Scale and Metric Design as Choice Architecture Tools

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US vehicle fleets will average 54.5 miles per gallon beginning in 2025.
Preferences are Constructed

• People are not always rational and often construct preferences on the fly (Payne et al., 1993).
  – Many examples: Framing, response mode, defaults, partitioning, number of options, etc.

• The choice architecture refers to the task and contextual features of a decision.

• Choice “architects” design the choice task and context and therefore influence decisions.

• Choice architects can “nudge” people’s choices (Johnson et al., 2012; Thaler & Sunstein, 2008).
  – Label design
Basic Label Principles

- Basic principles of label design (Bettman et al., 1986):
  - Make important information more salient.
  - Use a common organizational scheme.
  - Use symbols that quickly convey concepts.
  - Present information that reduces cognition need.
- Product price tag label (Russo et al., 1975; Russo, 1977).
- Energy consumption labels (Anderson & Claxton, 1982).
“Translated attributes” are different metrics derived from one global dimension subject to simple monotonic scale transformations.
Research Questions

• How are consumer’s decisions influenced by the presentation of different translated (i.e., highly correlated) attributes on labels?

• In the context of vehicle choice and the fuel economy label:
  – Which individual translation of metric/scale attracts the most weight in preference construction?

• Basic research approach: Hypothetical choice task
  – Ask participants to hypothetically chose between different pairs of vehicles comprising of a cheap, fuel inefficient model and an expensive, fuel efficient model.
Metric

• **Metric fluency**:  
  – Information that is processed more fluently is believed to be more true and thus given more weight (Alter & Oppenheimer, 2009).
    • Cost information ➔ More fluent ➔ More efficient choices.

• **Metric compatibility**:  
  – Consumers tend to process information in the format in which it is provided (Bettman & Kakker, 1977; Larrick & Soll, 2008).
  – Metrics given more weight when they match the problem-solving processes (Vessey, 1991; Fischer & Hawkins, 1993).
    • Cost information ➔ Better match ➔ More cost-minimizing choices.
Scale

• Scale expansion:
  – Differences perceived as larger when expressed on an expanded scale (Pandelaere et al., 2011; Burson, Larrick, & Lynch, 2009).
    • Expanded scale $\rightarrow$ Larger perceived differences $\rightarrow$ More efficient choices.

• Scale fluency:
  – Some scales are more familiar, processed more fluently, and allocated more weight (Alter & Oppenheimer, 2009; Lembregts & Pandelaere, 2013).
    • 100 miles $\rightarrow$ Familiar scale $\rightarrow$ More efficient choices.
Please consider the vehicles to be equivalent in all other respects.

Please assume that gas costs $4/gallon.

Which do you prefer?

<table>
<thead>
<tr>
<th>Cost of the vehicle in dollars:</th>
<th>Model A</th>
<th>Model B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gallons of gas used per 100 miles:</td>
<td>5.3</td>
<td>4.3</td>
</tr>
<tr>
<td></td>
<td>Model A</td>
<td>Model B</td>
</tr>
<tr>
<td>------------------------------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td><strong>Cost of the vehicle in dollars:</strong></td>
<td>$20,520</td>
<td>$23,520</td>
</tr>
</tbody>
</table>

- Please assume gas costs $4/gallon.
- **Which do you prefer?**
## Choice Set

<table>
<thead>
<tr>
<th>Choice</th>
<th>Cheaper, inefficient model</th>
<th></th>
<th>Expensive, efficient model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Price</td>
<td>Gallons per 100 miles</td>
<td>Cost of fuel per 100 miles*</td>
</tr>
<tr>
<td>1</td>
<td>$18,000</td>
<td>5.0</td>
<td>$20</td>
</tr>
<tr>
<td>2</td>
<td>$23,999</td>
<td>5.6</td>
<td>$22</td>
</tr>
<tr>
<td>3</td>
<td>$27,299</td>
<td>4.8</td>
<td>$19</td>
</tr>
<tr>
<td>4</td>
<td>$19,520</td>
<td>5.3</td>
<td>$21</td>
</tr>
<tr>
<td>5</td>
<td>$16,898</td>
<td>5.9</td>
<td>$24</td>
</tr>
<tr>
<td>6</td>
<td>$21,477</td>
<td>6.3</td>
<td>$25</td>
</tr>
</tbody>
</table>

*Assuming $4.00 per gallon of gas.
Methods

• Participants:
  – 424 Americans from Amazon’s Mechanical Turk.
  – 56% female.
  – Mean age = 32.1 years ($SD = 10.5$).

• Other measures:
  – Environmental attitudes, political attitudes, discounting attitudes, numeracy, cognitive ability, driving behaviors, other demographics.
Metric on Preferences

![Bar chart showing the proportion of efficient vehicle choices for different scales and cost metrics. The chart compares the use of gallons versus dollars in cost metrics. The metrics show a trend where higher scales lead to an increase in the proportion of efficient choices, indicating better metric fluency and compatibility.]
Familiarity (1-7 scale):
- 100 miles: 4.33
- 15,000 miles: 2.30
- 100,000 miles: 2.53
Driving Behavior

An additional 30,000 miles of expected driving was associated with a 3.0% increase in proportion selecting the more fuel efficient option.

Moving from the 100 to 100,000 miles scale was associated with a 6.8% increase in proportion selecting the more fuel efficient option.

Note: Total Intended Miles Driven is per 10,000 miles units.
Summary of Results

- People prefer fuel efficient vehicles more when fuel economy is expressed as the cost of fuel on a very expanded scale.
  - Metric fluency (Alter & Oppenheimer, 2009).
  - Metric compatibility (Fischer & Hawkins, 1993).
  - Scale expansion (Burson, Larrick, & Lynch, 2009).
  - Scale fluency (Lembregts & Pandelaere, 2013).
  - Anchoring
Conceptual Implications

• Consumers tend to give more weight to some attribute translations:
  – Problem-compatible, familiar metrics > Problem-incompatible, unfamiliar metrics.
  – Larger, familiar scales > Smaller, unfamiliar scales.
Ongoing Work

• A more social scale expansion?
• Aggregation over potential collective behavior:
  – *If you do X and so do 1000 others, then combined you will save Y.*
• Planned field studies:
  – Sustainable Duke
  – Beyond Meat
Policy Implications

• People can make better decisions for themselves if provided with **meaningful metrics** – those that easily allow assessment of goal achievement and progression:
  – Provide decision-makers amidst a consumption decisions with cost information.

• People can make better decisions for society if efficiency and future savings associated with efficiency are emphasized:
  – Express efficiency information on an expanded, **lifetime scale**.
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