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

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ABSTRACT

Some of the health benefits of positive thinking can include a lengthened life span, lowered levels of depression and stress, and increased cardiovascular health. The age-related positivity effect is a trend in many existing experiments that shows that as age increases, overall positivity tends to increase as well. This is thought to be a result of the amygdala becoming less sensitive to negative stimuli over time, therefore becoming unable to associate the stimuli with a negative emotion. Therefore, with age, people would be less likely to associate a certain color with a negative emotion. To further assess how overall positivity is connected to aging, a survey was distributed to a group of participants (n=20). The participants were asked to self-report their emotional responses to different color-based images using the Discrete Emotions Questionnaire. Each individual was categorized into one of three age groups, and differences between the positive and negative affectivity of the images between each group were analyzed using a one-way ANOVA test. The only significant variance between age groups occurred in the negative affectivity of red-based imagery, $F(2,12) = 8.913$, $p = 0.004$.

LITERATURE REVIEW

Introduction

There is a need for more research in the behavioral science field regarding how age and overall positivity are connected. Several studies have shown conflicting trends regarding the age-related positivity effect, and therefore it is not known for certain the effect which increasing age has on overall positivity (Schweizer et al., 2019). Positive thinking has been shown to directly reduce stress levels, impact success, and has been directly linked to an increase in learning and academic achievement in adolescents (Chen et al., 2018). Therefore, by understanding and addressing how overall positivity changes over the lifespan of an individual, the appropriate changes in environment or lifestyle can be made in order to improve quality of life.

Emotions

Self-Reported Emotions

The validity and dependability of self-reported emotions as a means for data collection is often considered all-or-none. One of the reasons for this way of thinking is that reports of current emotional experiences are much more likely to be correct or valid than reports of emotions that are displaced from the current period of time. It is also thought that responses can be biased among certain groups of individuals who might be less willing to respond and report negative emotional states of being. For example, a person who is of a higher economic status, regardless of the anonymity of the study, would not like to be perceived as having negative emotions. In self reported states of emotion, aspects such as valence (the overall positive or negative affectivity) and arousal (being alert and attentive), or the tendencies towards approach and avoidance, typically contain the large majority of the variance (Mauss & Robinson, 2009).

Positivity

Positivity often means that an individual has an optimistic outlook on life, approaches situations with an expectation of success, and learns from their mistakes. Some of the health benefits of positive thinking can include a lengthened life span, lowered levels of depression and stress, as well as better overall physical health, including increased cardiovascular health (Mayo Health Clinic, 2017). It is not known why these traits are commonly experienced in positive thinkers, but one current theory states that people with a positive outlook tend to live healthier lifestyles, as well as being able to deal better in stressful situations than those with a pessimistic outlook (Mayo Health Clinic, 2017).

Age

Age-Related Positivity Effect

The "age-related positivity effect" demonstrates the contradiction that as cognitive and physical decline increase with age, overall positivity tends to increase (Schweizer et al., 2019). In comparison to younger individuals, older people retain more positive than negative information. Therefore, older people place goals pertaining to their well-being in a higher regard (Reed & Carstensen, 2012). This theory implies that as people age, their emotional well-being should increase in relation. This contradiction was further supported by the development of the Aging Brain Model, shows that increased levels of positivity as age increases is the result of a decreasing sensitivity to negative stimuli in the amygdala. However, both of these findings were contradicted in a recent study, in which the data showed no support for this theory. The opposite trend was shown throughout the

experiment, where overall positivity was found to decrease across groups of increasing age (Schweizer, 2019).

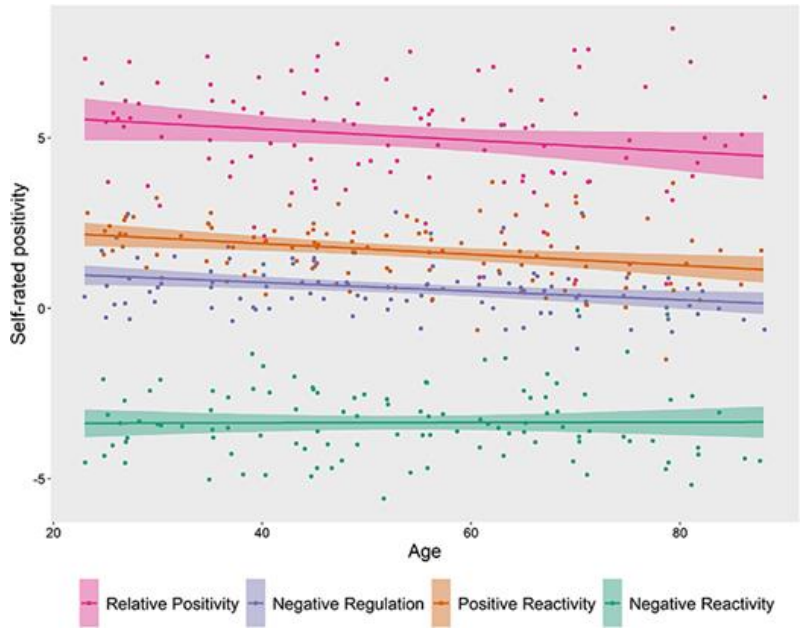

Figure #1 – the significant association between age and emotion ratings based upon Positive Reactivity, Negative Reactivity, and Negative Regulation (Schweizer, 2019).

Generational Theory

The Strauss-Howe Generational Theory states that there are groups called generations that tend to exhibit similar patterns of behavior that correlate with specific events in the history of the United States of America. Morris Massey, a sociologist, argued that these behaviors are created and driven by an individual's system of values, and that people within a generation are more likely to share those values and beliefs (Strauss-Howe Generational Theory, 2019). Another explanation for the generational theory is that a generation might share collective memories, as they have shared life experiences of significant events (Parry & Urwin, 2017). These events do not impact either the previous or the following generations of the one in question, and therefore create a difference in the

outlooks of the groups. At the conclusion of one study regarding generational differences, the researchers concluded that society is evolving as one entity, and that generations are the result of continuing trends that become more and more noticeable over time (Parry & Urwin, 2017). As a result of this, people that belong to one generation will have noticeable differences in mindset, values, behaviors, and life experiences when placed in comparison to an individual that belongs to a different generation. Therefore, the overall positive outlook of an individual should correlate with others in the generation they were born into, and what important events they have experienced as a group.

Anatomy

The Amygdala

The amygdala is a part of the limbic system, which is a part of the brain that deals with both behavioral and emotional responses. The amygdala consists of right and left amygdalae, both of which play a critical role in emotional processing and response. Some of the emotions that it typically deals with include anxiety, fear, and pleasure. The amygdala also has influence on an individual's memory systems, where it typically influences episodic memory. Episodic memory consists of events that occurred at a specific time or place, and are easily recalled by the individual. The amygdala influences this type of memory by attaching a specific emotion to the event that the individual thereby associates with it ("The limbic system").

The amygdala also plays a very important role in processing fear in particular. When it registers stimuli as possibly threatening or dangerous, it sends signals to other parts of the brain that control the body's physical response, such as the "fight-or-flight" mechanism. This reflexive response in the face of dangerous situations often occurs before the person is consciously aware of what is happening. As a

result, the amygdala also is able to associate this fear with events or memories that induced the emotion, creating an awareness of future events that may cause that same fear ("The limbic system").

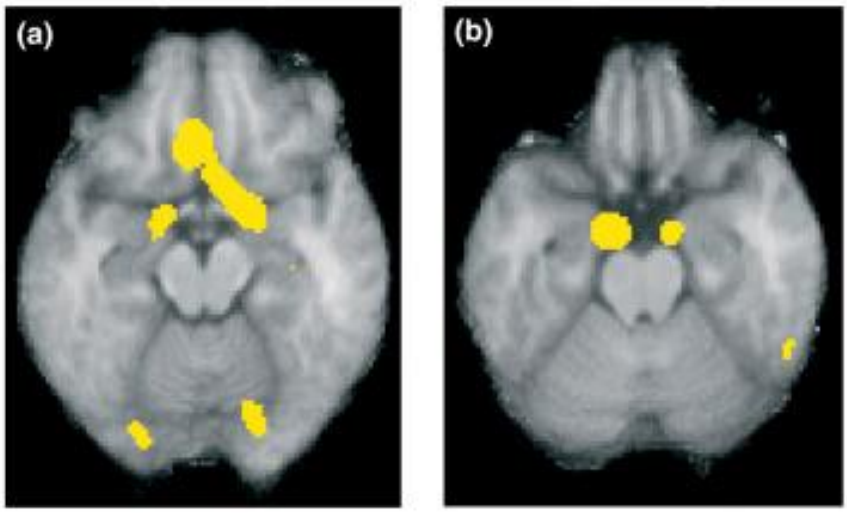

Figure #2 - Amygdala activity during positive (a) and negative (b) visual stimuli (Phelps, 2004)

The Hippocampus

The hippocampus is also a part of the limbic system, and deals with most of the memories that the brain forms. There are also two parts, each located on one of the two hemispheres. One of its functions is to attach certain senses to memories, such as smell or auditory stimuli. The hippocampus registers this information, and processes it in a way that the brain can understand and store in long-term memory. It is here that episodic memories are formed and sorted into memory storage. The rear part of the hippocampus, in particular is believed to play an important role in spatial memories and awareness ("The limbic system").

Age has been found to also have a major effect on the structure and functioning of the hippocampus. As an individual continues to age, the hippocampus will shrink in size, causing a decline in memory recall and overall performance. In one study, the researchers concluded that as age

increased and hippocampal volume decreased, the following factors also significantly declined in overall performance: episodic memory, working memory, processing speed, and executive function (O'Shea et al., 2016). Alzheimer's patients specifically had a smaller hippocampus and a much greater decline in volume than people with a normal rate of hippocampal volume loss.

Color Associations

Ecological Valence Theory

The ecological valence theory (EVT) states that an individual's preference for a certain color is derived from biological adaptations, and therefore will like colors that are associated with objects or things that they like (Palmer & Schloss, 2011). In nature, this is mimicked by colors that attract or deter other organisms, such as the colors that a flower uses to attract pollinators, or conversely, the bright colors that a poisonous toad uses to avoid predators. This theory also states that preferences for a certain color are adaptive, and appeal to natural selection. This stems from the idea that individuals would be more likely to survive if they avoid objects that look dangerous, and did so by associating them with a "bad" color that they would not be likely to approach. Conversely, objects with "good" colors would be advantageous to the individual's survival and eventual ability to reproduce. In relation to emotions, if an individual receives positive or happy feelings from an experience with a particular color, they will be more likely to have a preference for that color (Palmer & Schloss, 2011).

Hue Preferences

There are three basic components of color typically used: brightness, hue, and colorfulness. Hue, more specifically, refers to the correlating wavelength on the electromagnetic spectrum (in nm). In previous studies conducted, it was found that individuals preferred blue hues most of the time, and

showed an overall dislike of yellow hues (Palmer & Schloss, 2011). Regarding the other two attributes of color, it was found that more vivid (colorful) and lighter colors were preferred over less colorful and darker colors. Therefore, all three components play some role in color preferences, and should all be taken into account when conducting inquiries into this field. In the duration of this study, it was also found that in comparison to the most chosen preferred colors, the least preferred were chosen at a faster pace, and were less likely to be linked with a specific concept or object (such as in the EVT).

Overall, when asked to choose between colors, whether in an entire sample, or in a forced choice, paired comparison test, individuals most often chose yellow-green colors as their least preferred color in comparison to all of the other hues. In conjunction with other experiments, the overall preferred hues tended to be of a blue hue (Palmer & Schloss, 2011).

Photoreceptors

Photoreceptors are located in the retina, and are made up of cells that respond to the presence of light. It consists of densely packed membrane, that holds a photopigment called rhodopsin. The tightly packed membrane is necessary in order to create a high density within the photopigment. This is needed in order for a larger amount of the light photons to be absorbed by the photoreceptors. The two types of photoreceptors that are in the retina are called rods and cones (Land, 2019).

Rods typically are able to perceive changes between light and dark, as well and shape and movement. They are not used for color vision, and only have one type of light sensitive pigment. When there is a lack of good lighting, such as in a dimmed room, the rods are mainly used, rather than the cones. There are many more rods in the retina than cones (Land, 2019).

The cones are not typically used for changes in light, as they are much less sensitive to those shifts. They are mostly sensitive to changes in different colors, being red, green, or blue. When signals

are received from the cones, they are sent to the brain to be processed and translated into what the individual perceives as color. Cones only work in bright, not dimmed light, which is the reason why color is not easily seen in dark places. People who are color blind do not have one type of cone in their retina, or that cone may simply be damaged (Land, 2019).

Conclusion

While there are many studies that show a correlation between increased age and increased positivity, information that contradicts this trend can still be found in other experiments. Therefore, more research is needed in this field in order to address these controversies in how age affects the mindset of an individual. Few studies discuss this increased positivity in conjunction with color associations in particular. Overall, trends in positivity are important to research and consider, as they have been shown to correlate with several life-improving factors, such as lower levels of depression and stress, and increased physical health. This research might be able to be applied by therapists or others who work with people, and are looking to increase overall positivity of their clients. However based on the age of the individual they are working with, the methods that they should use will vary.

INTRODUCTION

Positivity is often associated with both mental and physical health benefits, including lowered levels of anxiety and depression, a lengthened lifespan, and increased cardiovascular health ("How to stop negative self-talk", 2017). It can also be connected to academic success and achievement.

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 & Urwin, 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).

Overall, trends in positivity are important to research and consider, as they have been shown to correlate with several life-improving factors, such as lower levels of depression and stress, and increased physical health. This research might be able to be applied by therapists or others who work with people and are looking to increase overall positivity of their clients. However, based on the age of the individual they are working with, the methods that they should use will vary. This study examines how the age of an individual affects 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.

METHODS

To address the researchable question, a study was completed through the design and distribution of a survey that asked participants to self-evaluate their emotional reactions to color-based imagery. 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. This was done in order to minimize the difference between the affectivity of what was depicted in the images, so that the participants were mostly affected by the change in color. There were nine images total in the main section of the survey, and were composed of three red-based images, three green based images, and three blue based images.

In order to self-report their reactions to this visual stimuli, the participants were provided with a scale called the Discrete Emotions Questionnaire, or the DEQ (Harmon-Jones et al., 2016). This scale consists of numerical values from 1 to 7, with each number representing to what extent the participant is experiencing that emotion. The DEQ scale is pictured below:

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

The original DEQ was modified slightly for the purposes of this experiment, as the list of emotions to respond to was decreased from 30 to 25 in order to decrease the repetitiveness of the questions. Each emotion correlates to one of eight subscales of discrete emotions.

The participants for the survey were of varying ages, as this was the independent variable for the experiment. Participants were composed of any gender and racial/ethnic composition. There were minimal risks to the participants, as the survey was completed online and contains minimal distressing factors. Participants who take part in the survey were completely anonymous, and no personal information regarding identity was recorded by the survey.

First in the survey, the participants were asked to report their age, the gender that they identify as, and what best describes their ethnic background. Immediately after, they were asked to describe their current emotional state using the DEQ scale that they would later use to describe their emotional state in response to the imagery. This was done in order to establish a baseline of emotional state for that particular participant, and therefore affectivity from that original state could be measured in response to each of the images in the survey. In order to do this, the average emotional state at the baseline of emotion was numerically compared to those after viewing the images in order to determine if the images significantly affected the participant's emotions. After completing these introductory questions, they continued into the main section of the survey. This consisted of the nine color-based images. The participants were asked to record their response to each image by rating 25 discrete emotions using the DEQ scale.

In order to analyze the data collected in this study, a one-way ANOVA statistical test was used. This test analyzes the difference between several populations to see if it is significant. In this case, the populations would be the age groups that the participants are categorized into. First, the mean for each emotion per image was found in each age group. Then, these means were sorted into the eight subscales, which were then combined into either positive or negative affectivity. It was these values that were used in the ANOVA test to show if there was a significant difference between the overall positivity of the age groups.

RESULTS

During data collection, a total of 20 responses were collected, in which one was partially discarded due to incompletion. Of these responses, eight participants were attributed to the 15-20 age group, seven were attributed to the 21-40 age group, and five were attributed to the 41-60 age group. The average initial emotional state was calculated for each age group.

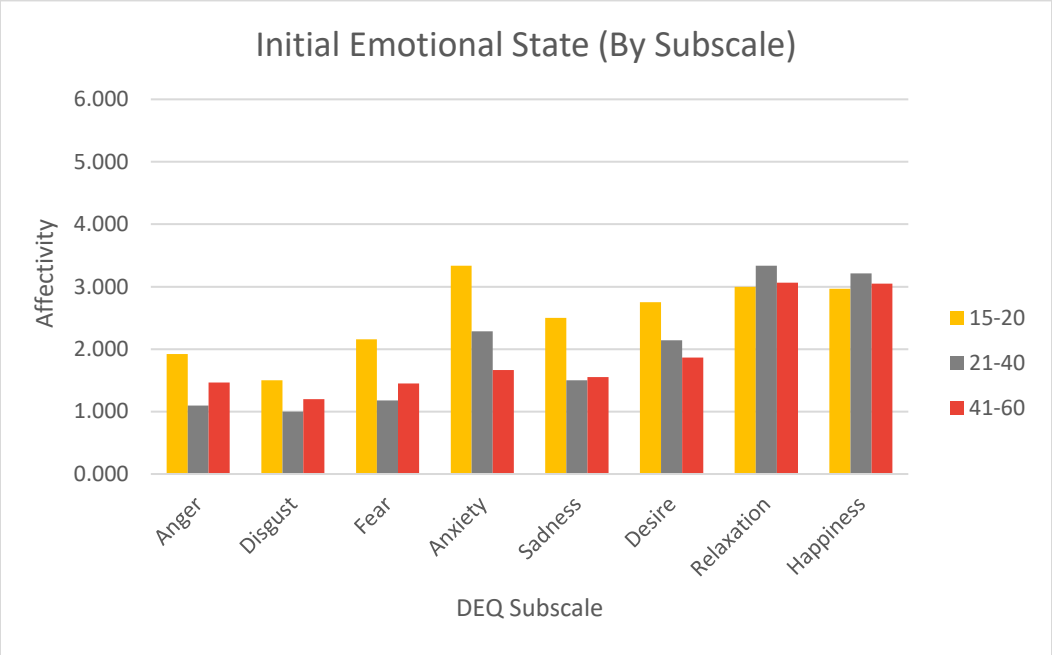

Figure 1: The average initial emotional state for each age group, categorized into each of the eight emotional subscales on the DEQ. The affectivity was measured on a scale from 1 to 7, with 7 being the most affected, and 1 being the least affected.

Overall, the data shows higher levels of negative emotions in the 15-20 age group than in comparison to the older groups, which were relatively similar. The 21-40 age group had the highest initial levels of positive emotion, scoring higher in Relaxation and Happiness than both of the other age groups, but not by a very large amount. The 41-60 age group did not score the highest in any of the eight DEQ subscales of affectivity, and only scored the lowest in the negative subscale of anxiety.

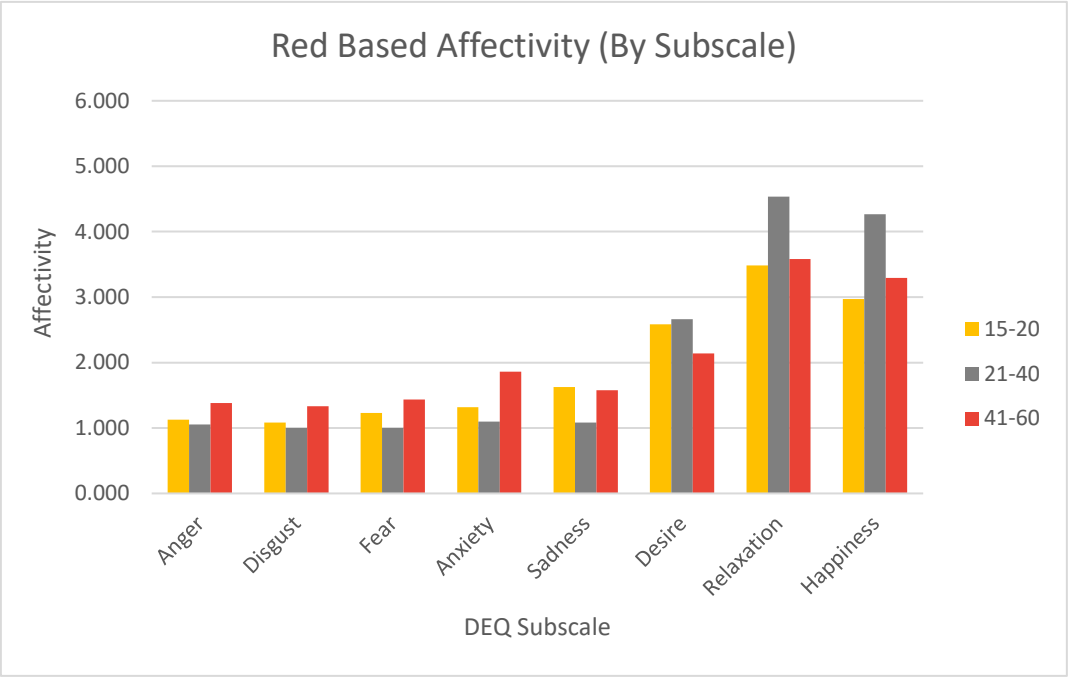

Figure 2: The average affectivity of the red based images for each age group, categorized into each of the eight emotional subscales on the DEQ. The affectivity was measured on a scale from 1 to 7, with 7 being the most affected, and 1 being the least affected.

In response to the red-based imagery, the oldest age group had a higher negative response in comparison to both of the other age groups, which scored lower in each of the subscales attributed to negative affectivity. The highest positive response to the red-based stimuli was the 21-40 age group, as this group scored the highest in all of the subscales that were attributed to positive affectivity, most notably seen in the Relaxation and Happiness subscales. In contrast to this, the 15-20 age group did not score the highest in any category, positive or negative, and only scored the lowest in the Happiness subscale.

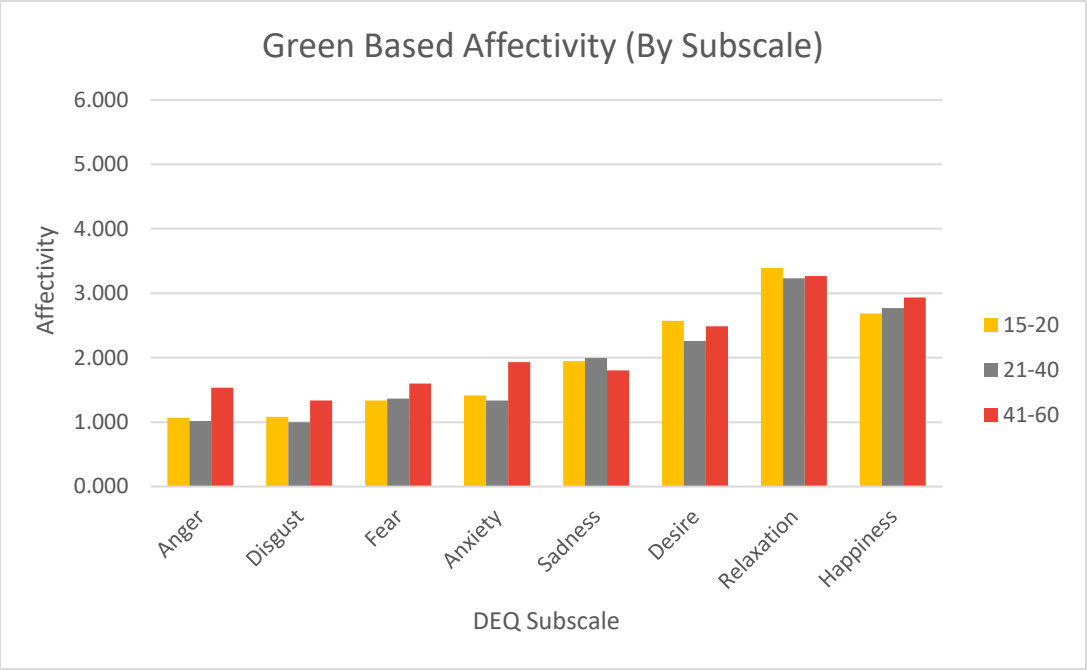

Figure 3: The average affectivity of the green-based images for each age group, categorized into each of the eight emotional subscales on the DEQ. The affectivity was measured on a scale from 1 to 7, with 7 being the most affected, and 1 being the least affected.

Overall, the green based stimuli affectivity varied between the age groups for both positive and negative. The 15-20 age group scored in the highest in affectivity in the Desire and Relaxation subscales, while the 21-40 scored the highest on the Sadness subscale. The 41-60 age group scored the highest on all of the negative subscales in response to green imagery, except for Sadness. However, the responses to the green-based imagery were the most similar across all age groups, which is a contrast to easily seen differences in response to blue and red based imagery.

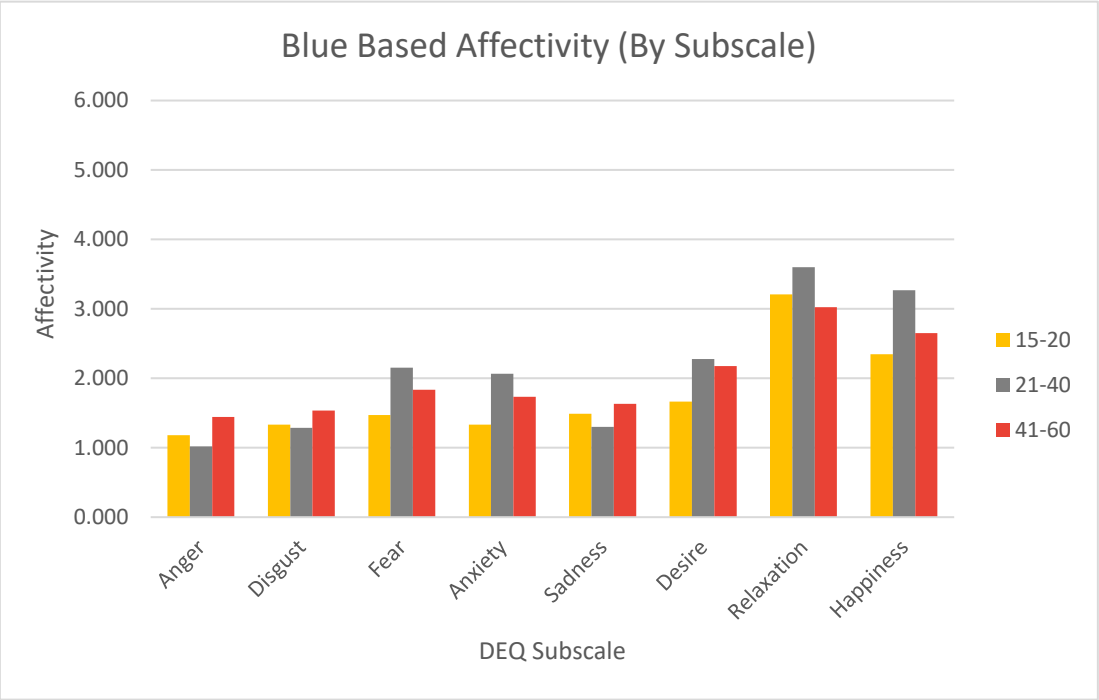

Figure 4: The average affectivity of the blue-based images for each age group, categorized into each of the eight emotional subscales on the DEQ. The affectivity was measured on a scale from 1 to 7, with 7 being the most affected, and 1 being the least affected.

In response to blue-based imagery, the 15-20 age group scored the highest in none of the subscales, but scored the lowest in Fear, Anxiety, Desire, and Happiness. The 21-40 age group scored the highest in several of the subscales, including Fear, Anxiety, Desire, Relaxation and Happiness, showing the highest positive response to the blue imagery. However, this showed some contradictions between the overall positive and negative affectivity for that particular age group, as they scored the highest in subscales attributed to both sides. The 41-60 only scored the highest in Anger, Disgust, and Sadness, showing an overall negative response to the blue stimuli.

DISCUSSION/CONCLUSION

Based on the data collected during the study, the hypothesis that if an individual ages, then their self-reported reactions to red and orange stimuli will increase in positivity, was refuted. Twenty participants elected to complete the survey, and one response was partially discarded due to lack of completion. Affectivity was calculated using the DEQ scale least affected (1) to most affected (7), and average values from these numbers were used to calculate overall negative or positive affectivity. Out of these participants, average positive reactions to red-based imagery decreased between the different groups as age increased, showing that positivity may decrease in conjunction with age. Prior to experimentation, it was hypothesized that positive reactions to red-based stimuli would increase with age, in accordance with the age-related positivity effect.

Out of all of the color-based stimuli, the color that was reacted to most positively overall was red. This represented a large positive association with the color red across all age groups, in comparison to lower positivity scores in the green and blue based categories. However, red was also the most negatively responded to across all age groups, showing a contradiction between the associations with this particular color. This could be explained by a general very strong memory or feeling associated with red that is age-independent and is not particularly affected in any way by degradation of the amygdala or by generational experiences. This partially contradicts what it found in literature, as many experiments have shown increasing positivity with age, and not in conjunction with a factor that is age-independent.

However, while negative reaction to all three color-based images (red, green, blue) increased with age in all cases for the oldest age group, it is worth noting that these values had little variance from the initial emotional state established at the beginning of the survey. While both positive and negative affectivity either increased or decreased for both of the other younger age groups, these

values stayed relatively steady for the 41-60 age group. So, while the original hypothesis was refuted, as negative affectivity for red-based images did increase across increasing age groups, it could be stated that affectivity becomes more neutral as age increases. Differences in color did not affect the emotional affectivity drastically one way or another, showing that preferences for color become increasingly neutral with age.

Some sources of error during this experiment could have stemmed from the fact that this study was dependent on the participants' self-reported response to the visual stimuli. This method of data collection can vary greatly in its reliability, due to the large possibility of personal bias influencing responses. Many studies that are conducted in a similar fashion to this one rely on the assumption that all questions are answered completely honestly, therefore this study assumes that all self-reported reactions are completely accurate in order to draw conclusions regarding the results. Another possible source of error could have resulted from some lack of responses in one or two emotions for an image from one participant. The survey was still accepted, as the large majority of questions were answered, but the small number of these missing values could have changed the resulting average by several tenths of a point, depending on what age group the participant belonged to.

Possible future directions for this project could involve analyzing this data, or a similar study, in conjunction with the participants' self-identified favorite/preferred colors. It would be interesting to see how positive or negatively affectivity changes in reaction to colors that they 'prefer,' as the numbers may show that they actually react more positively to a different color. Another possible extension of this study would be to conduct a similar study in younger children, which were not a part of this particular research project. Younger children may not have had an opportunity to form a solid emotional association with particular colors yet, and so may see colors and visual stimuli more abstractly or differently than most adults would. It would be interesting to see how their answers

would vary from even the teenagers tested during this study, and how perception of colors can change in that short of a time. The knowledge gained from this study could also be useful in environmental studies, such as those aimed towards maximizing productivity levels based on the participant's surroundings.

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APPENDIX

Limitations

1. There was a limited number of participants who elected to take the survey, which did not establish a normal distribution. This limits the accuracy of the statistical analysis performed.
2. There were a different number of participants in each age group, which also contributed to the limited accuracy of analysis.
3. There was limited access to a professional setting in order to conduct the study.

Assumptions

1. This study operated under the assumption that all participants answered each question honestly and accurately, in a way that most correctly represented their state of emotional being at the time.
2. This sample would be representative of the whole population.
3. All questions were interpreted exactly as intended by the researcher and were interpreted this way by every participant.

Survey

** *This is an exact copy of the survey each participant received and completed as a part of the study*

Student Researcher: Ryan Dillon
Survey Questionnaire
The Effect of Age on Emotional Response to Color-Based Visual Stimuli

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.

I have read the above passages and would like to complete the survey ->

- Yes
- No

Section 1:

1. How old are you (in years)?
    a. 15-20
    b. 21-40
    c. 41-60
    d. 61 or older

2. Please select your gender
    a. Female
    b. Male
    c. Non-Binary
    d. Other _____

3. Which best describes your ethnic background?
    a. White

b. Hispanic/Latino
c. Black or African American
d. Native American or American Indian
e. Asian/Pacific Islander
f. Other _____

4. Currently, to what extent are you experiencing these emotions?

Anger (Ag)
Wanting (Dr)
Dread (Ax)
Sad (S)
Easygoing (R)
Happy (H)
Liking (H)
Rage (Ag)
Grief (S)
Anxiety (Ax)
Desire (Dr)
Nervous (Ax)
Terror (F)
Scared (F)
Mad (Ag)
Satisfaction (H)
Relaxation (R)
Empty (S)
Panic (F)
Longing (Dr)
Calm (R)
Fear (F)
Revulsion (Dg)
Enjoyment (H)
Lonely (S)

Section 2:

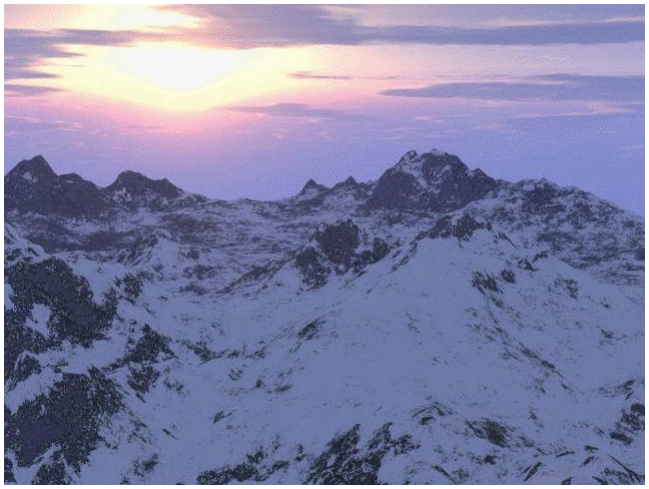
1.

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

Anger (Ag)
Wanting (Dr)
Dread (Ax)
Sad (S)
Easygoing (R)
Scared (F)
Mad (Ag)
Satisfaction (H)
Relaxation (R)
Empty (S)

Happy (H)
Liking (H)
Rage (Ag)
Grief (S)
Anxiety (Ax)
Desire (Dr)
Nervous (Ax)
Terror (F)
Panic (F)
Longing (Dr)
Calm (R)
Fear (F)
Revulsion (Dg)
Enjoyment (H)
Lonely (S)

2.



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

Anger (Ag)
Wanting (Dr)
Dread (Ax)
Sad (S)
Easygoing (R)
Happy (H)
Liking (H)
Rage (Ag)
Grief (S)
Anxiety (Ax)
Desire (Dr)
Nervous (Ax)
Terror (F)
Scared (F)
Mad (Ag)
Satisfaction (H)
Relaxation (R)
Empty (S)
Panic (F)
Longing (Dr)
Calm (R)
Fear (F)
Revulsion (Dg)
Enjoyment (H)
Lonely (S)

3.

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

Anger (Ag)
Wanting (Dr)
Dread (Ax)
Sad (S)
Easygoing (R)
Happy (H)
Liking (H)
Rage (Ag)
Grief (S)
Anxiety (Ax)
Desire (Dr)
Nervous (Ax)
Terror (F)
Scared (F)
Mad (Ag)
Satisfaction (H)
Relaxation (R)
Empty (S)
Panic (F)
Longing (Dr)
Calm (R)
Fear (F)
Revulsion (Dg)
Enjoyment (H)
Lonely (S)

4.

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

Anger (Ag)
Wanting (Dr)
Dread (Ax)
Sad (S)
Easygoing (R)
Happy (H)
Liking (H)
Rage (Ag)
Grief (S)
Anxiety (Ax)
Desire (Dr)
Nervous (Ax)
Terror (F)
Scared (F)
Mad (Ag)
Satisfaction (H)
Relaxation (R)
Empty (S)
Panic (F)
Longing (Dr)
Calm (R)
Fear (F)
Revulsion (Dg)
Enjoyment (H)
Lonely (S)

5.

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

Anger (Ag)
Wanting (Dr)
Dread (Ax)
Sad (S)
Easygoing (R)
Happy (H)
Liking (H)
Rage (Ag)
Grief (S)
Anxiety (Ax)
Desire (Dr)
Nervous (Ax)
Terror (F)
Scared (F)
Mad (Ag)
Satisfaction (H)
Relaxation (R)
Empty (S)
Panic (F)
Longing (Dr)
Calm (R)
Fear (F)
Revulsion (Dg)
Enjoyment (H)
Lonely (S)

6.

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

Anger (Ag)
Wanting (Dr)
Dread (Ax)
Sad (S)
Easygoing (R)
Happy (H)
Liking (H)
Rage (Ag)
Grief (S)
Anxiety (Ax)
Desire (Dr)
Nervous (Ax)
Terror (F)
Scared (F)
Mad (Ag)
Satisfaction (H)
Relaxation (R)
Empty (S)
Panic (F)
Longing (Dr)
Calm (R)
Fear (F)
Revulsion (Dg)
Enjoyment (H)
Lonely (S)

7.

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

Anger (Ag)
Wanting (Dr)
Dread (Ax)
Sad (S)
Easygoing (R)
Happy (H)
Liking (H)
Rage (Ag)
Grief (S)
Anxiety (Ax)
Desire (Dr)
Nervous (Ax)
Terror (F)
Scared (F)
Mad (Ag)
Satisfaction (H)
Relaxation (R)
Empty (S)
Panic (F)
Longing (Dr)
Calm (R)
Fear (F)
Revulsion (Dg)
Enjoyment (H)
Lonely (S)

8.

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

Anger (Ag)
Wanting (Dr)
Dread (Ax)
Sad (S)
Easygoing (R)
Happy (H)
Liking (H)
Rage (Ag)
Grief (S)
Anxiety (Ax)
Desire (Dr)
Nervous (Ax)
Terror (F)
Scared (F)
Mad (Ag)
Satisfaction (H)
Relaxation (R)
Empty (S)
Panic (F)
Longing (Dr)
Calm (R)
Fear (F)
Revulsion (Dg)
Enjoyment (H)
Lonely (S)

9.

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

Anger (Ag)
Wanting (Dr)
Dread (Ax)
Sad (S)
Easygoing (R)
Happy (H)
Liking (H)
Rage (Ag)
Grief (S)
Anxiety (Ax)
Desire (Dr)
Nervous (Ax)
Terror (F)
Scared (F)
Mad (Ag)
Satisfaction (H)
Relaxation (R)
Empty (S)
Panic (F)
Longing (Dr)
Calm (R)
Fear (F)
Revulsion (Dg)
Enjoyment (H)
Lonely (S)

Project Notes

Article #1 Notes: Frontal Control Over Automatic Emotional Action Predicts Acute Stress Responsivity

Article notes should be on separate sheets

Source Title	Frontal Control Over Automatic Emotional Action Predicts Acute Stress Responsivity
Source Author	Kaldewaij R., Roelofs K.
Source citation	Kaldewaij, R., Koch, S. B., Zhang, W., Hashemi, M. M., Klumpers, F., & Roelofs, K. (2019). Frontal Control Over Automatic Emotional Action Tendencies Predicts Acute Stress Responsivity. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*. doi: 10.1016/j.bpsc.2019.06.011
Original URL	https://www.ncbi.nlm.nih.gov/pubmed/31492567
Source type	Journal article
Keywords	Emotions, responsiveness, social interaction, stress
Summary of key points	• Controlling emotional actions is crucial for everyday social interaction • Experiment was conducted byl magnetic resonance imaging social-emotional approach-avoidance task which included both impulsive and controlled emotional actions • Emotion control was induced by approach avoidance task
Reason for interest	I was interested in the impact that this experiment had on the stress response, as well as the emotional actions that resulted from the experiment.
Notes	• Objective was to predict the stress response of the hypothalamic-pituitary-adrenal axis • They tested whether or not a reduced amount of frontal control over social approach-avoidance actions would signal a larger hypothalamic-pituitary-adrenal axis reactivity to following social stress exposure to the subject • After being exposed to magnetic resonance imaging, they were put into a stress induction, and a socially evaluated cold pressor task, and a mental arithmetic test. • Results included self reported negative effect • This included longer reaction times and more errors by the participants • More stress induction led to increases in stress measures • Researchers concluded that instrumental control over social approach avoidance actions could possibly signal stress responsiveness in major stress systems in the human body
Follow up Questions	• Why were most of the participants men? Did the women's data vary from the average for the overall trial? • Was the arithmetic hard, or more stressful?

	• How many participants self reported a negative effect as a result of the stress induction?

Introduction Notes:

- Control over social cues is especially important as to not overwork the major stress systems
- Problem: Direct evidence is missing to link frontal emotional control capacities with stress responsiveness
- Issues with frontal functioning play a role in affective disorders like depression and anxiety
- Recent study found a link between reduced prefrontal cortex (PFC) activation and increased cortisol after stress (in patients with and without depression)
- Their study measured PFC activation during a social emotional task to see if it predicts cortisol stress responsiveness
- Emotional regulation relies on control of the PFC
- Hypothesis: that low aPFC activation during emotional action would be linked with somewhat stronger cortisol increases after the following stress induction.

Article #2 Notes: How do you perceive threat? It's all in your level of brain activity.

Article notes should be on separate sheets

Source Title	How do you perceive threat? It's all in your level of brain activity.
Source Author	Fernandes O Jr., Oliveira L.
Source citation	Fernandes, O., Portugal, L. C. L., Alves, R. D. C. S., Arruda-Sanchez, T., Volchan, E., Pereira, M. G., … Oliveira, L. (2019). How do you perceive threat? It's all in your pattern of brain activity. *Brain Imaging and Behavior*. doi: 10.1007/s11682-019-00177-6
Source type	Journal article
Keywords	Perception, threat, emotional, stimuli (original link: https://www.ncbi.nlm.nih.gov/pubmed/31446554)
Summary of key points	• Objective was to determine whether subtle changes in emotional context during threat perception could be detected by MVPA • Also investigated to see if it was possible to differentiate a person's threat perception from their patterns of whole-brain activity to threatening stimuli using regression models. • Ultimately, they were successful in measuring the threat perception based on directed towards and directed away emotional contexts
Reason for interest	I was interested in this because it involves negative feelings as a reaction to outside stimuli, which is what I am thinking of looking
Notes	• Used multi-voxel pattern analysis (MVPA) to look at subtle differences in emotional context • The stimulus was directed both towards and way from the viewer in order to stimulate several different defensive responses • They were able to accurately predict the threat perception index from the patterns of brain activation • This, however, was only in the directed away context • Threat perception was much more intense in the directed towards the viewer context • Less intense in the directed away context • This was why the model was able to capture the subtle differences in subjective threat perception better in the directed away context
Follow up Questions	

Introduction Notes:

- fMRI helps gain insight into how emotional representations are encoded in brain activity
- Multi voxel pattern analysis (MVPA) has been increasingly used over the past fifteen years in order to analyze neuroimaging data using pattern recognition techniques

- It's difficult, however, to get individual inferences at the voxel level, making it difficult to analyze specific brain regions
- Brain regions are therefore ranked according to their contributions to the model
- One study classified nine emotions based on patterns in brain activity during emotional states
    - Another study measured six different emotions induced by short movies/mental imagery
- Research Question: "Does the accuracy of MVPA for discriminating emotional and neutral brain states vary according to the threat level induced by different threat contexts? "
- Used two different contexts: directed away or towards the viewer
    - This may change the perception of threat imminence
- In previous study, reaction time was reduced when the threat was directed towards the viewer
- Hypothesis: "a higher accuracy would be achieved for discriminating between emotional versus neutral brain states in the directed towards context than in the directed away context."
- To solve this, they used both a MKL classification model and a MKL regression model

Article #3 Notes: Framing deductive reasoning with emotional content: An fMRI study

Article notes should be on separate sheets

Source Title	Framing deductive reasoning with emotional content: An fMRI study
Source Author	Brunetti, M., Romani, GL.
Source citation	
Source type	Journal article
Keywords	Emotional reasoning; deductive reasoning (original link:https://www.ncbi.nlm.nih.gov/pubmed/24747514)
Summary of key points	
Reason for interest	
Notes	• This study looked at the influence of emotions on reasoning abilities • They used neuroimaging to look at this • Both neutral and negative stimuli were presented to the viewer • Both neutral and negative content were presented to the viewers • Viewers were placed in an MRI and asked to validate the logic of situations that they were presented • fMRI data showed that the medial prefrontal cortex was deactivated, and the lateral prefrontal cortex was activated • Hypothesis was confirmed, as performance in identifying logical solutions was negatively impacted when presented with the negative content • Concluded that emotional states do affect reasoning abilities in individuals ○ There was a delayed reaction as well
Follow up Questions	• What are syllogisms? • Do some more research on the prefrontal cortex (lateral and medial)

Article #4 Notes: Color associations to emotion and emotion-laden words: A collection of norms for stimulus construction and selection.

Article notes should be on separate sheets

Source Title	Color associations to emotions and emotion-laden words: A collection of norms for stimulus construction and selection
Source Author	Sutton, T.M., Altarriba, J.
Source citation	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
Original URL	https://www.ncbi.nlm.nih.gov/pubmed/25987304
Source type	Journal article
Keywords	Color, emotions, association, stimuli
Summary of key points	
Reason for interest	Colors in images influence emotional response, so this information may fill a knowledge gap regarding the psychology of colors
Notes	• People often correlate emotions with colors, often associating brighter colors with happier terms, and vice versa with darker colors and sadder words • Prior study found that we associate good/bad based on the brightness of a color/image • Hue is also a factor • Color was also correlated with better memory recall ○ Emotional > neutral memories • Experiment used 35 negative emotion words, 55 negative emotion-laden words, 29 positive emotion words, and 41 positive emotion-laden words • Not all subjects gave a response for every word • Red was most common for negative, and negative emotion-laden • Yellow was most common for positive emotion, and white was most common for positive emotion-laden • Results show that positive and negative emotions are correlated with different colors rather than being similar
Follow up Questions	• Clarify the difference between emotional and emotion-laden words?

Article #5 Notes: Abstract representations of associated emotions in the human brain.

Article notes should be on separate sheets

Source Title	Abstract representations of associated emotions in the human brain.
Source Author	Kim, J., Schultz, J., Rohe, T., Wallraven, C., Lee, S.-W., Bulthoff, H. H.
Source citation	Kim, J., Schultz, J., Rohe, T., Wallraven, C., Lee, S.-W., & Bulthoff, H. H. (2015). Abstract Representations of Associated Emotions in the Human Brain. *Journal of Neuroscience*, *35*(14), 5655–5663. doi: 10.1523/jneurosci.4059-14.2015
Original URL	https://www.ncbi.nlm.nih.gov/pubmed/25855179
Source type	Journal article
Keywords	Association, emotional, MVPA, fMRI
Summary of key points	
Reason for interest	It related to some aspects more geared towards neuroscience, and showed how emotions could be represented in different ways in the brain
Notes	• Different parts of the brain show emotions more abstractly • These representations should be activated by the experience of an emotional event • In this experiment, participants learned correlations between emotional and non emotional stimuli • They then saw if these emotional signals could be decoded by the use of fMRI • 5 emotions were used overall: anger, disgust, fear, happiness, sadness • Two different human body movements were viewed in clips: emotional body movements and dynamic facial expressions • 3 sections of testing: learning, test, fMRI session • 10 blocks of 5 trials • Association between fractal and emotional stimuli was examined after the learning part • Identify emotions correlated with the stimuli • Objective was to use fMRI to determine regions of the brain representing emotions • Accuracy and response time were both measured during the testing phase of the experiment • These four regions of the brain were shown to hold abstract representations of emotions: PCC, precuneus, MPFC, and angular gyrus in the right hemisphere.
Follow up Questions	

Article #6 Notes: Human emotion and memory: interactions of the amygdala and hippocampal complex.

Article notes should be on separate sheets

Source Title	Human emotion and memory interactions of the amygdala and hippocampal complex
Source Author	Phelps EA
Source citation	Phelps, E. A. (2004). Human emotion and memory: interactions of the amygdala and hippocampal complex. *Current Opinion in Neurobiology*, *14*(2), 198–202. doi: 10.1016/j.conb.2004.03.015
Original URL	https://www.ncbi.nlm.nih.gov/pubmed/15082325
Source type	Journal article
Keywords	Connections, amygdala, memory, emotions
Summary of key points	
Reason for interest	It shows the connections between the amygdala and the hippocampus, filling in a knowledge gap regarding a neuroscience component, as well as how emotion and memory are connected

Notes	• Several memory systems exist that are interconnected neurally
	• In prior experiments that focused on the effects of emotion on memory, researchers focused on amygdala and hippocampal complex
	• The two systems are able to work independently of each other, but also have more subtle connections
	• The amygdala is capable of influencing episodic memory that is linked to the hippocampal region
	• Emotional memories are more vivid and tend to last longer
	• 2 stages of memory
	  ○ Encoding, where stimuli are experienced for the first time
	  ○ retention/storage, where the amygdala can influence the storage of memories
	• Right and left amygdala can have differentiated roles depending on the subject
	  ○ Left for memory of emotional stimuli in females, while it is the right amygdala for males
	• There is proof of the opposite happening, episodic memory influencing amygdala rather than the other way around\
	  ○ Fear conditioning, events associated with fear/trauma
	  ○ Emotional significance of the event is stored
	• Concluded that both amygdala and hippocampus use two independently working memory systems that are able to interact and work together when emotions need to be associated with memories

Article #7 Notes: The Evidence Base for Generational Differences: Where Do We Go From Here?

Article notes should be on separate sheets

Source Title	The Evidence Base for Generational Differences: Where Do We Go from Here
Source Author	Parry, E., Urwin, P.
Source citation	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
Original URL	https://academic.oup.com/workar/article/3/2/140/2960078
Source type	Journal article
Keywords	Generations, gap, differences
Summary of key points	
Important Figures	As this was an experiment that analyzed previous datapoint, there are no significant figures that add a lot to the understanding of the article
Reason for interest	This experiment questions and investigates the validity of the generational gap theory, and if people are actually psychologically different based on when they were born.

Notes	• They argued that the approach of most generational studies is flawed, due to how they already have set categories in mind and then test for differences between those
	• They addressed this issue by simply looking for original patterns in the data
	• There are several theoretical definitions of a generation
	  ○ Some say that that are no sound explanations
	  ○ Group that shares birth years, age, location, significant life events
	  ○ A “social location”
	• They might share “an identity of responses” or collective memory
	• Their theoretical background is based off of these
	• “Period effects” are the effect of an event or trend on people’s outlook and behaviors for a short period of time - these behaviours may not last for long enough to be significant
	• Some events and trends give long lasting effects, effectively “scarring” a generation. These may be major historical/social events
	• These shared characteristics or behaviors do not affect or impact the previous or following generations, making a gap
	• “Cut off” points may or may not exist
	• At the conclusion, the researchers came up with an alternate hypothesis - “ Generations may be distinct points on a more general social journey”
	• This suggests that society is evolving as a whole, and generations are the results of continuing trends that become more and more noticeable

Article #8 Notes: Ecological influences on individual differences in color preference

Article notes should be on separate sheets

Source Title	Ecological influences on individual differences in color preference.
Source Author	Schloss, K. B., Hawthorne-Madell, D., & Palmer, S. E.
Source citation	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
Original URL	https://link.springer.com/article/10.3758%2Fs13414-015-0954-x
Source type	Journal article
Keywords	Color preferences, association
Summary of key points	
Reason for interest	Provides information on prior experiment regarding color association and preference
Notes	• The ecological valence theory (EVT) states that a persons preference for a color is determined by their preference for all objects that are the same color • Color preference in psychology has largely been inconclusive due to high variability between individuals • Avg hue preferences peak at blue, and fall around yellow to yellow green • Larger preference to more saturated colors • May also increase with increased lightness • Another possibility is that individual preferences are determined by differences in photoreceptors • Ecological theory is that it is adaptive for organisms to be close to objects that are colored nicely rather than colors that they dislike or think are dangerous • Positive emotions >>> negative emotions • The researchers calculated the weighted effective valence estimate (WAVE) for each color, which was used in the initial procedure • The four tasks in the important figures were completed by each participant • The variability of the color preference for each individual was tested
Follow up Questions	

Article #9 Notes: Age-related decline in positive emotional reactivity and emotion regulation in a population-derived cohort

Article notes should be on separate sheets

Source Title	Age-related decline in positive emotional reactivity and emotion regulation in a population-derived cohort.
Source Author	Schweizer, S., Stretton, J., Belle, J. V., Price, D., Calder, A. J., Camcan, & Dalgleish, T.
Source citation	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
Original URL	https://academic.oup.com/scan/article/14/6/623/5497467
Source type	Journal article
Keywords	Aging, positivity, emotional regulation
Summary of key points	
Reason for interest	This shows that as people age, their emotional well being increases, which may show a possible trend that may occur in my project
Notes	• The article begins by stating the contradiction that as cognitive and physical decline increases with age positivity tends to increase • During this experiment, they gave an emotion reactivity and regulation task to the participants • No support was found for increased positive emotional reactivity • They found decreased positivity across the lifespan, which contradicts what has been previously found in other experiments • The “age related positivity effect” has been proven in many experiments, but not this one • The Aging Brain Model was also not supported by this experiment (increased positivity as age increases is a result of decreasing amygdala reactivity to negative stimuli)
Follow up Questions	

Article #10 Notes: Children's choice: Color associations in children's safety sign design

Article notes should be on separate sheets

Source Title	Childrens choice: Color associations in childrens safety sign design
Source Author	Siu, K. W. M., Lam, M. S., & Wong, Y. L.
Source citation	Siu, K. W. M., Lam, M. S., & Wong, Y. L. (2017). Childrens choice: Color associations in childrens safety sign design. *Applied Ergonomics*, *59*, 56–64. doi: 10.1016/j.apergo.2016.08.017
Original URL	https://www.sciencedirect.com/science/article/pii/S0003687016301703
Source type	Journal article
Keywords	Color association, children, warning
Summary of key points	
Reason for interest	This experiment shows one instance of younger children's color association, which I hadn't looked much into yet

Notes	• Color communicates messages to children who can't read or understand written warnings
	• In order for children to get the right message, the sign designers need to take into account what they associate colors with
	• The children were given uncolored safety signs also written in Chinese
	• Each child produced 12 total drawings, for a total of 357 drawings in all
	• They had free choice of whatever color marker that they wanted to use for each phrase
	• After, the kids were asked 3 standard questions about their color and drawing choices
	• Their explanations were put into five categories (concept, object, constraints, design, and preference)
	• Overall, they found several trends
	  ○ Red, orange, yellow for prohibition/warnings
	  ○ Blue for water
	  ○ Many combinations of the colors green-black and blue-black
	  ○ Black used for general objects
	• The table above shows a color association network that the results were put into and used to analyze
	• Cultural issue was not addressed
	  ○ No way to know how it affected the results (conducted in Hong Kong)

Article #11 Notes: Measuring Emotion: Self Report vs Physiological Indicators

Article notes should be on separate sheets

Source Title	Measuring Emotion: Self Reports vs Physiological Indicators
Source Author	Ciuk, David J., Troy, Allison S., Jones, Markera C.
Source citation	Ciuk, D., Troy, A. K., & Jones, M. C. (2015). Measuring Emotion: Self-Reports vs. Physiological Indicators. *SSRN Electronic Journal*. doi: 10.2139/ssrn.2595359
Original URL	Downloaded as PDF
Source type	Journal article
Keywords	Emotion, self report, measuring
Summary of key points	
Reason for interest	This journal article shows many of the pros and cons of using self reported emotions as a way of measuring affectivity and collecting data
Notes	• This way of measuring is inexpensive and efficient for collecting data • Accuracy has been questioned • Participants might not want to give honest answers if those answers are socially not desirable • Survey takers may not be able to identify what specific reasons are for actions and attitudes • They also may rationalize their answers, == for any number of reasons, and not give honest, initial reactions • This study found that self reports were better predictors of political attitudes, but may provide biased reports of emotions effects on attitude • This study showed how accurate self reported data is in comparison to data taken physiologically
Follow up Questions	

Article #12 Notes: Measuring Individual Differences in Emotion Regulation: The Emotion Regulation Profile-Revised (ERP-R)

Article notes should be on separate sheets

Source Title	Measuring Individual Differences In Emotion Regulation: The Emotion Regulation Profile-Revised (ERP-R)
Source Author	Nelis, D., Quoidbach, J., Hansenne, M., & Mikolajczak, M.
Source citation	Nelis, D., Quoidbach, J., Hansenne, M., & Mikolajczak, M. (2011). Measuring Individual Differences in Emotion Regulation: The Emotion Regulation Profile-Revised (ERP-R). *Psychologica Belgica*, *51*(1), 49. doi: 10.5334/pb-51-1-49
Original URL	Downloaded as PDF
Source type	Journal article
Keywords	Emotion, measuring, survey
Summary of key points	
Reason for interest	This journal article shows many of the pros and cons of regulating emotion, and how it can impact people. It also assisted with the intent of designing an instrument or a survey to take and measure data points for projects similar to this

Notes	• People who can't manage or regulate their emotions are at risk for mental disorders, physical sicknesses, or problems in their social relationships
	• States that there is a lack of instruments that are about to measure regulation of positive emotions and individual differences in ER
	• Developed the ERP-R
	  ○ Composed of 15 scenarios that each feature a specific emotion
	  ○ Followed by 8 possible reactions
	  ○ 4 adaptive, 4 maladaptive
	  ○ Measures level of ER competence
	  ○ Vignette based experiment
	• Most existing ER measures are very general and as a result, are difficult to answer for some people

Follow up Questions	

Article #13 Notes:What is the Positive and Negative Affect Schedule? (PANAS)

Article notes should be on separate sheets

Source Title	What is the Positive and Negative Affect Schedule? (PANAS)
Source Author	N/A
Source citation	What is the Positive and Negative Affect Schedule? (PANAS). (2019, August 20). Retrieved from https://positivepsychology.com/positive-and-negative-affect-schedule-panas/
Original URL	https://positivepsychology.com/positive-and-negative-affect-schedule-panas/
Source type	Website
Keywords	Emotion, measuring, survey, positive, negative, affect
Summary of key points	
Reason for interest	This website details the composition and use of PANAS
Notes	• One scale measures positive, one scale measures negative • "Positive affect refers to the propensity to experience positive emotions and interact with others positively, even through the challenges of life. • Negative affect, on the other hand, involves experiencing the world in a more negative way. • Self reported measure of affect • Intended to show the specific relation between positive and negative affect • Participants assess their feelings and respond to a questionnaire with 20 items, using a 5 point Likert scale • Developed in 1988 • Affectivity refers to the emotions that people experience and might display, in terms of how those emotions influence actions and decisions • PANAS displays a very good internal reliability • Additional versions of the scale have been created over time
Follow up Questions	