Written Exam at the Department of Economics winter 2016-17

Science of Behavior Change

Final Exam

December 16, 2016

(2-hour closed book exam)

Please note that the language used in your exam paper must correspond to the language for which you registered during exam registration.

Suggested answers, 4 pages

NB: If you fall ill during the actual examination at Peter Bangsvej, you must contact an invigilator in order to be registered as having fallen ill. Then you submit a blank exam paper and leave the examination. When you arrive home, you must contact your GP and submit a medical report to the Faculty of Social Sciences no later than seven (7) days from the date of the exam.

Question 1 aims to assess the following two learning objectives:
- *Students will review the most recent developments and theories of human decision-making both from Economics and Psychology.*
- *Students will analyze the tools of behavioral science (namely incentive, regulation, persuasion and nudging) and they will compare their effectiveness to change specific behaviors.*

Question 2 aims to assess the following two learning objectives:
- *Student will reflect on how experiments and randomized controlled trials work and why this methodology is critical for making inference about causal relationships.*
- *Student will 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:
- *Student will examine 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.*
- *Students will design experiments and develop policy intervention aiming at ameliorate societal well-being and improve people's life.*

Answer to Question 1:

a) Preferences at date *t* do not agree with preferences held at date *t+1* about the tradeoff between utility in *t+1* vs. *t+2*. In other words, dynamic inconsistency occurs when individual preferences about if and when to do something depend on when in time they are making the evaluation (e.g., I will exercise tomorrow, but when tomorrow comes I do not exercise).

b) Present-biased preferences, in particular, the beta parameter in a quasi-hyperbolic discount function that uniformly discounts all periods in the future relative to the present generates dynamically inconsistent behavior.

c) In class we have seen many examples. For instance:
  ✓ Chocolate today vs. fruit tomorrow
  ✓ Juice now vs. two juices in 5 minutes
  ✓ Comedy today vs. high-brow movie tomorrow
  ✓ Cookies today vs. exercise tomorrow
  ✓ Good intentions to start saving tomorrow that aren't followed up on
  ✓ Demand for commitment devices (sophisticated agents)

d) We have seen several interventions. For instance:
  ✓ Commitment devices (clocky, Stickk.com, SEED account, etc.)
  ✓ Automatic enrollment
  ✓ Reminders
  ✓ Deadlines
  ✓ Require active choice today
  ✓ Plan-making

Answer to Question 2:

a) DellaVigna and Pope designed and ran a large experiment to compare the relative effectiveness of multiple incentives on a simple (and boring) effort task. They recruited 9800 participants on Amazon Mechanical Turk (MTurk) - an online platform that allows researchers to post small tasks. The task for the subjects is to alternately press the "a" and "b" buttons on their keyboards as quickly as possible for ten minutes. In their 18 treatments they measure what can motivate participant effort. In particular, they used

    1. standard incentives;
    2. non-monetary psychological inducements; and
    3. behavioral factors such as present-bias, reference dependence, and social preferences.

b) The Figure summarizes the phrasing of the 18 treatments and the average effort (number of button presses) per treatment. The main results can be summarized as follow:

    1. monetary incentives have a strong motivating effect – compared to a treatment with no piece rate, performance is 33% higher with a 1-cent piece rate, and 40% higher with a 10-cent piece rate.
    2. non-monetary psychological inducements are moderately effective in motivating the workers. The three treatments increase effort compared to the no-pay benchmark by 15 to 21% - a sizable improvement, especially given that it is achieved at no additional monetary cost. At the same time, these treatments are less effective than any of the treatments with monetary incentives, including the one with very low pay.
    3. the results using behavioral factors are generally consistent with behavioral models of social preferences, time preferences, and reference dependence. Treatments with a charitable giving component motivate workers in a way consistent with warm glow. Treatments with payments delayed by two or four weeks induce less effort than treatments with immediate pay. We observe larger response to an incentive framed as a loss than as a gain. Finally, probabilistic incentives induce less effort than a deterministic incentive with the same expected value (a result not consistent with overweighting of small probabilities).

c) The experts anticipate correctly the effectiveness of the psychological inducements. Strikingly, the average forecast ranks in the exact order the six treatments without private performance incentives. At the same time, the experts fail to correctly predict other features: for instance, for the very-low-pay treatment, where experts on average anticipate a 12% crowd out, while the evidence indicates no crowd out.
In addition, while the experts predict very well the average effort in the charitable giving treatments, they expect higher effort when the charity earns a higher return. Regarding reference dependence, the experts expect the loss framing to have about the same effect as a gain framing with twice the incentives. Turning to the probability weighting results, the experts on average overestimate the effect of the treatments with probabilistic piece rates.

Answer to Question 3:

This question has not a correct answer a priori. This question gives the student the possibility to show that s/he can use the knowledge for solving practical problem.

Students should:

1) define the context in which the nudging is going to happen (when and where).
2) briefly think through the behavior change and articulate the specific behavior that you want to change as a result of the nudge (specific and measurable behavior).
3) map the decision making process: different stages that people go through; various frictions and bottlenecks; identify nudges that would actually help you address those bottlenecks.
4) make a linkage between that map that you've just drawn, the process that you've just identified, and some of the concepts that you've talked about in this class.
5) describe the intervention and/or the nudge (precision)
6) describe the design of an experiment that can test the nudge and briefly how to do the data analysis (internal and external validity).