# AØKA08218U Science of Behavior Change

Suggested answers

January 5, 2015

(2 hours, closed book, written exam at computers)

**Question 1**

*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.*

a) A cognitive bias leads to a **systematic** and **predictable** error of judgment. The bias is caused by the thinker unconsciously taking a quick and easy time-saving mental shortcut. Once the mental shortcut is taken, the thinker has (unwittingly) left the highway of reason and calculation and (unknowingly) entered a mental tunnel (the bias). The bias then leads the thinker to a "destination" significantly different to the one at which the thinker set out to arrive. On arrival, the thinker has no idea they are somewhere else. A judgment error has occurred and a bad decision has been made.
Example: Availability heuristic. The tendency to overestimate the likelihood of events with greater "availability" in memory, which can be influenced by how recent the memories are or how unusual or emotionally charged they may be.

**b)** **Debiasing** requires an intervention that corrects the error which causes the biased judgment in the first place, while **rebiasing** refers to the use of a second bias to offset the effects of the original bias.
We illustrate this subtle distinction with a simple analogy. Imagine a simple door that is normally held shut with a spring mechanism. If the spring is faulty (i.e., it has lost its ability to push the door shut), this door would remain open, and we use this open door as a metaphor for a bias. There are two ways to correct this bias. One option is to simply **repair** the faulty spring hence directly address the cause of the bias. This would constitute a debiasing strategy. Alternatively, we can **exert an opposite force** of the faulty spring that keeps the door shut, and this would constitute a rebiasing strategy.
Note that both strategies achieve the same end result (a shut door), but do so using very different mechanisms.

**Question 2**

*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.*

a) The authors study a widely-implemented behavioral intervention, the "home energy report" produced by a company called Opower. The Opower reports feature personalized energy use feedback, social comparisons, and energy conservation information, and they are mailed to households every month or every few months for an indefinite period. The Opower reports have been implemented as a randomized control trial, which makes it possible to compare the behavior of those who receive the reports and those who do not. The authors use this data to study whether the report might have a short-term effect that fades unless the reminders continue, or a longer-term effect that continues for a time and then fades as people get tired of receiving the reports. The authors show that when first receiving a report, a number of consumers show a quick but short-term reduction in energy use. As people receive more reports, this cycle of reducing consumption and then bouncing back gets smaller. But the repetition of the message seems to have a longer-term effect after two years. In other words, people's habits have changed in a way that lasts for several more years.

b) The figure reports the **treatment effects**: effects increase in absolute value from statistically zero in the pre-treatment period to -0.452 and -0.660 kWh/day in the first and second years, respectively. The program effects are highly durable: when **continued** in the third and fourth years, the estimated ATE is -0.842 kWh/day. When the program is **discontinued**, the effects are also remarkably persistent: the ATE is -0.612 kWh/day for the dropped group in the two years after treatment is discontinued.
This result implies that as the intervention is repeated, people gradually develop a new "capital stock" that generates persistent changes in outcomes. This capital stock might be physical capital, such as energy efficient lightbulbs or appliances, or "consumption capital"—a stock of energy use habits.

c) Results document how **repeated intervention** can eventually cause people to change the composition of their responses, which generates more persistent changes in outcomes. These persistent effects might result from habitual behavior change, or they may result from changes in physical capital or other technologies that change outcomes without additional action. As Charness and Gneezy (2009) and others have shown, the same effect translates to other contexts: for example, a one-time encouragement to lose weight might cause people to diet for a week, while a longer-term intervention is more likely to eventually encourage people to find a workout partner and habitually go to the gym.

**Question 3**

*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.*

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).