



Notetaking Styles & Memory

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Research Question

Does hand-writing digital notes improve recognition and recall compared to paper notetaking?

Hypothesis

Hypothesis: Taking handwritten notes with a tablet and stylus vs pen and paper will show a difference in recall and recognition

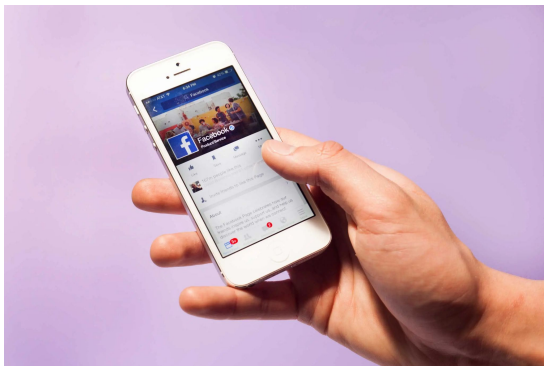
Direction of Outcomes:

- Higher recognition due to higher efficiency with digital notetaking: actions such as highlighting, bolding, etc are faster
- Recall will stay the same



Measurement Units

- Recruited students who owned a tablet and stylus.
 - This ensures that a participant could be randomly assigned treatment or control
 - Want people who have experience with both forms for comparable results
 - Removes the potential learning curve for taking notes on a tablet



Treatment

- All participants in a “treatment time slot” are assigned to take handwritten notes with a tablet and stylus
 - The control group takes notes during the lecture using only paper, pencil and other equivalent materials

2 million years - to develop our brains
3x size now
frontal lobe - pre-frontal cortex
↳ experience simulator
○ ben and jerry's flavors
equally happy w their lives - lottery winners
when simulator fails, people overestimate impact of trauma
happiness can be synthesized
↳ Jim Wright - believes better off w/o his power
the secret to happiness
↳ we personally believe synthetic happiness is not as good as natural happiness
proposing that happiness is equal
monet prints - hospital patients don't remember what they picked
amnesic patients don't remember, their scales continually switch to match the happiness synthesis scale
helping people accept what they can't change
Harvard pick the photo, people w the reversible option were less happy
Turgid Truth

Note Taking Lecture

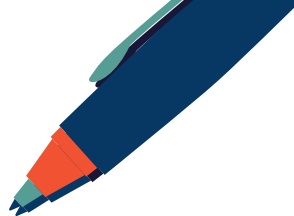
- 2 mil. years → smaller brain to bigger
↳ gained prefrontal cortex (frontal lobe)
↳ lobes → experience simulator & simulation
- Lottery winners ≠ poop = happy
↳ simulations → want to diff. outcomes / desires
- happiness can be synthesized
↳ psychological happiness
↳ think happiness is a thing to be found
↳ synthetic happiness
- secret of happiness → same
- synthetic happiness ≠ natural happiness
↳ inferior kind
↳ want what we want when we want
- in experiment ppl changed # of pointing
↳ the amnesic patients guess, cannot pick correct
↳ but like the one they own
- freedom to choose is enemy to sup. happ.
• helping ppl accept the things they cannot change
- Harvard study
↳ 1 group was told they can change, 1 not
↳ not group was happier, swap group not set
- reversible → not satisfied
↳ limited simulator
↳ overrated future, ambition only made
↳ leads to variable and outcomes

Randomization

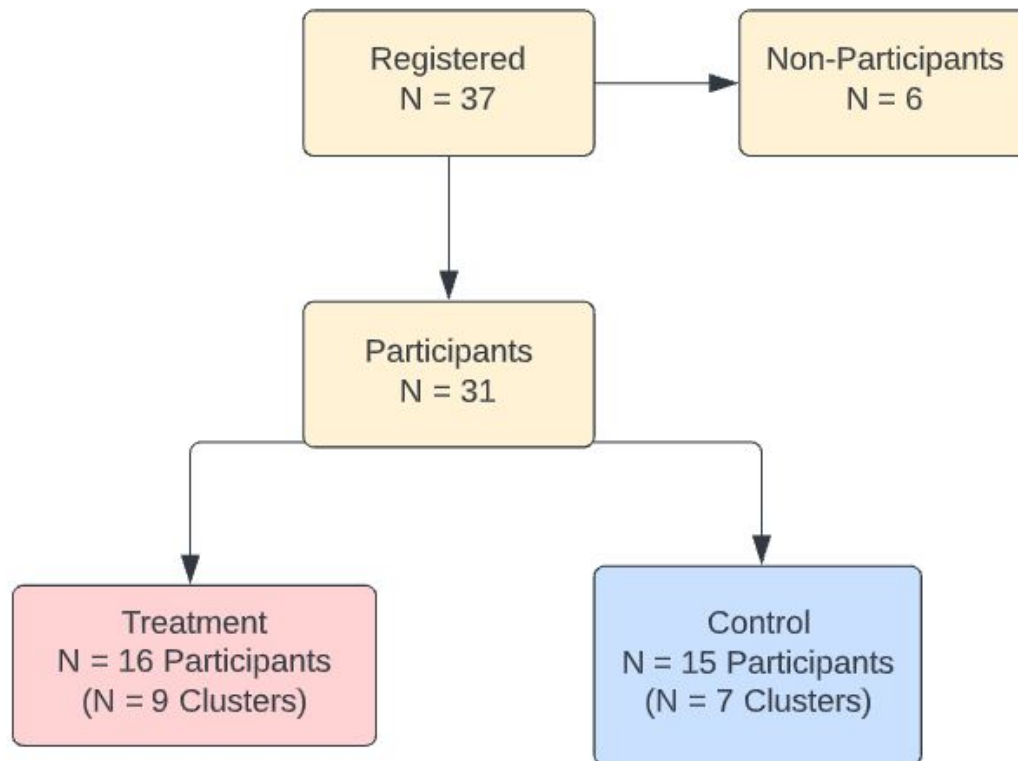


- Participants signed up for a scheduled time slot
- Each time slot was randomly assigned to treatment or control
 - All participants in each time slot received their randomly assigned treatment
- Block randomization: split subjects into groups (time slots) to get relatively equal sample sizes between treatment and control



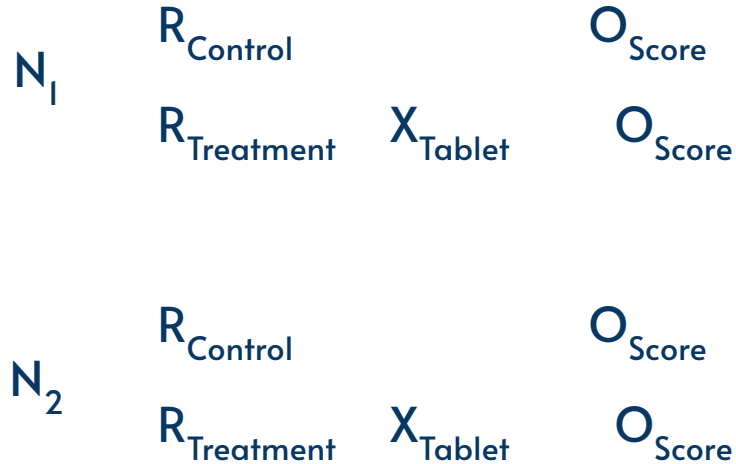


Flow Document





Posttest Only Randomized Experiment

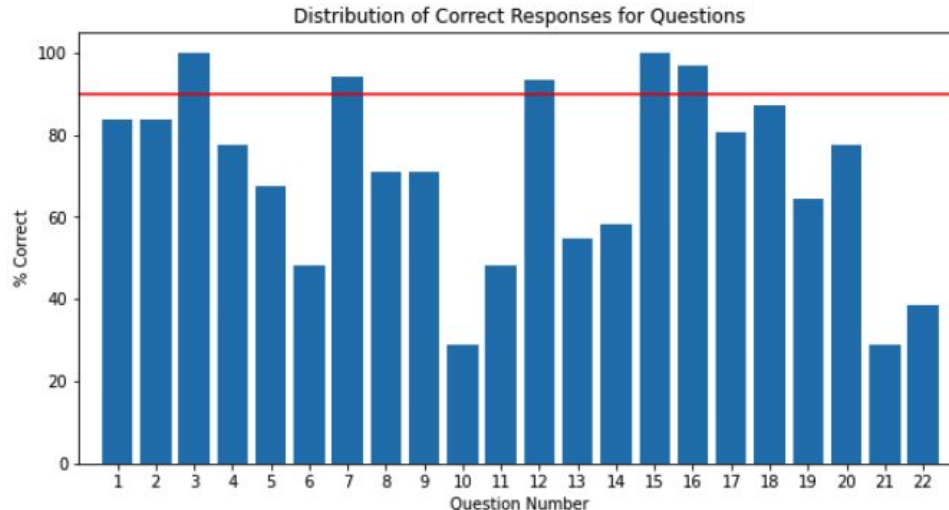


Experiment Design

- Power
- Interference Task - Ensures long term memory rather than short
- Multiple Choice questions - measure recognition
- Short Answer questions - measure recall
- Collected data on scores, education, major, hand, comfortability with treatment, familiarity with lecture, interest level, and disruptions

Outcome Measures

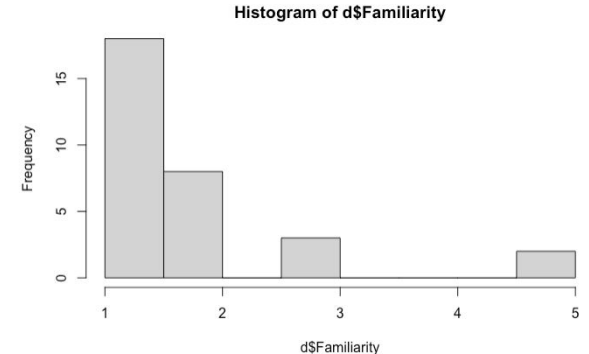
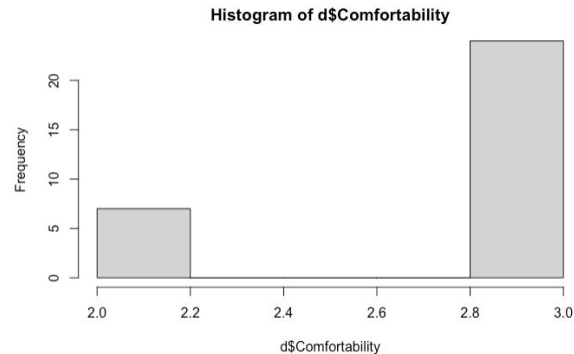
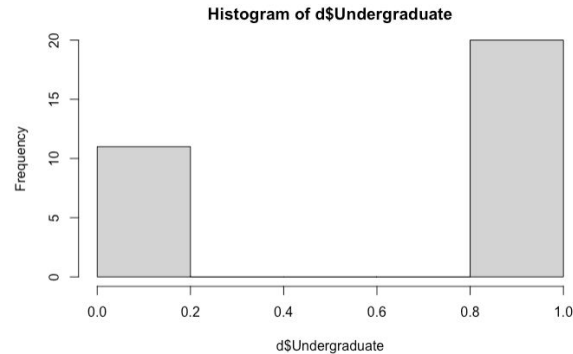
- Quiz based off lecture material measured recall and recognition
 - Multiple choice questions give insight on recognition
 - Short answer questions provide insight on recall



Category Name	
3	MC
7	Short Answer
11	Short Answer
15	MC
16	Short Answer

Analysis

- Assume independence between 2 question types
- Not much differences in bolding/highlighting/writing style
- $\text{lm}(\text{recall} \sim \text{treatment} + \text{covariates})$, $\text{lm}(\text{recognition} \sim \text{treatment} + \text{covariates})$



Results

	Dependent variable:					
	Recognition (1)	Recall (2)	Recognition (3)	Recall (4)	Recognition (5)	Recall (6)
Treatment	-0.500 (0.593)	0.204 (0.631)	-0.352 (0.609)	0.139 (0.716)	-0.723 (0.643)	0.142 (0.454)
"Section Leader"Shanie			-1.151* (0.633)	-1.795*** (0.504)		
"Section Leader"Simran			-0.807 (0.695)	-1.614* (0.835)		
Undergraduate			-1.233** (0.501)	0.309 (0.602)		
Familiarity					-0.210 (0.215)	0.027 (0.242)
Interest3 - Neutral					1.405 (1.946)	4.237*** (0.977)
Interest4 - Interesting					2.872 (1.788)	4.236*** (1.015)
Interest5 - Very Interesting					2.985* (1.801)	5.081*** (0.968)
Constant	8.000*** (0.416)	7.733*** (0.446)	9.477*** (0.644)	8.887*** (0.690)	6.072*** (1.768)	3.402*** (0.935)
Observations	31	31	31	31	31	31
R2	0.025	0.004	0.271	0.193	0.320	0.544
Adjusted R2	-0.008	-0.031	0.159	0.069	0.184	0.453
Residual Std. Error	1.597 (df = 29)	1.701 (df = 29)	1.459 (df = 26)	1.617 (df = 26)	1.437 (df = 25)	1.239 (df = 25)
F Statistic	0.759 (df = 1; 29)	0.112 (df = 1; 29)	2.413* (df = 4; 26)	1.554 (df = 4; 26)	2.352* (df = 5; 25)	5.971*** (df = 5; 25)

Note: *p<0.1; **p<0.05; ***p<0.001

Questions and Concerns

- Standardization of Note-Taking for each method
- Better lecture for testing out notetaking?
 - Make sure no participant is too familiar - bias
 - Replicates university - lecture style
- Other information to collect that influences outcome?

