**INSTRUCTIONS:** To propose your project to the team, complete items 1-5, 7a, 8a, and 8bi (marked in yellow) under the Development heading. If the project is approved, you will fill out the rest of this information with your faculty mentor. YOU MUST COMPLETE THIS FORM ENTIRELY TO CONTINUE WITH YOUR RESEARCH. This information will help you as you submit your IRB/IACUC and grant applications.

**Development**

1. What is your research question?

The Levari et al. (2018) experiment indicates that thresholds of categorizing signals changes based on the sequential prevalence of the signal. This leaves us with two primary questions:

* Are these same effects noted when the stimuli are not sequential (multiple signals available at the same time)?
* What attentional operations might predict the underlying mechanism of prevalence induced concept change (measured via eye movement)?

1. Establish the current state of the literature by addressing the following:
   1. Visit with Emily (emily.bullough@uvu.edu), our psychology librarian. She will give you a 30-minute tutorial on how to use all the library search capabilities to investigate your topic. Make sure to ask her how to go beyond keyword research.
      1. Done
   2. Create a 10 source annotated bibliography (see<https://guides.library.cornell.edu/annotatedbibliography> for help).

* <https://docs.google.com/document/d/1DAmQ7_yDYgTX031z3UB9GxwFJOETHRTplrLmFu_XyQ8/edit>
  1. Set a goal for completing this. What is your deadline for finishing the annotated bibliography?
     1. End of Spring Break (4/12)

1. What is your hypothesis(es)?

* Largely an exploratory study
* More ambiguous colors are more likely to have an incongruent categorical labeling
* If an ambiguous stimuli is presented, outer stimuli of a discrete color will influence the labelling of the ambiguous stimuli to the contrasting color.
* Fixation length and number of saccades are predictive of category labeling
  1. How does the literature support your hypothesis(es)?
     1. Levari et al. (2018) indicated that as the prevalence of a stimuli changes, so too do diagnoses of the target stimuli
     2. Mello-Thoms (2003) has shown possibilities of specific eye paths associated with diagnoses amongst radiologists (categorization/judgement of stimuli)

1. How might your study benefit the scientific community *(*e.g., the ADHD study explores and may provide evidence for or against Nigg’s (2006) framework for ADHD attentional deficits)?

If we can establish a relationship between color RGB values and parallel viewed stimuli, we may be able to better understand how the nature of signal prevalence and signal perception.

1. What are the real-world (practical) applications of your study? (e.g., the Stress and Yoga study could provide insight into the actual influences of mindful meditation on our sympathetic nervous system)

Generalizing these findings may lead to improved practices in signal detection and social perception. An increased understanding of the mechanisms behind categorization of stimuli and judgement of new stimuli has real-world effects in jobs where signal detection is key (e.g., radiologist, TSA agent).

1. Design and Statistical Analysis
   1. What type of study will this be? (e.g. archival, experimental, within/between subject….)

Primarily within-subject - Repeated measures. We are doing some exploratory analysis though as the topic hasn’t been studied in the context we are studying it.

* 1. Independent Variable(s)
     1. What is your independent variable?

Outer Stimuli Color Variability (Low, Mid, High; dependent upon Δ percent blue from a target middle)

Outer Stimuli Color Middle Congruence (relative to target RGB value)

* + 1. What is the level of your IV? (Nominal, Ordinal, Interval, Ratio)

Ratio for Color Middle Congruence, Ordinal for Outer stimuli color values

* 1. Dependent Variable(s)
     1. What is your dependent variable?

Response Time (stimulus onset -> response) - Ratio

Response Congruence (target stim “Blue” or “Not Blue”) - Nominal

Fixation Duration (outer stimuli) - Ratio

Number of saccades (within a trial) - Ratio

* + 1. What is the level of your DV? (Nominal, Ordinal, Interval, Ratio)

Mentioned above

* 1. Do you have any additional variables/data that you will collect? For each one, specify:
     1. Is it a control, factor, cofactor, covariate, etc.
     2. How will you operationally define these variables?
     3. What is the level of your data? (Nominal, Ordinal, Interval, Ratio)

Descriptive Statistics: Age, Gender, Ethnicity (Ratio, Nominal, Nominal)

Controls: Size and location of target and outer stimuli, time between trials

* 1. What statistical procedures will you use (NHSTs)?

2 Factor repeated measures ANOVA: Outer Stim Color Group & Stim Congruence v. Response Congruence

Multiple Regression: Target color RGB, Outer Stim RGB, Response Time, Fixation Duration, # Saccades - Exploratory Modelling

* 1. What are the assumptions of your statistical procedure? How will you evaluate these assumptions?

Relatively equal sample sizes (handled via R sampling)

Sphericity: (homogeneity of variances between all variables) evaluated via Mauchly’s test

Normality: measure skew and kurtosis of dependent variables, include histograms

* 1. What is your sample size?

Minimum 25 students

* 1. What is your statistical power?

>95 % via G-Power (subject to change if we mess with the procedure a bit)?

We conducted G-Power, however, our specific analysis test is not yet determined (we believe we should do a repeated measures, but we are looking into what an appropriate procedure to use is). Regardless, it is within-subjects with a G-Power nearing 1.

* 1. What are your null hypothesis(es)?

Stimuli color and variability have no effect on response congruence

* 1. What are your alternative hypothesis(es)?

Stimuli color and variability have an effect on response congruence

* 1. What are your alpha values?

.05

* 1. If your data support your hypothesis, how will you interpret the data? In other words, what claims/inferences can you legitimately make from this study?

Multiple regression procedures will be interpreted as exploratory. Significance indicates that the results are surprising and worth further study.

The hypothesis behind the ANOVA procedure has previous theory and research, and it would be appropriate to use our test as an evaluation and extension of the previous theory.

* 1. What threats to validity exist in your study (if applicable)

Generalizability is limited using a college sample. Our statistical validity is strong as power is high and the procedure matches the data (assuming assumptions are met), but it is still correlational as the experiment does not control all necessarily elements. Additionally, external validity may be reduced by experimental simulation.

1. Research Assistants
   1. How many research assistants do you think you will need during…
      1. Development
         1. 4
      2. Data Collection
         1. 5-6
      3. Analysis
         1. 4
      4. Dissemination
         1. 4
   2. Will your research assistants need any special training? If so, what and how much?
      1. The research assistants will need to be trained in proper set up and usage of:
         1. Eye tracker
         2. Experiment Builder
         3. Basic functions in data analysis programs such as Python or R
2. Funding, Materials, and Equipment
   1. If applicable, what resources (e.g., software, materials, recording devices, tests) will you need to conduct this research?
      1. Software:
         1. Experiment Builder
         2. Python
         3. R
      2. Recording Devices:
         1. Eye tracker
      3. Materials:
         1. Eye Tracking Software
   2. Grants
      1. For which grants will you apply?

If any grants are necessary for dissemination, then we can submit one of the following:

* + - 1. GEL
      2. URSCA
      3. SCULPT MINI
    1. When are their deadlines?
       1. GEL:
          1. Year round.
       2. URSCA:
          1. Varying, but usually the beginning of the month.
       3. SCULPT MINI:
    2. Will you need a signature from either (or both) of the faculty mentors?
       1. From one of the faculty mentors.
    3. Will you need a signature from the chair?
       1. Yes
    4. Will you need a signature from the dean?
       1. No, usually just financial manager and
    5. Include an itemized budget.
       1. N/A
       2. Currently, we have everything we need to complete this project.
    6. Write a justification for each budget item. For example, why do you specifically need the Kaufman Brief Intelligence Test as opposed to any other kind of intelligence test?
       1. N/A

**Data Collection**

1. IRB Submissions
   1. Is your study exempt, expedited, or does it require a full review?

Likely expedited. The act of organizing and categorizing colors does not have any blatant risks involved.

* 1. Will your study include any members of vulnerable populations (e.g. pregnant mothers, children, those with impairments prohibiting them from giving informed consent)?

Possibly pregnant mothers or those with non-related impairments, but it will pose no threat to their condition.

1. IACUC Submissions
   1. No IACUC required
2. Do you require a designated place to conduct research? If so, where will it be?
   1. Yes, wherever the eye-tracker is (Room 302)
3. Populations and Samples
   1. From what population will you be sampling? (e.g., UVU students, the elderly, dogs)
      1. UVU students, specifically students who receive credit from SONA systems.
   2. What are your inclusion/exclusion criteria (e.g., must be right handed, must have an ADHD diagnosis, dog must include vaccinations). You must have a justification for each of these.
      1. None
4. Data Management
   1. What tools are you using to collect your data? (e.g., eye tracker, qualtrics, paper-pencil, BioPac)
      1. Eye-tracker
      2. Sona Systems
   2. Where are you storing your data?
      1. External hard drives
   3. How will you anonymize your data?
      1. Participants will be assigned a “Subject ID” that will be linked to their SONA IDs so that names will not be associated with the data.
   4. How will you keep participant data secure?
      1. Participant data will be stored on hard drives that will be locked in the lab storage room when not in use.
   5. Who will have access to your data?
      1. Lab faculty mentors (Dr. Hill and Jorgensen), and immediate research assistants associated with the study.
5. Procedure
   1. Outline your data collection procedure. This should be clear enough that any other team member could read it and generally understand what you are doing.

Sessions will be scheduled via SONA. Sessions will consist of calibrating the eye-tracker and presenting the stimuli. Stimuli were created via Python and integrated into Experiment builder. A detailed explanation of how we determined the variables can be found in our drive and/or OSF account. The subject will participate in 18 blocks of 50 trials. Trials include stimuli presentation followed by a question determining the color of fixation stimuli by pressing a button.

* 1. If you are working with a living being, about how long will they be completing experiential tasks per session?

Approximately 30 minutes per session

* 1. Does your project require any counterbalancing or randomization? If so, answer the following:
     1. What type of counterbalancing will you use?

We are using Experiment Builder’s counterbalancing.

* + 1. How will you randomize?

Randomized via Experiment Builder.

* 1. If applicable, how will you pilot your experimental materials (i.e., how will you generate, select, and evaluate your stimuli)?

No. We will practice on ourselves, but not use the data.

* 1. Will you need anyone with special expertise or qualifications to help you…
     1. Set up the experiment initially? (e.g., programming an eye tracking study)
        1. No, the team leads on the project have been properly trained.
     2. Run all or part of each experimental session? (e.g., testing with the K-BIT or Woodcock-Johnson)
        1. No, the only qualifications required to run the study are a basic understanding of the eye-tracker and experiment builder.

1. A common challenge researchers face is finding enough participants for their study. What are your recruitment strategies?
   1. We plan to recruit using SONA systems, a research platform that offers students credit towards their grade for participating in studies.

**Analysis**

1. What process will you follow for missing or incomplete data? (e.g., exclude the response, leave it blank, fill in with 0)
   1. Any incomplete data would reflect a malfunction in the eye-tracking process which would make the specific data invalid. Such incomplete data will be excluded.
2. Are there any pre-analysis criteria that that might invalidate a response? For example, using questions in a qualtrics survey to check if the participant is paying attention.
   1. There will be a calibration and a fixation ***(not called fixation checkpoint but I can’t remember what it is called)*** check which will serve as an inadvertent attention check.
3. What tools will you use to analyze your data (e.g., R, SPSS)?
   1. Both R and Python will be used to analyze the data.
4. Will you require any special expertise or qualifications for data analysis?
   1. Data analysis will be conducted by the team leads and research assistants, however, we will ask a faculty mentor to check our analyses.

**Dissemination**

1. What is the order of authors? (Dr. Hill will help you determine this--don’t just guess.)
   1. To be determined
2. How will you disseminate your findings? (e.g., poster, article, lecture, panel)
   1. As the current researchers lack in published articles, the main dissemination goal of this project is to publish. Conferences may be attended, however, they are not priority.
   2. Is there a particular conference you hope to attend?
      1. No particular conference
   3. How would this impact your project timeline?
      1. We hope to complete this project as quickly as possible (data collection completed and analyzed by the end of the year).
   4. Is the conference international?
3. Will you require travel funds? How will you acquire these funds?
   1. If travel funds are required, the funds will be acquired through URSCA or GEL grants.