

APPENDIX: Recruitment e-mail and experiment instructions

Recruitment email showing random assignment to 8:00-9:00 a.m. response time window (alternate random time-slot assignments change that portion of the email, as well as prize drawing, which is \$300 for midnight to 8 a.m. time slot assignments). Highlights shown were part of actual email recruitment message.

You have been randomly selected to receive this email and online research participation opportunity. This online survey experiment protocol has been approved by the ASU institutional review board. *Please save this message as you will need it to be able to access the online survey link below.*

PLEASE READ THE ENTIRE MESSAGE BEFORE ACCESSING THE SURVEY. AS YOU'LL SEE, PART OF THE SURVEY REQUIREMENTS ARE THAT YOU COMPLETE THE SURVEY WITHIN A SPECIFIC 1-HOUR TIME PERIOD LISTED BELOW. DO NOT START OR COMPLETE THE SURVEY TODAY (see below).

The survey includes demographic questions, a few sleep questions, and other decision experiment questions of interest to the researchers. The estimated time to complete the survey is just 10-15 minutes. There is NO deception in this survey, and your responses will remain completely confidential. This survey offers the chance to earn a cash payoff simply for completing the survey as requested, and another chance to earn cash based on responses to a particular question in the survey (the question is highlighted in the survey). As noted above, you are asked to complete this survey within a specified 1-hour time period. This means that **you must both start AND finish the survey within the one-hour time period** as measured by the time-stamp on the server used to store survey responses (i.e., time on your computer or clock is not what counts). Different subjects are all randomly assigned different 1-hour time periods for their response, and the random prize drawing being offered is larger for those randomly chosen with a “graveyard shift” night-time period.

This is the **ONLY** opportunity you will receive to participate in this experiment. We will offer some response flexibility, however, in terms of the day you choose to complete the survey. **You must complete and finish the survey in the specified 1-hour time period shown below, but you are allowed to complete the survey within that 1-hour time period on either Tuesday, Wednesday, of Thursday of this week** (February 10, 11, or 12). The survey response collector will be closed after that.

Here is the online survey link (please use only this link for your participation, not anything forwarded by a friend, as this won't count as randomly assigned participation), your assigned 1-hour response time period, and the random prize drawing amount that is being offered as incentive for participation.

YOUR ASSIGNED 1-HOUR TIME PERIOD (you must start and finish the survey within this time period)= 8:00 a.m. – 9:00 a.m.

RANDOM PRIZE DRAWING: \$100 prize drawing will be awarded at the end of the Spring 2009 session

WHEN READY TO ACCESS THE SURVEY IN YOUR SPECIFIED TIME PERIOD, click the following link...[ONLINE SURVEY](#)

Recall that there is **the additional chance to win \$50** based on your response to specified question(s) in the survey itself. Such question(s) are highlighted in the survey.

Finally, please note that we want your responses without the help of any aids or other resources (e.g. books, friends, calculators, websites). So, when you go online to complete the survey, please just respond to the best of your abilities to any questions in the survey.

I hope that you will all be a part of this unique research project by completing the online survey as requested, and you will be contacted at the end of the semester in the event that you have won cash from this experiment.

Online Survey Experiment Instructions (Consent page and questions not relevant to the this paper omitted)

Legend

Page= 1. Sleep questions 2

- **Question 1**=last night sleep deprivation question (*SD* variable)
- **Question 2**=trait-level sleepiness (*TSleepy* variable)

Page= 2. Current state

- **Question 1**=subjective state-level (Karolinska) sleepiness question (Fig. 2)

Page= 3. GG

- **Question 1**=Guessing Game question analyzed in paper (treatment 1)
- **Question 2**=2nd treatment of Guessing game not analyzed in paper
 - **Note:** The second Guessing game treatment is not analyzed for two reasons. First, this second treatment always followed the first treatment in the online surveys. Thus there is an ordering confound in analyzing the treatment 2 data. Secondly, the parameters of this second treatment are such that the Nash equilibrium (of Guess=2000) is reached with *finite* depth of reasoning, as opposed to the *infinite* reasoning required to reach equilibrium in treatment 1. Thus, treatment 2 is not as cognitively challenging as treatment 1, and would be less likely to display behavioral effects of sleep and time-of-day than treatment 1 (assuming depletion of cognitive resources will manifest most with more cognitively challenging decision tasks). If, however, we analyze treatment 2 data similar to the analysis in Table 1, we find no significant differences in guesses in “good” versus “bad” states, except that mean guesses (in treatment 2) are significantly closer (i.e., higher) to equilibrium for the “bad” double-condition comparison of “Badtime & TSleepy” and “Goodtime & notTSleepy”. While this seems counter-intuitive, we again highlight the ordering confound in the treatment 2 data. Thus, this result may be due to a heightened anchoring of treatment 2 guesses to the lower guess interval from the previous (treatment 1) question for those “Badtime & TSleepy” subjects. Any treatment 2 data is available from the authors on request.

(survey experiment questions start on next page)

1. Sleep questions 2

* 1. Last night, how much sleep did you get?

- <4 hours
- 4-5 hours
- 5-6 hours
- 6-7 hours
- 7-8 hours
- 8-9 hours
- >9 hours

* 2. How likely are you to doze off or fall asleep in the following situations, in contrast to just feeling tired? This refers to your usual way of life in recent times. Even if you have not done some of these things recently, try to work out how they would have affected you.

	would NEVER doze or fall asleep	SLIGHT chance of dozing or falling asleep	MODERATE chance of dozing or falling asleep	HIGH chance of dozing or falling asleep
Sitting and reading	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Watching TV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sitting, inactive in a public place (e.g., a theater or a meeting)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As a passenger in a car for an hour	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lying down to rest in the afternoon when circumstances permit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sitting quietly after a lunch without alcohol	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In a car, while stopped for a few minutes in traffic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. Current state

* 1. Please mark the number that best corresponds to how sleepy you feel RIGHT NOW. You may mark any number, but only one number.

- 1. Extremely alert
- 2.
- 3. Alert
- 4.
- 5. Neither alert nor sleepy
- 6.
- 7. Sleepy--but no difficulty remaining awake
- 8.
- 9. Extremely sleepy--fighting sleep.

3. GG

***** THE QUESTIONS ON THIS PAGE OFFER YOU THE CHANCE TO EARN REAL CASH!!!

(based on your response and others' responses this semester to these same questions)

ONE of the following two questions will be selected by the researchers to determine a winner (or winners) based on the responses given. You will be contacted at the end of the semester if you are a cash winner of that survey question. Please note that the prize offered is independent (and in addition to) the random prize drawing being offered as general incentive for completing this survey at your specified time.

- * 1. Please submit an integer number (no decimals) between 0 and 1000 (including 0 and 1000 as possibilities).

All survey respondents this semester will be making this same choice. The winner is the person whose chosen number is closest to $\frac{2}{3}$ of the average number submitted. The winning prize is \$50.
(in the event of a tie, the prize money will be equally shared).

I submit the integer

- * 2. Please submit an integer number (no decimals) between 1000 and 2000 (including 1000 and 2000 as possibilities).

All survey respondents this semester will be making this same choice. The winner is the person whose chosen number is closest to 1.3 times the average number submitted. The winning prize is \$50.
(in the event of a tie, the prize money will be equally shared)

I submit the integer