Written Exam at the Department of Economics Winter 2018-19

Science of Behaviour Change

Final Exam

February 7, 2019

(2-hour closed book exam)

Suggested answers

Question 1 aims to assess the following two learning objectives:

- 1. Review the most recent developments and theories of human decision-making from both *Economics and Psychology.*
- 2. Analyze the tools of behavioral science and they will compare their effectiveness to change specific behaviors.

Question 2 aims to assess the following two learning objectives:

- 1. Reflect on how experiments and randomized controlled trials work and why this methodology is critical for making inference about causal relationships.
- 2. Debate and discuss critically several interventions that have been conducted to change people's behavior in the domain of energy efficiency, health and well-being, dishonesty, charitable giving, education and work performance.

Question 3 aims to assess the following two learning objectives:

- 1. Examine (real-world) cases where people make decisions that are inconsistent with the assumptions of rational decision-making and they will identify the consequences of this irrational behavior for the society.
- 2. Design experiments and develop policy intervention aiming at ameliorate societal well-being and improve people's life.

Answer to Question 1:

- a) The counterfactual is what would have happened to the participants in the absence of the intervention program. Since the counterfactual is not observable, the key goal of all impact evaluation methods is to construct or "mimic" the counterfactual. In fact, the counterfactual cannot be observed from the treatment group; it can only be inferred from the comparison group. In an experimental design, the comparison group (or control group) is a randomly assigned group from the same population that is not intended to receive the intervention.
- b) Because there is no exact replica of a single person we look for a group of people that *on average* are the same as participants would have been without the program. In other words, the counterfactual is often constructed by selecting a group not affected by the program. We have seen two types of construction of the counterfactual: "randomized", using random assignment of the program to create a control group which mimics the counterfactual and "non-randomized", arguing that a certain excluded group mimics the counterfactual. In more detail we have discussed:

- Randomized Evaluations: Experimental method for measuring a causal relationship between two variables. Participants are randomly assigned to the control groups. If randomization works, the two groups are statistically identical (on observed and unobserved factors).

- Pre-Post: Measure how program participant improved (or changed) over time.

- Simple Difference: Measure difference between program participants and non-participants after the program is completed.

- Differences in Differences: Measure improvement (change) over time of program participants relative to the improvement (change) of non-participants.

Multivariate Regression: Individuals who received treatment are compared with those who did not, and other factors that might explain differences in the outcomes are "controlled" for.
Statistical Matching: Individuals in control group are compared to similar individuals in

experimental group.

- Regression Discontinuity Design: Individuals are ranked based on specific, measurable criteria. There is some cutoff that determines whether an individual is eligible to participate. Participants are then compared to non-participants and the eligibility criterion is controlled for.

- Instrumental Variables: Participation can be predicted by an incidental (almost random) factor, or "instrumental" variable, that is uncorrelated with the outcome, other than the fact that it predicts participation (and participation affects the outcome).

c) Hawthorne Effect: tendency to perform differently when one knows they are being observed (example: Western Electric factory, 1924-1932. Treatments: change in lighting; Results: increased productivity due to the treatment.)

John Henry Effect: Treatment group compete with the control group. (John Henry is legendary steel driver who he heard that his output is compared to a steam drill and started to work so hard that he died.)

Resentment effect: Comparison group is demoralized or resentful.

Demand effect: When the participants change their behavior in response to what they think evaluator wants.

Anticipation effect: Change in the behavior due to the expectation of future treatment. Survey effect: Survey can change the behavior

Answer to Question 2

a) Gender discrimination in hiring has represented a major challenge over the past few decades. In an attempt to overcome gender biased hiring, a vast majority of symphony orchestras revised their hiring practices from the 1950s. Many orchestras opened up their hiring process to a range of candidates, rather than only hiring musicians who were handpicked by the conductor. As a result of these changes, most orchestras now hire new players after about three rounds of live or recorded auditions: preliminary, semi-final, and final. In addition, a number of orchestras adopted "blind" auditions whereby screens are used to conceal the identity and gender of the musician from the jury. In this study, the authors make use of existing audition records and orchestra personnel

In this study, the authors make use of existing audition records and orchestra personnel rosters to examine the effects of "blind" auditions at various stages in the audition process on the likelihood of women advancing and eventually being hired. The dataset is unique because it contains the complete contestant pool for each audition and allows authors to link individuals across multiple auditions. Audition records were collected from 8 major symphony orchestras, dating from the late 1950s to 1995. The analysis sample for auditions consists of 14,121 person-rounds, 7,065 individuals and 588 audition-rounds.

b) "Blind" auditions for symphony orchestras reduced gender biased hiring and improved female musicians' likelihood of advancing out of preliminary rounds, which often leads to tenured employment. The authors claim that in the years after these changes were instituted, the percent of female musicians in the five highest-ranked orchestras in the nation increased from 6% in 1970 to 21% in 1993. Note that given the low turnover found in most symphony orchestras, the increase in female musicians is significant.

In the paper, the authors examine whether these new hiring practices were responsible for the increase observed in women's employment in symphony orchestras. The table shows that using a screen to conceal candidates from the jury (blind) during preliminary auditions increased the likelihood that a female musician would advance to the next round (from 19.3% to 28.6% and from 13.3% to 20.0%). Moreover, during the final round, "blind" auditions increased the likelihood of female musicians being selected and hired (from 8.7% to 23.5% and from 1.7% to 2.7%). In this paper, the authors also show that according to analysis using roster data, the transition to blind auditions from 1970 to the 1990s can explain 30% of the increase in the proportion female among new hires and possibly 25% of the increase in the percentage female in the orchestras. In short, "blind" auditions significantly reduced gender-biased hiring and the gender gap in symphony orchestra compositions.

c) We often experience being tired and hungry and that we cannot function without our daily coffee. Recent research has shown that being tired and hungry can indeed deplete our cognitive resources and significantly affect our decision-making. A well-known and disconcerting studying on the effects of fatigue on decision-making examined the factors that most influenced whether eight Israeli judges granted or denied parole requests. Researchers identified that, immediately following meals, about 65% of parole requests were granted, but that rate dropped steadily between meals, nearly reaching zero when the judges were most hungry. In class we have discussed about the limitation of this study but also the new evidence collected that cognitive fatigue may reduce our ability to make the correct decision and study/work performances (for instance the paper recently published in PNAS looking at children performance in strandardized tests before and after the break). We can expect similar effect of cognitive fatigue in hiring decisions. For instance, one may expect that discrimination will be more severe when the hiring decision is taken later in a day or after a long day without breaks. Of course, more research should be done to study this expected effect.

Answer to Question 3:

This question has not a correct answer a priori. This question gives the student the possibility to show that he/she can use his/her competencies for solving practical problem. Students should:

- a) define the context in which the intervention is going to happen (when, where and who is the target agent).
- b) briefly think through the behavior change and articulate the specific behavior that he/she wants to change as a result of the intervention (*a specific and measurable behavior*).
- c) map the decision making process: different stages that people go through; various frictions and possible bottlenecks.
- d) make a linkage between that map that he/she has just drawn, the process that he/she has just identified, and some of the concepts that we discussed in this course.
- e) describe the intervention in detail
- f) describe the design of an experiment that can test the intervention and present how to organize the data analysis.