Coherent arbitrariness

Stable preferences in an unstable world
Pricing?

How do we decide if we should buy a cup of coffee (for $3)?

Ideally an internal representation of coffee will be compared to price.

- If value > price ➔ buy
- If value < price ➔ don’t buy
Fundamental Values

Economic theories assume underlying “fundamental” values.

Rarely, however, is it possible to measure fundamental values.

Virtually all tests of economic predictions examine the effect of changes in circumstances on valuation.

Such results are necessary but not sufficient condition for fundamental valuation.
A psychological perspective

- Reasons you love your spouse
  - Schwartz, 2002

- Sensitivity to anchors
  - Kahneman & Tversky, 1974

- Context effects
  - Simonson & Tversky, 1992

- People often have an imperfect understanding of their own values
How about new products?

- How much is this sound worth?
- How do we set such prices?
- How come the sound is so different from coffee?
- Sound should be simpler…
Some intuitions

Can one map the pleasure of a chocolate-bar to money?

Is this mapping immediate & direct?

How about chocolate vs. ice-cream?
### The parts

<table>
<thead>
<tr>
<th>Economics (theory)</th>
<th>Psychology (fuzzy preferences)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intuitions (mapping $ is hard)</td>
<td>Market (behavior is predictable)</td>
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</table>
A toy example

![Bar graph showing variance for different actions: Face Blue, Smell Shoes, Kill Mouse, Sing Songs, Shine Shoes, Newspapers, Walk Dog. Kill Mouse has the highest variance.]
Experiment 1 Procedure

Do people have fundamental values?

- 2 (Anchor) by 2 (order) by 3 (duration) by 3 (replications)
Introduction
Subjects listen to sound
Hypothetical question
No anchor
10¢ / 50¢

Bidding for real X 9
Getting real payoffs
Increasing 10 sec, 30 sec, 60 sec
Decreasing 60 sec, 30 sec, 10 sec
Experiment 1 Results I

<table>
<thead>
<tr>
<th>Ratios</th>
<th>R 60/10</th>
<th>R 30/10</th>
<th>R 60/30</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-(50c)</td>
<td>4.35</td>
<td>2.30</td>
<td>1.80</td>
</tr>
<tr>
<td>Low-(10c)</td>
<td>3.90</td>
<td>2.50</td>
<td>1.60</td>
</tr>
<tr>
<td>No-Q</td>
<td>4.15</td>
<td>2.60</td>
<td>1.90</td>
</tr>
</tbody>
</table>
Experiment 1: Interpretation 1

- High-(50c)
- Low-(10c)
- No-Q
Experiment 1 Results II

WTH over time

- High-ExPrice
- Low-ExPrice
- No-ExPrice
Experiment 1 Conclusions

- Subjects do not have internal value for novel hedonic stimuli.
- Once a response is made, other responses follow.

→ Coherent arbitrariness
# Real products

<table>
<thead>
<tr>
<th></th>
<th>Mean value</th>
<th>Low ss#</th>
<th>High ss#</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trackball</td>
<td>16.25</td>
<td>10.38</td>
<td>21.52</td>
<td>107%</td>
</tr>
<tr>
<td>Keyboard</td>
<td>32.47</td>
<td>21.81</td>
<td>42.03</td>
<td>93%</td>
</tr>
<tr>
<td>$9 wine</td>
<td>15.80</td>
<td>11.62</td>
<td>19.55</td>
<td>68%</td>
</tr>
<tr>
<td>$82 wine</td>
<td>22.89</td>
<td>17.42</td>
<td>27.76</td>
<td>59%</td>
</tr>
<tr>
<td>Design book</td>
<td>18.81</td>
<td>14.15</td>
<td>23.00</td>
<td>62%</td>
</tr>
<tr>
<td>Belgian Chocolates</td>
<td>13.31</td>
<td>10.04</td>
<td>16.24</td>
<td>62%</td>
</tr>
</tbody>
</table>

- High dependency between the prices of the 2 wines and 2 computer accessories
Poetry 2

Poetry, charge
Poetry, pay
Decision making exp

DM study, charge
DM study, pay
Other examples

Mountain climbing, giving public talks, performing on stage, cooking for others, taking pictures, etc.
“The model”

- Self herding

- Evaluating self preferences is hard

- Behavior is a signal for preferences

- Frequent behavior is taken as a strong signal
Experiment 2 Procedure

Will the forces of the market correct arbitrariness?

2 (Anchor) by 2 (order) by 3 (duration) by 3 (replications)

Anchors were 10¢ and 100¢

Groups (Markets), not individuals
Experiment 2 Procedure

Introduction
Subjects listen to sound

Hypothetical question
10¢ / 50¢

Bidding for real X 9

Getting real payoffs
Increasing 10 sec, 30 sec, 60 sec
Decreasing 60 sec, 30 sec, 10 sec
Experiment 2 Results I

Bids and wins over time

Bid High-ExPrice
Bid Low-ExPrice
Win High-ExPrice
Win Low-ExPrice
Experiment 2 Conclusions

- Arbitrary values are not “corrected” over time

- Arbitrary values are not “corrected” in marketplaces

- Learning to arbitrary values?
Experiment 3

- Known random anchors
- Use subjects’ own SS#
- Larger magnitude
  - 100 sec, 300 sec, 600 sec
- Same basic procedure as in Exp 1
  - Plus ranking of small annoying tasks
Experiment 3 results I

WTA ($) vs. Time (sec.)

- High Anchor
- Low Anchor
Experiment 4

What is the role of the first anchor?

- Information?
- Changes utility or mapping?

3 (sounds) by 2 (order) by 3 (Anchor)

- Anchors were 10¢, 50¢ and 90¢
- Duration was constant at 30 sec.
- Type of sound changed
- Fourth trail was the same as trial#1 + vise
Experiment 4 Procedure I

Introduction

Subjects listen to sound

Hypothetical question

10¢ / 50¢ / 90¢
90¢ / 50¢ / 10¢

Bidding for real
Getting real payoffs
Why the vise?
Experiment 4 Results WTA

WTA-1
WTA-2
WTA-3

Increasing
Decreasing
Experiment 4 Results II

- Significant effect of order
- No effect for anchors
- No effect for Vise/Sound choice
Experiment 4 Conclusions

- The first trial had a large role
- The first response determines future responses
- Not an inference process
  - Using the anchor as information
Utility theory interpretation

Traditional view on tradeoffs
Utility theory interpretation

“Incomplete preference” view on tradeoffs
Utility theory interpretation

Initial response and its consequences
Utilities or mapping?

- Leftovers
  - Experiment 3 (large payoffs & Random anchor)
    - Rank order of small annoying tasks [Blood test, missing a bus, dropping your ice-cream etc.]
  - Experiment 4 (3 different anchors)
    - Choice of sound vs vise
- No effect for anchoring!
Utilities vs. mapping experiment

4 Values ($0.5, $1, $2, $4)
The procedure

Pair-wise preference

OR

No measurement

Anchoring
Y/N Question

↓

WTA

Pair-wise preference

Time
Results Anchoring

- **Bedpan:** $R^2 = 0.46, F = 17.96, p < 0.01$
- **Butter:** $R^2 = 0.28, F = 5.8, p < 0.02$
- **Shock:** $R^2 = 0.34, F = 8.8, p < 0.01$
- **Drink:** $R^2 = 0.29, F = 6.23, p < 0.02$
Results effects on pair-wise

Are the pair-wise preferences influenced by the ratios of the pair-wise anchors?

- Shock/bedpan ($R^2 = 0.046$)
- Bedpan/butter ($R^2 = 0.023$)
- Bedpan/drink ($R^2 = 0.002$)
- Butter/shock ($R^2 = 0.002$)
- Drink/Shock ($R^2 = 0.011$)
Mapping or utilities?

summary

So far evidence for mapping

Questions

- What makes mapping difficult?
- Money? (sound vs. drink ➔ no)
- Abstract attributes?
- Distance?
Conclusions

The coherence of the market seem to reflect the psychology of relative valuations.

People do not seem to have fundamental values even for simple experiences.

Is money a bad idea?
The parts

- **Economics** (theory) - (x)
- **Psychology** (fuzzy preferences) - (√)
- **Intuitions** (mapping $ is hard) - (√)
- **Market** (behavior is predictable) - (√)
Possible Applications / economics I

Financial markets (Shiller, 1987)

“Who would know what the value of the Dow Jones Industrial Average should be? Is it really "worth" 6,000 today? Or 5,000 or 7,000? or 2,000 or 10,000? There is no agreed-upon economic theory that would answer these questions. In the absence of any better information, past prices (or asking prices or prices of similar objects or other simple comparisons) are likely to be important determinants of prices today.”

Market reactions are sensitive to performance relative to expectations (IBM is doing X better than expected) and to other relative changes (IBM is buying back X stocks)
Possible Applications / economics II


“Non-union companies seemed to be isolated islands, with most workers having little systematic knowledge of pay rates at other firms. Pay rates in different non-union companies were loosely linked by the forces of supply and demand, but these allowed a good deal of latitude in setting pay”

Well being within a company is related to relative pay to others and to former levels
contingent valuation

“valuations of any particular quantity [of a good] would be sensitive to its relative position within the range selected for valuation, but insensitive to which range is chosen, resulting in insensitive (or incoherent) values across studies using different quantity ranges” Frederick and Fischhoff (1998, p. 116)

BUT, within subjects evaluations are coherent
Possible Applications / economics IV

- Criminal deterrence (Ross, 1973)
  - People seem sensitive to policy changes in deterrence (perhaps only short term)
  - People seem insensitive to absolute levels of probability of punishment
  - Reactions to crime also have a very strong cultural effects
Questions for neuro-science

- Is there cardinal utility?
- When pain is experienced as pleasure (and the other way) what is the associated brain activity?
Marketing implications

First price has long lasting implications

Products are comparative in nature
  Understanding what a product will be compared to is important

Product lines and product extensions