



Seven Cognitive Concepts for Successful Sustainable Design

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- Postdoctoral Research, Sloan School of Business, Massachusetts Institute of Technology (2008-2009)
- M.S. (2004), Ph.D. (2008) Mechanical Engineering, University of Michigan (co-advised in Psychology)
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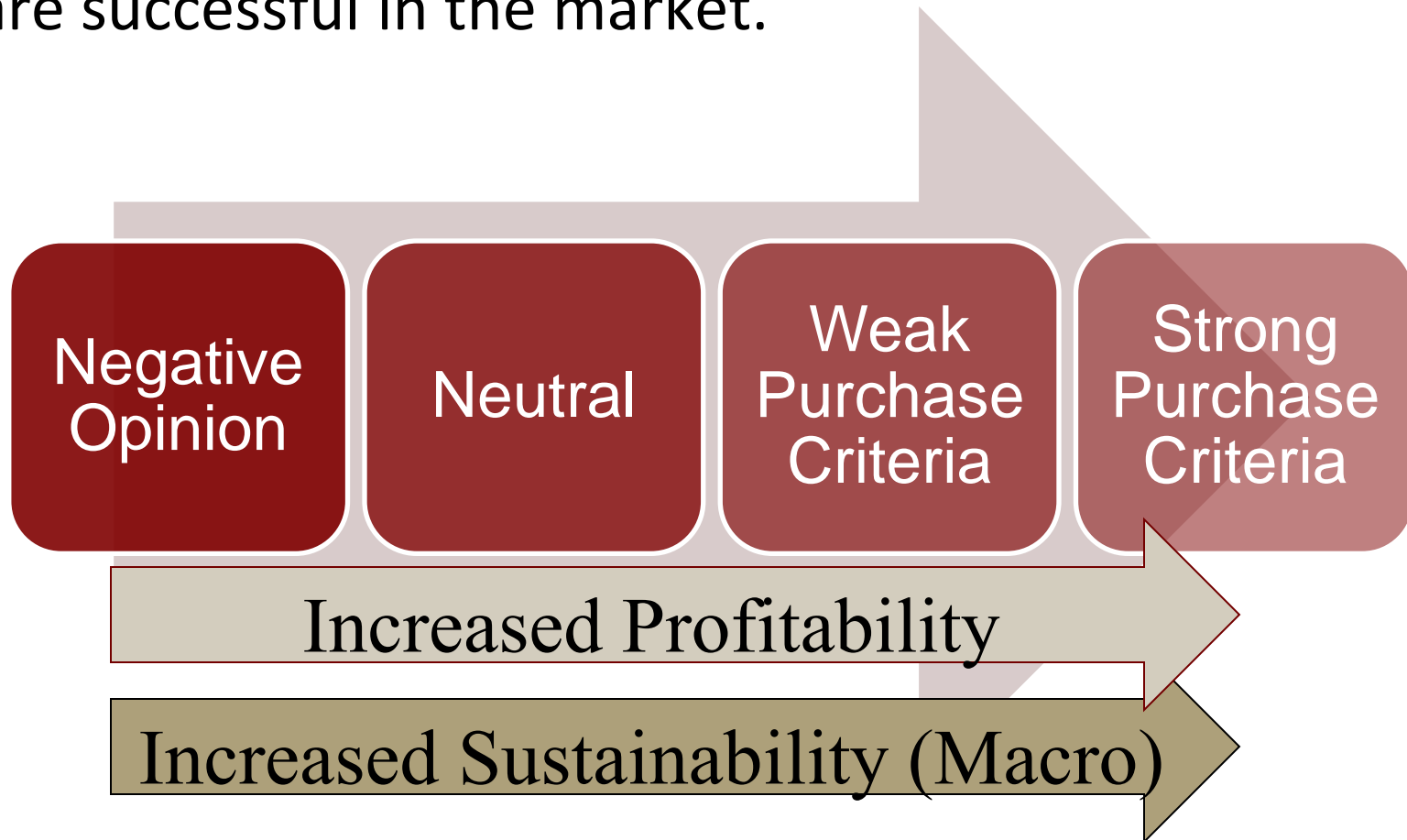


A product that is intentionally and methodically designed to decrease environmental impact versus the status quo, be that a competing product or an otherwise-defined baseline, using a scientifically-based environmental impact assessment tool of the designer's choosing.

Customer Preference for Sustainable Products



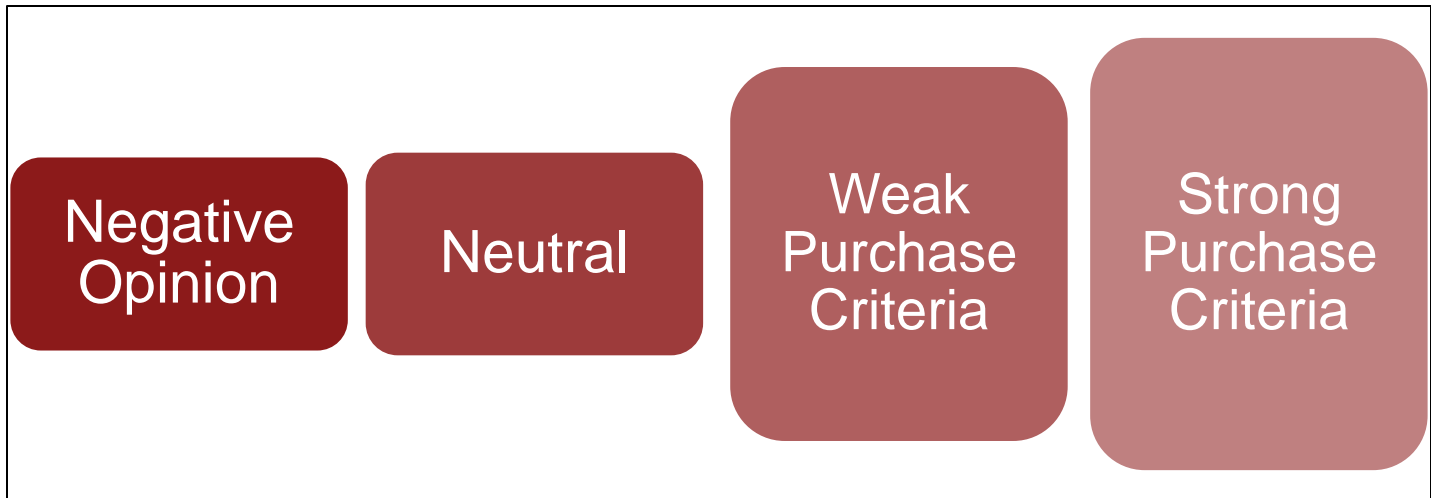
This research aims to design sustainable products that are successful in the market.



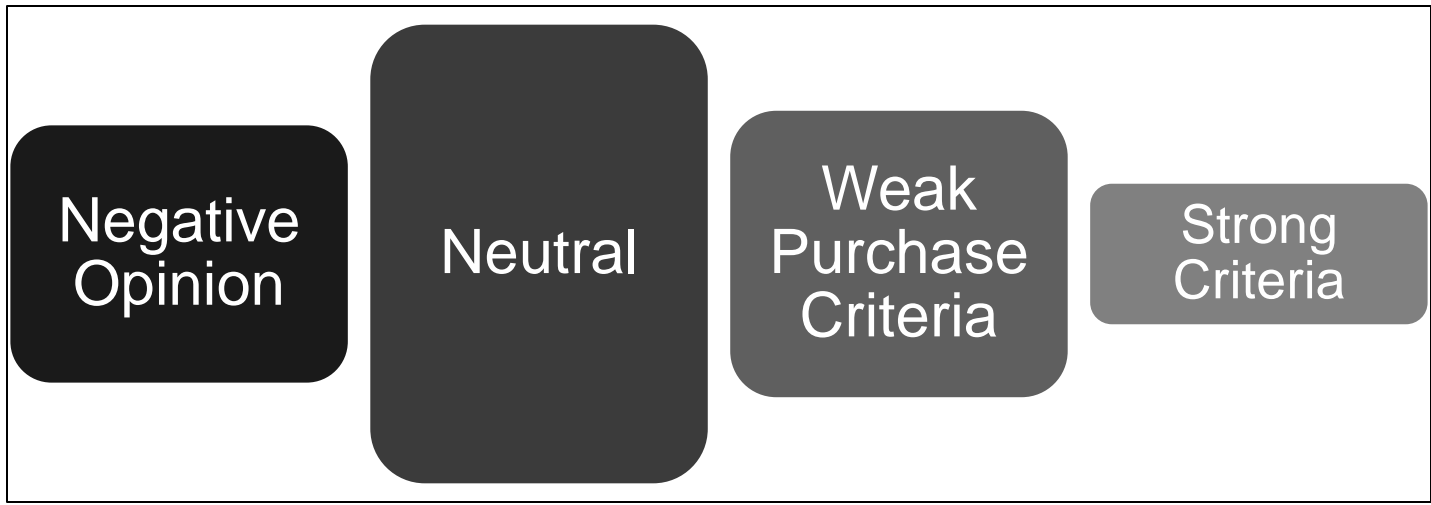
Customer Preference for Sustainable Products



In Design
and
Marketing
Interactions



In
Actual
Purchases



What explains the difference in purchase behavior?



Individuals construct preferences on a case-by-case basis when called to make a decision.

An individual's preferences are dependent on the context of the decision.

This well-accepted theory from behavioral psychology and economics applies to the design of products.

“Need-finding” is good design metaphor for the design of products that are preferred predictability across a variety of contexts, but not for all products.

The context of sustainable product choice

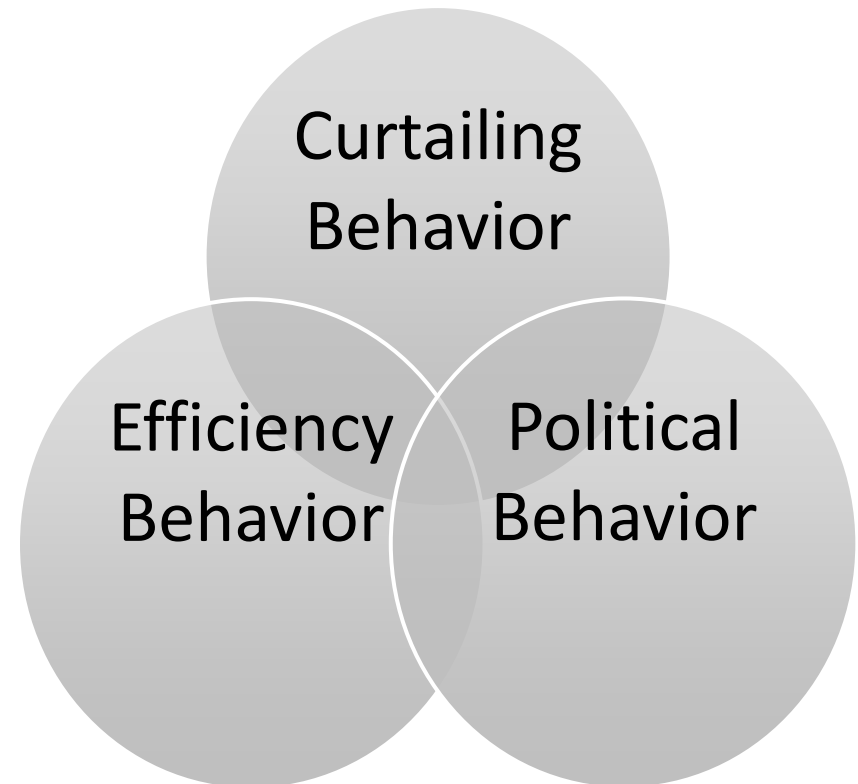


Why is decision context particularly important for decisions regarding the purchase and use of sustainable products?

Rephrased:

→ *What influences*






Pro-environmental Behavior (PEB)?












What influences Pro-environmental Behavior (PEB)?

Conducted a literature survey of:

-  Behavioral psychology
-  Behavioral economics
-  Environmental psychology
-  Environmental design
-  Marketing



Cognitive intermediaries for PEB in the form of sustainable product choices:

-  Sense of responsibility
-  Complex decision-making skills
-  Decision heuristics
-  The altruism-sacrifice link
-  Trust
-  Cognitive dissonance/guilt
-  Motivation



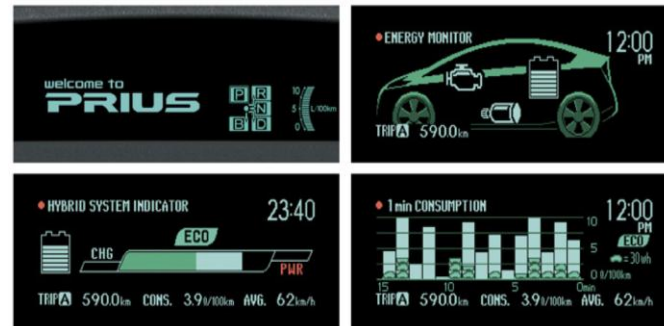
- ❏ A sense of responsibility for causing environmental problems can be overwhelming without the availability of actions to solve the problems
- ❏ Emphasize a customer's individual role in solving environmental problems, not their role in creating the problems
- ❏ Instill a sense of control



Complex decision-making skills



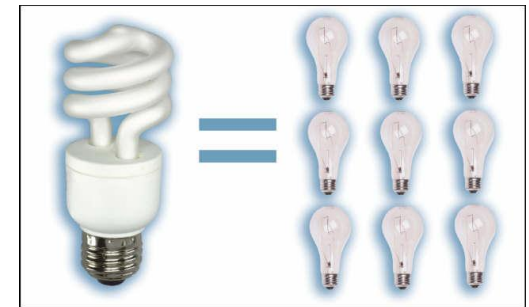
- ❁ People have a limited ability to handle the complexities of sustainable product choices
- ❁ Constrain customers' product decisions with industry standards or regulations
- ❁ Encourage tackling of complex decisions through purchase and interaction incentives
- ❁ Improve customer decision-making by designing-in educational feedback





- ❏ People use heuristics to make their decisions more efficient
- ❏ Even for highly-technical product innovations, perception is important
- ❏ Address the customers' environmental concerns *and* the crucial sustainability issues

- ❏ Identify measurement heuristics and use them to educate about the product's sustainability



Altruism-sacrifice link



- ❁ For some customers, being green implies giving up features or quality
- ❁ Even if your product is a “triumph,” be prepared to fight this perception
- ❁ Downplay altruism in the product’s design and marketing, instead speak to feature-based benefits
- ❁ Apply design for upgradability or adaptability only to work-horse products that are known for reliability and are not status symbols





To navigate the above cognitive concepts while actively searching for a sustainable product, a person must trust:

- (a) the science that supports the environmental problems
- (b) their ability to personally affect the problems with PEB
- (c) the sustainability claims made by the product's manufacturer
- (d) the up-to-par performance of the sustainable product



- ❏ Design trust into the product's form using semantics and heuristics
- ❏ Design trust into the product's purchase interactions and visual design using similarity



Cognitive Dissonance



- ❁ When an individual performs a behavior intending to reduce environmental impact, but later realizes that the behavior is detrimental to the environment, they will experience *cognitive dissonance*
- ❁ Resolving this dissonance can result in an unwanted change in core values of sustainability
- ❁ Recommendation:
Avoid making customers feel guilty.





There are three types of behavior motivation:

- (1) Intrinsic motivation, in which a person derives satisfaction from performing the behavior
- (2) Extrinsic motivation, in which a person derives satisfaction from a reward given when the behavior is performed
- (3) Amotivation, in which a person receives no satisfaction from the behavior, and is unsure why they are performing the behavior



- ❑ Change PEB from extrinsic to intrinsic with small, well-timed incentives designed into product interactions
- ❑ Design sustainable products for ease of use
- ❑ Design to target social norms
- ❑ Work with policy makers and marketers to design thoughtfully-structured sustainable product purchase incentives



The “Soft Side” of Sustainable Design



For more details, please make a request for the following paper under review from erinmacd@iastate.edu:

MacDonald, E., *Under Review*, “The Soft Side of Sustainable Design,” *Journal of Mechanical Design*.

Acknowledgements



Jinjuan She

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