Attribute-Value Functions and the Importance of Attributes

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EXTENDED ABSTRACT

Introduction

The validity and reliability of attribute-importance measurement is highly method-dependent. We propose to evade this method-dependency by shifting our attention to decision makers' value functions of attributes and investigate if and how the global and local shape of these value functions relate to different dimensions of attribute importance.

Attribute-value functions reflect the idiosyncratic valuation of an attribute at different attribute levels, relative to decision makers' reference points (Tversky and Kahneman 1991). We investigate the relationship between the *global* shape (i.e., S-shape, convex, concave) and the *local* shape (i.e., reference point, loss aversion, diminishing sensitivity) of attribute-value functions and the *global* and *local* importance of attributes (Goldstein 1990). The global importance of attributes reflects the importance of an attribute as a stable characteristic that does not depend on a specific stimulus set. The local importance of attributes reflects the importance in judgment and depends on the stimuli set under consideration.

Theory and Hypotheses

Our main proposition is that the shape of attribute-value functions relates to the importance of attributes. First, we hypothesize that *the global importance of an attribute polarizes and thus relates to decision makers' reference points* (H1), *increases decision makers' loss aversion* (H2) and *increases decision makers' diminishing sensitivity* (H3). These hypotheses are based on the notion that decision makers for whom an attribute is important based on personal values and needs (i.e., high global importance) will purchase products that perform maximally on that attribute and consequently develop a reference point that equals an attribute level at the end-poles of the relevant range of attribute levels (Kalyanaram and Winer 1995) (H1). Furthermore, the global importance of an attribute will positively influence the effects of changes in the attribute levels as reflected in decision makers' loss aversion (H2) and diminishing sensitivity (H3).

Building on the hypothesized effects of the global importance on decision makers' reference points, loss aversion, and diminishing sensitivity, we hypothesize that *the global importance of an attribute increases from decision makers with a convex value function for the attribute to decision makers with an S-shaped and concave value function* (H4).

The local importance of an attribute is generally operationalized based on the differences in valuation of attribute levels in a judgment or choice task. The difference in valuation depends on decision makers' reference points and loss aversion, which results in a steeper value function in the loss domain. Hence, *if (most of) the attribute levels in the judgment or choice task reflect a loss, the local importance will be larger than when (most of) the attribute levels in the judgment or choice task represent a gain* (H5). The relationship between the *global shape* of a value function and the *local importance* of an attribute follows a pattern comparable to that of the relationship between the global shape and the global importance of attributes (H6).

Study

To test our hypotheses, a study, involving 189 participants at a large southern university, was conducted. We studied rental rooms on two attributes: monthly rent and size (square feet). The *global importance* of both attributes is determined using the direct rating method (1=not important, 9=important). A measure for the *local importance* of both attributes was obtained using a full factorial judgment task with five levels for each attribute. To determine the *global* and *local shape* of the value functions of both attributes, we asked the participants to rate their valuation of the full range of 12 relevant attribute levels for one attribute at the time. Participants rated their valuation of rooms with 12 different rent levels as well as their valuation of rooms with 12 different sizes (0=I do not appreciate it, 100=I highly appreciate it). The global shape of the value functions is estimated using the EXP-IPT technique, which fits the attribute-level valuations for each individual to both the negative exponential function (EXP) and the log of the inverse power transformation function (IPT) (cf., Pennings and Smidts 2003). The former function is either fully concave or fully convex over the entire value function. The latter function is S-shaped.

Next, the *reference points* for both attributes were determined by asking participants to indicate what the rent and size of their current room is. To establish participants' *loss aversion* and *diminishing sensitivity*, we rely on the direct-rating data and employ the two-piece value function technique. Based on the self report reference points, we divide the value function into a gain and loss domain and estimate the EXP function separately for both domains. The *loss aversion* for an attribute is calculated by establishing the ratio of the slope of the value function in the loss domain and the slope of the gain domain. To establish the *diminishing sensitivity* concerning an attribute, we use the second derivative of the EXP function, calculate the relative change in valuation for each pair of independent variable levels, and determine the average diminishing sensitivity across domains.

Results

In line with H1, H2, and H3, we find significant relationships between the global importance of attributes and participants' reference points, loss aversion, and diminishing sensitivity. In line with H4, we find that the global importance of an attribute is highest (lowest) among participants with a convex (concave) value function. The global importance of those with an S-shaped value function falls in between. We find a significant relationship between participants' reference point and the local importance of both attributes, confirming H5. In line with H6, we find that the local importance of an attribute is highest (lowest) among participants with a convex (concave) value function for the attribute.

Finally, we examined the predictive validity of the global and local shape of value functions and find that the global and local shape of attribute-value functions predict choice up to 85.3% correctly.

Conclusions

We conclude that the shape of attribute-value functions relates to the importance of attributes, and as such drive judgment and choice behavior. Hence, measuring decision makers value functions for an attribute may yield more valid and reliable attribute-importance measures.