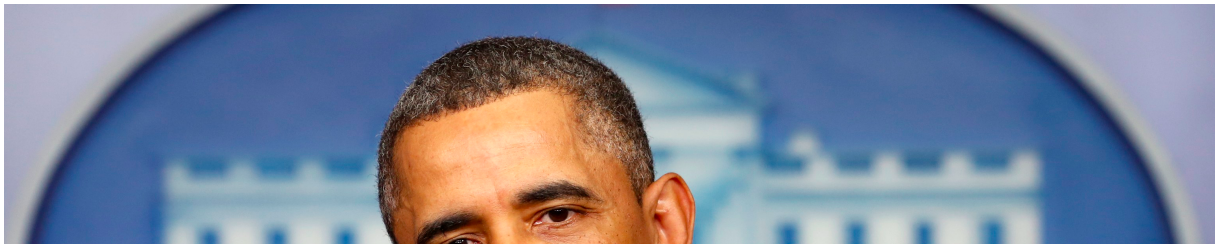
Scale and Metric Design as Choice Architecture Tools

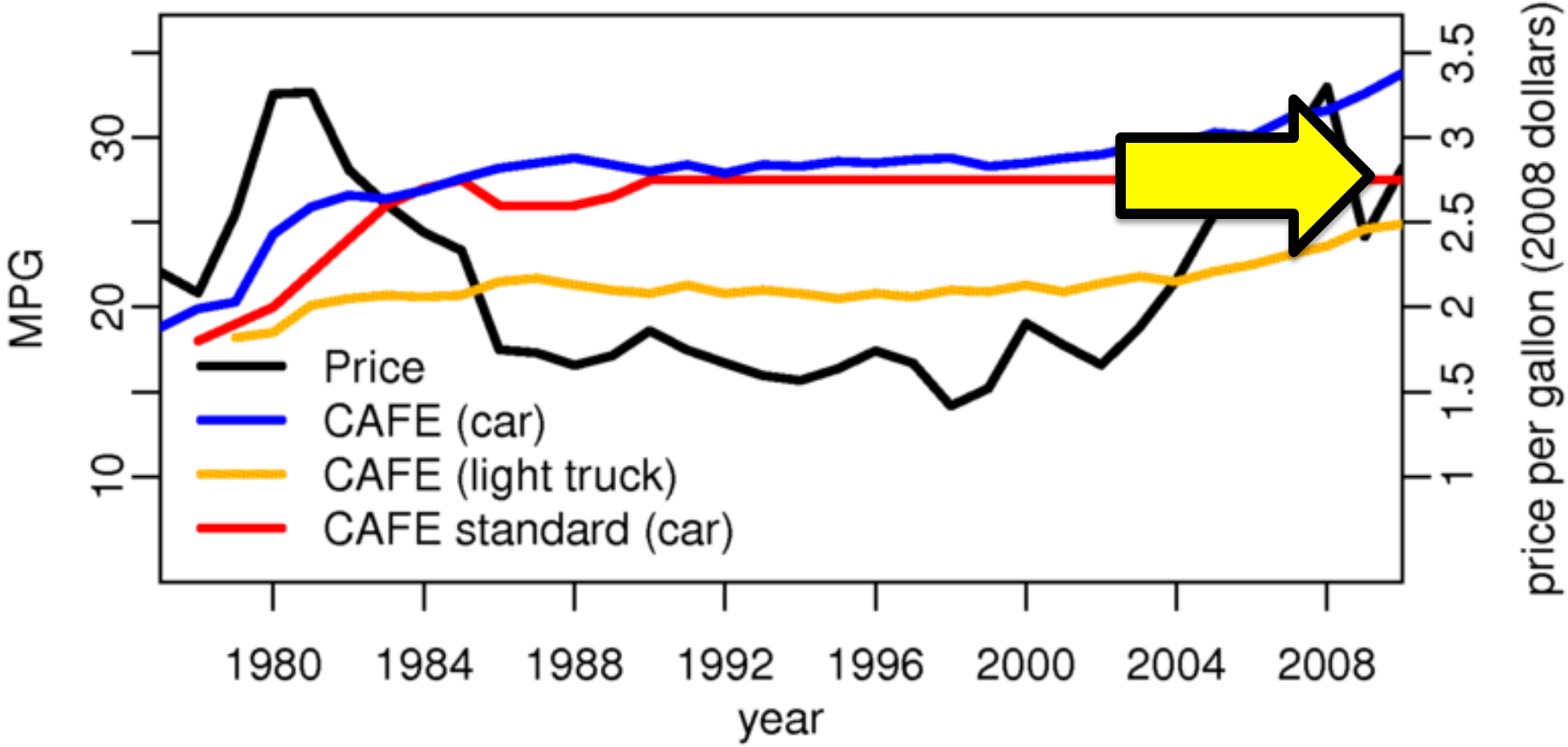
Adrian R. Camilleri

Richard P. Larrick

DUKE
THE FUQUA SCHOOL OF BUSINESS

Center for Research on Environmental Decisions
EARTH INSTITUTE | COLUMBIA UNIVERSITY




MPG
10
20
30
price per gallon (2008 dollars)
1
1.5
2
2.5
3
3.5
Price
CAFE (car)
CAFE (light truck)
CAFE standard (car)
1980
1984
1988
1992
1996
2000
2004
2008
year

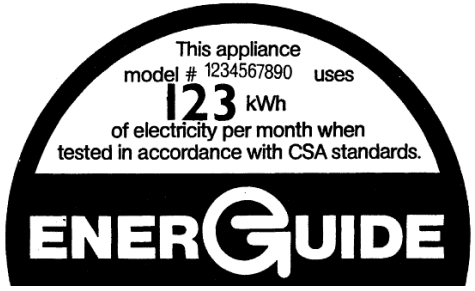
in 2025

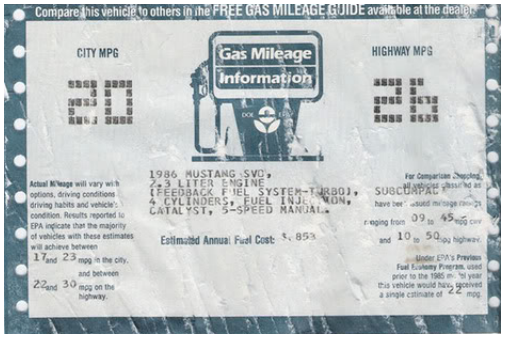
Preferences are Constructed

- 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

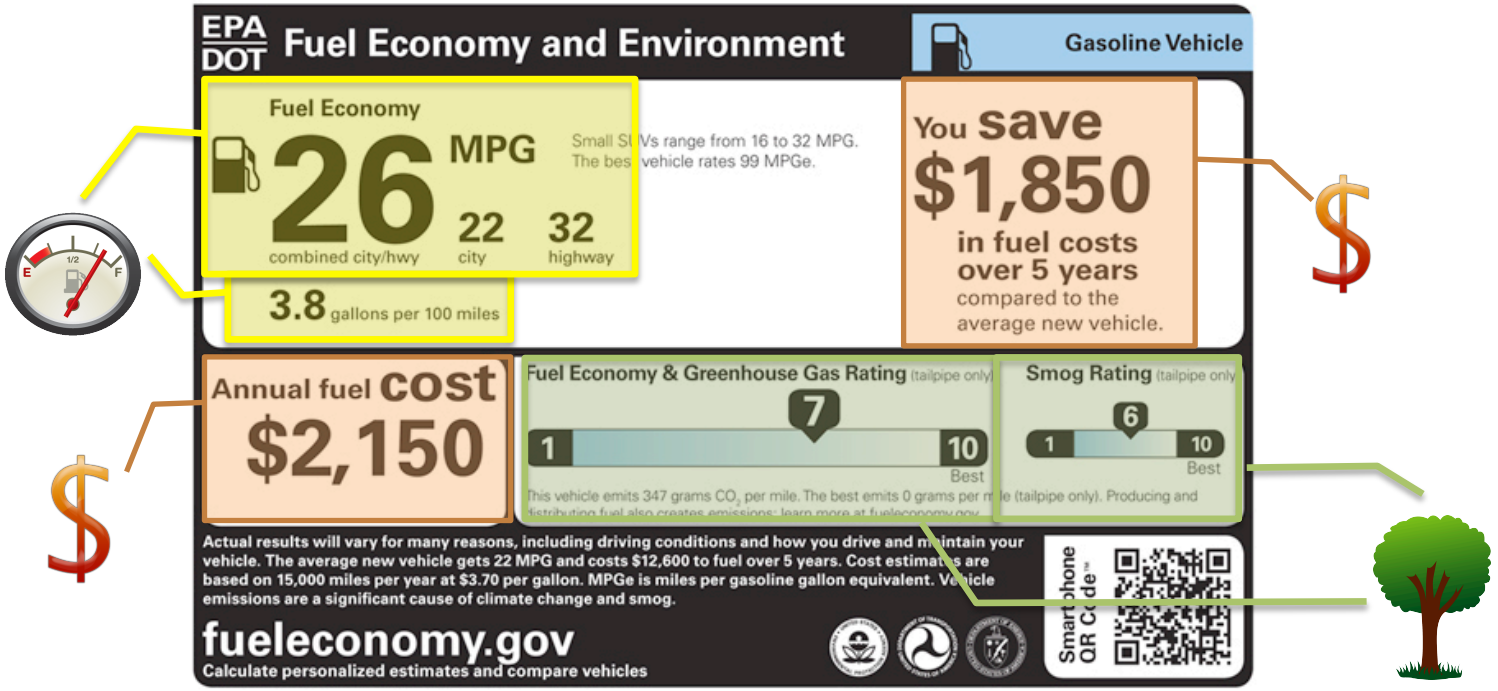
Basic Label Principles

- 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 in Modern Labels



- "Translated attributes" are different metrics derived from one global dimension subject to simple monotonic scale transformations.

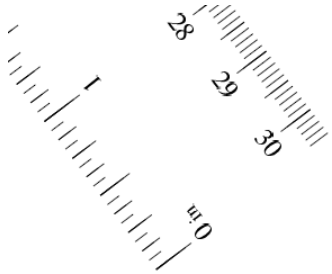
Research Questions

- 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 → Larger perceived differences → 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 → Familiar scale → More efficient choices.

	Model A	Model B
Cost of the vehicle in dollars:	$20,520	$23,520
 **Gallons of gas used per 100 miles:**	5.3	4.3

- Please consider the vehicles to be equivalent in all other respects.
- Please assume that gas costs $4/gallon.
- **Which do you prefer?**

	Model A	Model B
Cost of the vehicle in dollars:	$20,520	$23,520

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

Choice Set

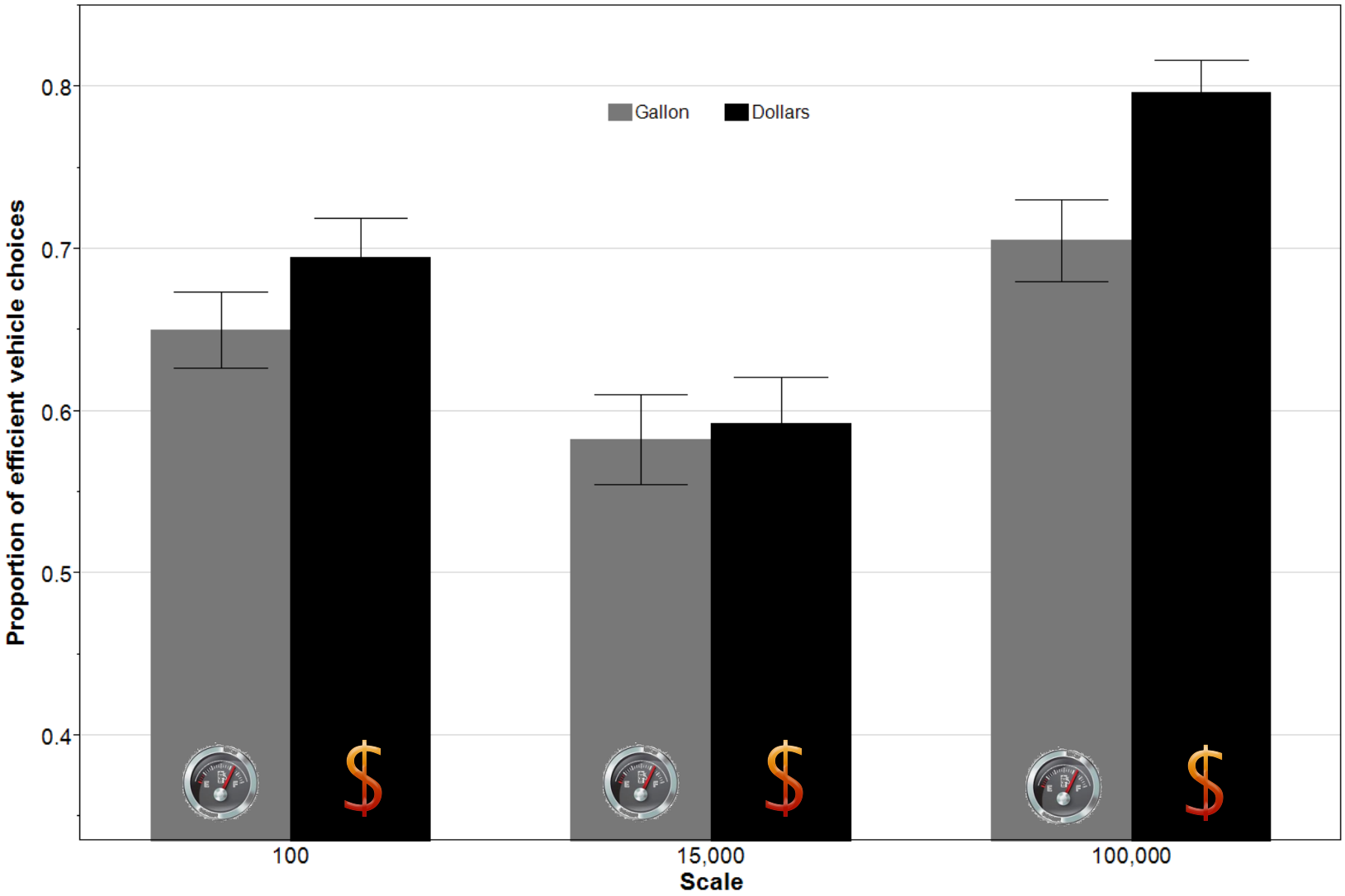
Choice	Cheaper, inefficient model			Expensive, efficient model		
	Price	***Gallons per 100 miles***	***Cost of fuel per 100 miles****	***Price***	***Gallons per 100 miles***	***Cost of fuel per 100 miles****
1	$18,000	5.0	$20	$21,000	4.0	$16
2	$23,999	5.6	$22	$26,999	4.2	$17
3	$27,299	4.8	$19	$32,299	3.4	$14
4	$19,520	5.3	$21	$21,520	3.8	$15
5	$16,898	5.9	$24	$24,898	3.7	$15
6	$21,477	6.3	$25	$25,477	3.6	$14

*Assuming $4.00 per gallon of gas.

Methods

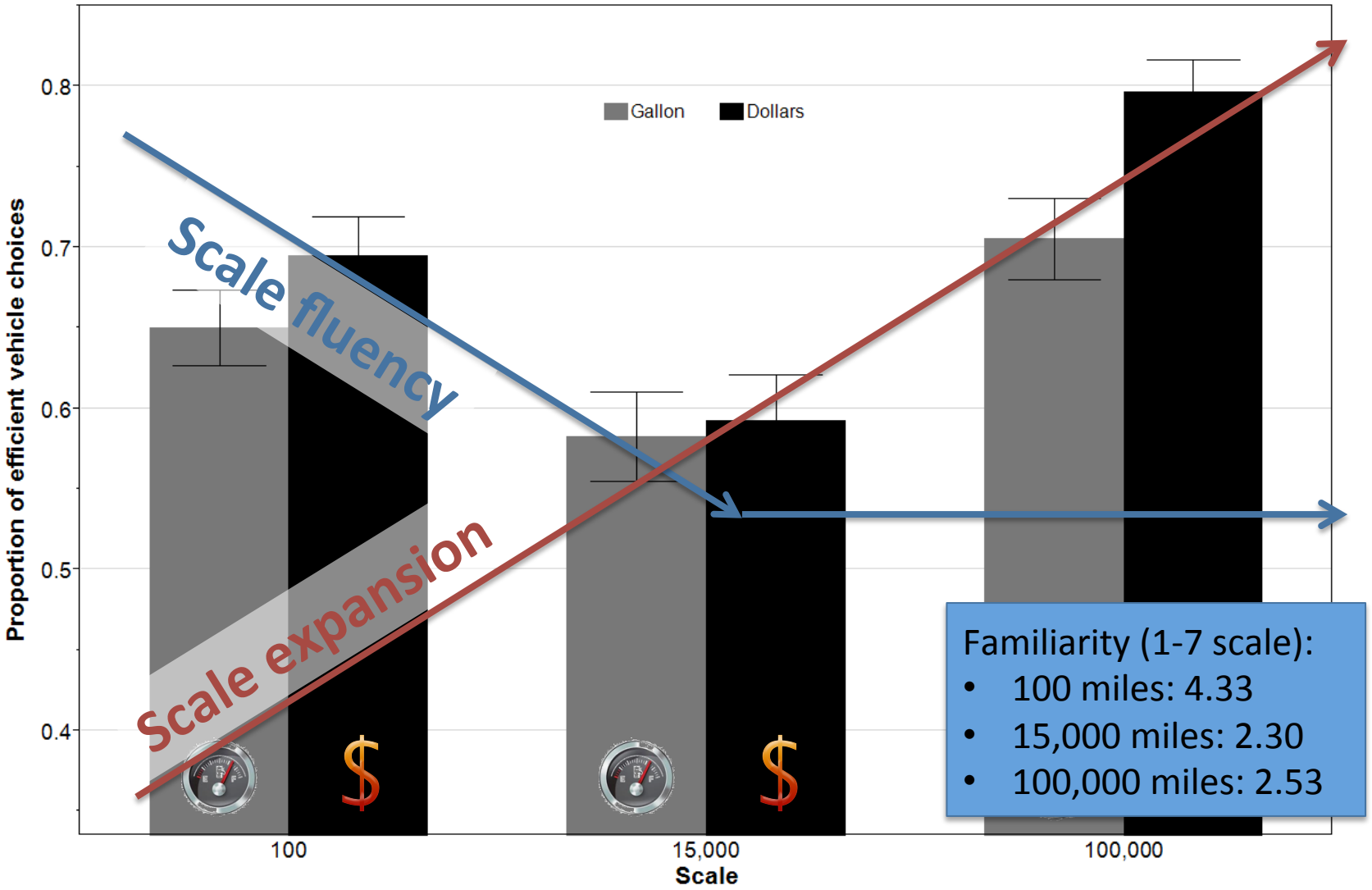
- Participants:
  - 424 Americans from Amazon's Mechanical Turk.
  - 56% female.
  - Mean age = 32.1 years (*SD* = 10.5).
- Other measures:
  - Environmental attitudes, political attitudes, discounting attitudes, numeracy, cognitive ability, driving behaviors, other demographics.

Preferences

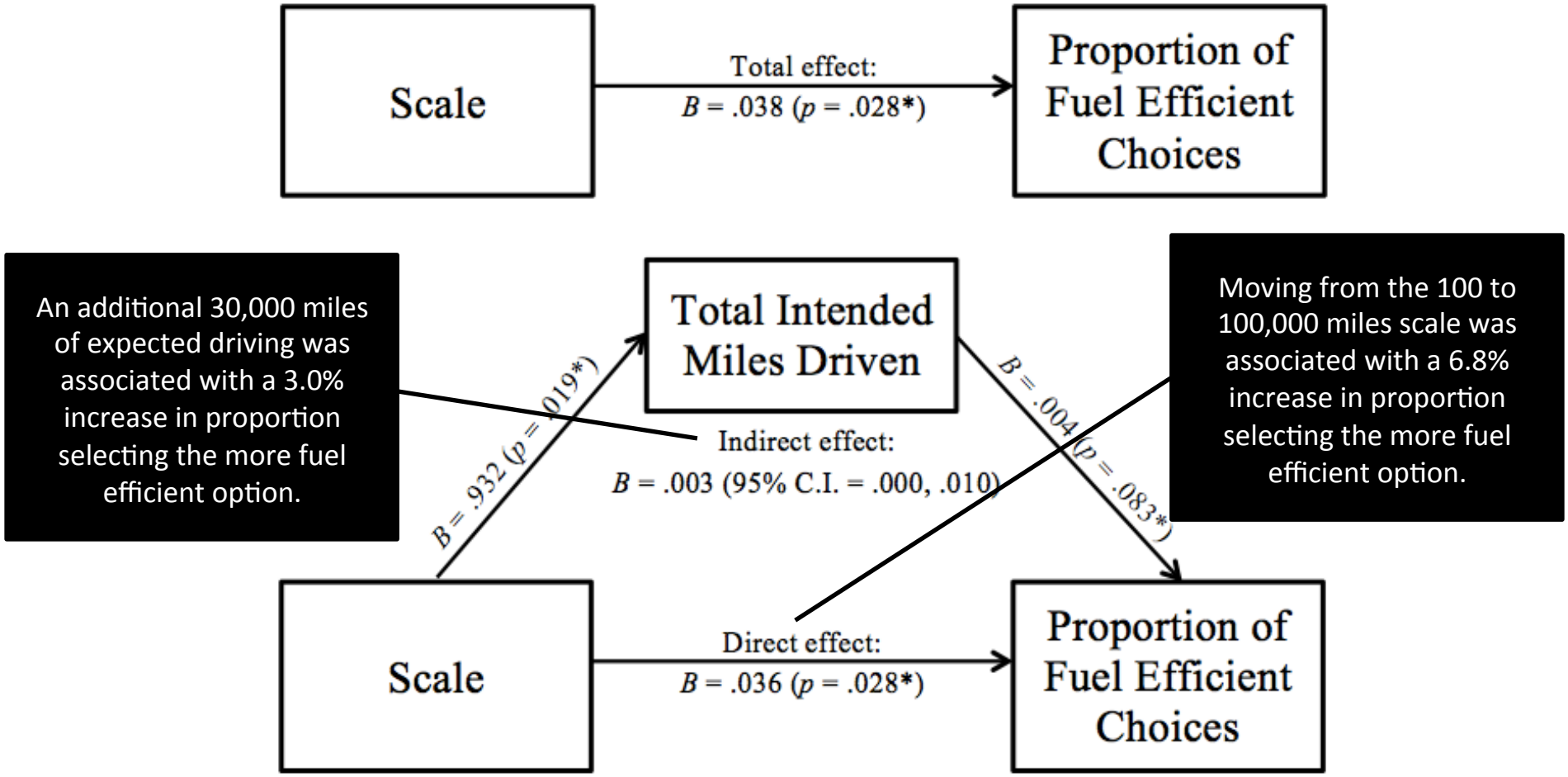


Metric on Preferences

Scale on Preferences



Driving Behavior

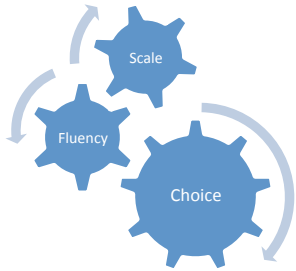


Note: Total Intended Miles Driven in per 10,000 miles units.

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

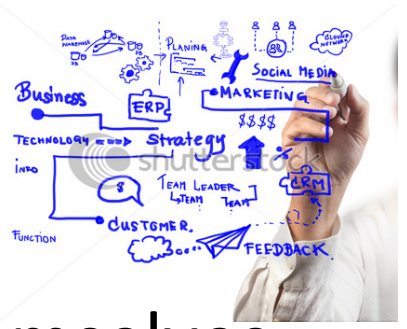


- Consumers tend to give more weight to some attribute translations:
  - Problem-compatible, familiar metrics **>** Problem-incompatible, unfamiliar metrics.
  - Larger, familiar scales **>** Smaller, unfamiliar scales.

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**.

Scale and Metric Design as Choice Architecture Tools

Adrian R. Camilleri

Richard P. Larrick

DUKE
THE FUQUA SCHOOL OF BUSINESS

Center for Research on Environmental Decisions
EARTH INSTITUTE | COLUMBIA UNIVERSITY