SCALE AND METRIC DESIGN AS CHOICE ARCHITECTURE TOOLS

Adrian R. Camilleri
The Fuqua School of Business, Duke University, Durham, North Carolina, USA

Richard P. Larrick
The Fuqua School of Business, Duke University, Durham, North Carolina, USA

SUMMARY

Choices are never presented in a vacuum: rather, alternative choice options are always presented within a context. Importantly, in many cases the context – the "choice architecture" – reflects the meta-decisions made by the designer of the context – the "choice architect" (Johnson et al., 2012; Thaler & Sunstein, 2008). A key principle associated with the choice architecture metaphor is that there is no neutral choice context and therefore those responsible for framing decisions will influence choices in all cases. Motivated by this belief, scientists and policy-makers have become increasingly interested in learning how to best arrange the choice architecture in order to help mitigate the threat of various social dilemmas, most recently the threat of climate change (Newell & Pitman, 2010; Weber & Stern, 2011).

Energy labels, and in many cases the standards that accompany the labels, are often considered to be the best available tools for governments to manage energy-efficiency policies and climate-change-mitigation programs (Gillingham, Newell, & Palmer, 2009; Stern et al., 1987; Wiel & McMahon, 2003). Given that the consumption of fossil fuels is a major contributor of greenhouse gas emissions, one natural target of choice architecture intervention are vehicle choices via fuel economy label design.

One important feature of the fuel economy label is the choice of metric or metrics to include. Most existing labels report some metric associated with fuel efficiency or consumption; however, there is also an option of providing a cost estimate. There is reason to expect that providing estimated fuel costs will influence consumer preferences more than fuel consumption information even though these two metrics are simple translations of one another. Payne (1982), for example, has argued strongly for the case that decision-makers often form preferences through task-contingent strategies that are tied to the representation of a problem (Payne, Bettman, & Johnson, 1992). Similarly, a number of researchers have proposed that task, strategy, and information systematically interact to produce "compatibility" effects (Fischer & Hawkins, 1993). Given the assumption that consumers have a primary motivation to minimize the total costs of purchasing and running their vehicle, and tend to underweight the latter, we hypothesized that those presented with a gas *cost* metric would make a greater proportion of fuel-efficient choices than those presented with a gas *consumption* metric.

A second important feature of the fuel economy label is the scale to express metrics upon. Most existing labels report fuel economy metrics upon a "per 100" distance scale. Interestingly, there is a growing body of research in cognitive psychology and marketing showing that rescaling otherwise identical information can systematically change preferences (Burson, Larrick, & Lynch, 2009; Gourville, 1998; Pandelaere, Briers, & Lembregts, 2011). The consistent finding in this literature is that decision-makers tend to perceive differences as larger when they are expressed on an expanded scale (such as per year) than when they are expressed on a contracted scale (such as per week). Larger differences in turn prompt greater reliance on that dimension in choice, thereby increasing preference for the option favored on that dimension.

Utilizing typical driving behavior information gathered during pilot work, we hypothesized that a greater proportion of fuel efficient choices would be made by decision-makers presented with a lifetime “per 100,000 miles” scale than those presented with either a annual “per 15,000 miles” scale or the routine “per 100 miles” scale.

In order to test these two hypotheses, we conducted an online experiment where we presented participants with a number of hypothetical binary choices between two vehicles that traded off on price and fuel economy. We also measured individual difference variables relevant to car purchase decisions: environmental attitude, discount rate, and cognitive reflection. Stronger preferences for the more fuel-efficient vehicle were expected for those who expected to drive more, who held pro-environment attitudes, and exhibited lower discount rates (in this case, of the later savings associated with the fuel efficient option).

With regards to metric, we observed that decision-makers tended to select the more fuel-efficient vehicles when fuel economy was expressed in terms of the estimated cost of gas rather than the amount of gas consumed. This metric effect is compatible with contingency explanations of information processing, such as the theory of cognitive fit (Vessey, 1991; 2006) and the scale-compatibility hypothesis (Tversky et al., 1988). In general, metrics that match the problem-solving processes required to form a preference have the greatest influence on choice.

With respect to scale, we observed that decision-maker’s tended to select the more fuel-efficient vehicles when the fuel economy metric was expressed on an expanded, lifetime scale. Interestingly, we observed a “U” shaped function in which the proportion of fuel efficient options was smallest at 15,000 miles and largest at 100,000 miles; 100 miles was somewhere in between. This result partially replicates past research on scale-induced preference reversals changes (Burson et al., 2009; Gourville, 1998; Pandelaere et al., 2011). The “U” shaped function was partially mediated by a similar U-shaped function for expected driving behavior: those who were presented with the 15,000 label during the experiment subsequently expected to drive less in the future than those presented with either the 100 or 100,000 scale.

As expected, those who held pro-environmental attitudes were more likely to select more fuel-efficient vehicle options. However, in contrast to our expectations, implied discount rate did not appear to moderate choices.

The important message from our work is that policy-makers should provide consumers with meaningful metrics that help consumers assess their goal progression. Many consumers would appear to do better in this regard if provided with estimate fuel cost information expressed upon an expanded, lifetime scale.

References available on request.

For further information contact:
Adrian R. Camilleri
The Fuqua School of Business
100 Fuqua Drive
Durham, USA 27708
adrian.camilleri@duke.edu