Behavioral Economics

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Midterm Exam

Due Tuesday 13th March

Question 1 (40 points) Consider the following (completely standard) decision maker: They have a utility function u on a set of finite alternatives X. Their preferences over sets of these alternatives (which we indicate by $\trianglerighteq$ for weak preferences) are given by the following. For any $A \in 2^X/\emptyset$, $B \in 2^X/\emptyset$

$$\begin{aligned} A &\trianglerighteq B \text{ if and only if} \\ \max_{x \in A} u(x) &\geq \max_{x \in B} u(x) \end{aligned}$$

1. Show that the binary relation $\trianglerighteq$ is complete and reflexive
2. Show that it is transitive
3. Show that it satisfies the following property: if $A \trianglerighteq B$, then $A \bowtie A \cup B$ (where $\bowtie$ indicates indifference - i.e. $A \bowtie B$ iff $A \trianglerighteq B$ and $B \trianglerighteq A$)
4. We will now start to prove that if $\trianglerighteq$ satisfies these three properties, then it must be the case that there exists some $u : X \to \mathbb{R}$ such that $A \trianglerighteq B$ if and only if $\max_{x \in A} u(x) \geq \max_{x \in B} u(x)$ (i.e these conditions are sufficient as well as necessary. First, define the following binary relation on X:

$$\begin{aligned} x &\succeq y \text{ if and only if} \\ \{x\} &\trianglerighteq \{y\} \end{aligned}$$

where $\{x\}$ is the set that contains only x. Thus, we will say that the object x is preferred to the object y if and only if the set that contains only x is preferred to the set that

contains only y. Now show that, if $\trianglerighteq$ satisfies the three properties above, then there is a utility function u such that $x \succeq y$ if and only if $u(x) \geq u(y)$ (hint: what properties must $\succeq$ have to have in order to have a utility representation

5. For any set A, prove by induction that there must exist some x_A such that $\{x_A\} \trianglerighteq \{y\}$ for all $y \in A$.
6. Show that, if the three conditions hold, it must be the case that $A \sim \{x_A\}$
7. Use this to prove that $A \trianglerighteq B$ if and only if $\max_{x \in A} u(x) \geq \max_{x \in B} u(x)$

Question 2 (40 points) Read the attached description of an experiment and its aim. Does it do a convincing job of achieving its stated aims? Can you think of 'real life' situations to which this would generalize? How well does it stand up to the criticisms of Levitt and List?

Question 3 (20 points) Consider the following model of choice in the presence of a status quo: A decision maker has two 'preference relations' on a set X

- $\succeq$, which are their 'normal' preferences - and are complete, transitive and reflexive
- $\rhd$, which represents 'strongly preferred. These are transitive, but not necessarily complete (i.e. it is not true that, for some x, y, either $x \rhd y$ or $y \rhd x$. Moreover, if $x \rhd y$ it must be the case that $x \succ y$, but if $x \succ y$ it is not necessarily the case that $x \rhd y$

The decision maker makes choices in the following way

- If there is no status quo, they choose the item in the set that is best according to the preference relation $\succeq$
- If there is a status quo x in the set, they identify the set of objects that are strongly preferred to x (i.e. all the $y's$ such that $y \rhd x$), then choose the best of these of these objects. If there are no objects y in the set such that $y \rhd x$, then they choose the status quo.

For convenience, you can write $C(A, x)$ to indicate the choice that the decision maker makes from A when the status quo is x

1. For a set of objects x,y, z, find a set of preferences (i.e. some $\succeq$ and $\rhd$) such that there is status quo bias - i.e. such that $C(\{x, y, z\}, x) = x$ and $C(\{x, y, z\}, y) = y$. Show that, in order to get status quo bias, it must be the case that $\rhd$ is not complete

2. Can this model explain 'too much choice'? Remember, too much choice occurs when people switch to choosing the status quo when the choice set gets too large - so for example $C(\{x, y\}, x) = y$ but $C(\{x, y, z\}, x) = x$.

CHOOSING HOW MANY OPTIONS TO CHOOSE FROM: DOES IT DEPEND ON AFFECTIVE PRIMING?

When making purchase decisions, how many options do people wish to have available? Does this number depend on people's affect towards the product? To address this, we combined two research areas, the "tyranny of too much choice" and "affective decision making".

Tyranny of too much choice

Larger choice sets offer advantages: As compared to smaller choice sets, they are likely to contain better options (assuming options are randomly sampled from the population), leading to better decision outcomes. On the other hand, larger choice sets also have disadvantages: More options require more computation, both for screening and comparing the options, leading to a more effortful and time consuming decision process. This trade-off between outcome-satisfaction and process-satisfaction is therefore integral to understanding how people determine the number of options they wish to have available, which we refer to as their desired-set-size (DSS).

Reutskaja and Hogarth (2006) measured satisfaction with a choice made from a set of gift boxes whose size ranged from 5 to 30 options. They observed an inverse U-shaped relationship between satisfaction and the size of the choice set. This suggests that initially the benefits of having a larger choice set are greater than the costs, causing satisfaction to increase. However, as the size of the choice set continues to increase, the additional costs exceed the additional benefits, causing satisfaction to decrease.

Despite recent interest in the tyranny of too much choice, the size of the choice set has nearly always been determined by the experimenter (e.g., Iyengar & Lepper, 2000; White et al., 2008). In real life, however, people can usually determine the size of their choice set themselves

by visiting as many stores as they wish and stop considering more options at any time. Much could be learned by asking participants to determine the size of the choice set themselves, but as far as we are aware, this has only been done in studies reported by Salgado (2005) and Chernev (2006).

Affective decision making

The above cost-benefit analysis ignores affect and emotions even though they play a role in choice situations. It is not only options themselves that evoke affect, rather, what happens prior to a judgment or decision can also cause options to be evaluated in an affective manner. Hsee and Rottenstreich (2004) found that people´s Willingness-to-pay (WTP) for items depends on whether a person is computationally primed (achieved with a questionnaire containing items that required them to perform computations) or affectively primed (achieved with a questionnaire containing items that required them to examine and report their feelings).

Predictions

Similar to Hsee and Rottenstreich (2004), we predicted that people who were computationally-primed would exhibit a constant sensitivity to an increase in the number of items. In contrast, we predicted that people who were affectively-primed would appear to be insensitive to the number of items.

Procedure. First, the 160 participants were told that they could choose 5 (or 10, manipulated between subjects) postcards of their university's campus. Second, they completed either the affective or computational-priming questionnaire (adapted from Hsee and Rottenstreich 2004). Third, they determined their WTP and their DSS from which they could choose their 5 (or 10) cards. The minimum set size was either 5 postcards (or 10, according to the condition); the maximum was 100 postcards. Fourth, these three steps were repeated with

Christmas present tags (order counterbalanced) and with different priming questions. Participants were given the opportunity to take home their chosen items.

Results and Discussion

The calculation-primed participants were willing to pay significantly more for 10 cards than for 5. In contrast, the affectively-primed participants were largely insensitive to the number of items they would choose. This predicted pattern was only significant for some of the dependent variables and was affected by whether outliers were removed from the data. In the full dataset, the interaction was significant when considering all dependent variables together (with a MANOVA), but when each dependent variable was analyzed separately (with separate ANOVAs) it was only statistically significant for the DSS that was stated a second time at the end of the experiment, although there was also a tendency towards this interaction for the DSS that was stated initially. In the trimmed dataset, the interaction was significant when considering all dependent variables together, but when each dependent variable was analyzed separately, it was only statistically significant for the DSS that was stated a second time and marginally significant for WTP.

After the experiment, several participants said that they did not perceive watching the pictures as an investment of time, that is, a cost they had to pay in order to select some good ones, but that they had intrinsically enjoyed seeing them. This could explain the added noise in the measures elicited before people actually watched the pictures.

There was no correlation between the two measures of costs, hypothetical financial costs (WTP) and expected temporal and cognitive costs that will subsequently be realized (DSS). This was surprising because these variables showed similar patterns of mean data. This suggests that, contrary to the well-known expression “time is money”, people do not naturally treat the

two concepts as being equal. Investigating the mental relationship between these two concepts could therefore be a fruitful area for further research.

We also measured participants' satisfaction with the choosing process and the chosen items. Reutskaja and Hogarth (2005) found satisfaction to be an inverse U-shaped function of the manipulated choice set size. In contrast, we found that there was no linear or nonlinear relationship between DSS and the two reported satisfaction measures. The fact that participants determined the size of the choice set themselves provides two plausible explanations for the lack of a relationship. First, people may have been able to determine the set size that would yield the maximum overall satisfaction for them. Second, people may have become committed to their stated DSS and therefore did not want to report regretting having too many or too few options, as that would imply that they had previously made an imperfect judgment.

References:

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