Technology in the Classroom—The Good & Bad

SHOULD YOU PAY ATTENTION TO YOUR STUDENT'S ATTENTION?

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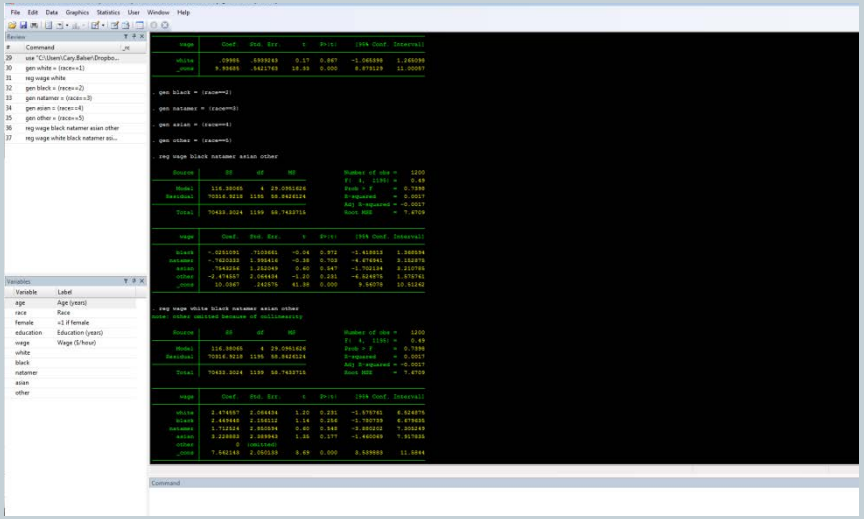
Motivation & Background

- Classroom Management
- Cat Memes



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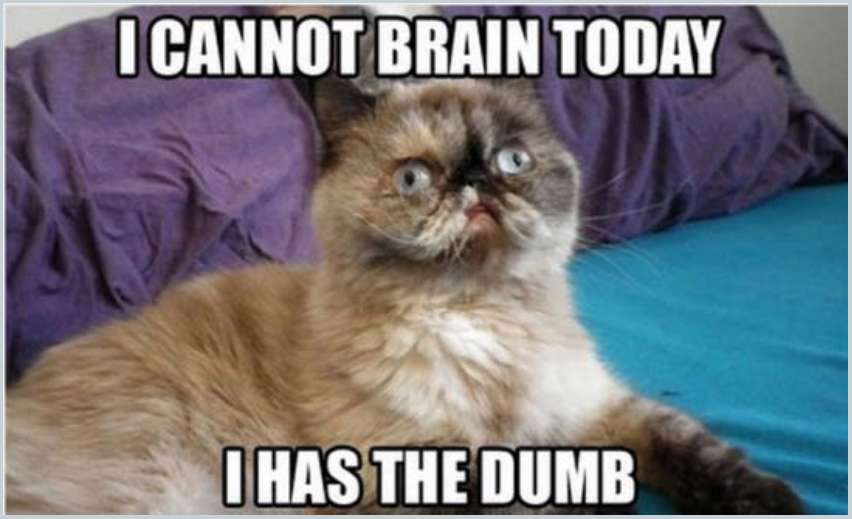


- Behavioral Economics - Nudges for the Classroom/Office

Research Questions

- What would happen to student performance if only internet and email access are removed?
- What are the apparent time-preferences of students?

Methodology

- Using 38 students across 22 lectures in Introduction to Econometrics
- Randomly assigned treatment by lesson/student
- Short-Term Assessments: End of Class Quiz
  - Recall Questions
  - Concept Question
  - Self-Reported Attention and Confidence
- Long-Term: Test Questions Linked to Lesson Objectives

Model

- Panel data model with student and lesson fixed effects:

$$\boldsymbol{y_{ij} = \beta T_{ij} + L_i + S_j + \varepsilon_{ij}}$$

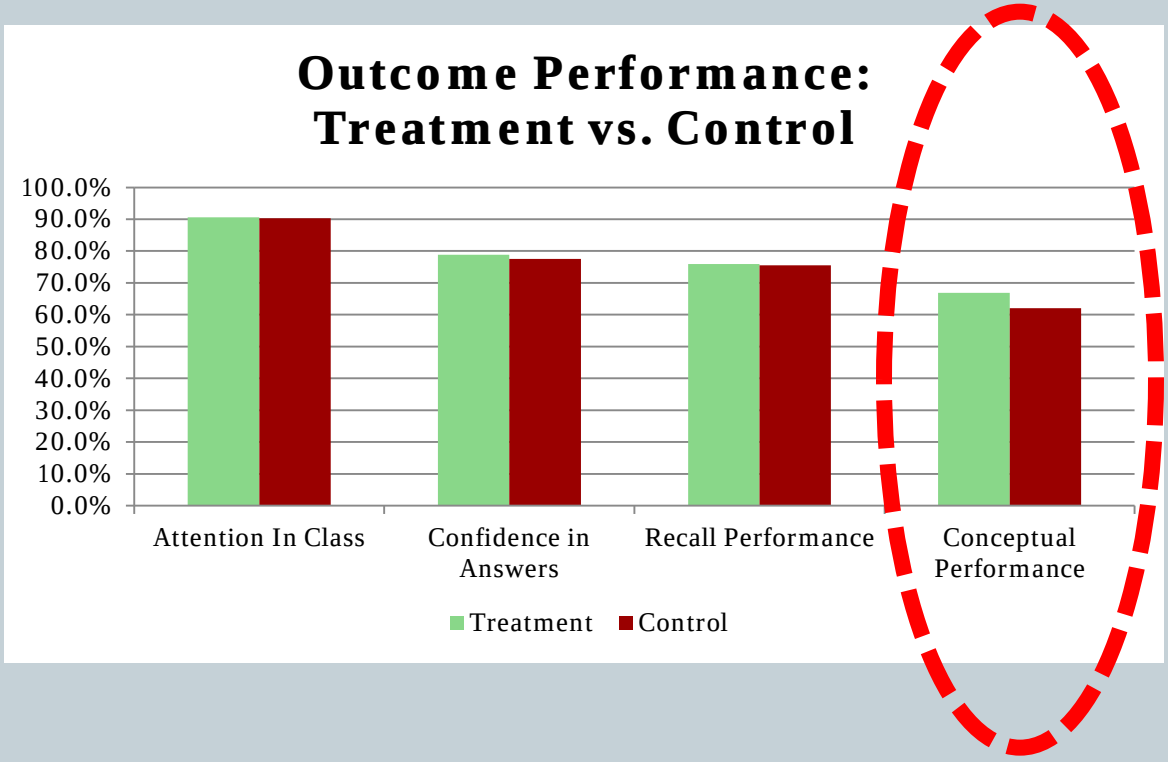
with

- y_{ij}: *Outcome performance* $(0 - 100\%)$ *for lesson i and student j*
- T_{ij}: *Treatment dummy for lesson i and student j*
- L_i: *Lesson Fixed Effect*
- S_j: *Student Fixed Effect*
- ε_{ij}: *Error Term*

- Outcomes
  - Attention
  - Confidence
  - Recall/Conceptual Performance on End of Class Quiz
  - Recall/Conceptual Performance on Tests

Summary Statistics

- Overall Response Rate: 94.7%
- Treatment rate for each student between 30% & 60%



Results

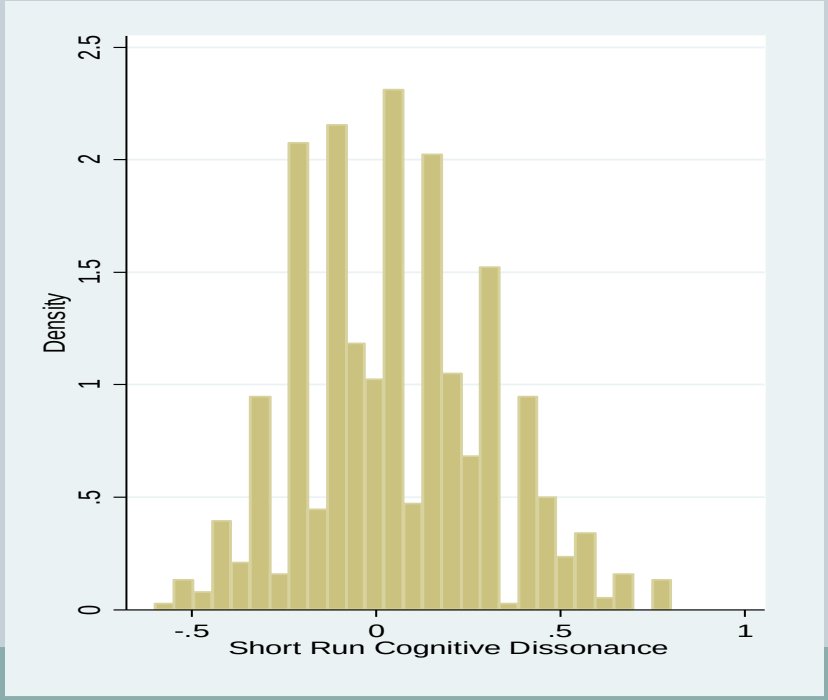
- Blocking internet & email had significant effects on:
  - Students' Confidence (+0.8 percentage points)
  - **Conceptual Understanding at the End of Class (+6.3 percentage points)**
  - Accuracy of Confidence to Performance on Recall Questions (+1.3 percentage points)

Table 1: Effect of No Internet on Performance Holding for Student and Lesson Constant

Outcome	Attention in Class	Confidence in Answers	Recall Performance		Conceptual Performance		Metacognition	
			End of Class	Test	End of Class	Test	Recall Questions	Conceptual Questions
Change for No Internet/Email	-0.13%	**0.80%**	0.30%	3.00%	**6.30%**	-0.70%	**1.30%**	1.70%
Significant	No	**Yes (5%)**	No	No	**Yes (5%)**	No	**Yes (5%)**	No

Results (Cont)

- Students overestimate their performance by 5.3%
- Females are 7% more “cautious” when predicting performance
- Students with higher GPA’s are also more “cautious”



Results (Cont.)

- Ability to block by lesson and student significantly increased R^2

Table 2: Effect of Research Design on R^2						
Outcome	**Attention in Class**	**Confidence in Answers**	**Recall Performance**		**Conceptual Performance**	
			End of Class	**Test**	**End of Class**	**Test**
R^2 with Random Assignment by Lesson	0.33	0.49	0.11	0.23	0.34	0.51
R^2 using Characteristic Data as Control	0.07	0.11	0.06	0.18	0.26	0.43
% Change in R^2	371%	345%	83%	28%	31%	19%

Further Questions

- Why do treatment effects disappear?
- Would proper information or behavioral nudges provide similar effects?
- How much is confidence tied to performance? Are there effects on meta-cognition?
- How can we use similar research design to test the causal effects of other educational interventions?

Questions?