B. Thus, the order they see two objectively similar options in, plus the use of feature matching, creates a preference where there normally would not be one. When two hotels share positive features and have unique negative features, people are more likely to prefer the first hotel because they focus on the unique negative features of the second hotel. On the contrary, if the two hotels share negative features and have unique positive features, people are more likely to prefer the second hotel because they focus on the unique positive features of the second hotel.

One important note is that this biased preference only occurs when the unique features of the two options are somewhat similar in their “goodness” (in the case of unique positives) or their “badness” (in the case of unique negatives). If one hotel has had multiple murders in the

past year and the other hotel has stale breakfast, there is not much feature matching can do to persuade guests to go to the hotel where murders have occurred.

Feature matching takes a good amount of mental energy (Hodges, 1998) – each of the features needs to be perceived individually and processed – and then checked for a match with the other option. The earlier hotel example is simplified, but in real life, there may be many features to compare. Imagine a person takes note of ten features of a first hotel and need to map out ten features of a second hotel onto that first hotel. A person would need to go through a good amount of work to feature match successfully. There would be less mental energy used if they simply made an overall evaluation of the first hotel and an overall evaluation of the second hotel and picked the one that seemed more positive. This raises the question: If humans were presented with an easier way to make decisions between two options, would they still engage in the effort of feature matching? Ooi (2004) tested this by conducting an experiment in which participants had to choose between two restaurants that when rated in isolation of each other were evaluated very similarly. In some situations, the restaurants had common, negative features and unique, positive features. In other situations, the restaurants had common, positive features and unique, negative features. Additionally, the participants were put into one of three different price conditions: both restaurants contained no price information; the first restaurant had a higher price than the second restaurant; or the second restaurant had a higher price than the first restaurant.

As expected, in the condition with no price information, participants rated both restaurants higher when they had common, negative features and unique, positive features than when they had common positive features and unique negative features. This illustrates that feature cancellation occurred. Additionally, when there was no price information, participants preferred the second restaurant when the restaurants had common, negative features and unique,

positive features and they preferred the first restaurant when the restaurants had common, positive features and unique, negative features; illustrating a direction-of-comparison effect.

In Ooi's study, there was no significant interaction of price condition with feature condition. Ooi hypothesizes that this is because either 1) feature matching effects were more powerful than price information or 2) the price differential between the two restaurants (\$11 vs. \$13 entree prices) that were used in the experiment were not different enough for the participants to care about price that much.

Ooi does not mention a third possibility: There may be certain people that are more likely to focus on feature matching and certain people who are more likely to focus on price. If only half of the participants in Ooi's study were primarily focusing on the price, he might not have had enough statistical power to see a significant interaction of feature condition and price condition. For example, if some participants care more about having a simple clear justification for picking one option over the other than they do about making the optimal choice, they may gravitate towards using a single dimension such as price. Yet, if other participants cared greatly about making the best possible choice regardless of the effort involved to make that choice, they might be more likely to use feature matching, with price information as only a factor in a larger equation with multiple dimensions so consider.

The scenario above explains the fundamental difference between satisficers and maximizers (Simon, 1978). Satisficers approach making decisions with a "good enough for me" mindset, while maximizers approach making decisions with a "which option will maximize my utility" mindset. A satisficer might go to a grocery store wanting to buy apples and quickly buy the first ones they see –not caring to examine other options or think about multiple dimensions on which apples can be evaluated. In contrast, a maximizer might go to a store wanting to buy

apples and compare the prices, research the farms the different apples were grown on, ask their friends which apple brand is their favorite, etc. Maximizers care more about getting the best option and maximizing their utility, rather than getting a merely “good enough” outcome, with each decision they make.

Maximizers and satisficers aren’t binary categories. People can fall anywhere on the continuous dimension of the satisficing-maximizing scale. Since the initial research on maximizers and satisficers, scales have been developed to measure a person’s maximizing/satisficing tendencies (Diab et al., 2008; Schwartz et al., 2002). Research has shown that maximizers experience less happiness, optimism, self-esteem, and life satisfaction while simultaneously having more depression, perfectionism, and regret (Schwartz et al., 2002). Additionally, maximizers have less satisfaction both during and after the decision-making process (Iyenger, Wells, & Schwartz, 2006). Researchers hypothesize that maximizers may experience more of these negative outcomes because of their desire to maximize utility. They spend more time on and stress more about the decisions they need to make. And, once they make a decision, they are more aware of all the alternative options that they passed up on and all the benefits they could have gotten if they had chosen a different option.

In the context of Ooi’s experiment, satisficers might be expected to focus on the price information of the two different restaurants because they could use this clear numerical dimension to select a “good enough” option instead of spending the time and mental energy to maximize their utility. In contrast, maximizers would be expected to use price as only one of many qualities about the restaurants because they are willing to spend the time and mental energy to try to make the *best* – not just a “good enough” decision. They might be more likely to spend the mental energy to feature match. That said, it would be expected that both satisficers

and maximizers would pay attention to price information, and thus when feature matching and price information pointed to different choices, everyone might be expected to use feature matching less when price was given.

This brings us to the current study, which has three goals 1) replicate the feature-matching effects found in previous studies, 2) increase the price discrepancy in the different price conditions that were originally used in Ooi (2004) to see if people will be less likely to feature-match when there is a bigger discrepancy on a single salient dimension, and 3) measure participants' individual differences on a maximizing-satisficing scale to see how maximizers and satisficers react differently in a decision where feature-matching could be used.

In the current study, feature matching is investigated by using two restaurants whose features were rated similarly in isolation. Our Hypothesis 1, which is congruent with past results, is that we will find a main effect of valence condition: Participants will evaluate the restaurants more positively when the restaurants have shared negative and unique positive features than when they have shared positive and unique negative features. Our Hypothesis 2, which is also congruent with past results, is that we will find an interaction of valence condition by order on restaurant evaluations: Participants will rate the second restaurant less positively than the first when the restaurants have unique negative features; they will rate the second restaurant more positively (and be more likely to pick it) than the first when the restaurants have unique positive features.

Next, we hypothesize that people will attend to price information and thus we will find an intuitive price condition by order interaction (Hypothesis 3): When the first restaurant is more expensive and the second restaurant is cheaper, participants will rate the second restaurant higher. In contrast, when the second restaurant is more expensive and the first restaurant is

cheaper, participants will rate the first restaurant higher. Despite the fact that Ooi's research found no significant price by order interaction, we predict that the higher price discrepancy used in this experiment will create a significant price by order interaction.

Thus, we anticipate finding both evidence of feature matching and evidence of using simple price information. Our next hypotheses address whether some people are going to be more influenced by one of these strategies than the other. For our maximizing-satisficing hypotheses, we predict that participants who score higher on the maximizing scale will generally rate both restaurants lower because they experience less satisfaction and more regret in their decisions (Hypothesis 4). Hypothesis 5 is that higher maximizers will be more likely to express interest in seeking out additional options (because they are more attentive to all the features of the restaurants, including the negative ones, and thus also less happy with the options they were offered). Hypothesis 6 is that higher maximizers will display greater effects of feature matching, by showing an enhanced preference for the second restaurant when the restaurants have unique positives and an enhanced preference for the first restaurant when the restaurants have unique negatives, relative to participants lower in maximizing. Last, Hypothesis 7 predicts that relative to lower maximizers, higher maximizers will show greater feature matching effects (i.e., preference for the second option when options have unique positive features and preference for first option when options have unique negative features), even when there is price information. In contrast, lower maximizers will show less evidence of feature matching when there is price information.

Methods

Participants

Participants were 435 undergraduate students recruited from Psychology and Linguistics courses at the University of Oregon and who participated in exchange for partial fulfillment of a course requirement. Nine students' data were excluded from the study because they completed the survey in less than 4 minutes, which was seen as unreasonably fast. Thus, a total of 426 students' data were included in the study (267 females, 158 males, and 1 nonbinary participant; mean age = 19.32 years, SD = 1.72).

Design

The study used a 2 (restaurant) x 2 (feature valence) x 3 (price information) mixed design. The repeated-measures factor of the design was restaurant; the participants were given the names ("Restaurant V" and "Restaurant W") and descriptions of two different restaurants. The between-subjects factors were feature valence and price information. The feature valence factor had two conditions: participants saw two restaurants either 1) with shared positive and unique negative features or 2) with shared negative and unique positive features. The price information factor had three conditions that were crossed with the feature valence factor. One-third of the participants saw a cheaper restaurant first (the average entrée was described as being \$12) and a more expensive restaurant second (average entrée was \$16); one-third of participants saw the more expensive restaurant first and the cheaper restaurant second; and one-third of participants were given no price information for either restaurant.

Stimuli

A list of different positive and negative restaurant features was previously pre-tested with a separate group of participants drawn from the same subject pool to find features with similar preference ratings. First, individual positive features were rated (e.g., “fun atmosphere”) and individual negative features were rated (e.g., “slow service”). Positive features with similar low variability plus either high positivity or high negativity ratings to each other went forward in the evaluation process. The rest were discarded. Next, two sets of three comparable positive features and two sets of three negative features were constructed. Restaurant descriptions were constructed by pairing one of these sets of positive features with one of these sets of negative features (the features were always listed in a particular valence order: positive, negative, positive, negative, negative, positive). These restaurant descriptions were then also pre-tested in a separate, second group of participants who saw and rated just one restaurant. This yielded three restaurants that were not only made up of similarly rated features, but that were also rated similarly overall when seen in isolation (a fourth restaurant description was discarded because overall ratings for it differed from the other three). This last round of norming yielded three 6-feature descriptions with similar mean ratings ($M=3.81$, $SD= 1.13$; $M=3.48$, $SD= 1.89$; and $M=3.79$, $SD=1.38$). Two of these restaurants had the same positive features but unique negative features; the third restaurant shared negative features with one of the first two but did not share positive features.

Materials

All participants participated online. They first viewed a consent form that informed them that they would receive credit for their psychology class for participating and that participation was voluntary. Participants were informed that they would see descriptions of two different

restaurants and would be asked to rate those restaurants afterwards. The instructions mentioned that participants would not be able to go back to view previous stimuli once they had advanced to a new page.

Next, participants viewed “Restaurant V,” which contained three positive features, three negative features, and in some conditions, price information. Next, they viewed “Restaurant W,” which also contained three positive features, three negative features, and price information in certain conditions. “Restaurant W” features were also presented in the same order as “Restaurant V.” Price information always came last.

Participants were asked to evaluate “Restaurant V” on three 7-point Likert scales : “How much do you like Restaurant V?” where “1” was “not at all” and “7” was “very much”; “How likely would you be to go to Restaurant V?” where “1” was “very unlikely” and “7” was “very likely”; and “How much do you think you would enjoy eating at Restaurant V?” where “1” was “not at all” and “7” was “very much.” The same three questions were asked for Restaurant W.

Participants were then asked, “If you were asked to pick one restaurant, which one would you choose?” Participants were also asked if they would go to additional effort to seek out information about additional restaurants (“Yes” or “No”) and how interested they would be in seeking out those additional restaurants on a 7-point Likert scale where “1” was “not at all interested” and “7” was “very interested.” This was to assess participants’ satisfaction with their choice. Next, to examine memory for the restaurant features, participants were asked to list as many features of Restaurant V and Restaurant W as they could remember (memory data was not examined for this project).

Last, participants’ maximizing tendencies were evaluated through a five-question regret scale (Schwartz et al., 2002); a 13-question Maximizing Scale (MS; Schwartz et al., 2002); a

nine-question Maximizing Tendency Scale (MTS; Diab et al., 2008); and a five-question situational dilemma scale which was not used in the current project (Diab et al., 2008). A sample question from the regret scale was “When I think about how I’m doing in life, I often assess opportunities I have passed up” where “1” was “Strongly Disagree” and “7” was “Strongly Agree.” A sample question from Schwartz et al.’s Maximizing Scale was “I often fantasize about living in ways that are quite different from my actual life” where “1” was “completely disagree” and “7” was “completely agree.” A sample question from Diab et al.’s Maximizing Tendency Scale was “I will wait for the best option, no matter how long it takes” where “1” was “completely disagree” and “7” was “completely agree.”

The Maximizing Scale (MS) found in Schwartz et al. (2002) is widely used, but we included the MTS (Maximizing Tendency Scale) from Diab et al. (2008) because Diab et al. found evidence that the MS correlated with maladaptive traits such as indecisiveness and neuroticism, while the MTS did not correlate with these maladaptive traits. The only trait MTS did correlate with was regret, and the researchers found a smaller correlation with regret for the MTS as compared to the MS. An important note is that the MTS incorporated three questions also found in the MS (they were only presented once and the three overlapping questions, along with other items in the scales can be found in the Appendix). We included both scales and planned to use all items on either scale that contributed to a single shared maximizing factor.

The final questions participants saw were about demographic information (age, gender, race) and the last screen of the study provided a debrief and explanation of the study. All materials can be found in the Appendix.

Procedure

Participants completed the questionnaire online using Qualtrics, a commonly used survey software program. Participants chose the device and location for completing the questionnaire.

Results

Three of the dependent measures (how much participants liked the restaurant, how likely they would be to go to the restaurant, and how much they would enjoy eating at the restaurant) were highly intercorrelated both for Restaurant V ($\alpha = .826$) and Restaurant W ($\alpha = .876$). These measures were thus combined to form an average composite evaluation score.

To test Hypotheses 1 and 2, a mixed-between analysis of variance (ANOVA) was conducted with feature valence (unique positive features and shared negative features vs. unique negative features and shared positive features) as a between-subjects factor, restaurant as a within-subjects factor (i.e., restaurant V or W) and composite evaluation restaurant score as the dependent variable. The test revealed no significant between-subjects main effect of feature valence (Hypothesis 1), $F(1, 424) = 2.46, p = .118$. Although there was no main effect of feature valence, the data trended in the expected direction. Participants tended to prefer the restaurants more when they had unique positive features and shared negative features ($M = 4.32, SD = 1.14$) than when the restaurants had the unique negative features and shared positive features condition ($M = 4.19, SD = 1.15$). The ANOVA also revealed an unpredicted within-subjects main effect of restaurant, $F(1, 424) = 12.62, p < .001$. Participants preferred the first restaurant ($M = 4.37, SD = 1.07$) compared to the second restaurant ($M = 4.13, SD = 1.17$). Additionally, as predicted, the ANOVA revealed a significant two-way interaction between restaurant and feature valence (Hypothesis 2), $F(1, 424) = 23.23, p < .001$. Participants in the unique positive-shared negative condition preferred the second restaurant ($M = 4.36, SD = 1.13$) over the first restaurant ($M = 4.28, SD = 1.04$), while participants in the unique negative-shared positive condition preferred the first restaurant ($M = 4.46, SD = 1.10$) over the second restaurant ($M = 3.91, SD = 1.17$). This aligns with previous research and illustrates that there is a direction-of-comparison effect.

To test Hypothesis 3 (that participants would prefer the cheaper restaurant), a second within-between repeated measures analysis of variance was conducted with cost condition as the between-subjects factor, restaurant as the within-subjects factor, and composite evaluation scores of Restaurant V and Restaurant W as the dependent variable. Once again, the ANOVA revealed an unexpected main effect of restaurant, $F(1, 424) = 15.15, p < .001$, with participants again rating the first restaurant that they saw higher than the second restaurant. The ANOVA revealed no main effect of price condition, $F(1, 424) = .17, p = .846$. That is, participants did not rate the restaurants differently depending on whether they saw the low-priced restaurant first ($M = 4.24, SD = 1.13$), the high-priced restaurant first ($M = 4.29, SD = 1.15$), or no price information at all ($M = 4.23, SD = 1.17$). However, consistent with our hypothesis, the ANOVA did reveal a significant two-way interaction between price condition and order (Hypothesis 3), $F(1, 424) = 5.40, p = .005$, indicating that our participants were sensitive to price information. However, the pattern of the interaction was not entirely as we had predicted. We had expected that participants would show a preference for the cheaper restaurant, which would emerge as a price condition by order crossover interaction in our design, given that we varied whether the cheaper restaurant appeared first or second. Participants did indeed show a strong preference for the low-priced restaurant ($M = 4.53, SD = .94$) over the high-priced restaurant ($M = 3.95, SD = 1.11$) when they saw the low-priced restaurant first. However, they actually showed a slight preference for the high-priced restaurant ($M = 4.35, SD = 1.06$) over the low-priced restaurant ($M = 4.22, SD = 1.22$) when they saw the high-priced restaurant first. When participants were given no price information, they also showed a slight preference for the first restaurant ($M = 4.27, SD = 1.17$) over the second restaurant ($M = 4.19, SD = 1.17$).

Our next analyses examined the role of maximizing. In order to test Hypothesis 4, a repeated measures analysis of variance was conducted with restaurant as the repeated measure and maximizing scores as a covariate; composite evaluation scores for Restaurant V and Restaurant W were the dependent variable. This analysis once again revealed an unexpected preference for the first restaurant $F(1, 424) = 12.91, p < .001$. However, there was no significant effect of maximizing $F(1, 424) = .09, p = .764$. Thus, contrary to our hypothesis, maximizers did not like the restaurants less overall.

To test Hypothesis 5, we first conducted a t-test to see if participants who answered “yes” to the question about wanting to seek out additional restaurant options ($n = 384$) had higher maximizing scores than those who answered “no” to question about seeking out additional restaurants ($n = 42$). We found no difference in the two groups’ maximizing scores, $t(424) = 1.56, p = .096$. Thus, contrary to our hypothesis, participants who answered “yes” were not significantly more likely to have higher maximizing scores ($M = 4.58, SD = .57$) as compared to participants who answered “no” ($M = 4.43, SD = .68$). Although the interaction was not significant, the data showed a weak trend toward the predicted pattern. (It should be noted that in order to do this analysis simply, we used the yes/no question about whether participants wanted to see more restaurants as the predictor variable and maximizing scores as the outcome, when conceptually, we were thinking of maximizing scores as the predictor.)

A linear regression was conducted to predict participants’ answer to the question about how interested they were in seeking out additional restaurants from their maximizing scores. High numbers indicated greater interest. In the linear regression, the coefficient for participants’ maximizing scores was $.182$ ($SE = .11$), $t = 1.68, p = .093$, depicting that maximizing scores were a non-significant predictor of participant’s reported likelihood of seeking out additional

restaurants. The R-squared value suggests that approximately 0.7% of the variance in the likelihood of seeking different options was accounted for by maximizing.

To test Hypothesis 6, a repeated measures analysis of variance with restaurant ratings as the repeated measure, and valence condition and maximizing group as the between-subjects factors, but for this analysis, we added an additional factor for maximizing, using a median split on maximizing scores to group participants into “satisficers” (low-maximizing-score) and “maximizers” (high-maximizing-score) subgroups. See Table 1 for all the effects.

Table 1
ANOVA examining Restaurant Order, Maximizing, and Valence Condition

Factor	Df	F	p
restaurant	1, 422	12.28**	.001
restaurant * maximizing	1, 422	.30	.582
restaurant * feature valence	1, 422	22.72***	< .001
restaurant * maximizing * feature valence	1, 422	2.17	.141
maximizing	1, 422	.45	.505
feature valence	1, 422	2.68	.103
maximizing * feature valence	1, 422	3.38	.067

** p < .01 ***p < .001

Even with the addition of maximizing, there was still a significant direction of comparison effect (seen in the significant restaurant by feature valence condition interaction in Table 1). There was no significant interaction effect of feature valence, maximizing group, and restaurant order $F(1, 422) = 2.17, p = .141$. However, data showed a weak trend toward the predicted pattern where high maximizers tended to show greater direction of comparison effects. In the unique negative-shared positive condition, maximizers had a greater difference in their ratings of restaurant V and restaurant W ($M_v - M_w = 0.687$) as compared to satisficers ($M_v - M_w = 0.417$). Additionally, in the unique positive-shared negative condition, maximizers also had a

greater difference in their rating of restaurant V and restaurant W ($M_v - M_w = -0.145$) as compared to satisficers ($M_v - M_w = -0.023$).

In order to test Hypothesis 7, a final repeated measures analysis of variance was conducted with restaurant as the repeated factor; valence condition, cost condition, and maximizing group as the between-subjects factors and composite preference scores of Restaurant V and Restaurant W as the dependent variables. Once again, a median split was used for maximizers. See Table 2 for all of the effects.

Table 2
ANOVA examining Restaurant Order, Maximizing, Valence Condition, and Cost Condition

Measure	Df	F	p
restaurant	1,421	14.49***	< .001
restaurant * maximizing	1,421	.32	.573
restaurant * feature valence	1,421	26.48***	< .001
restaurant * cost	1,421	6.65**	.001
restaurant * maximizing * feature valence	1,421	1.31	.253
restaurant * maximizing * cost	1,421	.41	.662
restaurant * feature valence * cost	1,421	1.56	.212
restaurant * maximizing * feature valence * cost	1,421	.90	.408
maximizing	1,421	.47	.492
feature valence	1,421	3.22	.073
cost	1,421	.28	.760
maximizing * feature valence	1,421	3.26	.072
maximizing * cost	1,421	1.22	.296
feature valence * cost	1,421	.97	.381
maximizing * feature valence * cost	1,421	.95	.388

** $p < .01$, *** $p < .001$

None of the effects involving maximizing were significant, including the 4-way interaction predicted by Hypothesis 7, but there was a marginal interaction effect of maximizing by feature matching. Satisficers in the unique-positive condition preferred both restaurants more ($M = 4.38$, $SD = 1.17$) than satisficers in the unique-negative condition ($M = 4.07$, $SD = 1.17$). In contrast, maximizers in the unique-positive condition did not prefer both restaurants more ($M =$

4.28, $SD = 1.17$) than maximizers in the unique-negative condition ($M = 4.28, SD = 1.17$) – illustrating that – contrary to our hypothesis – satisficers showed greater feature cancellation effects in our study.

Discussion

The results of this study replicated some previous feature-matching effects from past studies, but not all. This study replicated direction-of-comparison effects found in past studies (Hodges, 1997; Ooi, 2004). Participants in the unique-negatives/shared-positives condition tended to prefer the referent (first option) while participants in the unique-positives/shared-negatives condition tended to prefer the target (second option). A direction-of-comparison effect can be seen in our study in the significant interaction found between valence condition and restaurant order.

The current study, however, did not significantly replicate feature-cancellation effects found in past studies. These studies have shown that choosing between two options that have unique negative and shared positive features creates a context where people are likely to “cancel out” the shared positive features and focus on the unique negative features. As more attention is placed on the unique negative features, people were expected to feel worse about the two options. In comparison, choosing between two options that have unique positive and shared negative features was expected to have the opposite effect: people are likely to “cancel out” the shared negative features and focus on the unique positive features. People will give both restaurants higher ratings because they are focusing on the positive features. However, in the current study, participants did not give higher ratings to restaurants that had unique positive features than they did to restaurants that had unique negative features. This contradiction can be seen in the non-significant main effect of feature valence.

Although we had expected to find a feature-cancellation effect, a deeper look into past research suggests that feature-cancellation effects are not robust. Significant feature-cancellation effects for the referent are more difficult to obtain and are found less often than direction-of-

comparison effects (Hodges & Hollenstein, 2001). Feature-cancellation effects may be more visible in comparative judgments where additional participant judgment occurs (e.g., Hodges, 1997, in which participants rated a third option as well). It is also possible that feature-cancellation effects may not have been found because the current study was completed by participants online, while several past feature matching studies have been completed in the lab (Hodges, 1997; Ooi, 2004). This could lead to differing results because participants may focus harder when they are in a lab, with a research assistant present, than they do completing the study on their own with potential distractors (e.g., watching television).

Contrary to Ooi (2004), this study found that there was a significant interaction between price condition and order. Ooi states that one of the reasons why his study may not have found a significant interaction is because of the small price gap of \$2 used in his study (entrees at the high-priced restaurant were \$13; \$11 at the low-priced restaurant). The current study used overall higher prices (as a nod to inflation occurring since Ooi's study), but also a larger price gap of \$4 (entrees at the high-priced restaurant were \$16; low-priced restaurant entrees were \$12). Participants, as expected, generally rated the cheaper restaurant more positively than the more expensive one, indicating that they were sensitive to price. However, this effect was not always enough to counteract the powerful primacy effect we also found, with participants generally rating the first restaurant more positively than the second. This primacy effect was not found in Ooi's study; nor is it something that has been routinely noted in other feature matching studies either.

In fact, Nisbett and Wilson (1977) found the opposite of a primacy effect in their decision-making study. Participants were shown four identical pairs of nylon stockings (from left to right) and participants were almost four times as likely to choose the right-most stocking as

compared to the left-most stocking. However, Nisbett and Wilson were asking participants to pick between the actual physical options, whereas in the current study, participants were picking between verbal descriptions of the options' features. Still, the powerful preference found in the current study for the first option was unexpected, and also may possibly have been due to the computer-presentation format (Ooi's study was presented in a paper and pencil format).

We did not find support for any of our analyses involving maximizing. As high maximizers have been shown to experience more regret than low maximizers, Hypothesis 4 was that high maximizers would rate the pairs of restaurants lower compared to low maximizers. Instead, we found that the two groups had nearly identical results. One potential reason for this is because participants were asked to rate the restaurants before being asked to make a decision on which restaurant they would choose. They did not yet have to go through the cognitive process of choosing one option over the other and the feeling of regret that comes with that process.

Another potential reason why our maximizing results did not materialize is because of the low stakes nature of the study. If participants messed up on the survey or accidentally didn't answer honestly there were not consequential outcomes. The choices between restaurants were thought experiments and did not involve actual meals. On the contrary, when these students were choosing what college to go to or what dorm to live in, the stakes were much higher, and their different decision-making styles might have been more evident. One last potential reason why higher maximizers did not show their customary lower satisfaction with all options is because the participants were only choosing between two options. Iyengar and Lepper (2000) conducted two experiments that found that people were less satisfied and less likely to spend money when they were presented with more options. Schwartz and Ward (2006) coin this as the paradox of choice

where having more options can leave consumers with more regret because there are more potential benefits that they are missing out on.

Hypothesis 5 was that maximizers would be more likely to seek out additional restaurant options as compared to satisficers. This is because maximizers tend to care about picking the optimal choice while satisficers only care about picking a choice that is “good enough.” Although our analysis showed that maximizing scores were not a significant predictor of wanting to seek out additional restaurants, our data trended in the predicted direction. In the linear regression conducted, the line of best fit was positive, which means that if a participant’s maximizing score was higher, they were more likely to report an increased interest in seeking out additional restaurants. When we analyzed the question about maximizers being more interested in additional choices a different way, using a t-test, we found the same weakly consistent pattern, but again a non-significant result. In this case, one potential reason why the results were not significant is because of the landslide of participants who wanted to seek out additional restaurants ($n = 384$) compared to the small number of participants who did not want to seek out additional restaurants ($n = 42$). The unbalanced group sizes affect the power of the statistical test. In future studies, the design could make seeking out additional alternatives more costly – for example, adding a tangible downside to seeking out additional options (e.g., participants are told that they can subscribe to a restaurant newsletter for \$2 to find all the best restaurants in the area).

Hypothesis 6, which involved a valence condition, order, and maximizing interaction – was not significantly supported. However, the pattern of results weakly followed what we had predicted. Maximizers demonstrated a weak and non-significant tendency to show stronger direction of comparison effects relative to satisficers. Hypothesis 7– where we had predicted that

valence condition, order, price, and maximizing would significantly interact to show that maximizers were more likely to go to the effort of feature matching – was not supported. In fact, the maximizing by feature valence interaction trended in the opposite direction than what was predicted. Maximizers showed very little evidence of feature cancellation while satisficers showed more.

Given our results, we are left to believe that the utilization of feature matching may not be influenced by a person's maximizing tendency as originally hypothesized. One theory for this is that instead of feature matching being effort-based, it could merely be a cognitive process that all humans use. There is no difference in feature matching between a person who is looking for a “good enough” option and a person who is looking to maximize utility because they will both always engage in feature matching when the correct conditions are present. This would explain why in our analyses, maximizing had no significant effects on feature matching.

The current study further supports direction-of-comparison effects found in past studies by demonstrating that these effects are robust, even when accounting for decision making styles (maximizing), but it questions the robustness of feature-cancellation effects. Past research has previously suggested that feature-cancellation effects are less robust (Hodges & Hollenstein, 2001) and they may be more visible in comparative judgments where additional options are added after initial ones have been considered (e.g., Hodges, 1997). Future research could further investigate what other environments cultivate feature-cancellation effects. Additionally, future research could attempt to see exactly how robust direction-of-comparison effects are. Furthermore, in real life, it is quite unrealistic to expect all unique features to be of one valence and all shared features to be of another valence. A future study could investigate if

direction-of-comparison effects would still be found if the valences of the unique and shared features were slightly mixed.

Feature matching is a unique tool that humans use when making decisions. When choosing between two equally rated (in isolation) options, feature matching can create an inherent preference for one of the options merely due to the valence of the features and the order in which the options are presented. However, as evidenced by this thesis, there is still much to be learned about all the nuances of feature matching and exactly how it functions. Only by researching feature matching in the future will these nuances begin to be sorted and people will gain a better understanding of human decision-making.

Appendix A: Sets of Restaurant Features

Table A1

Restaurant Feature Set "P3"	Restaurant Feature Set "N3"
Wide menu selection Intimate atmosphere Food prepared by world famous chef	Not enough parking Slow service Cook uses too much salt
Restaurant Feature Set "P4"	Restaurant Feature Set "N4"
Fun atmosphere Voted best restaurant in newspaper poll Good desserts	Always a long wait to get a table Watered-down drinks Tables are too close together

Appendix B: Instructions and Questions from the Study in Order

Consent Form

You are invited to participate in a research study conducted by Dr. Sara Hodges, from the University of Oregon Department of Psychology. You were selected as a research participant because you are part of the Psychology/Linguistics Subject Pool. We ask that you read this form.

The purpose of this study is to learn how people make decisions when given a range of options. If you decide to participate, you will be asked to answer a questionnaire, which should take no more 30 minutes to complete. There are no reasonable foreseeable (or expected) risks, other than a possible but unlikely breach of confidentiality in that your responses might be able to be linked with you based on your particular set of demographic characteristics. This study may include risks that are unknown at this time.

For your participation, you will receive experimental credit for your psychology class. Please talk with your instructor if you are interested in alternative ways (other than participating in studies) for meeting the research requirements for your course. You will be awarded 1/2 credit for completing this study. The records of this study will be kept private. In any sort of report we may publish, we will not include any information that will make it possible to identify a participant. Research records will be kept in a locked lab rooms and on password-protected computers. Access to the records will be limited to the researcher.

Your participation is voluntary. If you choose not to participate, it will not affect your current or future relations with the University or the Psychology Department. You are free to withdraw at any time, for whatever reason. There is no penalty, loss of benefits, or jeopardy to your grades for not taking part or for stopping your participation. If you discontinue participation in the middle of the study, you will receive partial credit for participation: 1/4 credit for each 15 minutes of participation, rounded up to the next 15 minutes. For example, if you complete 1-15 minutes you will receive 1/4 credit. If you keep your scheduled study appointment but choose not to participate in the study at all, you will still receive 1/4 credit.

If you have any questions or if you have any problem with the experimental procedure or personnel, please feel free to contact Dr. Sara Hodges (sdhodges@uoregon.edu; 541-346-4919). If you have any questions about your rights as a research subject, you may contact: Research Compliance Services, University of Oregon at (541) 346-2510 or ResearchCompliance@uoregon.edu

Clicking the option to continue constitutes your consent to participate in this study. If you don't wish to continue, please exit the survey.

- I consent and wish to continue
- I don't consent and wish to exit

Initial Instructions

Instructions

In the first part of this study, you are about to read descriptions of 2 different restaurants. After reading the descriptions, you will then be asked to rate how much you like the restaurants.

Please read the descriptions carefully. Once you have read one description, you will be asked to advance to the next page, and you will not be able to go back. Similarly, after you read the second restaurant description, you will be asked to go forward to the questions, and you won't be able to go back to the restaurant descriptions.

Restaurant V Sample Features

Imagine that restaurant V has the following features:

Fun atmosphere

Always a long wait to get a table

Voted best restaurant in newspaper poll

Watered-down drinks

Tables are too close together

Good desserts

Average dinner costs about \$16

Restaurant W Sample Features

Imagine that restaurant W has the following features:

Fun atmosphere

Not enough parking

Voted best restaurant in newspaper poll

Slow service

Cook uses too much salt

Good desserts

Average dinner costs about \$12

Restaurant V Questions

The following questions are about the restaurants you just read about, Restaurants V and W. Please answer them as well as you can.

Answer all the questions, and then follow the instructions you see next.

Judging from the description of **RESTAURANT V...**

1a. How much do you like Restaurant V?

1 = not at all

2

3

4 = neutral

5

6

7 = very much

1b. How likely would you be to go to Restaurant V?

1 = very UNlikely

2

3

4 = neutral

5

6

7 = very likely

1c. How much do you think you would enjoy eating at Restaurant V?

1 = not at all

2

3

4 = neutral

5

6

7 = very much

Restaurant W Questions

Judging from the description of **RESTAURANT W...**

2a. How much do you like Restaurant W?

1 = not at all

2

3

4 = neutral

5

6

7 = very much

2b. How likely would you be to go to Restaurant W?

1 = very UNlikely

2

3

4 = neutral

5

6

7 = very likely

2c. How much do you think you would enjoy eating at Restaurant W?

1 = not at all

2

3

4 = neutral

5

6

7 = very much

Additional Restaurant Questions

3. If you were asked to pick one restaurant, which would you choose? (pick one)

Restaurant V

Restaurant W

4. Imagine you were really going out to eat, and you had been presented with these two options (Restaurants V and W). Would you be willing to go to additional effort to seek out information about other restaurants in addition to these two? (pick one)

Yes, would seek out information about other additional restaurants

No, would not seek out information about other additional restaurants

5. How interested would you be in seeking out additional restaurant options?

1 = not at all interested

2

3

4 = neutral

5

6

7 = very interested

Restaurant V Feature Recall

Please list as many features of **Restaurant V** that you can remember, putting each feature in a separate box below:

Restaurant W Feature Recall

Now, please list as many features of **Restaurant W** that you can remember, putting each feature in a separate box below:

Maximizing Questions

1. Once I make a decision, I don't look back.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

2. Whenever I make a choice, I'm curious about what would have happened if I had chosen differently.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

3. If I make a choice and it turns out well, I still feel like something of a failure if I find out that another choice would have turned out better.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

4. When I make a choice, I try to get information about how the other alternatives turned out.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

5. When I think about how I'm doing in life, I often assess opportunities I have passed up.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

6. Whenever I'm faced with a choice, I try to imagine what all the other possibilities are, even ones that aren't present at the moment.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

7. No matter how satisfied I am with my job, it's only right for me to be on the lookout for better opportunities.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

8. When I am in the car listening to the radio, I often check other stations to see if something better is playing, even if I'm relatively satisfied with what I'm listening to.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

9. When I watch TV, I channel surf, often scanning through the available options even while attempting to watch one program.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

10. I treat relationships like clothing: I expect to try a lot on before I get the perfect fit.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

11. I often find it difficult to shop for a gift for a friend.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree

- Agree
- Strongly agree

12. Renting movies is really difficult. I'm always struggling to pick the best one.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

13. When shopping, I have a hard time finding clothing that I really love.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

14. I'm a big fan of lists that attempt to rank things (the best movies, the best singers, the best athletes, the best novels, etc.).

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

15. I find that writing is very difficult, even if it's just writing a letter to a friend, because it's so hard to word things just right. I often do several drafts of even simple things.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

16. No matter what I do, I have the highest standards for myself.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree

- Somewhat agree
- Agree
- Strongly agree

17. I never settle for second best.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

18. I often fantasize about living in ways that are quite different from my actual life.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

19. No matter what it takes, I always try to choose the best thing.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

20. I don't like having to settle for "good enough".

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

21. I am a maximizer.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree

- Agree
- Strongly agree

22. I will wait for the best option, no matter how long it takes.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

23. I am uncomfortable making decisions before I know all of my options.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

24. I never settle.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree
- Strongly agree

Demographic Questions

Your sex:

- Male
- Female
- Nonbinary
- Other/Prefer not answer

How old are you?

Is English your native language?

- Yes
- No

If English is not your native language, how many years have you been speaking English?

What is your race/ethnicity?

- Asian
- Black
- Hispanic
- Multi/Mixed race
- Native American
- White
- Other

Have you rated restaurants in another psychology study survey in the last year?

- yes
- no

*Debrief***Explanation of Study – The Effects of Overriding Dimensions on Feature Matching****Background:**

Feature matching is a cognitive strategy that people use to compare options. When people feature match, they match up the features of one option with the features of another option. Those features that match up are shared; those that don't are unique. Past research has shown that people use the two kinds of features differently. When people make preference judgments--that is, pick the option they like best--they tend to ignore the shared features and focus almost exclusively on the unique features, with particular emphasis on the unique features of the second option they saw. Thus, if people are asked which of two options they like best and the two options have shared positive features and unique negative features, they will cancel out the shared positive features, and focus on the unique negatives. This may make them rate both options lower, because they have cancelled out the positive features and are focusing on the negative features. They also tend to prefer the first option under these circumstances, because the unique features of the second option get the most attention (and in this example, these features are negative). The upshot of this phenomenon is that options that would be rated similarly if they were seen in isolation may not be rated the same way if they are seen together in the context of a preference judgment.

Purpose of this study:

The main purpose of the study today was to examine whether people still engage in the feature matching process if there is one overriding feature (e.g. price) which may determine the decision by itself. For example, if people are shown two apartments that share positive features but have unique negative features, they may be unhappy with these apartments, because they are focusing on the unique negative features. However, if one apartment is significantly more expensive than the other, people might forgo the entire feature-matching and cancellation process altogether, and just make their decisions based on that one particular feature alone. If this is the case, we wouldn't expect the ratings of both apartments to suffer when they share positive features. In addition, we asked you to complete a "maximizers" scale. This scale measures individual differences among people in terms of how much they seek to "maximize" in their decisions – that is, get the very best option, even if it means putting a lot of effort into getting an option which might be only a little better than the next best choice.

Relevance:

Feature matching in decisions can have important implications. The paradigm we describe above occurs naturally in a variety of real life situations--running the gamut from what you order in a restaurant to choosing a president. Ultimately, we hope this research will be used to explain why people choose the way they do, and maybe even to improve people's decision-making abilities.

More info?

If you would like to know more about feature-matching, you can talk to Sara Hodges (sdhodes@uoregon.edu). Or, you might want to take a look at the reference listed below on feature. One final request: We would appreciate it if you would please NOT talk about the fact that we expect shared and unique features to get different amounts of attention or that you were given a memory test if you discuss this study with other students in the subject pool. It is important that all participants have roughly the same level of knowledge about what we are studying, and if some people knew our hypotheses in advance, it could make our data invalid.

Thank you for your time today.

Like to read more about feature matching?

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