Uniformity Bias in Attribute Perception and Evaluation

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The current research investigates Uniformity Bias, the tendency to treat alternatives as uniformly spaced regardless of actual spacing. In five studies we demonstrate that uniformity bias is produced by consumers using both cardinal and ordinal cues when valuing options, where ordinal cues are uniformly spaced (e.g., 1st, 2nd, 3rd).

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EXTENDED ABSTRACT

Suppose you are willing to pay $3 for a small 10 oz. coffee, how much would you be willing to pay for a medium 15 oz. coffee and a large 20 oz. coffee? Your answers to these questions tell us something about your rate of exchange between coffee cup size and money. This rate of exchange is akin to a riskless value function \( V(x) \) that indicates for any attribute level the level of your subjective valuation (Simonson and Tversky 1992; Tversky and Kahneman 1991; Tversky and Simonon 1993). Marketers care about rates of exchange and value functions because it allows them to make better decisions related to the design of product sets and price setting. For instance, should the intermediate cup size be positioned closer to the small cup size, closer to the large cup size, or right in the middle of the small and large cup sizes?

This paper demonstrates that consumers tend to value intermediate options as uniformly or equally spaced between the inferior and superior options regardless of the actual spacing of the options. For instance, consumers tend to value 12 oz. right in the middle of 10 oz. and 20 oz. Similarly, they tend to value 18 oz. right in the middle of 10 oz. and 20 oz. As a consequence of this Uniformity Bias the curvature of the value function varies dramatically depending on whether options are spaced in an accelerating manner (10, 12, 20 oz.), a uniform manner (10, 15, 20 oz.), or a decelerating manner (10, 18, 20 oz.).

Research on how the mind processes magnitudes suggests that humans learn how to assess ordinal rank before cardinal value (Brannon 2002; Wynn 1990). Consider again the coffee example above. Regardless of whether the intermediate option has 12, 15, or 18 oz. the ordinal information associated with the intermediate option remains the same: It is second in size. If consumers encode ordinal information when evaluating numeric attributes and if ordinal information carries over to continuous judgments, the ordinal information will bias consumer valuations toward treating different alternatives as uniformly spaced, regardless of actual spacing.

In a series of experiments, we will establish uniformity bias and its effect on value functions (experiments 1-3) and provide process evidence for our proposition that consumers use ordinal cues when evaluating alternatives (experiments 4-5).

Experiment 1: Participants were asked to imagine that Canon had just released three new camera models; the three cameras were identical in every way except for their resolution. The cameras had 5, 7, and 15 megapixels in the accelerating-spaced condition, 5, 10, and 15 megapixels in the uniformly-spaced condition, and 5, 13, and 15 megapixels in the decelerating-spaced condition. For each camera participants indicated its value (in dollars) and photo quality (13-point scale). To compare the spacing of participants’ judgments relative to the spacing of attribute levels, both judgments and attribute levels were transformed according to the formula: . For instance, in the decelerating condition the actual attribute levels would be scaled 0, 0.8, and 1. If a consumer valued the options at $150, $200, and $250, the value judgments would be rescaled to 0, 0.5, and 1. Consistent with uniformity bias, the accelerating condition, participants’ value (M=0.33; SD=0.15) and quality judgments (M=0.45; SD=0.17) were significantly higher than the rescaled actual attribute level (0.20, ps<.0001). In the decelerating condition, participants’ value (M=0.64; SD=0.16) and quality judgments (M=0.80; SD=0.17) were significantly lower than the rescaled actual attribute level (0.80, ps<.0001). That is, when attributes were spaced in an accelerating manner participants overvalued the intermediate option relative to its actual attribute level—producing a concave value function. In contrast, when spaced in a decelerating manner participants undervalued the intermediate option—producing a concave value function. The uniform condition was included as a check to ensure that there were no systematic response biases; no response bias was found in the current or subsequent experiments.

Experiments 2 and 3: Whereas experiment 1 held the exterior options constant and manipulated the intermediate option between participants, experiment 2 held the intermediate option constant and manipulated the exterior options between participants. Experiment 3 assessed uniformity bias in a multi-attribute paradigm, employing standard methods used in conjoint studies. Results of both experiments again indicated that in the accelerating conditions, participants tended to treat the options as uniformly spaced, regardless of actual spacing (i.e., overvaluing the intermediate option relative to its actual level), producing a concave value function. In the decelerating conditions, participants undervalued the intermediate option relative to its actual level, producing a convex value function.

Experiments 4 and 5: According to our account, consumers use ordinal cues when evaluating options. We tested this hypothesis by decreasing the salience of ordinal cues in experiment 4 and increasing their salience in experiment 5. In experiment 4 we manipulated the number of options (3 vs. 7) and the presentation order (fixed vs. random). When ordinal cues were more difficult to assess (i.e., 7 options presented in a random order), uniformity bias decreased. In experiment 5 we presented options without explicit ordinal cues (e.g., 10 inch, 16 inch, and 18 inch pizzas), with numeric-ordinal labels (e.g., Size 1: 10 inch, Size 2: 16 inch, and Size 3: 18 inch pizzas), or with verbal-ordinal labels (e.g., Small: 10 inch, Medium: 16 inch, and Large: 18 inch pizzas). Consistent with our hypothesis, when ordinal cues were made explicit, using the numeric and verbal labels, uniformity bias increased.

The current research suggests that how consumers value products depends not only on the actual quantitative level of a product, but on the ordinal rank of the attribute. Specifically, consumers appear to use the ordinal position of alternatives as a cue for their valuations of products. Because of this integration of ordinal information when evaluating products, consumers tend to treat intermediate options as uniformly spaced between inferior and superior alternatives, regardless of their actual level. The current research provides a novel behavioral effect, and elucidates the broader cognitive mechanism underlying how consumers derive value.

REFERENCES


