

## Final Project Milestone 2

**Research Plan.** Describe how you will execute your study, and summarize the variables that you will measure. Keep your project simple by only measuring six to seven variables - three demographic variables, and three or four variables related to your research question.

- **Demographic Questions :** Age and sex. Note : unless sex or gender identity is a major focus of your study, I would recommend measuring sex as a categorical variable with three levels: Female, Male, Other. (Please include some non-binary term).
- **Dependent Variable :** The variable you are trying to predict. Must be continuous!
- **Independent Variable :** The variable that you predict will explain variation on the dependent variable. Your independent variable can be either categorical or continuous, and can be either measured or manipulated.
- **Moderator Variable :** The moderator variable is a variable that you think might change or influence how the IV is related to your DV.

Type of Measure	Variable Name	How Will you Measure / Manipulate this Variable?	# of questions in Measure	Type of Data
Demographic	Age	What is your age? (open-ended numeric response)	1	Continuous
Demographic	Sex	What is your gender? (Female, Male, fill-in response)	1	Discrete
Demographic	Education	What is your highest education level (completed or currently pursuing)? (< high school, high school, college, graduate school)	1	Discrete
Dependent Variable	Memory	Performance on recall of 2 lists of nonsense syllables (numeric, out of 20)	20	Continuous
Independent Variable (IV <sub>1</sub> )	Placebo effect	Placebo manipulation (condition with memory-enhancing expectancy vs. condition without)	n/a	Discrete
Moderator Variable (IV <sub>2</sub> )	Awareness (if the participant knows about placebo effect/other psychological phenomena)	Have you ever taken a psychology class? (Yes: only an intro class, Yes: upper-division/multiple, No) Have you ever heard of the placebo effect? (Yes, no) If yes, how familiar are you with the placebo effect? (not familiar at all, somewhat familiar, very familiar)	3	Discrete

1. How will you recruit participants, how many participants do you expect to be able to recruit, and how will you collect data from these participants (e.g, paper, online, observe)?

I will recruit participants mostly through friends/family, as well as through social media. I expect to recruit about 10-20 participants. Data collection will be done through an online survey service, either Google Form or Qualtrics.

2. What exactly will your participants do in your study? Describe the step-by-step procedures. (E.g., "first, participants will...then they will..., etc.")

Participants will first be emailed or linked to an online survey. The treatment condition survey will begin with a short paragraph that states: "This study is investigating the effect of color on memory. Previous studies have shown that the color red boosts arousal and thus recall (Dzulkifli and Mustafar 2013, Loftus 1977, Tavalossi 2001). This study will explore this effect. Please watch this video below to begin the memory-enhancement process." The control group will receive a similar survey, but without the expectancy-inducing introduction. A short Youtube video of random red text and images will then play. After watching the video, participants will be shown another video of 10 nonsense syllables, each at a 1-second interval. Immediately afterwards, they will be asked to recall as many of these syllables as possible by filling out short-response questions (the back button will be disabled as to prevent cheating). The same thing will be repeated with another video. After the assessment, participants will answer additional demographic/data collection questions. Then, they will be debriefed with another short paragraph: "This study was actually investigating the placebo effect and memory. The placebo effect occurs when a person's beliefs affect some aspect of their physical or cognitive abilities. You were in the [CONDITION] group." The survey will then terminate, with a final form for additional questions/concerns.

3. What needs to happen for you to start data collection? List out the steps here, and describe when you will complete these steps.

1. To start data collection, I will first have to conduct a literature review to validate my experimental protocol.
2. Next, I will have to create my survey as well as the additional media components, such as the Youtube videos.
3. After that, I will find participants for my study through online and in-person recruiting.
4. Finally, I will randomize the participants into treatment and control groups.

4. What do you see as the biggest obstacle to your success on this project? Do you have any final questions for your GSI about your final project?

I believe the biggest hurdle will be getting enough participants. I can only access family/friends, since social media acquaintances may be unwilling to take part in my study.

**Research Justification : work through this page to help you fill out the table above. you don't need to answer this in complete sentences, but should add some notes / ideas below.**

1. **What is the model for your final project?** Write out your DV and IV as a model. What is this independent variable, and how / why did you choose this variable for your project? (Why do you want to focus on this variable)?

Memory ~ expectations (placebo effect) + error. I chose to investigate memory as my DV because human memory is still very poorly understood, particularly its deterioration and enhancement. I chose the placebo effect as my IV because it is another rarely studied psychological phenomena, particularly outside the realm of pharmaceuticals.

2. **What past research has been done on this independent variable?** Briefly summarize at least one study that has been conducted on this independent variable. Make sure to include references to whatever articles you include below (in APA format - use the export APA format feature in Google Scholar to do this - ask your GSI if they haven't already shown you how to do this!!)

- a. If past research has already found a relationship between this IV and your DV : What pattern did these researchers find? How did these researchers conduct their study? What are some ways that your study might *differ* from this past research, and how / why might these differences affect the results of the study (i.e., what's new about your study, and why does this matter?)
- b. If no past research has examined the relationship between your IV and the DV, then report what past research on the IV *has* there been? (Or, what research on something related to the IV has there been?) How / why would this past research suggest a relationship with the DV? (In other words, how will you build an argument that this IV - which hasn't been studied before - is relevant?)

Ashor, A. W. (2011). The placebo effect on psychomotor performance and working memory capacity: randomized single blind cross-over trial. *Annals Of Neurosciences*, 18(4). doi: 10.5214/ans.0972.7531.1118403.

In this article, researchers studied the effect of placebo and beliefs on memory. In particular, they focused on working memory, and operationalized it by having subjects perform a computer task in which they had to replicate a sequence of shapes appearing on the screen. Participants' accuracy rate in this task (the number of shapes and locations they got correct) served as a way to define memory. The study found that placebo (as an independent variable) had a significant effect on subjects' memory. Those that believed they were taking a stimulant drug performed better on the memory sequencing task. However, an unknown placebo (when participants were not told what the placebo did) actually caused deterioration of performance. My study differs because I will be investigating declarative memory, so my results might differ because declarative memory is considered "conscious", while working memory is more "unconscious". The placebo effect

occurs unconsciously, so it might have a different effect on explicit memory than implicit memory.

3. **What is the null hypothesis for your theory?** What research (or theory) might explain why you would NOT expect to find a relationship between this IV and DV? If you reference a research study, include the reference to this article in APA format. *Note : it's GREAT if you can identify or set up a question so that the answer is interesting no matter the result.*

My null hypothesis is that the placebo condition (whether a participant expects to have their memory enhanced or not) has no effect on their memory.

4. **Moderator Variable : How might the pattern between the DV and IV<sub>1</sub> be influenced by some other feature of the person or situation?** Life is complex - if you find a pattern between your DV and IV<sub>1</sub>, then it will likely depend on some other factor. For example, I expect that the relationship between final exam grades [DV] and attendance [IV<sub>1</sub>] will be more positive for students who attend in person than for students who watch the webcast [IV<sub>2</sub>] (where the pattern might be less positive). This second independent variable (that influences the relationship between the DV and IV<sub>1</sub>) is called a *moderator variable* - and we will talk much more about this later in the semester. For now, identify, label, and describe one moderator variable that you think might influence the pattern you expect to see between IV<sub>1</sub> and the DV, and why you think this variable will matter. *Note : you need to be able to easily measure or manipulate variation in this moderator variable, so don't choose (living in the US vs. living in Australia unless you plan to collect data in Australia...*

My moderator variable is self-insight, particularly in terms of psychological knowledge. My belief is that if someone knows about the placebo effect, or has taken psychology classes, they will be more skeptical about the study's pretense about "color improving memory." Some participants might even be able to guess the true meaning of the study.

5. **Has any past research been conducted on IV<sub>2</sub> that is relevant to your topic?** Now, find one other article on IV<sub>2</sub>. As before, has any past research been conducted between IV<sub>2</sub> and your DV? If so, what pattern did these researchers find, and how did they conduct their study? If there has been no research examining the relationship between IV<sub>2</sub> and the DV, then explain why past research on IV<sub>2</sub> would suggest a relationship with the DV. Include the reference to this article in APA format.

While I could not find research specifically relating psychological knowledge to memory, there has been significant research on "open-label" placebos, where participants are told that they are receiving a placebo. Even though participants know about the placebo, studies have shown that it is still effective. This suggests that, for people in my study, even those who suspect the placebo effect may still experience enhanced memory.

Carvalho, C., Caetano, J. M., Cunha, L., Rebouta, P., Kaptchuk, T. J., & Kirsch, I. (2016). Open-label placebo treatment in chronic low back pain: A randomized controlled trial. *PAIN*, 157(12), 2766–2772. <https://doi.org/10.1097/j.pain.0000000000000700>