



# The majority rule in individual decision making

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Received 6 October 2003

## Abstract

This research investigates an understudied decision heuristic, the majority rule. By using the rule, decision makers choose the option superior on most of the available cues. Cues are broadly defined, including advisors and attributes. We propose that decision makers are more likely to use the majority rule when encouraged to employ intra-cue comparison as opposed to intra-option integration, and that their choices are influenced by factors that influence which option appears majority superior. We corroborate the two propositions in four studies. In Studies 1 and 2, we explore two factors that moderate use of the majority rule through facilitating intra-cue comparison or intra-option integration—response mode and information display format. In Studies 3 and 4, we explore two factors that influence choice through influencing which option appears majority-superior—cue-unpacking and cue-regrouping.

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**Keywords:** Preference reversal; Choice heuristic; Advice integration; Multi-attribute decision making; The majority rule; Information display

Many important choices involve two options that vary along multiple (more than two) cues. Cues are broadly defined, including advisors (e.g., friends and magazines) and attributes (e.g., product features). For example, a prospective student choosing between two business schools may base the decision on the rankings of the schools provided by several authoritative magazines. A consumer choosing between two TVs may base the decision on several important features such as screen size, picture quality, and price. The present research investigates how people resolve such binary choices.

When choosing between two options that vary along multiple cues, decision makers often face the conflict that one option is *slightly* more favorable on most of the cues whereas the other option is *considerably* more favorable on the remaining cue(s). For example, suppose that a consumer is choosing between two cruise vaca-

tions, A and B. He is not familiar with either cruise, and has consulted three equally popular consumer magazines, X, Y, and Z. Each magazine has rated the two cruises on a nine-point scale, ranging from 1 (*poor*) to 9 (*excellent*), as described below.

|          | Magazine X | Magazine Y | Magazine Z |
|----------|------------|------------|------------|
| Cruise A | 9          | 6          | 8          |
| Cruise B | 8          | 9          | 6          |

Notice that the two cruises receive the same average rating from the three magazines. However, two of the three magazines (X and Z) slightly favor Cruise A over Cruise B and one magazine (Y) considerably favors Cruise B over Cruise A. Which cruise will the consumer choose?

Consider another example. Suppose that a manager is choosing between two candidates, A and B, for a position that requires proficiency in three foreign languages: French, German, and Russian. Proficiency in each lan-

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guage is equally important. A reliable language institute has rated the applicants' proficiency in each language on a nine-point scale, ranging from 1 (*poor*) to 9 (*excellent*), as described below.

|             | French | German | Russian |
|-------------|--------|--------|---------|
| Applicant A | 9      | 6      | 8       |
| Applicant B | 8      | 9      | 6       |

Notice that the two applicants receive the same average proficiency rating on the three languages. However, Applicant A is slightly more proficient than Applicant B in two of the three languages (French and Russian) and Applicant B is considerably more proficient than Applicant A in one language (German). Which applicant will the manager choose?

In this research, we do not distinguish between the two different types of cues—advisors and attributes. For simplicity, we call the option that is slightly better on most of the available cues the *majority-weakly-superior* option and call the option considerably better on the remaining cue(s) the *minority-strongly-superior* option. The two examples illustrate a general question: Will decision makers choose the majority-weakly-superior option or the minority-strongly-superior option, given that the two options have the same average rating?

The answer to this question depends on which choice rule decision makers use. They could use a variety of choices rules, including the averaging rule (e.g., Anderson, 1981), the weighted adding rule, the conjunctive rule (e.g., Coombs, 1964; Dawes, 1964), the disjunctive rule (e.g., Coombs, 1964; Dawes, 1964), the lexicographic rule (e.g., Fishburn, 1974), the lexicographic semi-order rule (e.g., Tversky, 1969), the elimination-by-aspect rule (Tversky, 1972), and the maximum-attractiveness-difference rule (e.g., Svenson, 1979; Wright, 1975) (for a review, see Svenson, 1979). Among these rules, the lexicographic rule, the lexicographic semi-order rule, and the elimination-by-aspect rule mainly apply to situations where cues differ in importance. Since we focus on situations where cues are equally important, we will not discuss these rules in detail.

The weighted averaging rule (e.g., Anderson, 1981) posits that the option receiving the higher weighted average rating across all the available cues will be chosen. The weighted adding rule holds that the option with the greater weighted additive or average utility across all the available attributes will be chosen. Differences between the two rules are not pertinent to the present research; for simplicity, both rules will be referred to as the averaging rule. The conjunctive rule (Coombs, 1964; Dawes, 1964) states that options failing to pass a low threshold value on any cue will be rejected. The disjunctive rule (Coombs, 1964; Dawes, 1964), on the other hand, states that the first option

exceeding a high threshold value on any cue will be accepted. The maximum-attractiveness-difference rule (Svenson, 1979; Wright, 1975) posits that the option superior on the cue that entails the greatest contrast between two options will be chosen. Except for the maximum-attractiveness-difference rule, which favors the minority-strongly-superior option over the majority-weakly-superior option, all the other rules are indifferent between the two options.

In the present research, we focus on another choice rule—the *majority rule* (e.g., May, 1954; Russo & Doshier, 1983). The majority rule posits that the option superior on most of the available cues will be chosen. Unlike the choice rules above, the majority rule favors the majority-weakly-superior option.

The majority rule we study here should be distinguished from the majority (voting) rule studied in the social-choice literature and the group decision making literature (e.g., Arrow, 1951; Gegone & Hastie, 1997; Luce & Raiffa, 1957; Saari, 2001; Sen, 1977). The former applies to individual choices and the latter collective choices.

We study the majority rule in two respects. First, we explore factors that moderate use of the majority rule—that is, factors that encourage or discourage use of the rule. Second, we explore factors that influence decision makers' choices when they do use it. We begin with a brief literature review.

## Literature review

Previous studies on decisions involving multiple advisors and those on decisions involving multiple attributes traditionally belong to two different streams of literature. Accordingly, our review comprises two parts, one for each of the two streams of literature.

### Decisions involving multiple advisors

Research on decisions involving conflicting advice from multiple advisors focuses on the weighted averaging rule and on how decision makers weight different advice (e.g., Anderson, 1981; Einhorn & Hogarth, 1975; Hogarth, 1977). The weight assigned to a piece of advice depends on several factors, including the credibility of the advisor (e.g., Hogarth & Einhorn, 1992), the perceived expertise of the advisor (e.g., Birnbaum & Stegner, 1979), the precision of the advice (Yaniv, 1997), the advisor's self-reported confidence in the advice (e.g., Sniezek & Buckley, 1995), and whether the advice is treated as an outlier (e.g., Harris, Yaniv, & Harvey, 2004; Yaniv, 1997). The evaluation of an option also depends on the variance of the ratings the option receives from different advisors, a measure of consensus among the advisors (e.g., Ganzach, 1995; West & Broniarczyk,

1998). Little research studies whether decision makers use the majority rule to integrate conflicting advice.

Research on social influence demonstrates that one's attitude and judgment tend to conform to those held by the majority of others (e.g., Asch, 1951; Nemeth, 1986; Wolf & Latane, 1983; see Tanford & Penrod, 1984, for a review). Conformity can be due to either social pressure or one's belief that the majority opinion is likely to be correct (Deutsch & Gerard, 1955). Conformity may lead a decision maker to choose the option favored by most of the advisors. However, when the majority of the advisors favor one option only slightly whereas the minority of the advisors favor another option strongly, it is unclear whether the decision maker would still conform to the majority preference. Here, following the correct advice of the majority may lead to a slightly superior option at best, whereas following the incorrect advice of the majority may lead to a much inferior option.

#### *Decisions involving multiple attributes*

Research on decisions involving multi-attribute options provides empirical evidence for use of the majority rule (e.g., May, 1954; Russo & Doshier, 1983). In an early study, May constructed three binary choices from three options, A, B, and C, all of which varying along the same three attributes. The options were such that A was better than B, B better than C, and C better than A on two of the three attributes. May found that the choices of a considerable proportion of respondents exhibited intransitive preference in a particular direction—choosing A over B, B over C, and C over A, suggesting that these respondents might be using the majority rule.

Russo and Doshier (1983), using eye-fixation and concurrent verbal protocol methods, provided direct evidence for use of the majority rule and shed light on the underlying process. They found that use of the majority rule increased when the number of attributes increased, and suggested that respondents used the majority rule to simplify choices and save cognitive effort. Similarly, Alba and Marmorstein (1987) found that under certain conditions, consumers were apt to favor the option having a larger number of desirable features, regardless of the importance of the features. Several studies involving risky options (e.g., monetary gambles) also found evidence for use of the majority rule (e.g., Fishburn & LaValle, 1988; Paterson & Diekmann, 1988).

The present research extends previous work on the majority rule in two respects. First, we explore factors that influence when decision makers use the majority rule as opposed to other choice rules such as the averaging rule. Second, we explore factors that influence decision makers' choices when they do use the majority rule.

Accordingly, the main body of the article consists of two parts, each exploring one of the two types of factors. In the first part, we first submit a general proposition—that factors facilitating intra-cue comparison encourage and those facilitating intra-option integration discourage use of the majority rule. Then, we derive two hypotheses from that proposition—one about response mode and one about information display format. These two hypotheses are tested in Studies 1 and 2, respectively. Similarly, in the second part, we first submit a general proposition—that factors influencing which option appears majority-superior influence decision makers' choices. Then, we derive two hypotheses from that proposition—one about cue-unpacking and one about cue-regrouping. These two hypotheses are tested in Studies 3 and 4, respectively. We conclude by discussing the implications of the present research.

#### **Factors influencing when decision makers use the majority rule**

Decision makers have many choice rules in their repertoire, and which rule they select for a given task depends on the characteristics of the task (e.g., Beach & Mitchell, 1978; Bettman, Luce, & Payne, 1998; Payne, 1982; Payne, Bettman, & Johnson, 1988, 1992). In this part of the article, we explore task characteristics that encourage or discourage use of the majority rule.

Choice rules differ from each other in whether they rely on intra-cue comparison or intra-option integration (e.g., Bettman & Zins, 1979; Svenson, 1979). Intra-cue comparison means comparing two options on one cue after another. Intra-option integration means combining an option's values on all the available cues to form an overall evaluation of the option. The majority rule relies on intra-cue comparison: Decision makers need to compare two options on each cue to identify the option superior on most of the cues. In contrast, the averaging rule relies on intra-option integration: Decision makers need to combine an option's ratings across all the available cues to obtain its average rating.

The preceding analysis leads to our first general proposition: Factors facilitating intra-cue comparison encourage use of the majority rule. Among all the possible factors that could potentially influence whether decision makers employ intra-cue comparison or intra-option integration, we focus on two that we consider particularly important—response mode and information display format.

#### *Response mode*

Different decision tasks may require decision makers to provide different modes of response. For example, one task may require them to make a choice between

two options; another may require them to rate how much they like each option; yet another may require them to indicate how much they are willing to pay for each option.

One of the most significant findings in the decision making literature is that preferences elicited in different but normatively equivalent ways may reverse (e.g., Chapman & Johnson, 1995; Goldstein & Einhorn, 1987; Hsee, Loewenstein, Blount, & Bazerman, 1999; Hsee, Zhang, Yu, & Xi, 2003; Irwin & Baron, 2001; Lichtenstein & Slovic, 1971, 1973; Lindman, 1971; Schkade & Johnson, 1989; Slovic, 1975; Slovic, Griffin, & Tversky, 1990; Slovic & Lichtenstein, 1983; Tversky, Sattath, & Slovic, 1988; for reviews see Hsee, Zhang, & Chen, 2004; Seidl, 2002; Slovic, 1995).

One reason preferences reverse is that different response modes evoke different decision strategies (e.g., Fischer & Hawkins, 1988; Ganzach, 1995; Nowlis & Simonson, 1997; Tversky et al., 1988). For example, Tversky et al. found that decision makers relied more on the lexicographic rule when choosing between two options than when matching the attractiveness of the options.

Choice and rating evoke different strategies: Choice encourages intra-cue comparison and rating encourages intra-option integration (e.g., Billings & Scherer, 1988; Fischer & Hawkins, 1988; Nowlis & Simonson, 1997; Rosen & Rosenkoetter, 1976). For example, Billings and Scherer found that respondents performed more intra-cue information search in choice than in rating and performed more intra-option search in rating than in choice. Since choice facilitates intra-cue comparison and rating facilitates intra-option integration, according to our general proposition, choice would encourage and rating would discourage use of the majority rule. Consequently, we submit the following hypothesis:

**Hypothesis 1.** Decision makers are more likely to use the majority rule in choice than in rating.

We tested Hypothesis 1 in Study 1.

### Study 1

#### Method

Two hundred and seventy-five students from a large Midwestern university in the US participated in the study for nominal payment. Participants were asked to imagine that they planned to take a vacation in Asia and were mostly interested in visiting two cities, X and Y. However, due to time constraint they could only visit one city. They asked three friends, A, B, and C, who had been to both cities before, to rate the attractiveness of each city on a 10-point scale, ranging from 1 (*not attractive at all*) to 10 (*very attractive*). The ratings were as below.

|        | Friend A | Friend B | Friend C |
|--------|----------|----------|----------|
| City X | 9        | 6        | 8        |
| City Y | 8        | 9        | 6        |

Participants were randomly assigned to two conditions: rating and choice. Participants in the rating condition were asked to provide an overall attractiveness rating for each city on the same 10-point scale; those in the choice condition were asked to choose the city they would visit.

#### Results and discussion

Notice that the two cities received the same average rating from the three friends. However, two of the three friends gave a slightly higher rating to City X than to City Y, and one friend gave a considerably higher rating to City Y than to City X. Thus, City X was the majority-weakly-superior option.

Recall that the purpose of this study was to test whether participants' preference for the majority-weakly-superior option would vary with response mode. In the choice condition, participants' preferences equaled their choices. In the rating condition, participants' preferences were inferred from their ratings. We considered participants who assigned different ratings to the two cities as preferring the one with the higher rating. We considered participants who assigned the same rating to the two cities as being indifferent between them, and we coded half of these participants as preferring one city and half of them as preferring the other.

If participants used the same rule in rating and in choice, their preferences would be the same in the two conditions. However, if they relied more on the majority rule in choice than in rating, as we hypothesized, more participants would prefer the majority-weakly-superior option in the choice condition than in the rating condition.

The result confirmed our prediction. More participants favored the majority-weakly-superior option in the choice condition (65.1%) than in the rating condition (53.4%) ( $\chi^2 = 3.87, p < .05$ ). Also, most participants in the choice condition favored the majority-weakly-superior option (65.1% > 50%;  $\chi^2 = 11.79, p < .001$ ), providing evidence for use of the majority rule in choice.

#### Information display format

Another factor that influences whether decision makers employ intra-cue comparison or intra-option integration is information display format. Two common display formats are by-option and by-cue.<sup>1</sup> Under the

<sup>1</sup> Another important display format is the matrix format. Under the matrix format, options are displayed on separate rows and cues on separate columns. Insofar as facilitating intra-cue comparison or intra-option integration is concerned, the matrix format lies somewhere between the by-cue format and the by-option format.

by-option format, one option's values on all the available cues are displayed first, followed by another option's values on the same cues, and so forth. Under the by-cue format, all options' values on one cue are displayed first, followed by the options' values on another cue, and so forth.

The idea that display formats may influence whether decision makers employ intra-cue comparison or intra-option integration was first suggested by Tversky (1969), and supported by subsequent research. For example, different display formats led to different information search patterns: The by-option format led to more information search by-option and the by-cue format led to more information search by-cue (e.g., Bettman & Kakkar, 1977; Bettman & Zins, 1979; Biehal & Chakravarti, 1982; Cafferty, DeNisi, & Williams, 1986; Jarvenpaa, 1989; Schkade & Kleinmuntz, 1994; Wright, 1975). Different information search patterns indicated the use of different choice rules (e.g., Payne et al., 1988, 1992). Two recent studies found that the by-option and by-cue formats led to not only different information search patterns but also different choice outcomes (Senter & Wedell, 1999; Tabatabaei, 2002). Since the by-cue format facilitates intra-cue comparison and the by-option format facilitates intra-option integration, according to our general proposition, the by-cue format would encourage use of the majority rule and the by-option format would discourage it. Consequently, we submit the following hypothesis:

**Hypothesis 2.** Decision makers are more likely to use the majority rule when information is displayed by cue than when information is displayed by option.

We tested Hypothesis 2 in Study 2.

## Study 2

### Method

Three hundred and thirty-six students from a large university on the east coast of China participated in the study for course credit. (The original questionnaires were in Chinese.) Participants were asked to imagine that they were buying a color laser printer for their company and were choosing between two models, X and Y. They asked several friends who were working in other companies and familiar with both models to rate the quality of each model on a 10-point scale, ranging from 1 (*very bad*) to 10 (*very good*).

Participants were randomly assigned to two conditions: by-option and by-cue. Participants in the by-option condition read the following information.

Friends A, B, C, and D's ratings for X are: 7.5, 9.0, 8.0, and 8.0, respectively; Friends A, B, C, and D's ratings for Y are: 8.0, 7.2, 8.5, and 8.5, respectively.

Those in the by-cue condition read the following information.

Friend A's ratings for X and Y are: 7.5 and 8.0, respectively; Friend B's ratings for X and Y are: 9.0 and 7.2, respectively; Friend C's ratings for X and Y are: 8.0 and 8.5, respectively; Friend D's ratings for X and Y are: 8.0 and 8.5, respectively.

Participants in both conditions were asked to make a choice between the two printers based on their friends' ratings.

### Results and discussion

Notice that three of the four friends gave a slightly higher rating to Model Y than to Model X and one friend gave a considerably higher rating to Model X than to Model Y. Thus, Model Y was the majority-weakly-superior option. Unlike Study 1, in which the majority-weakly-superior option and the minority-strongly-superior option received the same average rating from all the advisors, in the present study, the majority-weakly-superior option received a lower average rating than the minority-superior option. We included this feature to test the robustness of the majority rule.

If participants used the same choice rule regardless of the display format, their choices would be the same in the two conditions. However, if participants relied more on the majority rule when information was displayed by cue than when information was displayed by option, as we hypothesized, more participants would choose the majority-weakly-superior option in the by-cue condition than in the by-option condition.

The result supported our prediction. More participants chose the majority-weakly-superior option (Model Y) in the by-cue condition (59.8%) than in the by-option condition (44.9%) ( $\chi^2 = 7.43$ ,  $p = .006$ ). Also, most participants in the by-cue condition chose the majority-weakly-superior option (59.8% > 50%,  $\chi^2 = 6.44$ ,  $p = .011$ ), which was noteworthy because both the maximum-attractiveness-difference rule and the averaging rule favored the minority-strongly-superior option.

It is worth pointing out that other characteristics of information display also influence whether decision makers employ intra-cue comparison or intra-option integration (see Kleinmuntz & Schkade, 1993, for a discussion on various characteristics of information display). One such characteristic is whether cues are on a verbal or a numerical scale. Verbal scales facilitate intra-cue comparison and numerical scales facilitate intra-option integration (e.g., Schkade & Kleinmuntz, 1994). Another characteristic is whether cues are on different scales or on the same scale. Cues on different scales facilitate intra-cue comparison whereas cues on the same scale facilitate intra-option integration (e.g., Stone & Schkade, 1994). According to our general prop-

osition, these characteristics of information display may also moderate use of the majority rule.

### Factors influencing decision makers' choices when they do use the majority rule

One's choice by using the majority rule depends on which option appears to be superior on most of the available cues. This leads to our second general proposition: If decision makers use the majority rule, factors that influence which option appears majority-superior will influence their choices.

One such factor is how cues are arranged. Cue-arrangement determines how the same substantive information is presented, including the number of cues that represent the information and which cues are grouped together. In this research, we focus on two factors that influence cue-arrangement: cue-unpacking and cue-re-grouping. That these two factors influence choice will provide evidence for use of the majority rule and support the proposition regarding cue-arrangement.

#### Cue-unpacking

A cue can be presented either as it is or as several sub-cues that contain the same amount of substantive information. When the cue is unpacked into several sub-cues, the option superior on that cue may appear superior on most of the cues. If decision makers use the majority rule, their choice of that option will increase. Accordingly, we submit the following hypothesis.

**Hypothesis 3.** Cue-unpacking can influence which option appears majority-superior and choice.

We tested Hypothesis 3 in Study 3.

#### Study 3

##### Method

One hundred and sixteen students from a large university on the east coast of China participated in the study for course credit. They were asked to imagine that they were in charge of recruiting a new employee for their company and were choosing between two candidates, A and B. The two candidates differed in two equally important skills—computer skills and English-skills. A reliable source had rated the candidates on each of the two skills as “excellent,” “good,” “average,” or “poor.”

Participants were randomly assigned to two conditions: computer-skills-unpacked and English-skills-unpacked. In the computer-skills-unpacked condition, the cue “computer skills” was replaced with two sub-cues—“computer software skills” and “computer hardware skills.” In the English-skills-unpacked condition,

the cue “English skills” was replaced with two sub-cues—“spoken English skills” and “written English skills.” To keep the substantive information in the two conditions constant, for the cue that was not unpacked in each condition, the labels of its sub-cues were displayed in parentheses.

Participants in the computer-skills-unpacked condition read the following information:

|             | English skills<br>(spoken English<br>and written<br>English) | Computer<br>software<br>skills | Computer<br>hardware<br>skills |
|-------------|--------------------------------------------------------------|--------------------------------|--------------------------------|
| Candidate A | Good                                                         | Excellent                      | Excellent                      |
| Candidate B | Excellent                                                    | Good                           | Good                           |

Those in the English-skills-unpacked condition read the following:

|             | Spoken<br>English-<br>skills | Written<br>English-<br>skills | Computer skills<br>(Computer software<br>and hardware skills) |
|-------------|------------------------------|-------------------------------|---------------------------------------------------------------|
| Candidate A | Good                         | Good                          | Excellent                                                     |
| Candidate B | Excellent                    | Excellent                     | Good                                                          |

Participants in both conditions were asked to make a choice between the two candidates.

#### Results and discussion

According to the vignette, the two conditions involved a choice between the same pair of candidates—Candidate A having better computer skills and Candidate B having better English skills. Normatively speaking, participants' choices should be the same in the two conditions. However, in the computer-skills-unpacked condition Candidate A appeared superior on most of the cues, whereas in the English-skills-unpacked condition Candidate B appeared superior on most of the cues. Thus, if participants used the majority rule, they would choose Candidate A in the former condition and choose Candidate B in the latter.

As we predicted, most participants (70%) in the computer-skills-unpacked condition chose Candidate A ( $70\% > 50\%$ ,  $\chi^2 = 9.6$ ,  $p < .01$ ), whereas most participants (64.3%) in the English-skills-unpacked condition chose Candidate B ( $64.3\% > 50\%$ ,  $\chi^2 = 4.6$ ,  $p < .05$ ). The difference between the two conditions was highly significant ( $\chi^2 = 13.7$ ,  $p < .001$ ).

The results of this study are consistent with Weber, Eisenfuhr, and Winterfeldt's (1988) finding that when an attribute (e.g., “job security”) is unpacked into two sub-attributes (e.g., “stability of firm—bankruptcy risk” and “personal job security”), the judged importance weight of the attribute is smaller than the sum of the

judged importance weights of its sub-attributes (see also Borchering & von Winterfeldt, 1988; Weber & Borchering, 1993). We have generalized this attribute-unpacking effect from importance judgment to actual choice.

Our results are also consistent with Fox and associates' finding that one's judgment of the subjective probability of an event depends on how the sample space containing the event is unpacked into interchangeable events (e.g., Fox & Clemen, 2005; Fox & Levav, 2004; Fox & Rottenstreich, 2003). The idea is that one tends to treat different events as equally likely, and therefore the subjective probability assigned to each event depends on the number of alternative events.

### Cue-regrouping

Another factor that influences cue-arrangement is cue-regrouping. Cues typically belong to multiple layers. For example, suppose that two cameras differ in two features, resolution and memory capacity. Three equally reliable magazines, A, B, and C, have rated each feature of the two cameras on a 10-point scale, ranging from 1 (*very bad*) to 10 (*very good*). The table below presents the detailed information.

|         | Resolution |            |            | Memory capacity |            |            |
|---------|------------|------------|------------|-----------------|------------|------------|
|         | Magazine A | Magazine B | Magazine C | Magazine A      | Magazine B | Magazine C |
| Model X | 7          | 7          | 9          | 9               | 8          | 7          |
| Model Y | 8          | 8          | 7          | 7               | 9          | 8          |

In this example, each cue (i.e., rating) has two layers—feature and magazine. In the table above, feature comes before magazine: Different magazines' ratings on one feature are grouped together, separated from the magazines' ratings on the other feature. In other words, features are the higher-layer cues and magazines are the lower-layer cues. Alternatively, the same set of ratings can be arranged as in the table below:

|         | Magazine A |                 | Magazine B |                 | Magazine C |                 |
|---------|------------|-----------------|------------|-----------------|------------|-----------------|
|         | Resolution | Memory capacity | Resolution | Memory capacity | Resolution | Memory capacity |
| Model X | 7          | 9               | 7          | 8               | 9          | 7               |
| Model Y | 8          | 7               | 8          | 9               | 7          | 8               |

Here, magazine comes before feature: Ratings on the two features provided by one magazine are grouped together, separated from ratings provided by another magazine, and so forth. In other words, magazines are the higher-layer cues and features are the lower-layer cues.

The two different groupings may yield different choices, provided the following two assumptions are: (1) Decision makers would first process the lower-layer cues under each higher-layer cue and then process the higher-

layer cues; (2) and they would use the majority rule where it is applicable and use the averaging rule when it is not. To see this, let us examine the two tables in turn. In the first table, on either resolution or memory capacity, two of the three magazines assign a higher rating to Model Y than to Model X, making Model Y appear majority-superior. In contrast, in the second table, two of the three magazines assign a higher average rating to Model X than to Model Y, making Model X appear majority-superior. If decision makers use the majority rule, they will choose Model Y under the first grouping and choose Model X under the second. Consequently, we submit the following hypothesis.

**Hypothesis 4.** Cue-regrouping can influence which option appears majority-superior and choice.

We tested Hypothesis 1 in Study 4.

### Study 4

#### Method

One hundred and thirteen students from a large Midwestern university in the US participated in this study for nominal payment. Participants were asked to imagine that they were shopping for a digital camera and had narrowed their choices down to two equally expensive models, X and Y. The two models differed on two equally important features—resolution and memory capacity. Three equally reliable consumer magazines, A, B, and C, had rated each feature of the two models on a 10-point scale, ranging from 1 (*very bad*) to 10 (*very good*).

Participants were randomly assigned to two conditions: group-by-feature and group-by-magazine. Participants in the group-by-feature condition saw the first table in the illustrative camera example, and those in the group-by-magazine condition saw the second table. Participants in both conditions were asked to make a choice between the two cameras.

### Results and discussion

We predicted that the choice percentage of Model Y would be higher in the group-by-feature condition, in which it appeared majority-superior, than in the group-by-magazine condition, in which Model X appeared majority-superior. The result confirmed our prediction. More participants (70%) in the group-by-feature condition chose Model Y than did those (49%) in the group-by-magazine condition ( $\chi^2 = 4.9$ ,  $p < .05$ ).

Notice that in the group-by-magazine condition, Model X was not chosen by most of the participants. We speculate that one reason for this is that a proportion of participants ignored the grouping manipulation but still used the majority rule to resolve the choice. These participants would choose Model Y because it received a higher rating than Model X on four of the six cues.

## General discussion

The present investigation of the majority rule yields two major findings. First, response modes and information display formats that facilitate intra-cue comparison encourage use of the majority rule; second, cue-unpacking and cue-regrouping influence decision makers' choices by influencing which option in the choice set appears majority-superior. These findings advance our understanding of how the majority rule influences decisions.

We have shown that the majority rule applies to both choices involving multiple advisors and choices involving multiple attributes, even though the two types of choices are traditionally studied in two different streams of literature. We do not, however, rule out the possibility that the nature of cues—advisors or attributes—influences whether one is willing to employ intra-cue comparison or intra-option integration, and moderates use of the majority rule. Future research on this issue may be worthwhile.

The cue-arrangement effect we have documented may be generalized to other important choice rules. Take the lexicographic rule, for example. One's choice by using the lexicographic rule depends on which cue appears the most important. Conceivably, which cue appears the most important may depend on how cues are arranged. It has long been recognized that information display influences which choice rule decision makers use. The present research suggests that information display may also influence how decision makers use a particular choice rule as well as their choices.

Our findings may have real world implications. For example, our findings suggest two factors marketers endeavoring to design effective marketing strategies ought to consider. First, they need to consider whether their product is the majority-weakly-superior option or the minority-strongly-superior option before deciding whether to encourage a feature-by-feature comparison between their product and the competitor's product. According to our findings, if their product is the majority-weakly-superior option, then they may want to encourage the feature-by-feature comparison; otherwise, it is better for them to encourage consumers to focus on the overall performance of their product. Second, marketers ought to consider the opportunity of making their product appear majority-superior through product information display. According to our findings, they could unpack the feature on which their product is superior into several sub-features and at the same time pack the features on which their competitor's product is superior into a single feature. Similarly, they can group the features in a way that makes their product appear majority-superior.

What the present research has primarily demonstrated is the potential of the majority rule in influencing choices. Using the majority rule renders decision mak-

ers' choices labile and susceptible to two types of influences: One type influences whether they will use the majority rule as opposed to other choice rules, and the other type influences which option they will choose when they do use the majority rule. Increased flexibility of choice due to use of the majority rule may be a welcome news to those who endeavor to influence others' choices, but a reason for caution to those who themselves are making the choices.

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