Project Proposal

Project Title: The Effect of Age on Emotional Response to Color-Based Visual Stimuli

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Background:

How does the age of an individual affect emotional responses to color-based visual stimuli? If the age of the individual is increased, then their self reported reactions to red and orange stimuli will increase in positivity. Typically, these colors are associated with danger or a warning, but in accordance with the age-related positivity effect, responses should become increasingly positive with aging.

The ecological valence theory (EVT) states that an individual's preference for a specific color is influenced by their preference for objects that are the same color. In ecological theory, it would be adaptive for organisms to approach objects that are nicely colored. Conversely, colors associated with dangerous objects would be disliked, and would not be approached. (Schloss, 2015) Therefore, colors that are associated with positive emotions would be favored by an individual over those with negative connotations.

The amygdala has a key role in emotional processing, and the hippocampal complex is correlated with forming new memories, as well as learning and emotions. Both systems are capable of working independently of each other, but have also been shown to have an influence on the other (Phelps, 2004). The amygdala influences episodic memory, which occurs at a particular place and time, and is linked to the hippocampal region. The emotional significance of the event is remembered, therefore these memories are more vivid, and tend to last longer in the memory of an individual.

The idea of generational differences is an idea that is fairly new and often contested. Within a generation, people tend to have shared life experiences. These differences have been observed most notably in the workplace, where varied work values, career development, and management styles have all been noticed by human resource management. (Parry, 2017) However, the validity of this theory is often brought into question, as there are many doubts as to the correlation of psychological differences between people and the time period in which they were born.

Several previous experiments have established a trend known as the "age-related positivity effect," that as cognitive and physical decline increase with age, overall positivity tends to increase (Schweizer, 2019). This contradiction was further supported by the Aging Brain Model, which attempts to prove that increased positivity when aging is the result of a decreasing sensitivity to negative stimuli in the amygdala. However, these findings were contradicted in a recent study, in which their data showed no support for this theory. The opposite trend was

shown throughout the experiment, where overall positivity was decreased across increasing age groups (Schweizer, 2019).

The overall aim of this project is to determine how emotion-color associations differ between people of different ages. It will also attempt to address some of the controversies regarding the age-positivity theory in the field, by showing a correlation between increased age and an increased number of positive responses across all images in accordance with the hypothesis.

Experimental Design/Research Plan Goals:

Methods: The project will be completed through the design of a survey in order to collect data. Participants will be asked to self evaluate their emotional reactions to individual images using a slightly modified version of the Discrete Emotions Questionaire (Harmon-Jones et al., 2016).

Visual Stimuli: The images that are used in the survey were taken from the Geneva Affective PicturE Database, otherwise known as GAPED (Dan-Glauser, 2011). The chosen images all depict natural sceneries, containing only inanimate objects. There are 9 images total, 3 being red based, 3 being green based, and 3 being blue based.

Participants: The participants for the survey should be of any age, as this is the independent variable for the experiment. Participants will be composed of any gender and racial/ethnic composition. There will be minimal risks to the participants, as the survey is completed online and contains minimal distressing factors. Participants who take part in the survey will be completely anonymous.

Informed Consent:

The purpose of this experiment is to analyze a possible correlation between increased age and increased positivity through emotional associations with color-based images. If you choose to participate, you will be asked to view 9 images. Please indicate your response to the images, for each emotion listed, using the scale provided.

While viewing the photograph, to what extent did you experience these emotions?

1	2	3	4	5	6	7
Not at all	Slightly	Somewhat	Moderately	Quite a bit	Very much	An extreme amount

 This survey will take approximately 30 minutes. Your participation is entirely voluntary, and there are no anticipated risks associated with your participation. All of your answers will be completely anonymous. You are not required to respond to any question that you are uncomfortable answering. You may choose to end your participation in the survey at any time by exiting out of your browser, and there will be no penalties for choosing not to complete the survey.

Potential Roadblocks:

The use of a survey to collect data may be very difficult to complete due to many existing restrictions regarding ethical human testing, and rules regarding the questions that may be asked in the survey. To resolve this, a dataset that already exists might have to be used instead. In order to maintain the validity of the experiment, any participants that might have been part of the preliminary survey will not be able to participate in the main data collection.

References:

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2. Sutton, T. M., & Altarriba, J. (2015). Color associations to emotion and emotion-laden words: A collection of norms for stimulus construction and selection. *Behavior Research Methods*, *48*(2), 686–728. doi: 10.3758/s13428-015-0598-8

3. Parry, E., & Urwin, P. (2017). The Evidence Base for Generational Differences: Where Do We Go from Here? *Work, Aging and Retirement*, *3*(2), 140–148. doi: 10.1093/workar/waw037

4. Schweizer, S., Stretton, J., Belle, J. V., Price, D., Calder, A. J., Camcan, & Dalgleish, T. (2019). Age-related decline in positive emotional reactivity and emotion regulation in a population-derived cohort. *Social Cognitive and Affective Neuroscience*, *14*(6), 623–631. doi: 10.31234/osf.io/2eypg

5. Schloss, K. B., Hawthorne-Madell, D., & Palmer, S. E. (2015). Ecological influences on individual differences in color preference. *Attention, Perception, & Psychophysics*, *77*(8), 2803–2816. doi: 10.3758/s13414-015-0954-x

6. Dan-Glauser, E. S., & Scherer, K. R. (2011). The Geneva affective picture database (GAPED): a new 730-picture database focusing on valence and normative significance. Behavior Research Methods, 43(2), 468-477. doi: 10.3758/s13428-011-0064-1

7. Harmon-Jones, C., Bastian, B., & Harmon-Jones, E. (2016). The Discrete Emotions Questionnaire: A New Tool for Measuring State Self-Reported Emotions. *Plos One*, *11*(8). doi: 10.1371/journal.pone.0159915

Timeline:

Complete research and project proposal by the beginning of October break.
During October break, develop a preliminary survey/survey questions that adhere to the rules regarding human testing.
During the last week of October, complete MSSEF paperwork that is required for fair.
Throughout November, collect preliminary data from a smaller experimental group, and begin to analyze it using statistics.
Finalize presentation and data for December fair during the first week in December, while also beginning to edit the survey if needed for the main data collection throughout December and January.

Throughout the rest of December and the beginning of January, proceed with main data collection and analysis

Background Knowledge Goals:

Date	Topic	Completed Date
9/18/19	The amygdala	10/4/19
9/28/19	Generational gap	10/19/19

Don't Want to Use	Why?
Picking emotions to focus on	I'd rather just use a general positive, negative, or neutral reaction to begin with in order to avoid any major differentiations in the data - diving into more specific branches of these (i.e. angry, anxious, upset) would require a lot more thinking from the subject when I would rather just have a raw initial reaction
Face recognition (database of faces)	I would rather work with images of just inanimate objects or scenery rather than of humans/animals because that would require a lot more research into memory and bias regarding facial recognition processes in the brain
Existing databases	I'm not sure I would want to use these, just because I'd rather collect new data from a smaller experimental group rather than analyzing a much larger group of already existing data points
AI	I'm just not really interested in AI, and wouldn't know how to begin using one in this context for this experiment

Want to Use	Why?	Assumptions making with this idea	How can these assumptions be challenged
How different colors make people feel (inherent/developed over time?)	This may be a component in how overall emotional responses to images are initially made	Look at previous research - yellow=happy, blue=sad? Does this hold up in actual	This may not hold true for all people based on personal experiences with color

		research	
Neuroscience connections	I think this would be really interesting to research and look more into based on the different parts of the brain and how they process imagery	Are the parts of the brain associated with visuals and emotions connected in any major way?	Look at anatomy/previous research to see if there are any major connections between the two already established? Further research needed