

Mind the Gap: Expectation Biased Perception and the Energy Paradox

A Research Sketch

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August 5, 2013

- The energy paradox is an unresolved issue with serious implications for environmental sustainability and economic welfare.
- Traditional discrete choice models assume perfect information and interpret choices as an expression of preferences.
- With expectation biased perception, **consumers cannot attain perfect information** about product attributes even after using the products first-hand.

Defining Key Concepts

Expectations

The consumer's beliefs about the quality of product attributes held prior to direct testing of the product. Expectations about attributes often vary with product categories such as luxury vs economy and eco-friendly vs standard.

Perception

The sensory experience of a product attribute the consumer has while using a product. For example, the consumer experiences some level of softness to the touch when testing a roll of toilet paper.

Biased Perception

The consumer's perception is biased by the product category if his perception of a product attribute changes when the product category label is present or absent.

Expectation Biased Perception

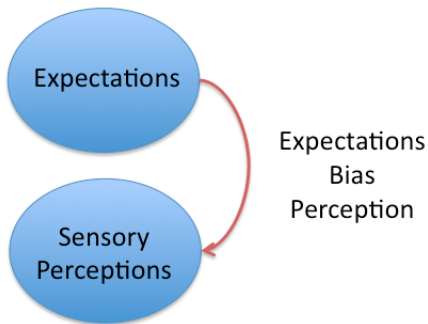
Psychological Framework

Expectations

Sensory
Perceptions

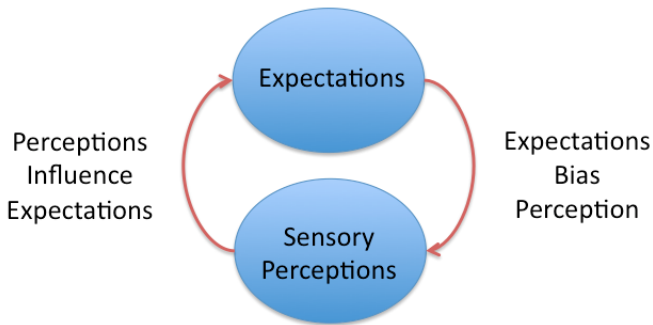
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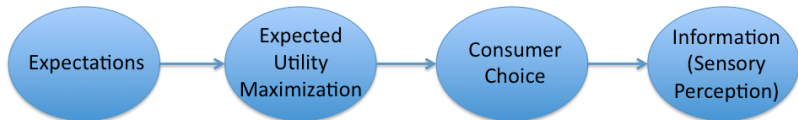
Expectation Biased Perception

Psychological Framework



Self-Perpetuating Information Bias

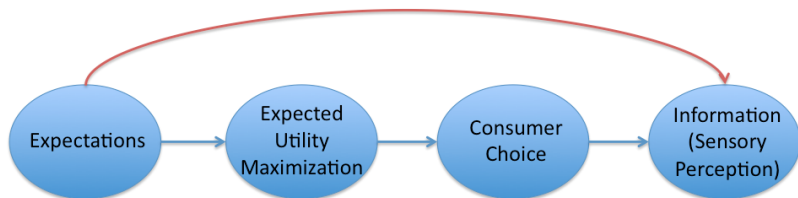
Economic Framework



Self-Perpetuating Information Bias

Economic Framework

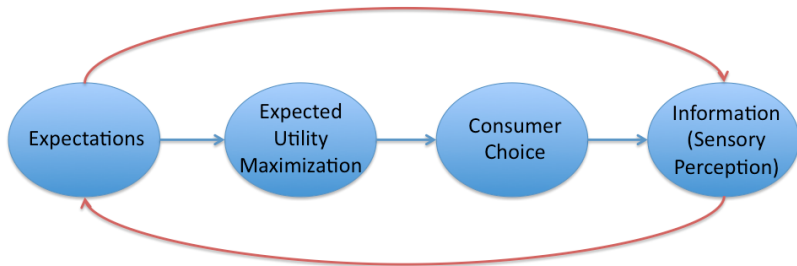
Expectations Bias Perception:
Imperfect Information



Self-Perpetuating Information Bias

Economic Framework

Expectations Bias Perception:
Imperfect Information

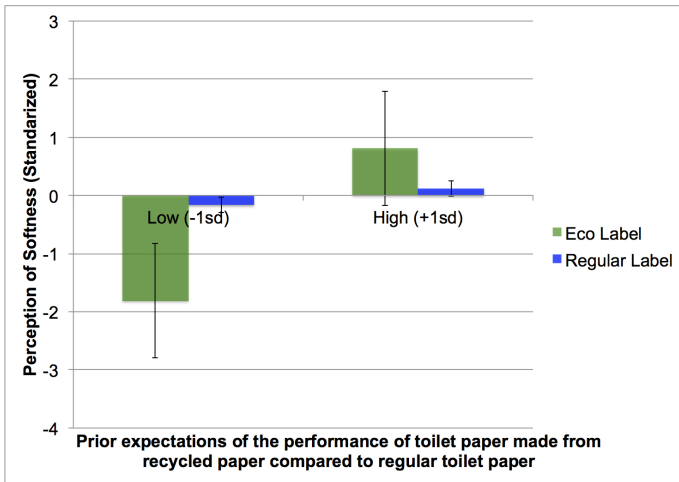


Perceptions Influence Expectations:
Bias is Self-Perpetuating

Primary Research Questions

- Do expectations about the performance of eco-products bias perceptions of product performance?
- What is the impact of expectation biased perception on willingness to pay for eco-products and eco-product market share?

Expectation Biased Perception: Experimental Results



Results from ongoing work by Todd Rogers & Trisha Shrum

Research Plan

- 1 Specify a discrete choice model that allows for expectation biased perception of product attributes
- 2 Carry out lab experiments to estimate the function that maps expectations into perceptions and product choice
- 3 Conduct nationally representative surveys to estimate the distribution of consumer expectations for key eco-products
- 4 Combine experimentally estimated relationship between expectations and perceptions with data on the distribution of consumer expectations and market data on consumer choice to identify model parameters.
- 5 Simulate demand with counterfactual distributions of eco-product expectations

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Preview of Model

Period 1: Consumer i holds expectations, α_{ik} , about an attribute, θ_j , of product j in product category k . He tests product j and retains information about his sensory perception, $\tilde{\theta}_{ij}$, of the product attribute with true value, θ_j .

$$\tilde{\theta}_{ij} = f(\alpha_{ik}, \theta_j)$$

Period 2: Consumer chooses product to maximize the following utility function:

$$u_{ij} = \eta_i(w_i - p_j q_j) + \psi_{ij}(\alpha_{ik}, \theta_j)$$

where $E[\psi_{ij}(\alpha_{ik}, \theta_j)] = \tilde{\theta}_{ij}$

Preview of Model

The consumer has perfect information about the product attribute iff $\tilde{\theta}_{ij} = \theta_j$.

This occurs if expectations have no impact on perception:

$$\tilde{\theta}_{ij}(\alpha_{ik}, \theta_j) = \tilde{\theta}_{ij}(\alpha_{il}, \theta_j) \quad \forall k \neq l$$

Or when the consumer has neutral expectations of the product:

$$\tilde{\theta}_{ij} > \theta_j \text{ if } \alpha_{ik} > 0$$

$$\tilde{\theta}_{ij} < \theta_j \text{ if } \alpha_{ik} < 0$$

$$\tilde{\theta}_{ij} = \theta_j \text{ if } \alpha_{ik} = 0$$

where $\alpha_{ik} > 0$ denotes positive relative expectations of product category k , $\alpha_{ik} < 0$ denotes negative relative expectations, and $\alpha_{ik} = 0$ denotes neutral expectations.

Request for Feedback

- Choosing the right framework:
 - Reduced form vs. structural approach
 - Dynamic vs. static
 - Bayesian learning
 - Tastes for products vs. tastes for characteristics
- Caveats, recommendations, thoughts?