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AP Research Assessment Overview

Students are assessed with one through-course performance task consisting of two distinct components. Both components will be included in the calculation of students' final AP scores.

- **Academic Paper — 75%**
- **Presentation and Oral Defense — 25%**

AP Research Through-Course Performance Task

**Weight:** 100% of the AP Research Score  
**Recommended Completion Date for Both Components:** April 15  
**Submission Deadline:** April 30

*Note: Teachers must carefully plan a calendar that provides time for the task to be completed, scored, and uploaded by April 30.*

Teachers must upload and submit the following by April 30:

- Internal Score Report for the following components:
  - Academic Paper (AP)
  - Presentation and Oral Defense (POD)

Retention of Performance Task Presentation and Oral Defense Videos

AP Research teachers are required to keep video files of all performance task presentations and oral defenses for a minimum of one academic year because the College Board may request to review the scoring for these components to identify samples for scoring training and to ensure scoring quality.

Task Overview

Students design, plan, and implement a yearlong, in-depth study or investigation in an area of personal interest through a chosen or designed inquiry method and develop a well-reasoned argument based on the evidence collected in an academic paper of 4,000–5,000 words. As a culmination of their research, students deliver (using appropriate media) a presentation and orally defend their research design, approach, and findings. Students whose academic paper is accompanied by an additional piece of scholarly work (e.g., performance, exhibit, product) must arrange for the teacher and panelists to view this work prior to the presentation and oral defense. Throughout the inquiry process, students communicate regularly with their teacher and, when appropriate, consult with an internal or external expert.
Components

The following components are formally assessed:

<table>
<thead>
<tr>
<th>Component</th>
<th>Scoring Method</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Paper (AP)</td>
<td>Teacher scored, College Board validated</td>
<td>75%</td>
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<tr>
<td>4,000–5,000 words</td>
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<tr>
<td>Presentation and Oral Defense (POD)</td>
<td>Teacher scored</td>
<td>25%</td>
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<td>(15–20 minutes total for presentation followed by three or four questions from a panel of three evaluators).</td>
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Task Guidelines

Students develop a research question/project goal on a topic of their own choosing in an area of personal interest. They submit an inquiry proposal (see Inquiry Proposal Form, p. 55) for the teacher’s approval, and teachers provide feedback that helps students refine their research questions/project goals. Once the inquiry proposal is approved, students begin their background research (i.e., review of previous scholarship) on their topic.

With assistance from the teacher, students may identify one or more expert adviser(s) — internal or external to the school — to serve as an additional resource. The expert advisers should be experts in the chosen discipline or field that the student is investigating or in the research method that the student chooses to employ.

Under the teacher’s guidance — and using the expert advisers’ expertise as needed — students design or choose a method to collect data and information and then analyze, evaluate, and select relevant and credible evidence to develop a logical, well-reasoned argument or aesthetic rationale that results in an academic paper of 4,000–5,000 words. The argument or aesthetic rationale must directly address the research question/project goal. If the academic paper is accompanied by an additional piece of scholarly work (e.g., performance, exhibit, product), this work is not formally assessed but is viewed by the teacher and panelists to contextualize the student’s research.

Academic Paper (AP)

The academic paper must contain the elements listed in the following table. These elements should be presented in a style and structure appropriate to the discipline in which the topic resides (e.g., psychology, science, music).
AP Capstone Program

### Required Element | Description
---|---
**Introduction** | Provides background and contextualizes the research question/project goal and initial student assumptions and/or hypotheses. Introduces and reviews previous work in the field, synthesizing information and a range of perspectives related to the research question/project goal. Identifies the gap in the current field of knowledge to be addressed.

**Method, Process, or Approach** | Explains and provides justification for the chosen method, process, or approach.

**Results, Product, or Findings** | Presents the findings, evidence, results, or product.

**Discussion, Analysis, and/or Evaluation** | Interprets the significance of the results, product, or findings; explores connections to original research question/project goal. Discusses the implications and limitations of the research or creative work.

**Conclusion and Future Directions** | Reflects on the process and how this project could impact the field. Discusses possible next steps.

**Bibliography** | Provides a complete list of sources cited and consulted in the appropriate disciplinary style.

The nature of students' inquiries is open-ended in that students' approaches to their investigations and the type of research they conduct may vary widely. However, every student is expected to produce a paper that addresses his or her inquiry, and all papers will be subject to the same standards of college-level work that demand research conducted at a deep, rigorous level.

Students must avoid plagiarism by acknowledging, attributing, and/or citing sources throughout the paper and by including a bibliography. Students must also observe ethical practices when gathering information through such vehicles as interviews or discussions, and be prepared to sign agreements with individuals, institutions, or organizations that provide primary and private data. Students should also be prepared to obtain institutional review board (IRB) approval prior to engaging in research involving human subjects. Graphs, data tables, images, appendices, abstract, and the bibliography are not part of the total word count for the academic paper.

**Presentation and Oral Defense (POD)**
All students will develop a 15–20 minute presentation (using appropriate media) and deliver it to an oral defense panel of three evaluators.
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<th>Score of 1</th>
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<th>Score of 3</th>
<th>Score of 4</th>
<th>Score of 5</th>
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<tr>
<td>Presents an overly broad topic of inquiry.</td>
<td>Presents a topic of inquiry with narrowing scope or focus, that is NOT carried through either in the method or in the overall line of reasoning.</td>
<td>Carries the focus or scope of a topic of inquiry through the method AND overall line of reasoning, even though the focus or scope might still be narrowing.</td>
<td>Focuses a topic of inquiry with clear and narrow parameters, which are addressed through the method and the conclusion.</td>
<td>Focuses a topic of inquiry with clear and narrow parameters, which are addressed through the method and the conclusion.</td>
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<td>Situates a topic of inquiry within a single perspective derived from scholarly works OR through a variety of perspectives derived from mostly non-scholarly works.</td>
<td>Situates a topic of inquiry within a single perspective derived from scholarly works OR through a variety of perspectives derived from mostly non-scholarly works.</td>
<td>Situates a topic of inquiry within relevant scholarly works of varying perspectives, although connections to some works may be unclear.</td>
<td>Explicitly connects a topic of inquiry to relevant scholarly works of varying perspectives AND logically explains how the topic of inquiry addresses a gap.</td>
<td>Explicitly connects a topic of inquiry to relevant scholarly works of varying perspectives AND logically explains how the topic of inquiry addresses a gap.</td>
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<td>Describes a search and report process.</td>
<td>Describes a nonreplicable research method OR provides an oversimplified description of a method, with questionable alignment to the purpose of the inquiry.</td>
<td>Describes a reasonably replicable research method, with questionable alignment to the purpose of the inquiry.</td>
<td>Logically defends the alignment of a detailed, replicable research method to the purpose of the inquiry.</td>
<td>Logically defends the alignment of a detailed, replicable research method to the purpose of the inquiry.</td>
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<td>Summarizes or reports existing knowledge in the field of understanding pertaining to the topic of inquiry.</td>
<td>Summarizes or reports existing knowledge in the field of understanding pertaining to the topic of inquiry.</td>
<td>Conveys a new understanding or conclusion, with an underdeveloped line of reasoning OR insufficient evidence.</td>
<td>Supports a new understanding or conclusion through a logically organized line of reasoning AND sufficient evidence. The limitations and/or implications, if present, of the new understanding or conclusion are oversimplified.</td>
<td>Justifies a new understanding or conclusion through a logical progression of inquiry choices, sufficient evidence, explanation of the limitations of the conclusion, and an explanation of the implications to the community of practice.</td>
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<td>Generally communicates the student’s ideas, although errors in grammar, discipline-specific style, and organization distract or confuse the reader.</td>
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<td>Competently communicates the student’s ideas, although there may be some errors in grammar, discipline-specific style, and organization.</td>
<td>Competently communicates the student’s ideas, although there may be some errors in grammar, discipline-specific style, and organization.</td>
<td>Enhances the communication of the student’s ideas through organization, use of design elements, conventions of grammar, style, mechanics, and word precision, with few to no errors.</td>
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<tr>
<td>Cites AND/OR attributes sources (in bibliography/works cited and/or in-text), with multiple errors and/or an inconsistent use of a discipline-specific style.</td>
<td>Cites AND/OR attributes sources in bibliography/works cited and/or in-text, with multiple errors and/or an inconsistent use of a discipline-specific style.</td>
<td>Cites AND attributes sources, using a discipline-specific style (in both bibliography/works cited AND in-text), with few errors or inconsistencies.</td>
<td>Cites AND attributes sources, with a consistent use of an appropriate discipline-specific style (in both bibliography/works cited AND in-text), with few to no errors.</td>
<td>Cites AND attributes sources, with a consistent use of an appropriate discipline-specific style (in both bibliography/works cited AND in-text), with few to no errors.</td>
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Day 1 Samples
Drosophila Insulin Like Peptides: Causal Neuropeptide for Fly Aggression?

Word Count: 4287
**Introduction**

A high frequency of aggressive disorders in the population is one of many American health concerns. Today America is home to over 3.5 million diagnosed patients with schizophrenia, over 3 million with bipolar disorder, and over 8 million diagnoses of Post-Traumatic Stress Disorder (NAMI). The cost borne by society for the treatment of aggression borne out by these mental disorders can be sobering. For instance, the government funded Veterans Health Administration reports that treating PTSD in veterans returning from various theatres of conflict, costs four to six times more than unaffected veterans, totaling around $8,300 per PTSD affected veteran as opposed to $2,400 per unaffected veteran, assuming all other health conditions remain constant. (CBO, 2012) With nearly 1.3 million active duty soldiers in the armed forces, these costs put a significant drain on resources which can be better used elsewhere (DOD, 2016).

On the other hand, a large number of psychopathies, such as schizophrenia and bipolar disorder can exact a similar toll on the already extended healthcare system in the country. There is significant evidence that patients with these psychopathies have an increased risk for aggression and violent behavior, including homicide. Data for this relationship comes from a study carried out by Fazel and Grann, which indicated that 5.2% of severe acts of violence are committed by individuals with a major psychiatric disorder, most commonly schizophrenia (Fazel et al., 2006). A 10-year follow-up study by Soyka and Graz of 1662 former schizophrenic inpatients in Germany showed that 10.7% were convicted of a crime, 94 of which were violent in nature (Sokya et al., 2007). Although attempts have been made to address such conditions with cognitive based therapy as well as pharmacological treatments, these are either marginally effective or carry significant side-effect profiles. Genome-wide association studies for the
neurobiological basis of aggression are either lacking or currently being investigated by very few researchers.

**Literature Review**

In 2002, Young et al. found that a homozygous deletion in mice *NR2E1* gene resulted in hyper-aggression (with significantly increased violent tendencies). The deletion of this gene also caused various developmental deficiencies, such as hypoplasia of the cerebrum and olfactory lobes (Young et al., 2002). These mice, although noticeably smaller in size would aggressively attack siblings, unrelated mice, and even mating partners, resulting in serious injury or death. Additionally, an array of sensorimotor tests measuring the efficiency of neuronal sensory-response pathways, showed that the mutant mice took longer to turn around corners and alleys and exhibited less exploratory behavior with fewer arm stretches to feel their surroundings. The time taken by them to find hidden food sources was also of several magnitudes as compared to wild type mice. Dr. Young concluded that the *NR2E1* gene was likely causal for decreased sensorimotor control. Although the degree of aggression and developmental abnormalities might be at least partially dependent on genetic background, violent behavior and behavioral deficits were found in all phenotypes with a homozygous *NR2E1* gene deletion. This study however, failed to explore whether the developmental deficiencies could have been at least partially responsible for causing the aforementioned violent behavior and decreased sensorimotor skills.

Another approach to better understand the genetic source of violent psychopathy is to use the extensively studied Drosophila melanogaster, the common fruit fly. In this species, the tailless gene (abbreviated *tll*) plays an important role in brain and body size development, Dr.
Ruth T. Yu found that the mammalian NR2E1 gene was similar to the tailless gene in *Drosophila melanogaster* (Yu et al., 1994) shown by in-vitro DNA-binding assays exhibiting similarity in function. Both proteins would regulate another set of genes in the organism’s genome, and these regulated genes showed resemblance despite belonging to different organisms. The study confirmed this finding by replacing the tailless gene in Drosophila with the mammalian NR2E1 gene, which functioned as the tailless gene and allowed for almost normal fly development (Yu et al., 1994).

A recent study of the analogous tailless genes in *Drosophila* also provides evidence that the tailless gene is responsible for regulating aggressive behavior (Dierick et al., 2014). Dr. Herman Dierick at Baylor College of Medicine found that when mRNA from the tailless gene was continuously broken down by RNA interference, fly aggression increased dramatically. This study sorted flies of each genotype into groups of two and placed them on opposite sides of a small cubic ring separated by a thin removable wall allowing for controlled interactions between the flies. These were recorded using high resolution video, analysis of which affirmed that the tailless gene, analogous to the mammalian NR2E1 gene, also had a high degree of correlation with aggression. Specifically, *tll* and *NR2E1* coded for transcription factors that prevent uncontrolled transcription of an aggression neuropeptide in the fruit fly and mice models. Dr. Dierick also hypothesized that the tailless gene interacted with corepressor molecules Scribbler and Atrophin. By comparing aggression between these three set of flies, namely those unable to produce Scribbler, those unable to produce Atrophin, and finally flies that lacked a functional tailless gene, he discovered that only Atrophin negative flies and tailless negative flies displayed increased aggression. This allowed him to conclude that the tailless gene interacted with Atrophin to regulate transcription. Furthermore, tagging the tailless gene with a fluorescent
protein showed that it was prolifically expressed in the region of the fly brain which is analogous to the mammalian hypothalamus. Thus, one could conclude that the hitherto unknown gene responsible for expression of the aggression neuropeptide was regulated by the tailless gene and was present in the *pars intercerebralis*.

To determine potential neuropeptides that could be the cause of aggression in *Drosophila melanogaster*, one can look to two major parameters: their location and associated symptoms. Since the tailless gene is expressed mostly in the in the *pars intercerebralis*, one can extrapolate that its regulated protein would also be found in the same area. One family of prominent neuropeptides that are often found in the *pars intercerebralis* neurons are the Drosophila Insulin Like Peptides or dILPs (specifically dILP 1, dILP 2, dILP 3, and dILP 4). A study published by Dr. Kavitha Kannan at the University of Connecticut-Storrs found a similar array of developmental deficiencies in the knockdown of dILPs as those with deficiencies of the tailless gene knockdown (Kannan et al., 2013). This, coupled with dILPs 1, 2, 3, and 4 localizations in the *pars intercerebralis* neurons of the brain, suggested that dILPs may be the unknown neuropeptides that cause aggression. Although the studies mentioned above and others proposed the significance of dILPs, there remains a significant gap in the literature as far as decisive evidence of dILPs’ role as the aggression neuropeptide.

These dILPs were the subject protein of my experiment, which examined their role in regulating aggression. I hypothesized that flies without the ability to produce dILPs would have lower quantifiable aggression than those that could produce dILPs. I tested my hypothesis by examining and directly comparing flies that did not have the ability to produce dILPs to flies that did have the ability to produce dILPs. This led to the development of my leading question: are the Drosophila Insulin Like Proteins (dILPs) 1 to 4 causal for aggression in *Drosophila*
DROSOPHILA INSULIN LIKE PEPTIDES: CAUSAL NEUROPEPTIDE FOR FLY AGGRESSION?

*melanogaster*? The experiment that this paper will expound upon involved ordering *Drosophila* flies that had a mutation within each specific dILP gene which rendered them ineffective. The flies were then ‘pitted against’ flies from the same genotype to determine the level of aggression and thus the presence or absence of a neuropeptide responsible for aggression. Once this neuropeptide has been identified, it can be used to identify analogous mammalian proteins leading to potential advancements in identifying the etiology of aggression in human psychopathies.

**Methods**

**Behavioral Observation**

* Drosophila melanogaster* males are characterized by smaller size, a solid black coloration on the abdomen, and a tendency to “fight” under certain circumstances, including fighting for a mate, for territory and for dominance over a food source (Asahina et al., 2015). High intensity fights include exchanging blows with various appendages (mostly legs and wings) and grappling each other with limbs alone. These fights are rare but are found largely in territorial disputes or disputes over dominance of a food source. Using a high-resolution position tracking software JABBA developed by Dr. Kabra and Dr. Robie at the Howard Hughes Medical Institute, one can calculate the number of “lunges” that the flies attempt at each other (Kabra et al., 2012). The software tracks eleven essential positions on each fly’s body: two wings, six legs, two sides of the abdomen and finally the head. The two sides and head are used to track each fly’s unique position. Based on pre-defined parameters, the software starts detecting ‘lunges’ when these fly’s are near each other. A ‘lunge’ occurs when a fly quickly moves its limbs or wings against the other. Using this method, the aggression of individual flies (in the number of lunges) can be
quantified or fighting frequency among large groups of flies with similar traits (in terms of percentages) can be determined (Kabra et al., 2012).

For my experiment, flies in the wildtype control group had no genetic mutations and were fully capable of producing the dILP neuropeptide. Conversely, the experimental group consisted of flies with the mutated dILP gene, lacking the dILP neuropeptide. In order to ensure that all the flies in the control group had the same genotype, I used a breed of genetically identical flies called Canton Special, abbreviated Canton-S. Although these flies are not truly “wild”, most researchers use them in their control groups because they tend to exhibit characteristics one would expect in flies collected from the wild. On the other hand, the experimental group consisted of four genotypes: each with an inability to produce dILP 1, dILP 2, dILP 3, and dILP 4 (notated dILP 1 negative, dILP 2 negative, dILP 3 negative and dILP 4 negative respectively). Each of these strains were ordered online from the Indiana University Bloomington Drosophila Stock Center via FlyBase (a database of Drosophila genes and labs that produce several different strains) Each strain of Drosophila was unable to produce only one type of dILP while adequately producing all the others.

The observed behavioral aspect of my experiment comprised of three steps. First, I placed a parental generation of flies into a test tube, waited for them to produce offspring, and then removed the offspring immediately after hatching. I did so by first administering carbon dioxide into the sealed tubes to anesthetize the flies. Then I used a brush to move flies onto a plate, and separated 30 male flies of each genotype into two separate smaller tubes (totaling two tubes of 15 flies each). This was done to ensure that the flies would have no interactions with each other prior to their first contact in the ring. I did not want the flies to recognize each other during the recorded fight nor did I want the flies to fight before the recording was initiated. This
was followed by a waiting period of four days which allowed the flies to mature in their tubes. The flies that would eventually fight were seven days old since it has been well established that flies become more aggressive as they attain maturity. I then took a fly from each of the two tubes of a single genotype and placed them into separated compartments of a square ring, 14 millimeters on each side and 3 millimeters deep. This ring was bisected by a removable sheath of plastic. After being placed in their respective compartments, the flies were allowed to acclimate to their new surroundings and explore the ring for three days, so that any individual exploratory behavior would not interfere with the aggressive interactions being tracked.

Figure 1a (left) and 1b (right). Images of sixteen fly rings, bisected by removable black plastic dividers. Figure 1a depicts an aerial view of the ring, while Figure 1b depicts a diagonal view with glass cover.

Finally, both compartments of the ring were placed under a high-definition camera which recorded 20 minutes of fly interactions immediately after the compartmental divider was removed. The camera was programmed to record images in the Tagged Image File Format (.tiff files) at 20 frames per second. Because the camera’s field of vision was quite large, up to sixteen rings could be recorded simultaneously. Following the recordings, the images were converted to Audio Video Interleave (.avi files) video format via a custom MATLAB script so that they could be played back to identify lunges.
Figure 2. Image of behavioral observation setup, featuring fly rings positioned under an HD camera and the computer used to record and store the images.

Data Analysis

The video was then analyzed by the software program JABBA, (Janelia Automatic Animal Behavior Annotator), coded in MATLAB. JABBA used measurements known as classifiers to identify important aspects of each image; two important ones being distance between flies and limb velocity. Using these, JABBA identifies that flies which are close together and have high forelimb velocity have lunged at each other. After detecting the number of lunges in each video using JABBA, I reviewed each video and confirmed that each automatically detected lunge was indeed a lunge and not a computer measurement error. The total number of lunges per pair over a 20-minute period was calculated and transferred to an Excel document. This document contained details about the genotype, number of lunges and pair
DROSOPHILA INSULIN LIKE PEPTIDES: CAUSAL NEUROPEPTIDE FOR FLY AGGRESSION?

ID (numbering system used to keep track of each pair in a genotype). We repeated this procedure for 25 pairs of flies per genotype for a total of 125 pairs of flies.

Although my flies should have been genetically identical, I expected some pairs of flies to exhibit high lunge numbers as a result of random mutation or chance. However, these outliers had to be eliminated to accurately compare the effect of dILP negative mutations on fly aggression. In order to do this, I first found the interquartile range of my data set (the upper quartile value subtracted from the lower quartile value) and then multiplied this value by three. This new value was added to the upper quartile and subtracted from the lower quartile to calculate the outer fence range for my data set. Finally, I eliminated all the data points that exceeded the outer fences as major outliers.

After eliminating the outliers, I performed three statistical analyses to identify the average, median, and p-value generated by a T-test for significance. The T-test is a statistical tool used to decide whether the differences in values are significant between two groups. Since my experiment called for comparing each dILP to the wildtype genotype, I performed T-tests between each dILP and the Canton-S stock, rather than T-tests between different types of dILP. Furthermore, I used a two-tailed distribution because I was unsure of which data set would be higher and used a two-sample equal variance because I was comparing two similar variance sets. If the p-value generated was below 0.05, I could consider the difference between sets significant. However, if this value was above 0.05, then my results would be regarded as insignificant.

Following this analysis, I created a histogram comparing the average number of lunges for each genotype over twenty minutes of exposure to another fly.

With this methodology, I could form my final hypothesis concerning the role of different dILPs in fly aggression: *Drosophila melanogaster* that are incapable of producing the dILP
protein will have fewer lunges over a twenty-minute period than that of wildtype flies which can produce an effective dILP protein.

The methods that I used to answer my research question align with my project goal because they directly compared quantitative aggression in flies without an effective dILP protein to flies with a functioning dILP protein. Due to an absence of other confounding factors between the control group and the experimental group, my experiment provides a side-by-side comparison of the effect of dILPs on aggression in *Drosophila melanogaster*. Conclusive evidence that this experiment could provide can be used to identify the analogous mammalian protein that is responsible for aggression in rodent models, leading to potential advancements in identifying the etiology of aggression in human psychopathies.

**Results**

After obtaining the lunge number for wildtype Canton-S flies, as well as those for mutant flies unable to produce each type of dILP these were plotted on a histogram and analyzed in detail. Prior to eliminating outliers, flies unable to produce dILP 1 had an average lunge number of 5.48 over the twenty-minute period, those unable to produce dILP 2 had an average of 14.29, those unable to produce dILP 3 had an average of 4.77, and those unable to produce dILP 4 had an average lunge number of 1.08. On the other hand, the Canton-S stock with an intact capacity to produce dILP had an average lunge number of 2.60. Flies without the ability to produce either dILPs 1, 2, or 3 actually tended to have a higher lunge number than the wildtype, but *dILP 4* had a lower lunge number.
Table 1. The table depicts statistical analyses, including mean value, median, first (1\textsuperscript{st} Q) and third (3\textsuperscript{rd} Q) quartile, and outer fences, of lunge number over the 20-minute interaction period. All genotypes were compared to the same wildtype control group using T-tests; P-value is the result of each test. Pair ID denotes the identification number given to each pair of flies.

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| P-value      | 0.54158844 | 0.05222738 | 0.11798863 | 0.12242311 |
During my analysis, I found that experimental genotypes *dILP 1 negative* and *dILP 2 negative* had three outliers each while genotype *dILP 3 negative* and the wildtype control group each had one outlier in their data set, and experimental genotype *dILP 4* had no outliers whatsoever. However, after eliminating outliers, the range of averages decreased dramatically.

Flies incapable of producing dILP 1 had an average lunge number of 2.14, those unable to produce dILP 2 had an average of 4.19, those unable to produce dILP 3 had an average of 3.43, and those unable to produce dILP 4 remained at an average of 1.08. Furthermore, the Canton-S stock exhibited a lunge number of 1.79.
I then performed four T-tests to determine the significance of my results after eliminating outliers. The p-value for the experimental groups dILP 1 negative, dILP 2 negative, dILP 3 negative, and dILP 4 negative as opposed to the wildtype data set were 0.542, 0.052, 0.118, and 0.122 respectively. From this, I was able to conclude that the differences in lunge number between each data set were insignificant and that the flies which were unable to produce dILP did not have a significant difference in lunge number from the wildtype flies with an intact ability to produce dILPs.

**Discussion**

As seen in Figures 3a and 3b, dILP 1 negative, dILP 2 negative, and dILP 3 negative feature pairs that have an average lunge number higher than that of the wildtype flies over the twenty-minute period. Although this may suggest that these dILPs could be another type of transcription factor for aggression, further analysis revealed that the p-values for these data sets...
are higher than 0.05, deeming that the averages were insignificantly different from that of the wildtype flies, that could produce functional versions of the same dILPs (Fig. 4). However, the 

p-value for flies that could not produce dILP 2 approached 0.05, which might be due to the fact that dILP 2 may be another transcription factor for the unknown gene producing the aggression neuropeptide. On the other hand, \textit{dILP 4 negative} appears to show a lower average lunge number over the twenty-minute period when compared to the wildtype lunge number. However, the T-test (p-value greater than 0.05) between them reveals that the difference is insignificant.

Thus, because the difference between wildtype flies capable of producing dILPs and experimental mutants that are incapable of doing so, is insignificant, I rejected my hypothesis: flies with the inability to produce dILPs have a lower lunge number than those of flies capable of producing dILPs. Due to this, it is unlikely that dILP 1, dILP 2, dILP 3, or dILP 4 are individually causal for aggression in \textit{Drosophila melanogaster}. However, it is possible that multiple dILPs are causal for aggression, in which case a decrease in aggression would only be present if all dILPs were mutated. Moreover, further study into flies without dILP 4 (those that exhibited decreased lunge number in my experiment) might reveal a significant decrease in aggression if a similar experiment is performed in the background of more aggressive flies.

Having understood that dILPs are unlikely to be the cause of aggression in \textit{Drosophila melanogaster}, we can now discuss the implications of this finding. First and foremost, looking back at Dr. Dierick’s research of the tailless gene as a transcription factor, it is doubtful that the dILP genes 1 to 4 are the target genes of the tailless gene, because the tailless gene should regulate the aggression neuropeptide producing gene (Dierick, 2014). Next, it is improbable that the mammalian analogues of dILPs are responsible for aggression in mice models or humans. Because Dr. Ruth T. Yu’s research found that the tailless gene and the analogous \textit{NR2E1} gene
share target genes, Dr. Yu concluded that the target genes that produce the aggression peptides share a similar base pair sequence in both mice models and *Drosophila melanogaster* (Yu et al., 1994). One can then extrapolate that the protein produced by the unknown target gene should be similar between both species. Thus, because dILPs are unlikely to cause aggression in *Drosophila melanogaster*, its analogues are unlikely to cause aggression in mice models or humans. Knowing this, further study into possible causal aggression peptides in *Drosophila melanogaster* models or mice models should exclude dILPs and their mammalian analogues as potential candidates. Rather, researchers in the field should focus on other possible aggression neuropeptides in the PI region of the brain (where the tailless gene is expressed the most) that may be regulated by the tailless gene. These neuropeptides should also have analogous mammalian proteins that are regulated by NR2E1. By following these guidelines and by excluding dILPs, researchers would be more likely to isolate neuropeptides that cause aggression in *Drosophila melanogaster* and eventually those in mammals.

**Limitations**

In light of rejecting my hypothesis, there are certain limitations to the experiment that need to be mentioned. It is possible that multiple neuropeptides are causal for aggression, which would explain why *dILP 4 negative* exhibited a slight decrease in quantifiable aggression. Conversely, it is also possible that dILP 2 is another transcription factor for the unknown gene that produces the aggression neuropeptide. This would support the hypothesis that aggression in *Drosophila melanogaster* is caused by multiple neuropeptides and regulated by multiple transcription factors (such as the tailless gene). However, although the tailless gene has co-repressors (such as the Atrophin molecule), Dr. Herman Dierick proved that the tailless gene is
the principal transcription factor by finding that Atrophin works with the tailless gene to regulate transcription. Moreover, it is unlikely that dILP 2 alone is a transcription factor; one could infer that the peptides in the dILP family share similar functions. Thus, the biggest limitation of this experiment would be the background in which it was performed. The experiment was conducted with flies that had functional tailless genes. These may have suppressed the transcription of dILPs in the control group Canton-S flies (Dierick et al., 2014). Therefore, it is possible that all flies had minimal dILP present in the brain to begin with, and this, in turn, caused insignificant differences between the data sets. However, this limitation is mitigated by the fact that one would expect to see some difference between flies that have transcription factors that simply regulate the production of a potential neuropeptide and flies that cannot produce the potential neuropeptide whatsoever. Regulation of genes via transcription factors depend on the concentration of the transcription factors and the concentration of the DNA it regulates; it is possible – even probable – that some neuropeptide is produced, evidenced by the fact that wildtype flies with functional tailless genes must produce aggression neuropeptides when fighting. On the other hand, flies without the DNA to even begin transcription of an aggression neuropeptide would have almost no chance to produce any neuropeptide at all. Nevertheless, it is important to note that differences between data sets were considered insignificant in this paper and might have been caused by this discrepancy. Performing a similar experiment with flies that are more aggressive (specifically those that have a knocked down tailless gene) may reveal a profound difference in aggression phenotypes, especially for \textit{dILP 4} that exhibited some decrease in aggression. Such an experiment would eliminate the possibility that the tailless gene was hindering significant production of aggression neuropeptides, solving for this potential limitation.
Future Research

Further research that should be performed in the future could address these limitations by testing flies that are incapable of producing multiple dILPs (as compared to an inability to produce only a single dILP) as well as by using flies that display a higher level of aggression. Future testing will focus on recreating this experiment in the presence of a tailless gene knockdown because differences in aggression between flies that cannot produce aggression neuropeptides at all versus flies produce the same neuropeptides in significantly increased quantities would be more obvious.

In continuance of this research, I plan to use the RNA interference system (RNAi) to nullify mRNA produced by the tailless gene (Dierick et al., 2014). By crossing flies with RNA interference of the tailless gene and flies that cannot produce dILPs, I should be able to compare the differences in aggression and subvert the limitations that my original experiment encountered. Nullifying the tailless gene would allow me to conduct my experiment with flies having a higher level of aggression, and in doing so, any decrease in aggressive behavior would be more profound and readily observable. Furthermore, to test the possibility that aggression is the result of multiple proteins, this experiment will also test more dILP negative genotypes and dILP negative genotype combinations, including dILP 1 negative, dILP 2 negative, dILP 3 negative, dILP 4 negative, dILP 5 negative, dILP 6 negative, dILP 7 negative, dILP 1-4 negative, and dILP 5-7 negative (these are the only combinations available on FlyBase, the commercial site where mutated flies are bought). This experiment would then be able to conclusively
DROSOPHILA INSULIN LIKE PEPTIDES: CAUSAL NEUROPEPTIDE FOR FLY AGGRESSION?

determine if proteins dILPs 1 to 4 are individually causal or whether they are collectively contributory towards aggression.

By knocking down the tailless gene in flies that are incapable of producing these neuropeptides, one should not see an increase in aggression. This would prove that the said neuropeptides are those that the tailless gene regulates. The goal of such future research would then be to answer the question whether Drosophila Insulin Like Proteins (dILPs) 1 to 4 cause increased fighting frequency in the simultaneous presence of a ‘knocked down’ tailless gene.
DROSOPHILA INSULIN LIKE PEPTIDES: CAUSAL NEUROPEPTIDE FOR FLY AGGRESSION?

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Cultivation, Resistance, & Beauty: 
A Case Study on the Defiant Gardens of the Manzanar Internment Camp during World War II

AP Research
Word Count: 4736
“The Foundation” by Mitsuye Yamada

This could be the land
where everything grows.
Bulldozers had sifted up
large piece of parched woods and
worthless rocks.
Bilateral builds to be are not yet.

Meanwhile on this dust
I counted seven shapes
of sturdy grey and greens
some small and slender
vertical parallels.
No one planted them here with squared T's.
Some weblike tentacles reaching out
Toward rounded rotundas.

Molded by no one.

Here
starshaped with tiny speckles,
are these the intruder in my garden
of new seedlings?
My garden carefully fed and fettered?
Of course.
I pronounced their execution
with a pinch of my fingers.

But here
among a myriad of friends
they flourished in weedly wilderness,
boldly gracing several acres
of untended land.
Tomorrow they shall be banished from their home.

And watered by many droplets
of human sweat
will sprout another college where
disciplined minds finely honed
will grow
in carefully
planted rows.

No room for random weeds.

Abstract

Following the bombing of Pearl Harbor, US President Franklin D. Roosevelt signed Executive Order 9066, authorizing the incarceration of 110,000 Japanese Americans into internment camps. By 1943, agriculture dominated camp life, especially at the Manzanar Internment Camp in Owens Valley, California. During their internment, the Japanese Americans, unbeknownst to each other, raised a variety of gardens, including traditional Japanese ornamental gardens. The ornamental gardens ranged greatly in size and consisted of raked gravel dry gardens, cactus gardens, showy flower gardens, and ornate rock gardens. In an effort to preserve the history of the near-extinct generation of Japanese Americans, this study seeks to understand the purposes and implications of the ornamental gardens, with a focus on the Manzanar camp. In this qualitative retrospective ethnographic case study, I examine the overarching themes arising from ten interviews with WWII internees who lived at the Manzanar internment camp using the thematic analysis approach. This study found that the Japanese Americans initially raised the ornamental gardens to resist and combat their desolate, harsh environment, but these gardens had unforeseen consequences for the Manzanar community. While the gardens functioned as a pastime, a means to preserve and revive Japanese culture, and, paradoxically, an avenue to strengthen relationships with the War Relocation Authority officials, they also ultimately helped the inmates to conceptualize their highly complex experiences during WWII. This study’s findings, with a deep examination of the Manzanar camp, are aligned with broader environmental studies on the Japanese Americans during WWII, specifically with regard to the gardens functioning as acts of resistance. Looking towards the future, I recommend that further research should examine how defiant gardens throughout history compare with one another and drive the narratives of those involved.
Historical Context

On December 7, 1941, the Japanese bombed Pearl Harbor, catalyzing mass fear and mistrust of Japanese American citizens across the United States. In response, on February 19th, 1942, President Franklin D. Roosevelt signed Executive Order 9066 which authorized the removal and incarceration of 110,000 Japanese Americans (two-thirds of whom were American citizens) living on the West Coast into temporary internment camps. The executive order also called for the establishment of the War Relocation Authority (WRA), the federal government agency responsible for the relocation of all Japanese people and the creation and regulation of relocation centers (internment camps). Beginning in August 1942, the Japanese Americans were moved into the internment camps and deprived of their civil liberties. On March 20, 1946, nearly six months after the official end of WWII, all internment camps were retired and the Japanese Americans were left to rebuild their American lives.

As Japanese Americans relocated into the internment camps, they were forced to leave their homes and occupations behind. In contrast to their pre-WII lives, the Japanese Americans in the camps were assigned occupations designed to aid the war effort, such as teaching, cooking, and farming. From the perspective of the WRA, the conditions in the internment camps generally provided the “the bare subsistence level”. In camp, the Japanese Americans were relegated to “simple construction barracks,” in the place of homes and provided with a few facilities and

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3 Ibid, 135.
5 Ibid, 240
6 Oguzhan, 150.
services including food courts, minimal medical care, and education for their children. Despite their job assignments and their access to meager resources, the Japanese Americans found themselves with an abundance of time. After living in the camps for a few months, the internees longed to enrich camp life. They began organizing activities such as painting, pottery, baseball, fishing, farming, and gardening. Prior to WWII, Japanese Americans dominated agricultural businesses in the US. Ten years before the war, one-third of Japanese Americans in Los Angeles were gardeners. By 1940, on the West Coast more than forty-six percent of Japanese Americans were employed in agriculture, with an additional twenty-six percent employed in “agriculture-related activities such as produce businesses.” However, these pursuits had to be suspended at the start of WWII.

By 1943, agriculture came to dominate camp life. Camp community groups, led by former farmers and gardeners, and schools typically maintained the gardens and crops. Most of the internment camps had victory gardens — gardens initiated by the US government to aid the war effort. The victory gardens enriched the inmates' government-issued diet with an increased

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11 Ibid.
variety of produce; the internees took this opportunity to plant Japanese vegetables. The Japanese Americans also constructed thousands of ornamental gardens, ranging in size from parks for all inmates to enjoy, block gardens (a set of barracks were called a block), to small personal gardens. Among these ornamental gardens were traditional raked gravel dry gardens, cactus gardens, showy flower gardens, and ornate rock gardens. The Manzanar internment camp in Owens Valley, CA became famous for the creation of Merritt Park, the most elaborate and sophisticated garden in all of the camps. The project, featuring ponds, boulders, tea houses, and a waterfall, illustrated the complexity and magnitude of a wartime garden.13

Literature Review

In this literature review, four major works consider the environmental conditions and agriculture across Japanese internment camps during WWII. Bowdoin College Professor Connie Chiang sets the framework for the current literature on the topic. Chiang not only provides an overview of environmental theory and history, but also examines how agriculture influenced the interactions between WRA officials and inmates. Examining specifically environmental injustice theories, Chiang claims that, “WRA officials tried to use nature as an instrument for social


13Ibid.
control by locating the camps in places where they could isolate Japanese Americans and procure their labor in the name of assimilation and patriotism.”¹⁴ As she explores both the perspectives of the WRA and of Japanese Americans, she asserts that in an effort, “to resist and endure their incarceration, Japanese Americans both established intimate connections to nature and sometimes refused to work when demanded.”¹⁵ In short, Chiang argues that, “the natural world” became a platform that upset “power relations” between the WRA and Japanese Americans, “ensuring that WRA control over the detainees was not absolute.”¹⁶

Kenneth Helphand finds a similar theme in his book on defiant gardens. According to Helphand, defiant gardens are, “gardens created in extreme or difficult environmental, social, political, economic, or cultural conditions”.¹⁷ In his chapter on Japanese internment, Helphand claims that, “At the relocation camps, garden-making was literally the domestication of an inhospitable environment, creating a cultural setting which was a semblance of normalcy.”¹⁸ He further adds that the gardens were mechanisms to maintain “cultural integrity” and “self-respect”; they were “an enterprise of survival, a defense of sanity and a demonstration of psychological, and here political, defiance.”¹⁹ Helphand’s book claims that the gardens served as acts of resistance, a tool to defy the WRA and their living conditions, and a means to emotionally survive the wartime experience. Ultimately, Helphand and Chiang’s analyses demonstrate how the Japanese Americans’ relationship with nature across the camps became a tool for defiance against their incarceration and the WRA.

¹⁵ Ibid, 236.
¹⁶Ibid, 236.
¹⁸ Ibid, 117.
¹⁹ Ibid, 117.
Anna Tamura offers a similar perspective as she focuses on agriculture at two internment camps: Manzanar and Minidoka. Similar to Helphand and Chiang, she reports that the gardens functioned as acts of resistance — “political symbols of sedition and non-compliance as well as loyalty and patriotism.” Arguing that the gardens were “restorative agents that fostered communal healing, and [were] the results of cultural cohesion and community competition,” she too highlights how these gardens served as techniques of daily survival. Monica Embrey’s dissertation speaks to Tamura’s claims. In her case study on the environmental justice history of the Manzanar internment camp, Embrey examines the Japanese Americans’ relationship with the Owens Valley land, with a focus on their use and conservation of water. When addressing gardening and farming in the camp, she brings two important Japanese concepts into the literature discussion: "Gaman" and "Shikata ga nai". In her book *The Art of Gaman*, Delphine Hirasuna defines gaman as, “enduring what seems unbearable with dignity and grace” while Professor Jane Iwamura defines Shikata ga nai as the belief that, “one should not concentrate on the things one cannot change.” With these two concepts in mind, Embrey argues that they are fundamental in understanding the motives of Japanese Americans’ relationships with the land surrounding them. With sources such as Tamura and Embrey, the Japanese Americans’ quest to ease routine adversity shines through; it is apparent that agriculture in the camps fostered emotional survival.

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21 Ibid, 1.
While Helphand, Chiang, Tamura, and Embrey’s analyses contextualize the Japanese Americans’ relationships with the environment and agriculture, no study focuses solely on the Japanese ornamental gardens. Furthermore, with the exception of Embrey, this literature lacks comprehensive research on one particular internment camp. While these articles analyze the importance and implications of these gardens, the current gap in research allows for generalizations when understanding the Japanese American experience and their relationship with ornamental gardens. A qualitative ethnographic case study examining the purposes of the gardens in the Manzanar internment camp may shed light on this gap. Furthermore, it will provide deeper insight into the everyday acts of resistance and the grit that enhanced camp life.

**Method**

The method of my study addresses the question: *Through a qualitative retrospective ethnographic case study, what purposes did the Japanese ornamental gardens in the Manzanar internment camp serve for the Japanese Americans during World War II?* I hypothesized that the Japanese Americans built the gardens as a pastime, a means to resist the WRA, and a method of healing as a community. It is important to recognize that I made a significant assumption within the research question. Asking, “what purposes did the... gardens... serve” implies that I believe that there is/are purpose(s) behind these gardens. But gardens do not, in general, spring out of deserts without good cause.

**Qualitative Retrospective Ethnographic Case Study**

With these questions in mind, it is important to break down and define the different components of the method. Qualitative methods “rely on text and image data, have unique steps
in data analysis, and draw on diverse designs.” In a qualitative retrospective ethnographic case study, “retrospective” implies that outcome of the event has already occurred by the time the study is initiated. Hence, this study analyzed the purposes of the gardens during WWII, rather than the purpose of the gardens today. An ethnographic case study is a sociological method that explores how a select group of people live and make sense of their lives with one another in a particular place. In the context of this study, the selected cohort consists of ten Japanese Americans who lived at the Manzanar internment camp. Each individual in the cohort developed a relationship with the gardens, whether it was through a parent working in the gardens or their own direct contact with and memory of the gardens. This method was chosen to not only fill the current gap in the literature, but also to avoid generalizations when describing the internees’ relationships with the ornamental gardens. I chose to focus on the Manzanar internment camp as it was the largest internment camp in the nation and was home to Merritt Park, and thus has the most primary sources documented.

**Thematic Analysis**

At the beginning of the study, I thematically analyzed interviews of the ten internees. In thematic analysis, qualitative researchers determine the relationship between overarching themes in a data set; they build their patterns, categories, and themes from the bottom up by organizing the data into increasingly more abstract units of information. This method of

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26 “Ethnography,” 1.
analysis was chosen to link the individual experiences of the internees to common themes that can be applied to the Manzanar narrative as a whole. The ten interviews were found on the Densho Encyclopedia Digital Repository by using the search words, “Manzanar camp gardens”, “Manzanar”, “camp gardens”, “parks”, and “camp activities”. The interviews were pre-recorded on the site and range from one to five minutes. Densho Encyclopedia is a nonprofit organization with the “initial goal of documenting oral histories from Japanese Americans who were incarcerated during World War II.”29 Today it serves as a database of primary sources from Japanese Americans during WWII.30

The thematic analysis was conducted in three steps. Firstly, I watched and transcribed each of the ten interviews. I watched the interviews multiple times in effort to familiarize myself with the testimonies of the interviewees. Then, I identified similar experiences among the Japanese Americans in an attempt to understand what types of events contributed to the raising of the gardens. Once I identified similar experiences, the narratives were analyzed to discover the purpose of raising ornamental gardens. Then the overlapping experiences were sorted into groups and further labeled with an overarching theme.

After I conducted a pilot study in December 2017, I realized I lacked a robust and clear argument based solely on using these interviews. Therefore, a second qualitative step was added to my method: a mixed media primary source thematic analysis. I expanded my data set by adding other primary sources such as official documents from the WRA, poems, diary entries, and camp newsletters to flesh out my argument. These sources were found on various platforms

30 Ibid.
including Densho Encyclopedia, museum collections, and other literature on the gardens. The primary sources underwent the same process of thematic analysis as the interviews.

**Limitations**

Before moving on to the findings discussion of the study, it is important to address the limitations in my research process and findings. The first and most significant limitation lies within my cohort. Because most of my desired cohort is over 80+ years old or already deceased, conducting the interviews myself was unfeasible. Owing to the nature of historical retrospective inquiry, I chose instead to use the ten pre-recorded interviews found on Densho. Therefore, I was unable to write the questions myself. Perhaps if I was able to conduct the interviews in person, my findings would have been free of the innate subjectivity of some of the questions asked. Another limitation regarding my cohort was the sample size. Considering the number of interviews and the average length of each segment directly speaking to the ornamental gardens (two minutes), the amount of data I was able to analyze was not lengthy. Given this limitation, I may have missed opportunities for a wider analysis. However, since very few individuals who lived in the Manzanar Camp and were connected to the gardens are still alive today, the perspectives in the interviews still offer crucial insight into the purposes of the Manzanar gardens. Lastly, there was room for human error from both the interviewees and researcher. Because the interviewees were looking back on their experiences, it is possible that they did not accurately depict camp life in the gardens. Similarly, it is possible that I transcribed part of an interview incorrectly or misinterpreted the meaning in these testimonies which could have potentially skewed my data.
Findings

After I applied the thematic analysis to the interviews and primary sources, seven different themes emerged regarding the purposes of Japanese ornamental gardens in the Manzanar internment camp; however, five themes were repeated consistently. These five themes are: (1) Community Building and Enrichment, (2) Defiance of Environment, (3) Gaman, (4) Shikata ga nai, and (5) Boredom. Below, these five themes are defined.

Table 1: Definitions

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<th>Theme</th>
<th>Definition</th>
<th>Number of interviews with this theme</th>
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<tr>
<td>Community Building and Enrichment</td>
<td>The effort to improve or enhance the quality of life through communal activities</td>
<td>5</td>
</tr>
<tr>
<td>Defiance of Environment</td>
<td>The attempt to beautify the camp in contrast to the barren environment</td>
<td>4</td>
</tr>
<tr>
<td>Gaman</td>
<td>Enduring what seems unbearable with dignity and grace[^{31}]</td>
<td>4</td>
</tr>
<tr>
<td>Shikata ga nai</td>
<td>One should not concentrate on the things one cannot change[^{32}]</td>
<td>4</td>
</tr>
<tr>
<td>Boredom</td>
<td>The abundance of unstructured time leaving the inmates to feel restless and in need of a pastime</td>
<td>3</td>
</tr>
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For the purposes of a robust, clear analysis and line of reasoning, these themes will not be discussed in isolation and will rather be analyzed in the context of the larger narrative of the Manzanar internment camp during WWII.

**Discussion**

When the Japanese Americans were relocated to the internment camps, the community immediately faced a problem: the hazardous and poor environmental conditions. Located in the Owens Valley, California, the Manzanar land was notorious for its extreme temperatures, ruthless sun, and strong winds. When the WRA built the camps, they erased any trace of vegetation and leveled the land, “to build roads, prepare building sites, and establish agricultural fields.”

This excavation exacerbated the conditions of Manzanar as the newly churned dust coated the lives of the internees, including their skin, food and barracks. Henry Fukuhara remembered, the “wind would come and, and it would be so bad that you could hardly walk outside, and then... the sand would come up through the cracks in the floor and would come in through the sills of the window, and it was terrible.”

Hikoji Takeuchi added, “let’s face it, Manzanar was a barren

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In fact, four internees used the word “barren” to describe the initial conditions of Manzanar, emphasizing the harsh conditions they endured in their desolate, dust-coated camp.

In effort to resolve the environmental issues of the camp, the WRA launched a camp landscaping program. This advancement set the framework for all future agricultural projects to be developed over the next four years, including victory gardens, cattle ranches, block gardens, and ornamental gardens. While the WRA facilitated many of these landscaping projects, the Japanese Americans initiated the construction of ornamental gardens as a defense against the environment. Sue Kunitomi recalled that internee Henry Uenu raised a little ornamental garden outside of the mess hall, “because everybody lined up for their meals outside the mess hall and there was no shade and no place to sit, so he talked to the mess hall people... and the men in the block ....” including Uenu and his friends, “decided they would build ...this garden.” Uenu’s project ultimately sought to mitigate the hot, uncomfortable conditions near the mess hall. His story, along with others, sparked a grander purpose in raising the gardens: beautifying the camp. Henry Fukuhara recalled that before the Japanese Americans began to build these gardens, “everything was just barren because there


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were no trees there at all because, with the exception of an apple tree ... [the WRA] bulldozed everything... [the gardens] made the appearance [of the camp] more appealing and more comfortable.” Willie Ito added, “They tried to make it look homey. Rather than seeing nothing but sand, it [was] so nice to see greenery.” Most of the youth, however, had become accustomed to the barren environment. Eiichi Sakauye remembered that, “Because of the gardens [the] bumble bees and butterflies came in.” He further added that he would have to explain to the kids, “Watch out, there’s a bumblebee, it’ll sting you. And then they wondered why I said that to them. And the butterfly comes along, the butterfly comes to suck the sugar from this pollen and so forth. We [told] them how the butterfly lays its egg and it pupates to a worm, and from the worm, it comes to a butterfly. And these kids were quite interested. So the kids come from all parts of the camp and come to see us... I don’t think they’d been exposed to nature.” Essentially, Fukuhara, Ito, and Sakauye’s testimonies describe the stark contrast in environment after the Japanese began building the gardens: with the garden came comfort, beauty and biodiversity. With this juxtaposition, the ornamental gardens defied the barren setup of the Manzanar internment camp. The small but highly significant changes to the landscape altered the Japanese

Americans perceptions toward their internment experience; they came to see beauty can be nurtured even in dust.

Even with this environmental enrichment, Japanese Americans faced an internal struggle. In the camps, the inmates sought to preserve their Japanese culture and identity, yet needed to pledge their allegiance to the WRA and, more broadly, the US. When the Japanese Americans initially settled into the internment camps, their relationships with the WRA were tense and formal. The WRA was responsible for logging the inmates’ daily interactions ranging from meal plans to medical examinations. They also regulated the internees’ activities and prohibited them from displaying and teaching Japanese culture (including speaking and writing in Japanese and celebrating Japanese cultural events and recreation).\(^4\) Despite these rules, the Japanese Americans silently protested their confinement through the ornamental gardens.

In advancing their agricultural projects, the inmates defied camp regulations but unexpectedly strengthened relationships with the WRA. The nature of these formal interactions with the WRA changed as Pleasure Park, also known as Merritt Park, was built. Brothers Kuichiro and Akira Nishi along with Henry Uenu initiated the project, gathering their fellow inmates to raise the sophisticated, beautiful Japanese ornamental garden. As they embarked on their project however, they faced a problem in the planning of the garden: they did not have the resources

needed to grow the garden, including machinery, plants, and shrubs. And so the debates and deliberation with the WRA began. Eventually, the Nishi brothers convinced the WRA to not only move forward with the project, but also fund supplies and further loosen camp rules. Henry Nishi, son of Kuichiro, recalled that when his father needed locust trees for Pleasure Park, “[the WRA] must have been given permission to go out of camp... to get locust trees because there were] no locusts... on the property.”⁴² Similarly, Arthur Ogami remembered his father, “...had a crew and [the WRA] provided [a] truck for him. And he’d go out to the foothills of the mountain to pick up rocks and trees, shrubs to use in the garden”.⁴³ As the Japanese Americans pushed the limits of their incarceration to build gardens, they found themselves rewarded with opportunities to venture out of the camp, allowing them short reprieves from their highly regulated lives. Eventually, the brothers renamed Pleasure Park to Merritt Park after WRA project director Ralph Merritt in gratitude for his help. Though the WRA still recorded and charted every aspect of the inmates lives (including the gardens), the innate nature of the interactions between the two groups changed course. As the two parties worked together, the WRA learned to trust the Japanese Americans and came to empathize with the Japanese American perspective. Though the gardens initially symbolized defiance, they ultimately functioned as an agent to soften the interactions between the WRA and internees.

While the gardens became a pathway for communication between the WRA and internees, they also forged closer relationships among the Japanese Americans. In Manzanar, sixty-percent of the Issei generation (the first generation of Japanese Americans) had worked in agriculture and landscaping businesses prior to WWII.⁴⁴ By raising the gardens, the Japanese Americans were

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able to reconnect with their lives before WWII as a community. Madelon Arai Yamamoto remembered that as her father dug a large ornamental pond in 1943, “he had many friends that helped, that were interested in building the pond... before I knew it they were in front of the house digging it out. And then before I knew it they arrived with the concrete, and then before I knew it there was boulders all around there.”

Yamamoto’s testimony demonstrates how the initiative of one person had a multiplier effect on the participation of those around him. George Izumi further described how the gardens were a mechanism for Japanese Americans to collectively reunite with their heritage. He recalled, “there was a fellow named... Mr. Kato, who was a rock garden specialist. He built that garden. He brought all the stone, big rocks down there, and they built a beautiful rock garden up near the hospital.”

Similarity, Henry Fukuhara added that, “there were gardeners that knew how to make the real Japanese gardens,” and taught the younger generations the practices of the Issei. Henry Nishi added, “none of us had too much experience [with ornamental gardens]. We were pretty.... young. But most of our... dads were not around either because they were interned elsewhere... [we were] exposed to a lot of agriculture, ornamental agriculture.” Perhaps the gardens acted as a liaison between the generations so the Issei were able to pass down their expertise in traditional Japanese gardening. Yamamoto

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46 Izumi, George, interview by John Allen, Densho Digital Repository, November 6, 2002.
added, “it was a way to develop a little community.”

The efforts to beautify the Manzanar environment, build community, and pass down Japanese gardening techniques, however, would not have been possible without the abundance of unstructured time. In the majority of the interviews, the Japanese Americans recalled how bored they were in the camps. Madeline Yamamoto also remembered, “...even though all adults had some sort of responsibility or, quote, job, in camp, they had lots of time. No one had cars, no one could go to the movies... We had a lot of time on our hands.” Perhaps this is to say that without the free time in the camps, the gardens would never have been raised. Jun Ogimachi added, “Well... the people within the block were just doing them. They just... need[ed] something to do.”

Yamamoto and Ogimachi’s testimonies bring to light two important Japanese beliefs: gaman (enduring what seems unbearable with dignity and grace) and shikata ga nai (not concentrating on the things one cannot change). Perhaps the gardens allowed the internees to focus on an aspect of their life which they could change, rather than dwelling on the ways their lives were regulated. George Izumi added, “So, you know, it goes to show you that if... any individual... set[s] their mind to do what they want to do, they can do it. It doesn't matter ... what it is in life.” Looking back on his father’s garden next to the camp hospital, Arthur Ogami added, “I think the gardens expressed that just because we’re here, we have to do something to refresh our feelings. I think that the gardens... express[ed] that there is hope for peace and

54 Izumi, George, interview by John Allen, Densho Digital Repository, November 6, 2002.
freedom. And you can go to these gardens and feel it.” Izumi’s and Ogami’s reflections on their experiences suggest these gardens functioned as a mechanism of endurance for the people of the Manzanar internment camp. As the Japanese Americans crafted intricate yet bold gardens, they reflected their heritage and peacefully channeled their feelings. Through organizing and nurturing these gardens, the Japanese Americans found their strength, voice, and hope in a time seeded with alienation and adversity.

**Conclusion**

These interviews summarize the purposes of the ornamental gardens for the Japanese Americans in the Manzanar internment camp. The cohorts’ reflections on their WWII experiences make apparent that the gardens served to defy environmental conditions, improve relationships with the WRA, reconnect generations, and offer creative expression of their feelings. When comparing the results of this study to the body of literature, certain key differences emerge. The first difference is that while this study does recognise that the gardens were defiant against the environmental conditions, the results did not find that they were used to resist the WRA as Chiang claimed in her study. Rather, I found that the gardens eased the tense relationships between the two. This proves my earlier claim that the gap in

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literature must be addressed to avoid generalizations when describing the internees’ relationships with the ornamental gardens. Furthermore, while the literature focuses on the gardens acting as political statements, my findings suggested that rather than resistance, the significance in the gardens lay in their emotional grounding for the internees of Manzanar.

In contrast to many reactions to unjust historical turning points, the Japanese American response to alienation and incarceration is stunning. While this study is significant in that it preserves the history of this near-extinct generation of Japanese Americans, the narrative of the Manzanar ornamental gardens, arguably more significantly, is a exemplar template for peaceful protest and communal healing. Looking towards the future, I recommend that further research should examine how defiant gardens throughout history compare with one another and drive the narratives of those involved — for example, Guantanamo Bay prisoners scavenged seeds from their meals which flourished as secret gardens, an endeavor later known as “Seeds of Hope”. Or, ironically, the British serving in Afghanistan built their own oasis, the Helmand Peace Garden, surrounding their military headquarters. Today, an English Rose grows there in defiance of its barren environment. These stories and many others bring to light the complexity at the intersection of cultivation, resistance, and beauty. Ultimately, the ornamental gardens and their implications serve as the perfect symbol of graceful endurance. Like the gardens, the Japanese Americans were assimilated, organized, and parented. However, despite the obstacles of their barren and toxic environment, they too found a way to thrive.

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58 Ibid, 117.
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Manzanar Relocation Center.


Manzanar Relocation Center.

The Second Sun: Determining and Simulating the most effective Solar Energy System for the
United Arab Emirates’ Next Solar Plant

AP Capstone Research 2018

Word Count: 4254
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TABLE OF CONTENTS</td>
<td>1</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>2</td>
</tr>
<tr>
<td>LITERATURE REVIEW</td>
<td>3</td>
</tr>
<tr>
<td>Research Question</td>
<td>3</td>
</tr>
<tr>
<td>United Arab Emirates’s Energy Summary</td>
<td>3</td>
</tr>
<tr>
<td>The Shams 1 Initiative</td>
<td>4</td>
</tr>
<tr>
<td>Understanding Solar Power Systems</td>
<td>4</td>
</tr>
<tr>
<td>RESEARCH METHODOLOGY</td>
<td>8</td>
</tr>
<tr>
<td>Fuzzy Standard Adjustments:</td>
<td>10</td>
</tr>
<tr>
<td>DATA COLLECTION</td>
<td>12</td>
</tr>
<tr>
<td>RESULTS</td>
<td>14</td>
</tr>
<tr>
<td>Comparing Systems</td>
<td>14</td>
</tr>
<tr>
<td>Operational System Analysis</td>
<td>15</td>
</tr>
<tr>
<td>DISCUSSION</td>
<td>17</td>
</tr>
<tr>
<td>Choosing the System</td>
<td>17</td>
</tr>
<tr>
<td>Meeting the UAE’s Goals</td>
<td>18</td>
</tr>
<tr>
<td>Limitations</td>
<td>19</td>
</tr>
<tr>
<td>CONCLUSION</td>
<td>21</td>
</tr>
<tr>
<td>References</td>
<td>22</td>
</tr>
<tr>
<td>Appendix</td>
<td>25</td>
</tr>
</tbody>
</table>
INTRODUCTION

Fossil fuels such as oil and coal have been dominating the energy generating landscape since the industrial revolution. These non-renewable energy sources not only come in finite quantities, but also damage the natural environment through the release of chemicals that disrupt natural environmental processes. Carbon dioxide and other greenhouse gases have caused environmental damage and pollution, which has prompted the global society to move towards more sustainable energy sources, with solar energy being amongst the most popular.

The research done in this study aims to help design the next most effective solar energy plant that can be the solution to many of the problems that non-renewable energy creates in the United Arab Emirates (UAE). Due to its almost year-round susceptibility to the sun’s rays, the UAE is the ideal environment for solar energy plants.
LITERATURE REVIEW

Research Question

Shams 2: Through Which Solar Power System Could the UAE Create the Most Effective Solar Farm?

United Arab Emirates’s Energy Summary

The United Arab Emirates (UAE) is a nation that discovered natural resources of oil and gas over half a century ago. This development allowed for rapid industrial growth that resulted in the UAE becoming a leading nation in the hydrocarbon energy industry. (1) As the fifth largest producer of oil in the Organization of the Petroleum Exporting Countries (OPEC), the UAE has been relying solely on fossil fuel based energy production since the beginning of its energy endeavors. According to their released 2016 reports, the UAE government has seen a dramatic rise in the energy production. From 77.9 TeraWatt hours (TWh) consumed in 2008 to 105.4 TWh in 2013, (2) the UAE has shown an increase in energy consumption of 35.3%.

In the same report, Mr. Bilal Hassan, a lead engineer for the UAE Ministry of Energy, described how the United Arab Emirates is looking to replace much of that energy generation from fossil based fuels to renewable energy. He stated that “in order to meet energy demand while balancing environmental considerations, renewable energy must play an important role, solar energy being one of the most promising sources”, (3) showing that the UAE is focused on creating a more sustainable future primarily through solar energy. It is evident that with their Shams 1 solar plant that they are on their way to a cleaner future through renewable energy. As stated in the introduction, the immediate goal for the UAE is to have 30% of its electricity be generated from local solar energy initiatives, and a plan for a second solar
energy system has already been developed, for which 14.2 billion dirhams ($3.866 billion as of March 2018). (3)

The Shams 1 Initiative

The Shams 1 initiative is a Concentrated Solar Plant (CSP) located in the capital city of Abu Dhabi at the coordinates of 23°34’ and on the longitude of 53°42’. (4) It spans 2.5 km², and was inaugurated in 2013. It has the installed capacity of 100 MegaWatts (MW) which, according to Masdar (the parent company of Shams) powers 20,000 homes in Abu Dhabi (the UAE’s capital city). (4) The full project cost $600 million (the largest financing for a Concentrated Solar Plant yet), (4) and from Abu Dhabi Distribution Co. (the electricity authority of Abu Dhabi), the charge per home for 1 kiloWatt hour (kWh) of energy costs 26.8 fils (assuming one is an expatriate consuming energy under the recommended daily usage) per kWh. This means that 20,000 will provide the UAE with 5,360 dhs in one hour, and 128,640 dhs per day. From this, it can be calculated that the amount of time it would take to earn back all of the cost for the plant, which is roughly 4,666 days, or 12 years and 9 months. This, however, is just a baseline calculation considering there are other variables (such as the UAE’s local Emiratis only having to pay 6.7 fils for energy, and there being an overuse charge charge which is 7.5 fils for Emiratis and 30.5 fils for expatriates), but it is a good estimation considering there are only 551,535 nationals, compared to the 2,356,638 non-nationals, and the lack of exact data to determine how much energy each of those 20,000 house holds utilize. (5)

Understanding Solar Power Systems

Solar power systems (SPSs) are the amalgamation of hardware and processes that convert energy released by the sun in the form of heat and light to electrical energy that can be directed into the grid. The authors of the scholarly journal _Toward clean environment: evaluation of solar electric power_
technologies using fuzzy logic separate the types of solar power systems using a flow chart that categorizes every single type of solar power system (Figure 1).

![Flow Chart showing the breakdown of the different solar power systems](image)

*CLFR = Compact Linear Fresnel Reflector

Figure 1: Flow Chart showing the breakdown of the different solar power systems (6)

SPSs are separated into two types of conversion. Direct electricity conversion is the system that allows for heat to be absorbed by a panel and then converted to energy. (6, 7) Conversely, Indirect electricity conversion is the system that contains a reflective surface - a heliostat - which directs energy to an absorbing surface (which varies based on the system). (8)

The sub-branches of indirect electricity systems highlight the method of which electricity is transferred from one surface to another. Concentrating power systems utilize heliostats that reflect power in a manner that focuses energy into a central area. For example, parabolic troughs utilize the properties of a parabola in that the heliostat is curved around a central point (the focus) so that all light that falls onto it is reflected into a pipe located at the focus (Figure 2). The single axis tracking system focuses only on the sun, so the only movement necessary is for the sun to stay in exactly the same position as the Earth rotates about it. In contrast, dual tracking systems require the system to track the sun and where the sun’s rays are being reflected too. For example, the solar tower systems (figure 3) requires the sun to reflect heat from the sun to a heliostat and then to a central location that absorbs the heat. This requires the heliostat to be angled in relation to both the sun and the central absorbing system which requires adjustment of the whole system. (6)
Non-concentrating systems, on the other hand, do not focus the energy but absorb it by means of a fluid with a large surface area and transfer the heat to a collector or generator. (10, 11) Solar chimneys, for example, utilize a vast surface area to trap hot air inside of a chimney shaped dome (figure 4) which then pushes a vertical turbine at the base of the chimney to convert solar energy to kinetic energy. (6) The large area of air under the transparent dome acts as the carrier, making it an indirect, non-concentrating system.
By using this system of organization for each of the different SPS, The researcher can determine what would be the best system for the UAE to use for its next solar farm. By sorting these systems into the various categories, the researcher will be able to better analyse the system they determine to be the ideal one for the United Arab Emirates.
RESEARCH METHODOLOGY

The purpose of this study was to determine the best system for the United Arab Emirates through a detailed analysis of the ideal Solar Power System and through an evaluation of the main components of the aforementioned system. The researcher utilized a grounded theory research methodology to evaluate a multitude of sources to simulate an ideal SPS (Appendix) in the United Arab Emirates.

The first stage of research was based on discovering the ideal SPS from a scholarly journal that evaluated all of the different types of SPSs through the use of ‘fuzzy logic’. (6) Fuzzy logic is a concept that allows for a quantitative observation of both qualitative and quantitative raw data. The data is processed into a decimal system that ranges from 0 to 1 and the ranges can go from one decimal place (least accurate) to 3 decimal places (most accurate) in this journal. (6, 12) The journal splits the evaluation into costs and benefits, so a higher score for benefits is ideal (a score of 1 for power means the system is very efficient) and a lower score for costs is ideal (a score of 0.10 out of 0.5 for water usage is also considered efficient). Furthermore, fuzzy logic uses parameter importance to determine how important each component is based on the overall relevance to the system. For example, temperature may not be as important as the amount of power generated. The researcher will be re-evaluating the parameter importance to allow for specification to the United Arab Emirates. It evaluates 14 benefits and 8 costs, including and defined as:
### Table 1: Benefits

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
<th>Original Parameter Importance</th>
<th>Revised Parameter Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power</strong></td>
<td>Plant’s Installed capacity or size (MW)</td>
<td>1</td>
<td>No Change (NC)</td>
</tr>
<tr>
<td><strong>Annual Efficiency</strong></td>
<td>Annual solar to electrical energy conversion efficiency</td>
<td>0.71</td>
<td>0.8</td>
</tr>
<tr>
<td><strong>Thermal Efficiency</strong></td>
<td>Efficiency of heat absorbance and transfer</td>
<td>0.71</td>
<td>NC</td>
</tr>
<tr>
<td><strong>Peak Efficiency</strong></td>
<td>Maximum solar to electrical energy conversion efficiency</td>
<td>0.5</td>
<td>NC</td>
</tr>
<tr>
<td><strong>Availability</strong></td>
<td>Availability of resources</td>
<td>1.0</td>
<td>NC</td>
</tr>
<tr>
<td><strong>Annual CF</strong></td>
<td>Annual Capacity Factor</td>
<td>0.5</td>
<td>NC</td>
</tr>
<tr>
<td><strong>Storage h</strong></td>
<td>Number of hours heat is storable after absorbance</td>
<td>0.5</td>
<td>NC</td>
</tr>
<tr>
<td><strong>Maturity</strong></td>
<td>Popularity or development of system</td>
<td>1.0</td>
<td>0.8</td>
</tr>
<tr>
<td><strong>T</strong></td>
<td>Temperature</td>
<td>0.71</td>
<td>NC</td>
</tr>
<tr>
<td><strong>Safety</strong></td>
<td>General Safety of farm</td>
<td>0.43</td>
<td>NC</td>
</tr>
<tr>
<td><strong>Concentration Ratio (CR)</strong></td>
<td>Area of reflector panel in relation to area of receiver</td>
<td>0.71</td>
<td>NC</td>
</tr>
<tr>
<td><strong>Relative Weight</strong></td>
<td>The average score of the system on a scale of 0 - 1</td>
<td>N/A*</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Normalized Relative Weight</strong></td>
<td>The weight of the system in relation to all other systems divided by the largest weight possible (to create a scale from 0 to 1)</td>
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<td>N/A</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
<td>Original Parameter Importance</td>
<td>Revised Parameter Importance</td>
</tr>
<tr>
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<td>-----------------------------------------------------------------------------</td>
<td>-------------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>Hardware Cost</td>
<td>Cost of all the physical items used to create the solar farm</td>
<td>0.5</td>
<td>0.8</td>
</tr>
<tr>
<td>Electricity Cost</td>
<td>Cost of all the energy used to power the system (rotating panels, computer systems etc.)</td>
<td>0.5</td>
<td>NC</td>
</tr>
<tr>
<td>Water Usage</td>
<td>Cost of all the water being transferred through piping (assuming all heat transfer fluids are water (to create consistency)</td>
<td>0.5</td>
<td>NC</td>
</tr>
<tr>
<td>Land Usage</td>
<td>Cost of renting the land</td>
<td>0.4</td>
<td>0.1</td>
</tr>
<tr>
<td>Maintenance Cost</td>
<td>Cost of replacing old/malfunctioning parts</td>
<td>0.5</td>
<td>NC</td>
</tr>
<tr>
<td>Environment</td>
<td>Damage done to the environment</td>
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<td>0.1</td>
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<tr>
<td>Relative Weight</td>
<td>The average score of the system on a scale of 0 - 1</td>
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<tr>
<td>Normalized Relative Weight</td>
<td>The weight of the system in relation to all other systems divided by the largest weight possible (to create a scale from 0 to 1)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

All data collected from Source 6
* These values were considered not applicable because of their objective nature in that they are just comparisons of mass of the structure which has nothing to do with the quality of the farm, but they are good comparison standards

Fuzzy Standard Adjustments:

The following are reasons for why the researcher had altered the specific data values from the original fuzzy logic data set:

1. **Annual Efficiency**: Part of the conclusions of this study was to estimate the payback time of the solar farm so that the researcher could analyse whether or not the solar farm would be efficient in the long run for the UAE government. As annual efficiency is an essential part of that calculation, the researcher felt that it needed an increased value of importance.
2. **Maturity**: The researcher felt that the maturity of the system did not need to be valued as high as other standards of system evaluation due to the fact that the data collected on installed capacity and efficiency would matter more than how far the technology has developed since it had first been designed. In some cases, some technologies may have developed faster or later than others,
but objectively they could still be more powerful (as will be analyzed through our data of the fuzzy sources.

3. **Hardware Cost:** The United Arab Emirates may be a leading solar energy developer, but its resources are mostly imported from other regions. This led the researcher to consider that the cost of components may need to be increased to account for the increase of component pricing due to shipping and transport costs.

4. **Land Usage:** Considering that the UAE is a monarchical society, all land is owned by the presiding Sheikh of Abu Dhabi at the time, and considering the project will be government funded, the land would either be gifted or rented at a much cheaper price. Thus, it was necessary to greatly depreciate the parameter importance of the cost of land since this would not be a private venture. (13)

Once the researcher had completed his reevaluation of the fuzzy parameter importances, he began to compare all of the data to determine the overall costs in relation to the overall benefits of each system. He first multiplied each value for each parameter by the parameter importance to gain an accurate value for each data point. For example, if the value for some standard was 0.71, but its parameter importance was 0.5, then its Real Data Value (RDV), the value of the specific score in relation to every single score of every standard, would be 0.355. This is essential because the next step was to sum all of the data points for cost and all of the data for benefits (independent from each other) to find the total benefits and cost for each SPS. This would then allow the researcher to quantitatively identify the system with the highest benefits and the lowest cost. This, however, could mean that one system has the highest benefits, but does not have the lowest cost, so the benefit will then divide the benefits by the cost to see which system has the most ideal ratio of benefits to cost and will then select the top choice of SPS.

After completing the evaluation of these systems through fuzzy logic, the researcher began the second phase of data collection which was to utilize scholarly journals and information on existing and similar solar energy systems (between the top two systems). These documents allow the researcher to find more variables in order to compare the top systems with and give a more in depth understanding of the systems and their differences. Furthermore, the real life comparison of the separate systems will allow the researcher to determine more of the architectural and economic variables of the plant that may affect the quality of the system including the cost and the size of the whole system.
Figure 4 is the graphical representation of all of the average values of the Normalized Relative Weight once the researcher had modified the parameter importances and recalculated all values to factor in the new parameter importances. Once those were calculated, the values for each system were averaged to obtain the Relative Weight (RW) for benefit and then divided by the highest Relative Weight of all the systems to generate the Normalized RW (NRW) of them on a scale of 0.000 - 1.000 (See Appendix A). The same was done for the cost analysis (See Appendix B) (Figure 5).
Finally, all the costs and benefits were compared by dividing the benefit by the cost to find the ratio (figure 6) (See Appendix C). If any of these B/C values were below 1, that meant that the costs outweigh the benefits so they were immediately disregarded.
RESULTS

Comparing Systems

The Compact Linear Fresnel Reflector (CLFR) solar system is a single axis, concentrating system that converts energy indirectly. This means it contains both reflector and absorbing units, but only needs to track one object (the sun) and position its reflectors in relation to the object. The parabolic trough is also a single axis, indirect conversion, concentrating solar system and therefore operates in much the same way. The differences between them lay in their design, as the parabolic trough utilize curved reflectors that reflect light into a single focusing tube. This absorbing tube lays above the reflectors and contains the heat transfer fluid (HTF) that act as the transportation system for the solar energy which is converted through a generator.

The CLFR solar system is similar in that it concentrates heat energy from curved (or straight) reflectors onto absorbing pipes, but these pipes are positioned much higher up and usually allow for multiple rows of heliostats to reflect into a singular (or usually 2) transfer pipes. Figure 7 and 8 show a Parabolic Trough (PT) system and a CLFR system respectively.

Figure 7: Source 14

Figure 8: Source 14
According to the scholarly journal authored by Nishith B. Desai - an Energy Systems Engineer from the Indian Institute of Technology, Bombay, and colleagues - and Professor Bandyopadhyay - of the same institute - which evaluated both systems, it was noted that the major difference and disadvantage that the Linear Fresnel reflectors have is their limited optical efficiency (the amount of energy that can be reflected to the absorbing panels) and steam efficiency. (14) One advantage that PT systems have (as a product of 20 years of further development over the Fresnel Reflector systems) is that they can utilize multiple heat transfer methods (known as cycles) to achieve heat transfer, whereas CLFR systems are limited to only steam based cycles, which severely limits their installed capacity because of the actual boiling point of water being lower than those of molten salt or oil. (14) Furthermore, Desai highlights that in their most latest forms, PT technology is at least two - four percent more efficient than CLFR, and even though both have a relatively low capital cost, the risk for implementing the latter is much lower when considering the rapid improvement of technology being made with Fresnel Reflectors in comparison to PT collectors. (14)

Operational System Analysis

Currently, the CLFR plant with the largest capacity is the Rajasthan Sun Technique Energy Pvt. Ltd Power Plant in Rajasthan, India. It has an alleged installed capacity of 125 MegaWatts (MW), according to the Reliance Power Co. (the owners of the plant), and covers an area of 340 hectares (ha). It has an expected power generation of 280,000 MegaWatt hours per year (MWh/yr), and cost approximately $351 million as of 2014 (converted from Rupees). (15)

In comparison, the Solnova power plant is a parabolic trough based system that is comprised of 3 separate units (Solnova 1, 3, and 4). Independently, each of the 3 units cover 115 ha, they generates an
estimated 113,520 MWh/yr, have an installed capacity of 150 MW, and all together cost approximately $527,743,000 as of 2007 (the first year of operation). (16, 17, 18, 19)

From the data above, it can be seen that the CFLR plant generates less energy at almost the same area (340 ha < three 115 or 345 ha). The PT plants generate a combined 341,000 MWh/yr of energy which is almost 80,000 MWh/yr greater than the CFLR, and even though the PT system was built 7 years earlier than the system in Rajasthan it still generates more energy, but at a higher accounting cost (by almost $175 million.)
DISCUSSION

Choosing the System

From all of the data presented, the researcher has evaluated that the best Solar Power System for the United Arab Emirates to implement is the Parabolic Trough solar system.

From the fuzzy logic data set, the researcher performed an in-depth analysis of all of the different aspects of each solar system, and came to the conclusion that the top two systems of that evaluation were the Concentrated Linear Fresnel Reflecting system and the Parabolic Trough system. These two were both connected by exactly the same branches on the flowchart diagram (figure 1) which meant that they were both single-axis tracking, concentrating, indirectly converting solar energy systems. This also meant that the designs that fit these categories are the most effective in solar energy generation.

In the first section of our results section the researcher compared the two systems and described them in more detail than the flow chart could provide. By evaluating the limitations of both systems the researcher learned that the CLFR system could only utilize steam based heat energy transfer and that due to the PT system’s popularity and existence for a longer period of time, they have been developed further, making PT systems the best candidate for the UAE’s new solar system.

Finally, to compare both the systems in a non-simulated situation - to give a third and final perspective on which system would be the most effective - the researcher evaluated two systems of similar size (in hectares) and installed capacity (in MW). The researcher further learned that the PT systems generated more electricity yearly, but were considerably more expensive. However, this cost may be due to the gap in development, as the PT system was seven years older than the CLFR system. The PT system was chosen by the researcher as the most effective because it was the highest scoring system for fuzzy logic benefits, its limitations were fewer than the CFLR system, and it was more well developed.
Meeting the UAE’s Goals

Currently, the largest solar farm that utilizes PT technology is the Solar Energy Generating Systems (SEGS) in the Mojave Desert, California. It is a collection of 9 units that each have the installed capacity of 80 MW, and each has the ability to generate 2,725 kWh/m²/yr or 1.265 tWh/yr per plant. (20)

From the UAE’s released electricity consumption history, it can be said that as of 2013 the UAE consumes at least 105.4 tWh of energy. 30% of this figure would be 31.62 tWh, which would need 25 independent solar energy generating units to supplement. Considering that the 80 MW unit utilizes 483,960 m² of area, the UAE would theoretically need 12,099,000 m² to construct this farm, (20) which is equivalent to 0.014% of the total area of the United Arab Emirates (the total area being 83.6 billion m²).

(21) From a UN Food and Agriculture Organization, the total uninhabited area of the uae is equivalent to 5.9 billion m², (21) which is approximately 7.05% of the total area of of the UAE.

In terms of land usage this is feasible, but the cost of the system is a heavy determinant of the feasibility. The International Renewable Energy Agency (IRENA) released a cost analysis on the different types of solar systems as of 2010, which stated that a parabolic trough system with a "storage capacity of 7.5 hours estimated to cost […] USD 7 280/kW". If our system had an installed capacity of 80 MW or 80,000 kW, the cost of one system would be $582.4 million, which would allow us to create 24 plants. This would also mean that the revenue collected by the operational units (depending on the cost of electricity) could be fed back into the production of the last unit, making the creation of 25 units feasible.

From the current owners of the SEGS, Nextera Energy, the researcher found that the production for each unit began a year after the previous and was completed after four years of construction. Allowing for two years of planning from now, if the plants commissioned building, it would have ten years to finish all of the units, or 6 to begin the construction of all of them. If five units were constructed for the first
three, four for the next two, and two in the last year, the UAE would be able to meet their goal of 30% renewable energy in 2030.

Limitations

The two biggest limitations to this paper as a whole was the accumulation of too many variables that could not be assessed in any of the 3 standards of comparison, and the limited access to information and knowledge that would make the paper more accurate. It is first evident through the parameters of importance in the fuzzy logic phase of data collection that there was a limited access to data. The researcher was unable to fully modify all the specific parameters that were set in the original data set to fit the UAE’s specifications because justification for each parameter was not provided so the researcher chose to carefully change only a few and instead manipulate given data to re-evaluate the Solar Power Systems.

Considering the fuzzy logic standards, the real life systems, and the design of each system, the researcher was unable to accurately give consistent measures for each system's positive and negative attributes due to the sheer number of variables present in the study. The researcher had to eliminate several systems early on to create a ‘funneling’ process that brought seven systems down to two and then finally the best one. This made it easier for the researcher to determine a system for the UAE, but did not give the other systems a chance to be qualitatively examined, thus the researcher would suggest any further research to go in the direction of qualitative research and evaluation for all of the various SPS.

Finally, the project of a 25 unit Parabolic Trough Solar Power System could exist given the current conditions and calculated values for the land usage, plant cost, and build time. These values were either calculated or obtained from what limited public information the researcher had access to, but the calculations themselves are accurate. The researcher would suggest that if this research were to be taken further, it be in the direction of a more accurate analysis of each standard, with less weight on fuzzy
standards (due to their consideration of too many variables) and more emphasis on the direct comparison of both the quantitative and qualitative data on each of the various solar powered systems.
CONCLUSION

The purpose of this research paper was to identify and simulate the implementation of a Solar Power System that could provide the UAE with the most energy while still taking into consideration other factors that may affect the quality of the system. By assessing SPS’s benefiting factors such as the Annual CF and Maturity, while also weighing them against cost factors such as Environmental impacts and Electrical cost the researcher was able to compare seven different systems across 20 or so standards to calculate the more effective system (or systems) through a fuzzy logic data set. This helped us eliminate several of the candidates for UAE’s ideal SPS, but to choose the most ideal one required more qualitative analysis. By evaluating the design aspects of the top two contenders and the real system comparison of the two helped the researcher select the final candidate for the system: the solar trough.

The researcher then discussed the potential of solar trough farms in the UAE by estimating the amount of trough units, the time of construction, and the cost of construction to estimate whether the goals of the UAE could be met with current technology. With the limitations of a lack of available information and an accumulation of variables, the researcher was able to provide a rough method for the implementation of 25 units that would cost more than $500 million each and take 10 years to be fully operational. With the UAE’s ambitious goals of being a leader in renewable energy, leaps in energy technology and funding into solar plants of such scale and magnitude are necessary for realizing the efforts to push to more renewable energy focused initiatives that can both utilize natural resources and eliminate the global necessity for natural gases, oil, and coal. Thus, making the UAE a pioneer in energy collection and renewable energy generation.
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    https://www.nrel.gov/csp/solarpaces/project_detail.cfm/projectID=35.

21. United Arab Emirates: Geography, Climate, and Population. AQUASTAT Survey: Food and
Appendix

Appendix A:

Benefits - Original Data:

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Appendix B:

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Bias and its correlation with race & ethnicity
BIAS AND ITS CORRELATION

Abstract

Bias is present throughout all of society. Its present in our everyday lives and decisions we make. It can affect how we perceive or gather information. With that being said, Bias is one of the many issues that we are facing in today's society. Such examples include Gun Rights, Gender oppression/discrimination, etc. and it's affecting us in ways that may not be visible today, but will show in the future. When we think of bias, we usually think of the stereotype that follows the argument or topic such as; Black protesting with Black Lives Matter, Females protesting for feminine rights, Whites for Gun Rights, etc. The List goes on and on with the general stereotype that has been developed over the countless years of this country. In general Bias and Stereotypes works hand in hand, and I am seeking to find (if any), Biases that exists in my high school population. This correlational study is about the bias and stereotypical comments, discussions, and mindsets that is present in our current day to day lives. Bias lives and thrives everywhere and there is no denying that. There is always a bias with each individual person that can range from different political views, religious views, family views, etc. Some People may choose to not accept the facts of current day society, but the truth is. That it's out there and no matter how many laws, regulations or people we educate. It will still remain out there since bias is one of the many traits of being a unique human. My study will consist of prompting survey questions to my high school students asking them multiple questions about their opinions and thoughts on commonly discussed topics that are very debatable, and has a lot of bias present in each, individual argument or point someone is trying to prove. My objective in this correlational study is
BIAS AND ITS CORRELATION

to prove 2 things. To prove a point that everyone has their own bias towards some subjects and topics, as well as too see if there is any correlation of any bias between a person's background, ethnicity, race, gender, and socio-economic status. I wish to fill the gap between the people who deny these facts and won abide or live alongside of them, since in my study. I have found that if a person doesn’t accept other people's bias opinions towards something, something could happen that can lead to a negative and aggressive outcome that neither party is going to like; furthermore this study also hopes to show how current day society is wrongful, stripping certain people of their rights for personal/petty gain, many are uneducated with the people and world around them which leads to petty, and weak arguments; and just the stereotypical hypocrisy that lives with certain people that we see on the news in a daily basis. All in all, this correlational study is created to make a correlation between one bias and how it affects us as people, and those around us.
BIAS AND ITS CORRELATION

Introduction

On the halloween night of 2017, people gathered up to conduct a campaign in order to gain a reaction from the liberal (Leftist) media/people in order to show how ill-considered they can be. They did this by posting a blank poster with the words “It’s Okay To Be White” across multiple campuses around the country. With the campaign being a success, the media came out and called the poster “Racist”, “Divisive”, and “provocations intended to divide us from one another.” (Richardson 2017) This sparked the interest towards this subject matter in how people can be extremely bias/defensive towards things that they don’t view right, these people are normally called “Social Justice Warriors”, SJWS for short.

This research presents itself with a subject matter that is too board to cover completely, as well as to gather a good knowledge on the bias that one may have. In order to convey the study that I am trying to achieve, it was necessary to narrow the scope of the Bias as well as narrow the participants in order to make it a realistic study. Thus the design and choices that was made for this study, was to make it as accessible and realistic towards my capabilities that I currently have as a high school senior. My study will consist of gather students from my high school, in order for them to answer a pre-created survey. This survey consists of multiple questions regarding some of the common Biases that we face in today's society such as; “Racism”, “Stereotype”, “Gun Rights”, “Gender oppression”, “Education Bias and Flaws”, etc. The reasoning towards creating a survey, was in order to fit the correlational analysis that I’ve done with the results collected from my participants. The analysis consists of grouping the answers
BIAS AND ITS CORRELATION

towards the participants race and ethnicity, too is if there is any correlation between the

2. It is later shown in my findings of my participants that it all came as expected and
non-surprising. Due to how the gap that I will be filing is too see if the a person’s
thoughts/bias is unique and different from others with the same race/ethnicity.
BIAS AND ITS CORRELATION

Review Of Lit

Many of the information and sources that is depicted from the various question on the survey. Are from common knowledge, various news outlets, social media videos, etc. I chose these references due to how valuable they are when seeing the Bias/viewpoint that it is in each individual post, article and video. I am aware that majority of my sources or “un-credible” and “non-scholarly”, but that's the beauty of my study. Since it has nothing to do with scholarly papers or studies, but rather one’s personal thoughts and viewpoints towards subject matters that is relevant and present in their lives. One common knowledge that is well known throughout the high school, is that the current American education is failing and not meeting up to the standards of the new generation to come. It's common knowledge since its present through students and teachers saying when asked about the topic of how the education is developed. One example to bring up is the notion of “Hurricane Makeup Days” since this happened when Irma came around. Where the educational department deemed it necessary for teachers and students to have make up days for the week lost. But when asked about, no one is siding the higher ups decision, not even the teachers since the days that are made up, are the days the teachers need to gather themselves, grade work, catch a breath, think about what they are going to due, etc. Furthermore, these days are pointless to countless students since the knowledge that was lost, was regained in a matter of days since the teachers picked up the pace and caught us up with the days lost. So this points out one of questionable decisions that the education system makes on a daily basis, though lacking on information and general sources. I cannot continue this further but to show how bias is
BIAS AND ITS CORRELATION

effect the education as we know it, even the college board is not safe from the bias that they have. Other sources to list that aren’t videos, posts, etc. Are presentations discussing and talking about the Black Lives Matter movement, and how there message against “police brutality” or “Racism” is non-existent due to how the law-enforcement agencies are taking every precaution towards diversifying their officers, extra steps towards handling individuals, as well as showing data regarding the number of incidents that they have such as “While African-American men make up 44.3% of assailants against the police, they only make up 26.3% of the deaths from legal interventions” (Dr. Johnson, 2012)
BIAS AND ITS CORRELATION

Method

Participants included 14 adolescents who are enrolled in Boca Ciega High School. Age or grade level didn’t matter when choosing the participants. The majority of the participants were male; only 42.9% being female. Followed by an overwhelming majority of participants being white 78.1%; other races were Black, Asian, Native American, and Mixed. Analysis of my participants were conducted by selecting determined questions out of my survey and comparing the answers with the other participants. This was done through a Google Doc and Excel Spreadsheet.

Google Forms was used to create the survey, while google spreadsheet and docs were used to organize and analyze the questions answered by the participants. Other materials used were images from google depicting the swastika, “It’s Okay To Be White” poster, and a image depicting a dark comedy. As well as 2 videos from youtube. One showing the full perspective of the student when his Make America Great Again hat was stolen, as well as the Fox News report on the incident.
BIAS AND ITS CORRELATION

Results

My study consisted of my participants taking a pre-created survey regarding multiple political issues, societal questions, and one’s personal opinion towards certain situations, cases, words, stereotypes, etc. But due to the nature of majority of my participants being high school student’s, I couldn’t go in-depth of any of the questions asked, and needed to condense the questions by a vast amount since many questions that no one wishes to talk about requires more in depth questions and more time on the participants part. My prime objective with my survey is too try and condense the questions to fit towards the participants time, but by me condensing and trying to restrict the number questions asked, I also lose the in-depth analysis of the question and argument I am trying to convey; but I understand that time is at the essence of my survey as well as this whole study in general, so I prioritized the usage of time on both my part as well as my participants part in order to create a flexible environment towards my participants rather than a strict and time-consuming survey. I chose this way since my main objective of doing this survey is to possible open some minds of the few students that took my survey in order for them to take a good look at themselves and question about there morals, deals, etc. regarding society in today’s standards as well as the possible problems/questions that is relevant towards all aspects and perspectives of society since even though they are in high school, these questions and problems will never go away and remain relevant as long as there is a bias in society, which to be frank; is a difficult problem to tackle and to solve since it originates from one’s mind and past teachers rather than information given to them by outside sources. My results of my
BIAS AND ITS CORRELATION

Survey conducted were nothing surprising or out of this world since it is expected with high school student’s to be vastly different and unique from one another, some people answered one way while others answered a different way, since it is all based on that person’s own personal thoughts and ideals of society around them rather than one's race, gender, etc, furthermore again; my survey is not in-depth nor well detailed in order to gain a well understanding of my argument that I am trying to convey since it is not realistic for me to conduct a study this massive on a high school population, with the majority of them relying on their personal thoughts and norms of society since in today's day and age, the younger generation doesn’t do any research nor cares about modern day politics since it doesn’t relate to them due to they can't vote or voice their opinion towards today's political issues and questions that are being asked on a daily basis, and for that reason I understand that my survey cannot and will not be scholarly nor accepted by any person really since again, my survey is geared towards being flexible towards the participants as well as for them to gain a little understanding of one’s self and their thoughts on some of the questions that are asked in today's society, but in the end I will still used the results from the survey as a stepping stone or a first small step towards a problem that is too big for me to face alone with my current age restriction, time restriction, and position in the world, so that is why my results section will be consisted of a general summary of my motives and survey motives rather than hard facts and results found in my survey due to again, it wasn't detailed enough in order for it to be classified as results but rather findings towards one’s perspectives and ideals and see if there is...
BIAS AND ITS CORRELATION
any connection with one's race, gender, etc instead of finding if there is a general bias
towards the schools population.
BIAS AND ITS CORRELATION

Discussion

Throughout the study, the data analyzed was un-surprising due to the major limitation of this study taking place in a high school setting, as well as the lack luster of diversity and variety from my participants. Though with that being said, the data gathered was still an eye opener since even though participants have the same race, the questions they answered were various and different from one another. But this could be the effect of many factors such as the participants honesty, willingness, and motivation towards completing the survey. My study consists of talking about the bias that is present in today's society both in a general and a political perspective alike. I do this in order to gain a little understanding or knowledge in my current high school population too see if there is any correlation between the students and their races, background, etc. The reason to why I focused my study around this perspective is because I have a great interests towards talking about controversial or highly debated topics, since it's just very interesting to see how many perspective or viewpoints that people have towards those topics. My interests spiked with the recent events of protests and rallies that is happening all over the United states, and I saw an opportunity to see the perspectives of the many people who know or doesn't know about what is happening, and too gain their input on the subject at hand; Some examples include the “It’s Okay To Be White” peaceful campaign and the overreaction of the public and how they took it to another level when in reality, it's just a harmless and peaceful message that doesn't affect or target any demographic other than stating a common knowledge, but due to the lack of knowledge that the general public has and how they are all geared towards their bias
BIAS AND ITS CORRELATION
and stereotype rather than researching and looking up the facts, these massive protests begin to spread out and trying to spread or convey a message that isn't factual or real in any perspective you put it, and yes you could say that I have a bias as well towards the people who try and convey a message for something that isn't possible or they are trying to restrict us by teaching us the correct morals and norms of society when in reality, that just isn't the case with today's knowledge and diversity that is out their in our present time when in comparison to past years, and this doesn't only affect the general public, but it's starting to spread to mainstream media such as movies and/or talk shows who are trying to convey a message to make a better future for all and shame those who go out of the norm since it's not how they envision society; even though I do not believe nor want to follow those social justice warriors or people who try to shame the people who are actually trying to clear up the confusion that they are creating or just doing it to get other people's reaction in order to have a good and fun time laughing at the people who are doing or talking about something that doesn't make any sense, but they still do it anyways since they want to follow the bandwagon of protests or just stick with their bias, stereotype and race. Even though I wanted to explore more with this topic and question an vast majority of people, I am limited to my high school setting. Which is not always the most effective route for taking information regarding this topic since majority of us are non-political and don't really follow politics or the news in general. I follow under this category in how I don't follow politics or anything political wise since I am not that type of person to research politics in depth, or follow the news 24/7. I may see it every now and then regarding a major event that could have happened such as the douglas school
BIAS AND ITS CORRELATION

shooting. But anyways, this study is a passionate project in order to gain a better insight at my high school population and too see if there is any correlation at all regarding any biases that the student population may have, since I would like to open the eyes of my participants in order for them to take a good look at themselves in order to answer the questions that is affecting today's society and how they fall under this spectrum.

Furthermore, due to my great amount of interests, I have to remain neutral when conducting the analyzation of my data and when I'm presenting my data in order to remain credible and professional rather than a personal rant about the subject.
BIAS AND ITS CORRELATION

Conclusion

This study in general was a very interesting study to be conducting in this day and age where political correctness is highly present as well as one’s morals being shut down by certain activists that are trying to create and promote a society that isn’t feasible or possible due to they don’t understand that we are humans and build to have different opinions and thoughts from one another; since that’s what makes us human and unique from one another. Furthermore by each of us having a different opinion, we are more human than before since we all have different perspectives and viewpoints from many subjects and topics for a variety and vastly diverse reasoning such as past history, family teachings, personal thoughts, etc. The list can go on and on with the number or reasons to why we all have different opinions towards things in life. But somethings those opinions can be taken in the wrong sense since they could contribute towards one bias or stereotype; which can lead towards a downward spiral towards confusion and misleading information that can be used against them while than help them. There are many examples of this happening such as the outlast against the campaign of “It’s okay to be white”, multiple protests for the oppression of certain races or genders, false information being spread around, as well as the recent protest of college students preventing entry of the white students in campus due to their inability to comprehend that there protests do not convey a message or anything in the matter other than creating aNousience and an annoyance towards the students who want to learn, as well as the faculty who are receiving multiple complaints about the behavior of a vast majority of students on campus. So due to these “protests” that those people are showing as well
BIAS AND ITS CORRELATION

as the misbehavior of some individuals in order to convey a message of “proper living in today's standards”, is only making a fool out of themselves since they are incompetent to actual do the research and learn about the topic or subject in depth, and actual create a movement and a professional protest or convention towards the things that they are experiencing rather than making a pissing match to see who can create the biggest noise the loudest. Even though my study doesn’t fully grasp the scope of what I was trying to accomplish, it still provided a lot of information about how everyone is different towards a lot of things in life and it all depends on that person's knowledge about that subject. In general, for future directions I am not planning on expanding this survey or study any further than it already is since even though I succeeded into making the study and survey into a neutral state, I myself is bias towards a lot of things in this survey since research and knowledge is king in today's world and society.

In general, this study isn’t what I was expecting from a personal viewpoint of my progress and overall execution of my study. Since I based my study on a personal interest rather than a logical one, and because of that, I have created a bad foundation towards my study in general. But with that being said, even though with the amount of mistakes I made with my paper, study, etc. It will probably not even get noticed or published in any matter due to the facts of how un-credible by study may seem to a academic scholar or person. Since the majority of my sources/reasoning comes from personal interests, common knowledge, or through media sources such as “youtube”. So even though I will not pass this exam, I still had one great time with the study as well as others had a great time with this as well. Due to I added an extra section at the end of my
BIAS AND ITS CORRELATION

study for them to write any questions, compliments, and gain their overall opinion on the survey, and with that. People wrote that they enjoyed the survey since they were able to speak their mind in a “safe space” towards topics that they know is forbidden to talk about since with today's society shaming certain topics due to they deem it “offensive” or “not right”. So it is hard to find somewhere or someone to talk too, in both a professional perspective, as well as a casual perspective. Since the internet will be the internet, and in there we are able to speak freely and talk about whatever we want in our own separate communities or groups without having to worry about the consequences it may bring if talked in a public. Furthermore, with the rise of “tragic events” in today's society such as school shootings. People are becoming for anxious and tense regarding certain things that are discussed, it could be a subject about guns and guns rights. But what they fail to realize is that even though they deem it forbidden to joke and make funny statements about school shootings, it will still happen. Since people seek to have enjoyment and laughter towards things society deems forbidden, which makes it better. Since when showed towards a group that accepts the joke and laughs, it's a great time. But it will be a better time when we show joke about a school shooter and they just either call us out for being a “bad person” or they just deny it, which towards us, is very funny to us. Since we are not bound towards societies viewpoints, so we go beyond and embrace all concepts and subjects towards us. No matter the context, other jokes include Nazi, 9/11, Russian, Black, etc. That we deem funny and interesting while others see it as “Rude” or “Ungrateful”. In general, in today's society many things are restricted due to their context of either historical perspective, or general perspective. But since we are all humans, we
BIAS AND ITS CORRELATION

can all regulate how we say or see things in our own mind since that is based on that person’s moral, ethics, and past teachings rather than a logical understanding. So even though this conclusion is getting far out of context towards what I was originally talking about, it is nice to say things out of my mind here and there. Since I had a wonderful time with this study and that is the most important factor of anything in life really. That if you do something that you are happy or personal enjoy doing, then you are going to have a better experience and memories to back that up, even though it will cost you a grade or exam (such as this one). I don’t mind it.

This will conclude my study that from the beginning was on a downward spiral and had a terrible foundation to make this into a scholarly and professional study, while having sub-par grammar and sentence structure. I hope you enjoyed my mess of a study, and I hope to whomever is reading this to have a wonderful day and I wish you well when grading or reading other academic papers, since I can tell you for a fact that mines is a bottom tier paper when compared to others. But hey, like I said. I had a wonderful time with this paper and since I lack in english and overall paper writing skills, I will still push forward and get help along the way. Thank you and I wish you well.
BIAS AND ITS CORRELATION

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BIAS AND ITS CORRELATION

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Assent to Participate in Research
Information for Persons of or under the Age of 18 Who Are Being Asked To Take Part in Research

Title of study: Correlation between a high school students bias

Why am I being asked to take part in this research?
You are being asked to take part in a research study about the bias mindsets of teenagers in this current generation and how it affects how we perceive things and interpret things. You are being asked to take part in this study because you are a teenager between the ages of 14-18 that goes to Boca Ciega High School. If you take part in this study, you will be one of about 10 students who choose to participate.

Who is doing this study?
The person in charge of this study is Eden Prieto. He is being guided in this research by Dr. Jennifer M. Denmon.

What is the purpose of this study?
By doing this study, I hope to determine which bias mindset does this current generation of teenagers' have and how it could possible affect how the new generation/working world operates. This research is being conducted as a requirement of the AP Capstone program.

Where is the study going to take place and how long will it last?
This study is taking place anywhere that has a stable internet connection since my questionnaire that I will be giving you will be through online, and you will be able to complete it whenever and wherever. Once you have finished the questionnaire, you will no longer be needed for my research. However, if the researcher needs any further information from you, or vice versa, he will contact you.

What will you be asked to do?
- You will be asked to complete a questionnaire online created by Eden Prieto.
- After you finished the questionnaire, your part in the study is over.

What things might happen if you participate?
To the best of our knowledge, your participation in this study will not harm you.
BIAS AND ITS CORRELATION

Is there benefit to me for participating?
We cannot promise that you will receive benefit from taking part in this research study.

What other choices do I have if I do not participate?
You have the alternative to choose not to participate in this research study.

Do I have to take part in this study?
You should talk with your parents or guardian and others about taking part in this research study. If you do not want to take part in the study, that is your decision. You should take part in this study because you want to volunteer.

Will I receive any compensation for taking part in this study?
You will not receive any compensation for taking part in this study.

Who will see the information about me?
Your information will be added to the information from other people taking part in the study so no one will know who you are.

Can I change my mind and quit?
If you decide to take part in the study you still have the right to change your mind later. No one will think badly of you if you decide to stop participating. Also, the people who are running this study may need for you to stop. If this happens, they will tell you when to stop and why.

What if I have questions?
You can ask questions about this study at any time. You can talk with your parents, guardian or other adults about this study. You can talk with the person who is asking you to volunteer. If you think of other questions later, you can ask them.

If you have any questions, concerns or complaints about this study, call [redacted] at [redacted] or email him at [redacted]

If you have questions about your rights, general questions, complaints, or issues as a person taking part in this study, call [redacted] at [redacted] and ask to speak to [redacted]

You will be given a copy of this form.
Assent to Participate

I understand what the person conducting this study is asking me to do. I have thought about this and agree to take part in this study.

__________________________________________  __________________
Name of person agreeing to take part in the study (under 18 years old)  Date

__________________________________________
Signature of person agreeing to take part in the study (under 18 years old)

__________________________________________  __________________
Name of person agreeing to take part in this study (18 years old)  Date

__________________________________________
Signature of person agreeing to take part in this study (18 years old)

__________________________________________  __________________
Name of person providing information (assent) to subject  Date

__________________________________________
Signature of person providing information (assent) to subject
BIAS AND ITS CORRELATION

Parental Permission to Participate in Research Involving Minimal Risk

Information for parents to consider before allowing their child to take part in this research study

The following information is being presented to help you and your child decide whether or not your child wishes to be a part of a research study. Please read this information carefully. If you have any questions or if you do not understand the information, we encourage you to ask the research.

We are asking you to allow your child to take part in a research study called: Is there a correlation between a high school students bias

The person who is in charge of this research study is [Name]. This person is called the Principal Investigator. However, other research staff may be involved and can act on behalf of the person in charge. She is being guided in this research by [Name].

Why is this research being done?

By doing this study, we hope to determine whether students of this current generation and possible upcoming generations has a strong biased towards something with everything happening in today’s society and how it could affect the next working generations and upcoming generations.

Why is your child being asked to take part?

We are asking your child to take part in this research study because they are a student in [Name].

Should your child take part in this study?

This informed consent form tells you about this research study. You can decide if you want your child to take part in it. This form explains:

- Why this study is being done.
- What will happen during this study and what your child will need to do.
- Whether there is any chance your child might experience potential benefits from being in the study.
- The risks of having problems because your child is in this study.

Before you decide:

- Read this form.
- Have a friend or family member read it.
BIAS AND ITS CORRELATION

- Talk about this study with the person in charge of the study or the person explaining the study. You can have someone with you when you talk about the study.
- Talk it over with someone you trust.
- Find out what the study is about.
- You may have questions this form does not answer. You do not have to guess at things you don’t understand. If you have questions, ask the person in charge of the study or study staff as you go along. Ask them to explain things in a way you can understand.
- Take your time to think about it.

The decision to provide permission to allow your child to participate in the research study is up to you. If you choose to let your child be in the study, then you should sign this form. If you do not want your child to take part in this study, you should not sign the form.

What will happen during this study?
I will ask your child to complete a questionnaire that [Eden Prieto] has created, and within that questionnaire I will be asking your child to answer all questions that I put forth in their own honest opinion and whatever they agree or disagree with, without any peer pressure or today’s norms. The questions that I will be asking will revolve around current debate and topics that are being discussed today as well as historical questions. Once your child is finished with the questionnaire, his information and his identity will remain anonymous and confidential, I will be taking the answers and combining them with other students answers in order to see if they have a correlation or not. Furthermore, your child will not be needed for my research anymore once the questionnaire is complete; I may or may not ask your child for further information depending if they didn’t answer all the questions.

How many other people will take part?
No one else will take part other than your child.

What other choices do you have if you decide not to let your child to take part?
If you decide not to let your child take part in this study, that is okay.
Instead of being in this research study your child can choose not to participate.

Will your child be compensated for taking part in this study?
You will receive no payment or other compensation for taking part in this study.
BIAS AND ITS CORRELATION

**What will it cost you to let your child take part in this study?**
It will not cost you anything to let your child take part in the study.

**What are the potential benefits to your child if you let him / her take part in this study?**
We do not know if your child will gain any benefits by taking part in this study.

**What are the risks if your child takes part in this study?**
There are no known risks to those who take part in this study. There is no more chance of risk as your child coming to school each day.

**Privacy and Confidentiality**
We will keep your child’s information private and confidential. No names will be disclosed in the publication of this research. The only people who will be allowed to see are:

- The Principal Investigator
- The Advanced Placement Capstone Research Program, in order to grade the research paper, the board will review the paper. This is only to evaluate the paper and is not in any way to obtain the information of your student.

We may publish what we learn from this study. If we do, we will not include your child’s name. We will not publish anything that would let people know who your child is.

**What happens if you decide not to let your child take part in this study?**
You should only let your child take part in this study if both of you want to. You or child should not feel that there is any pressure to take part in the study to please the study investigator or the research staff.

**You can get the answers to your questions, concerns, or complaints.**
If you have any questions, concerns or complaints about this study, call Eden Prieto at (727) 373-8597 or prieto.eden@gmail.com
If you have questions about your child’s rights, general questions, complaints, or issues as a person taking part in this study, call the Boca Ciega High School at (727) 893-2780 and ask to speak to Dr. Jennifer Denmon.
BIAS AND ITS CORRELATION

Consent for My Child to Participate in this Research Study

It is up to you to decide whether you want your child to take part in this study. If you want your child to take part, please read the statements below and sign the form if the statements are true.

I freely give my consent to let my child take part in this study. I understand that by signing this form I am agreeing to let my child take part in research. I have received a copy of this form to take with me.

_______________________________________________
Signature of Parent of Child Taking Part in Study          Date

________________________________________________
Printed Name of Parent of Child Taking Part in Study

Statement of Person Obtaining Informed Consent

I have carefully explained to the parent of the child taking part in the study what he or she can expect from their child’s participation. I hereby certify that when this person signs this form, to the best of my knowledge, he/ she understands:

● What the study is about;
● What procedures will be used;
● What the potential benefits might be; and
● What the known risks might be.

I can confirm that this research subject speaks the language that was used to explain this research and is receiving an informed consent form in the appropriate language. Additionally, this subject reads well enough to understand this document or, if not, this person is able to hear and understand when the form is read to him or her. The parent signing this form does not have a medical/psychological problem that would compromise comprehension and therefore makes it hard to understand what is being explained and can, therefore, give legally effective informed consent. The parent signing this form is not under any type of anesthesia or analgesic that may cloud their judgment or make it hard to understand what is being explained and, therefore, can be considered competent to give permission to allow their child to participate in this research study.

This part of the consent form is to be signed by the Principal Investigator.
BIAS AND ITS CORRELATION

___________________________________________
Signature of Person Obtaining Informed Consent

Date

___________________________________________
Printed Name of Person Obtaining Informed Consent
BIAS AND ITS CORRELATION
Score: 5

The paper earns a score of 5 because it establishes a focused topic of inquiry, clearly indicating the relevance of its question (page 2, paragraphs 1 - 2). The paper also identifies a research gap within its superior review of literature (see page 2/3 "Genome wide..." and page 5, paragraph 2: "...there remains a significant gap...") that leads to the question on pages 5 and 6. The paper carefully identifies its conclusion via a presentation of its evidence (pages 11 - 14) while also noting limitations of its study, including possible explanations for the null hypothesis (pages 16 - 18). The writing is elegant: the student does an excellent job of making complex terminology accessible to non-experts, and in defining the meaning and import of statistical terms and data. The paper also uses visuals that enhance communication of the method (e.g. - page 7).

The paper does not score a 4 because it clearly conveys an understanding of the importance of this study in relation to a larger context, and carefully reflects upon its research process in order to promote further study.

More specifically, in relation to this paper’s review of the literature, the paper is clearly able to analyze existing evidence (e.g. - pages 2 - 5. For example, page 3, bottom of first paragraph of literature review: "This study, however, failed to explore..."). The paper focuses the inquiry on specific genes suspected of affecting aggression (lacking the dILP neuropeptide), and explicitly links the student’s topic to relevant scholarly works (e.g. - Dierick et. al., Kannan et. al., and Young et. al.). The paper also logically explains the gap addressed by the inquiry (page 2, bottom to page 3: "Genome-wide association studies for the neurological basis..." and page 5, paragraph 2: "...there remains a significant gap...").
Sample A

Score: 5

The paper earns a score of 5 because it establishes a focused topic of inquiry, clearly providing background information on its topic (pages 4 - 9). The paper indicates the relevance of its uncovered gap and resulting research question (page 9, paragraph 1: "A qualitative ethnographic case study examining the purposes..."). The paper speaks to the limitations of its replicable method, and discusses implications (page 22) of an analysis like this for other contexts such as Guantanamo. In addition, the paper is well organized and uses its interpretation of evidence to construct a persuasive and sophisticated argument leading to a new understanding. The student is also able to connect this understanding and the research process back to the scholarly literature (see page 21), placing the new understanding in conversation with past studies. While the visuals (for examples, see pages 5, 6, and 14) were not analyzed directly as the student implied they might be, if they are considered as visuals accompanying a presented lecture, they do not detract or confuse the main argument.

The paper does not score a 4 because the writing and citation attribution style are clear and compelling and provide a strong sense of the student's unique voice as a credible researcher. It is the establishment of this voice and the paper's superior understanding of context in which the research is being conducted that cause the paper to merit more than a score of 4. More specifically, in relation to this paper's review of the literature (pages 6 - 9), the paper is clearly able to analyze existing evidence using scholarly sources (page 7, paragraph 2: "Ultimately, Helphand and Chiang's analyses demonstrate how the Japanese-Americans...") and page 8, paragraph 1: "With sources such as Tamura and Embrey, the Japanese-Americans' quest to ease routine adversity..."). The paper also focuses the inquiry (page 9, paragraph 1: "While Helphand, Chiang, Tamura, and Embrey's analyses contextualize the Japanese-Americans' relationships with the environment and agriculture, no study focuses solely on the Japanese ornamental gardens."). The paper also logically explains the gap addressed by the inquiry (page 9, paragraph 1: "While these articles analyze the importance and implications of these gardens, the current gap in research allows for generalizations when understanding the Japanese American experience and their relationship with ornamental gardens. A qualitative ethnographic case study...").
Sample B

Score: 3

The paper earns a score of 3 because it is an example of basic capital "R" research which includes a narrowing research topic (page 8, paragraph 1: "...what would be the best system for the UAE to use for its next solar farm"); also page 9, paragraph 1: "The purpose of the study was to determine the best system for the United Arab Emirates..."), a solid survey of the literature (pages 4 - 7), it identifies its method (page 9, paragraph 1, as: "...a grounded theory research methodology" into which it incorporates: "...the use of ‘fuzzy logic’" [paragraph 2]), and some sense of a coherent argument supported by original evidence leading to a new understanding provided in text and a series of tables (pages 10 - 14). The paper then discusses the results (pages 15 - 17) and reaches a new understanding on page 18, paragraph 1: "From all of the data presented, the researcher has evaluated that the best Solar Power System for the United Arab Emirates to implement is the Parabolic Trough solar system".

The paper does not earn a 2 because it describes a reasonably replicable method, conveys a new understanding, and communicates its ideas competently.

The paper does not earn a 4 because it does not fully explain and defend the use of grounded theory and fuzzy logic in a way that lends credibility to the student as researcher. Even though the paper implies a gap on page 3, paragraph 2, and page 8, paragraph 1, it does not provide enough information in its literature review to establish that this gap is verifiable.

More specifically, in relation to this paper’s review of the literature on pages 4 - 8, the paper presents (rather than analyzes) existing evidence, but does focus the inquiry somewhat (i.e. - the UAE and its increasing need for energy, page 4, paragraph 1: "... the UAE has shown an increase in energy consumption of 35.3%"). The paper does link some of the student's topic to relevant scholarly works (e.g. - Akbarzadeh, Johnson, & Singh; NASA; and Tan & Wong), although the implied gap (page 3, paragraph 2: "The research done in this study aims to help design the next most effective solar energy plant...") is not fully verifiable.
Sample C

Score: 2

The paper earns a score of 2 because it implies a research question (page 4, paragraph 2: "This research presents itself with a subject matter...") and attempts a research method (page 8).

The paper does not score a 1 because it does attempt to pose a research question that might reasonably be answered by an undergraduate research paper. The paper also attempts to identify evidence that will potentially lead to a new understanding.

The paper does not score a 3 because: a) its attempts at research are punctuated by periodic lapses into a non-scholarly polemic reflecting a singular perspective (see pages 6 - 7); b) while it attempts a narrowing of focus, its topic remains overly broad (admitted on page 4, paragraph 2); c) its research method is neither clear nor replicable, as survey questions and results are not presented (page 8); and d) writing is uneven and there are no scholarly sources presented, yet cited egregious citation errors (page 3, four lines down; page 4, paragraph 2; and page 6, paragraph 1). This paper is a clear example of an oversimplified "attempted" method.

More specifically, in relation to this paper’s minimal review of the literature, while the paper does not analyze existing evidence (page 6, paragraph 1: "I am aware that majority of my sources or [sic] ‘uncredible’ and ‘non-scholarly’, but that’s the beauty of my study. Since it has nothing to do with scholarly papers or studies, but rather one’s personal thoughts and viewpoints towards subject matters that is relevant and present in their lives"), the paper is beginning to focus its inquiry of "bias" (page 4, paragraph 2: "This research presents itself with a subject matter that is too board [sic] to cover completely, as well as to gather a good knowledge on the bias that one may have"). The paper links some of the student’s topic to a variety of perspectives (e.g. - Black Lives Matter vs. It’s Okay to Be White posters and Education Biases), and the gap identified (page 5, paragraph 1: "Due to how the gap that I will be filing [sic] is too [sic] see if the a [sic] person’s thoughts/bias is unique and different from others with the same race/ethnicity") is not supported due to the absence of contextual discussion of sources.
Day 4 Samples
The Impact of Photography Techniques on the

Decision of Potential Dog Adopters

Word Count: 4998
The Impact of Photography Techniques on the Decision of Potential Dog Adopters

Introduction

Dogs are one of the most popular domestic animals across the country. There are many ways people can acquire “man’s best friend,” but by far, adoption from an animal shelter is the most common method. Bir et al. (2017) found through a study of people across the nation, that people viewed adoption as the most ethical way to get a dog. Approximately 1.6 million dogs are adopted through shelters each year. But, there is another aspect to dog adoption. How do people decide what dogs to go see, which shelters to visit?

Picture this, year 2006: 10 million, 2010: 15 million, 2016: 25 million. These numbers represent the number of pet adoptions across the United States using the online adoption agency PetFinder, which partners with thousands of animal shelters across the country. Although those numbers don’t solely represent dogs, the rising trend of online adoption of pets, and thus online dog adoption, is clear. When looking for a pet online the main source of information is the picture provided. What makes a dog photo stand out on a website, what makes the viewer of a picture stop and say “that is my dog?”

There is an abundance of research on the impact of photography on the viewer of a photo. Researchers agree that a picture has the power to influence the viewers thoughts and actions. The first realization about the impact of a photograph emerged with the documentation of the Great Depression. The Farm Security Administration (FSA) was responsible for photographs,
including the world renowned Migrant Mother, taken by Dorothea Lange (pictured below), to evoke emotion amongst pictures’ viewers to promote change (Stevens and Fogel, 2001).

Researchers today agree to the same consensus involving the power of photography in portraiture. According to Morrison et al. (2013) facial expressions evoked by a subject in a photo have the ability to change the viewer’s thoughts about the subject, specifically how attractive the viewer sees the subject of the photo. Six basic emotional expressions were tested: anger, disgust, fear, happiness, surprise, and sadness. Consistently, happiness and neutral facial expressions ranked the most attractive amongst both males and females. Like Stevens and Fogel, Morrison proved the power that emotion in a photo can have on the viewer. This idea that a picture of a human can influence the viewers thoughts is agreed to by another study done on the impact of political candidates’ headshots on electoral success. Participants in the study were asked to rank political candidates by facial attractiveness and facial competence solely based on the photo provided. After the election occurred, researchers gathered the number of votes for each candidate and calculated statistically via standard deviation models the impact of facial ranking on election outcome. The results proved that both facial attractiveness and facial competence were positive predictors of electoral success (Laustsen, 2014). This study adds an important idea to previous research; not only can photos of a human impact the viewers thoughts, but it can also influence the viewers actions, in this case candidate selection.
However, the ability of a photo to influence the viewers’ thoughts and actions does not solely apply to human subjects. Photos with animal subjects can change the viewers’ perception of the subject just like they did in human portraiture during Morrison’s study on emotion. Kalof et al. (2016) conducted a study on college students’ perception of the word animal. After being shown a slideshow of professional photographs of wild animals, 92% of the students changed what they thought of the word “animal.” Pictures of animals influence the actions of viewers as well. In fact, animal shelters and rescue organizations across the United States are largely reliant on photos of the animal when deciding whether or not to accept a dog from a distant location. 78% of the respondents/rescue shelters said the photographs of the dog were extremely important and often the determining factor when choosing which dogs they want to have in their shelters (Simmons, Hoffman, 2016). Like Laustsen’s study on how physical attractiveness can predict electoral selection success, the physical appearance of a dog is a positive predictor of being chosen. Additionally, Weiss et al. (2012) conducted a study in five animal shelters across the country that asked respondents to choose what factors were influential when adopting their pet. Over 75% cited appearance as a large contributing factor for canines, proving the importance of a dog’s appearance in an adoption photo.

Rather than focusing solely on the appearance of the subject in a photo like the researchers cited above, other research has looked at what makes the composition of a photo appealing. Students studying photography at Carnegie Mellon University are taught the “rules of thumb” of photography. These composition rules include: 1. Framing- the main subject of the image is surrounded by a sort of “frame” giving the image depth and drawing the eye of the
viewer to the subject, 2. Rule of Thirds- a photo divided into nine equal squares, should have the subject of focus lay on one of the four corners of the middle of the square,

3. Leading Lines- the eye follows a path through the image or leads to the focal point, 5. Texture and Patterns, 6. Backgrounds, 7. Color and Lighting. These professional photography “rules” are regarded as the most impactful and visually pleasing to the viewer (Efros, 2011). Like professor Efros, researchers Joshi, Wang, and Li (Studying Aesthetics) focused on the impact of these composition techniques. They analyzed a professional photography website where users rate quality and give “likes” on images and proved computationally that the “rules of thumb” of photography are in fact indicators of what viewers deem as an appealing image.

Some of these composition rules have been applied to animal photos as well. Stokes (2007) showed the impact of color on the visual appeal of pictures of penguins by proving a strong positive correlation between the amount of warm color and image appeal in his studies. Stokes findings on the composition aspect of color support those of Efros and Li. Also supporting those researchers is award winning canine photographer Sheri Hatt, who credits her
success to techniques including various backdrops (Tors, 2002). Her success with the use of backdrop variation aligns with the composition technique of backgrounds providing aesthetic appeal, thus showing how that composition rule also applies to canines.

Although there is some research on aesthetic appeal of animal photos, it is limited. And only a minuscule amount exists specifically looking at aesthetic appeal of adoption images of dogs. There was one study looking at rates of dog adoptions based on adoption photos, but the study focused mostly on the impact of a human in the dog adoption photo. It also stated that composition factors professional photographers deem important had no significant impact (Lampe, Witte, 2015). This contradicts what other researchers like Efros and Li have found. However, Lampe and Witte (2015) did find that an outdoor setting was most beneficial to dog adoption, which supports previous findings about the impact of background. The varying findings set up an area of inquiry because it is unknown what makes an adoption photo of a dog visually appealing.

Adding to the area of inquiry is that there are certain characteristics of dogs known to make them more adoptable. These characteristics relate to the visually appealing photography techniques found by the previous researchers, but they have not been looked at through the photographic lens of adoption. For example, according to Ledger (2014), dogs who widen their eyes when meeting their potential adopter are more likely to get adopted than those that show no significant eye widening (Ledeger, 2014). This connects with how emotion and physical appearance of the dog influences the adopter. Also, according to Kahler (2015) dogs are more likely to get adopted when they are not perceived as a “shelter dog.” This can be addressed in
online adoption photos by making sure the dog is not in a shelter setting when the adoption photo is taken, which connects with the composition technique of background.

Knowing that the physical appearance of the subject in a picture and the aesthetic appeal of a picture’s composition can influence the viewers’ thoughts and actions, it is clear the appearance of dog adoption photos online may have the ability to influence the adopters decision to adopt a dog. The previous research points to two aspects that need to be addressed when trying to create the most visually appealing adoption image. First would be the appearance of the subject, the dog, and second would be the image composition. Together these two aspects create the most visually appealing dog adoption photo. There is no research on the visual appeal of dog adoption photos and their ability to influence the behavior of the adopter. This clearly sets up a grey area providing for more exploration on this topic. This leads to my guiding research question: **To what extent does implementing visually appealing photography techniques for taking adoption photos of dogs at Shelter X impact a potential adopter’s decision of whether or not to adopt a dog?**

Imagine sitting in a cage for nearly 22 hrs per day, hearing other dogs barking profusely, and watching people pass, looking at but never choosing you. Sadly, this is the life many dogs live for months and even several years of their life. Some dogs are even housed in kill shelters across the nation, which is not safe because of the possibility for euthanization. Being housed in a crowded shelter with so many other dogs for long periods of time also makes it easier for illnesses to spread and creates an unstable social and emotional environment for the dogs causing behavioral issues (Donaldson, 2000). Dogs that appear to be in poor health or have behavioral
issues are less likely to get adopted creating a seemingly neverendless cycle. Decreasing the time it takes for dogs to get adopted can deter this cycle.

The goal of my research is to find the most impactful dog photography techniques that make it more likely for a dog at Shelter X to get adopted. To reach my overall goal, three sub-goals need to be met: 1. Prove the prevalence of online dog adoption near Shelter X, 2: Find the most visually appealing techniques in an adoption photo, 3: Prove that a visually appealing image has the power to influence the adoption process. Finding a way to increase the likelihood of dogs getting adopted could increase overall dog adoption rates, not only at Shelter X, but others across the nation as well. There is the potential for saving lives of innocent dogs and protecting their overall well-being by getting them out of the loud, crowded shelters, locked in a cage, to a home with a stable family who loves them unconditionally. Not only will the dogs benefit, but people can experience the proven benefits of being a dog owner and dogs that get adopted could also be used for therapy purposes, further benefitting society as a whole. By allowing dogs to stay in shelters for longer than needed without looking for solutions, we are fostering the idea that it is acceptable. It is imperative a way is found to give shelter dogs the best life possible, and that starts with finding their forever home quickly and efficiently.

Methods

Study Design

This study largely involved the use of survey research in order to gather information about what potential dog adopters find most appealing when looking at a photo of a shelter dog. The information provided by the surveys were used in a comparative manner due to the fact that the various photography techniques are being compared to one another and to the current
adoption photos posted on Shelter X’s website. The surveys were also used in a descriptive nature with general questions to gather potential adopter opinions on their view of dog adoption and what they liked in an adoption photo. The professional photography techniques used to take the dog photos were those found by previous researchers to be the most visually pleasing techniques. The research was quasi-experimental because as the researcher I had control over the various photography techniques being used to evaluate the survey takers’ opinions. Also, there was a target population where specific groups or people were asked to complete the survey, so no randomized procedures were implemented. A case study would have been the most ideal research method so that after finding the most effective techniques, they could be implemented by posting pictures with the techniques on Shelter X’s website to see if they get adopted faster. However, the time constraints presented by the research process as a whole prevented me from doing so. The use of a survey provided a quick and easy way to collect large amounts of data about what potential adopters are most looking for in a dog adoption photo. The survey has identical questions, which minimizes any uncontrolled variables, and could be easily sent via email to multiple people. With that information, a hypothesis can be formed about which photography techniques are most effective in influencing adopters decisions.

**Ethical Considerations**

My research design was cleared with an Institutional Review Board (IRB) in order to ensure minimal risk was involved with participation in my research (See Appendix A p. 27-29 and Appendix C p. 31-32 for informed consent forms). In order to further reduce any risk to participants, my survey required no personal identifiers, so all responses would be anonymous. This ensured privacy protection for all participants. Further, the shelter that allowed me to take
photos of their dogs is unnamed and mentioned only as Shelter X throughout my research. Leaving the shelter masked protects the location of the dogs photographed for use in the survey.

**Selection of Participants**

My original plan was to use Shelter X’s list of email addresses of potential adopters that have come in to look at dogs to send out my survey so that the participants would truly represent those active potential adopters. However, I was unable to get access to that information. So instead, I conducted ethnographic research at Shelter X during the month of February 2018. I observed people that came in to look at dogs at Shelter X and estimated and determined the average age of people coming in to look at and potentially adopt dogs at the Shelter. The targeted age group for this research was anywhere from 20-60 years of age, with a high concentration of families. Other criteria used to select participants was a love of dogs and proximity to Shelter X.

Based on this criteria and time constraints of the research, the survey was distributed to the 300 plus staff at my high school. They fall into the age range, most live within the county that Shelter X is located, and those that like dogs were presumed to be the ones that would complete the survey. Although a random sample of participants would have been preferred, given the circumstances, a convenience sample was much more feasible for this research. The participants were sent the online survey via email so they could complete it on their own time. Participants were informed before taking the survey that they could stop and remove their responses from the research at any point within the survey.
Procedure

**Initiation and Photo Taking**

To begin my research process, I met with the manager of Shelter X, and together we looked at Shelter X’s website and identified five dogs of various breeds that I would be allowed photograph. Some of the dogs on Shelter X’s website already had professional photos taken of them, but others did not. Three of the dogs chosen had professional photos taken of them; the other two did not. The original intent was to choose five dogs without professional photos, but I was not allowed to photograph many dogs due to their personality and physical strength. Once the five dogs were identified, during the final two weeks of January 2018, I took photos of each of the five dogs with the various photography techniques proven to be visually appealing. I chose to use the techniques of the rule of thirds, background, emotion, and color.

The rule of thirds was addressed by cropping the image. Backgrounds used included indoor, outdoor and blurred. About half of the photos were taken indoors and half outdoors. Photos containing a blurred background were edited to achieve the effect. An emotion was achieved by holding a dog treat near the camera. The last technique, color, was addressed by putting bandanas on the dogs. These various techniques represented the independent variables of this research. The control variable was that each of the dogs were subject to the same techniques.

Because I am not a professional photographer and I do not have any funding to do this research, the photos were taken on an iPhone and then any editing was done with a free photo editing app. A volunteer at the shelter was required to hold the dog on a leash while the photos
were taken because I was not allowed to handle or be with the dogs by myself. This was not the optimal or intended way to take pictures, but this factor was out of my control. A total of nearly 200 photos were taken with those four photography techniques in mind, and then analyzed to see which ones best represented the techniques for each dog. Photos deleted included those that were blurry, the dog was moving, or when the majority of the photo contained the volunteer rather than the dog. In the end, each of the dogs had seven photos. Each photo represented a technique: rule of thirds, outdoor, blurred, emotion, color, one that contained all of the previous techniques, and the photo already posted on Shelter X’s website.

**Survey Creation**

Once each dog had seven viable photos they were put into my research survey (see Appendix C p. 32-63). The responses to the survey represented my dependent variable: participant opinion. The survey consisted of four parts. The first part was a small section asking the participants about their opinions on online adoptions. Second, consisted of the dog photo rankings. For each of the five dogs the participants were asked to rank the photos in order from 1-7 based on which photo they liked or stood out to them the most. 1 represented their first choice/most liked and 7 was their last choice. The participant was asked to identify what made them choose their number one ranked photo. This question allowed me to identify what the participant thought was visually appealing even if it wasn’t the technique I was trying to convey. Because it was hard to completely isolate each of the techniques and control the dogs while taking photos, there were many unavoidable confounding variables when taking the photos. The third section consisted of general questions regarding appeal in adoption photos. These general questions were where I addressed uncontrollable variables and gave me supplemental
information to determine what participants find most appealing in an adoption photo of a dog without comparing pictures. The final part asked participants about their opinions on the impact of an online adoption photo.

**Survey Distribution**

The complete survey was distributed to participants within the first few weeks of February 2018. The surveys were an online form sent via email attachment to the convenience sample (see Appendix B p. 30). Before completing the survey, the participants were told it would take approximately fifteen minutes to complete and they were not required to participate. The survey yielded a total of 124 responses.

The data from the survey was analyzed with my three sub-goals in mind. Part one was studied to make sure online usage for dog adoptions near Shelter X was prevalent. The second and third parts were analyzed for patterns or consistencies in the dog photo rankings and within responses about what is appealing in an adoption photo. In the fourth part I looked for the majority opinion to see if participants believed an online dog adoption photo has the power to influence an adoption decision. Together these four parts were studied and sorted allowing me to establish a relationship between photo technique and the potential adopter decision.

**Results**

(Complete Results can be found in Appendix D p. 64-93)

**Survey Part 1**

Figure 1.1
Figure 1.2

I would look at shelters for dogs to potentially adopt.
124 responses

Figure 1.3

I looked at the adoptable dogs online before adopting my dog from the shelter.
56 responses

Figure 1.4

The picture that I saw of my dog on the shelter's website is what made me come in to look/adopt him/her.
56 responses
Survey Part 2

Below shows the ranking results for one photo with the blurred background technique. As seen below there was not a common ranking for this technique. Graphs with no clear distinction, like the one below, were the result for nearly all of the photos for each dog, nor were the graphs for each technique similar throughout the dogs.

Figure 2.1

Only three photos had a clear preference for ranking number one as seen in Figure 2.2 below, however they were not photos that used the same technique.

Figure 2.2
**Survey Part 3**

**Figure 3.1**

*What would be most appealing to you when looking at a dog’s face in a photo?*

- The dog’s eyes/ facial expression: 62.7%
- The dog is smiling: 20.2%
- The dog looks happy in general: 10.1%
- The way the dog’s face is portrayed in the photo does not have a significant impact on me: 5.7%

**Figure 3.2**

*What background would make a dog’s photo most visually appealing to you?*

- Blurred background: 43.5%
- Outdoor background: 40.0%
- Indoor background: 9.2%
- Shelter background (e.g., you can see they are in a shelter just by looking at the photo): 5.5%
- Background does not have a significant impact on me: 4.8%
Survey Section 4

Figure 4.1

Seeing a photo of a dog that stands out to me on a shelter's website would bring me in to look at the dog.

124 responses

Figure 4.2

A visually appealing photo of a dog would influence my decision on whether or not to adopt a dog.

124 responses
Analysis

Discussion

The purpose of this research was to ultimately determine if there are specific photography techniques that can be used for adoption photos in order to influence a potential adopter to adopt a dog at Shelter X. Prior research exists on using photography techniques to make images aesthetically appealing, but limited amounts have been done on visual appeal in animal photos. There is also extreme scarcity on credible research done on the impact of dog photos on dog adoptions. To reach my research goal I had to first prove that online adoption photos are prevalent in the adoption process for people near Shelter X. Next, I had to find the most appealing photography technique to potential adopters. Finally, in order to definitively reach my goal, I had to prove those techniques had a large enough impact to influence an adoption decision.

The results from Section 1 & 4 of the survey were as expected. Section 1 showed the use of online adoption photos had great prevalence near Shelter X. Although, approximately only half of the respondents said the picture on a shelter’s website is what brought them in to look at the dog they adopted (see Figure 1.4), Figure 4.1 proves undoubtedly that a picture has the ability to bring in potential adopters. The results in Figure 1.4 can be accounted for by the possibility that adopters may have adopted a dog other than the one they were interested in on the website, or maybe the photo of the dog they adopted did not stand out to them on the website. Section 4 continues by going even further to prove the adoption photos put online can impact a potential adopters decision to adopt the dog depicted. This finding supports the previous
findings by researchers such as Simmons and Hoffman (2016) that dog photos have the ability to influence a viewer’s thoughts and actions. Thus, an online adoption photo has the ability to influence a potential adopter to adopt the dog pictured.

Sections 2 and 3 of the survey dived deeper into what potential adopters are most drawn to in a photo of an adoptable dog. The results from Section 2 of the survey showed that respondents had no clear preference for the photo techniques used to picture the dogs. There was never a clear ranking pattern of photo techniques across each of the dogs to be able to establish an overall preference. Analysis of Section 2 of the survey shows that although there was not a consistent ranking pattern across all of the dogs, there was consistency as to why respondents chose their number one ranked photo. There is an overwhelming consensus that emotion has the most impact on what makes a photo of a dog stand out to a potential adopter. More specifically, positive emotion is what is most appealing to the viewer (see Figure 3.1), which supports the research findings done on human photos by Morrison et al. (2013) as well as the conclusion reached by Ledger (2014) that positive emotion was a positive predictor of being adopted.

However the composition techniques including rule of thirds, background, and color were not generally cited as a reason for choosing the number one photo choice. This shows how those techniques are not as visually appealing to a potential adopter when looking at dog adoption photos. This strongly conflicts with the findings of Joshi, Wang and Lee (Studying Aesthetics) that those composition aspects are positive predictors of aesthetic appeal. The reason for this conflicting finding could be that emotion is more powerful than the composition “rules of thumb,” or it could be that their research did not focus solely on animals.
The result that those composition aspects do not have a significant impact is supported by the study of adoption photos impact on speed of adoption conducted by Lampe and Witte (2015). On the other hand, Lampe and Witte (2015) found dogs with an outdoor background in their adoption photo were adopted faster than dogs that did not. The survey results shown above from Sections 2 and 3 are not as clear to make that conclusion. Background did not seem to have as significant impact on the respondents of this research survey (see Figure 3.2).

**Limitations**

The largest limitation of this study is that shelter dogs are very hard to photograph. Most of the dogs are not trained to sit and stay. The dogs are very active and it is hard to get a photograph with them sitting still, let alone looking at the camera. Because of this, the photos used in the study were not as well taken as hoped, but because of the time constraints and the ability to only photograph certain dogs at Shelter X, the photos were used. In addition, a trained professional photographer did not take the photos for this study. These factors could have caused the photos to not properly reflect the techniques that were trying to be conveyed, thus adding inconsistencies within the data. The other big limitation was the sample. It was smaller and not as reflective of potential adopters as it was hoped to be because I was not allowed access to Shelter X’s email list of all people interested in adopting a dog there. This may have caused the data to be less representative than data on people actively looking to adopt at Shelter X.

**Significance**

The significance of these findings is the potential impact that they can have on the future of dog adoptions. The data showed a positive emotion is most visually appealing to potential
dog adopters near Shelter X in a photo of an adoptable dog. Other photography techniques such as the rule of thirds, backgrounds, and color do not seem to have nearly as significant of an impact as emotion did. The similar finding that photo composition elements had no significant impact done by Lampe and Witte (2015) shows that those composition techniques deemed highly visually appealing do not apply to dog adoption photos. The fact that emotion seems to be the most appealing aspect to the viewer of an adoption photo is extremely important. There is no need to hire professional photographers to come in with special cameras, props, and backgrounds to take fancy photos of the dogs. Potential adopters are most influenced by the dog looking happy, which in this study was evoked by simply holding a dog treat. Because the data clearly showed that a visually appealing adoption photo can influence the adopter’s decision, finding the optimal picture taking technique that is appealing to a potential adopter has the ability to increase dog adoptions at Shelter X and possibly many others.

Based on the findings of this research, the impact of background in an adoption photo definitely needs to be studied more due to the conflicting result with other researchers, as well as the graph in Figure 3.2. Also, based on Figure 2.3 further research could look into the impact of placement of the dog in an adoption photo. Despite emotion consistently being the most cited reason for participants choosing their number one photo, the next most common reason was always the placement of the dog. Because of the limited information about this topic and the limitations discussed above, there clearly needs to be more research in general about how different photography techniques impact dog adoptions. Nevertheless, these findings serve as a strong basis for further research into what makes a dog adoption photo most visually appealing. These and future results have the ability to increase the likelihood of a dog pictured on a
Shelter’s website, or another online source, getting adopted. Or in the least, visually appealing photos of dogs may bring more potential adopters into a shelter to look at dogs. Either way, with further research on this topic there is the potential to influence adopter behavior and increase overall dog adoption rates.

**Conclusion**

Now imagine that moment when your cage opens up and you meet that special someone. You and your loving new owner are happy as can be and you can’t wait to start a new life outside the confinements of a shelter. That joyous feeling needs to come faster for dogs housed in shelters. Making the goal of an adoption photo at a shelter to be a photo where the dog is smiling could be a step in the right direction. There is no need to spend money on professional photographers with fancy backdrops and cameras: a cell phone and a simple dog bone could be key in taking an adoption photo that stands out to a potential adopter online. With the conduction of further research on visual appeal of dog adoption photos, there is the possibility of finding the optimal photography technique that is most appealing to adopters. Thus, potentially increasing the rate of dog adoptions in shelters across the nation finding dogs their forever homes with loving families. Take a moment to look at the two photos below of one of the dogs used in this research study. The one on the left was posted on Shelter X’s website and was taken by a professional photographer with composition techniques including blurred background. On the right, is the photo taken with a cell phone, and it’s composition aspects would not be deemed visually appealing.
Which photo would make you more likely to adopt? Based on Shelter X, it seems a little smile really does go a long way, and raising awareness to this fact could change how shelters everywhere take and use potential adoption photos to find a home for “man’s best friend.”
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Appendices

Appendix A

Informed Consent Form For Shelter X
ALTERNATIVES

Some alternatives to the use of dog adoption have been proposed in this study. However, none of these alternatives have been tested in a controlled setting. As such, it is not possible to determine the effectiveness of these alternatives. It is important to remember that adoption is a complex process and that the success of any alternative will depend on a variety of factors. These factors include the willingness of the dog to participate in the study, the availability of resources, and the willingness of the participants to follow the study protocols.

COMPENSATION & LIMITS

If you choose to participate in this study, you will receive $100 for your participation. However, it is important to note that this compensation does not cover any potential costs associated with participating in the study. In addition, you will be asked to sign a consent form that outlines the risks and benefits of participating in the study.

RESEARCHER CONTACT INFORMATION

If you have any questions or concerns about the study, please feel free to contact me. I can be reached at [email protected]. You can also contact me by phone at [phone number].

DATA CONTACT INFORMATION

If you would like to receive any updates or results of this study, please provide your contact information below. I will not share this information with any third parties without your explicit consent.

REFERENCES

[Provide references if available]

[End of page]
PARTICIPANT AGREEMENT
I have read the information in this document and agree to participate in the study. I have
given a choice to take any photographs I have about the study, and they have been associated for
understand that I will be given a copy of the same for my records.

[Signatures]

Date

[Handwritten Notes]
Appendix B

Email Sent for Potential Survey Participants

Hi, my name is __________. I am a current student in the AP Capstone program conducting research on the impact of photography on dog adoptions. I have been working closely with the Humane Society _________ throughout the past couple of months taking pictures and spending time with the dogs! I have created a survey incorporating various photos of dogs in order to further my research into this topic. My goal is to find a way to make dogs more adoptable through the photos that are posted on a shelter’s website. Many of the photos on shelter websites do not do the dogs justice! I am hoping to find the most effective picture taking techniques that will influence a potential adopter to adopt a dog. Hopefully at the end of the research I will be able to identify certain qualities of pictures that will make a dog more likely to get adopted. If I find qualities that have this impact I could help many dogs find their forever homes faster!

In order to find and establish the most effective photo techniques I need your help by completing the Google Forms survey that I have created. The survey takes approximately 10-15 minutes to take depending on how long you look at the dog photos. I am asking that responses be submitted prior to **Monday, February 26**. I hope that you will be willing to help me with this final stage of my research process. Completing the attached Google Forms via the survey link below would be greatly appreciated. Thank you so much!

If you have any questions about me or my research, feel free to contact me directly at __________@gmail.com.

Survey Link:

[https://docs.google.com/forms/d/e/1FAIpQLSeEi9qCorOTz3BpxgTDSievcfERPuPR78EllV9gE6eB10ZBqw/viewform?usp=sf_link](https://docs.google.com/forms/d/e/1FAIpQLSeEi9qCorOTz3BpxgTDSievcfERPuPR78EllV9gE6eB10ZBqw/viewform?usp=sf_link)
Appendix C

Survey

Research Participation and Consent

Please read the following terms and conditions regarding this research.

Image title
I agree to all of the above terms and conditions regarding this research and my participation in this study.

Number of Dogs

Description (optional)

I own ____ dog(s).

- 0
- 1
- 2
- 3+

Continue to next section
Non-Dog Owners

Description (optional)

I do not own a dog because:
- [ ] living arrangements
- [ ] dog has passed
- [ ] work load
- [ ] Other...

I am likely to get a dog in the next year.
- [ ] strongly agree
- [ ] agree
- [ ] disagree
- [ ] strongly disagree

Dog Owners Continued

Description (optional)

I own one or more dogs because:

Short answer text

I am likely to get a dog in the next year.
- [ ] strongly agree
- [ ] agree
- [ ] disagree
- [ ] strongly disagree
General Variable Questions

I would look at shelters for dogs to potentially adopt.
- [ ] Strongly Agree
- [ ] Agree
- [ ] Disagree
- [ ] Strongly Disagree

I would look online for dogs to potentially adopt.
- [ ] Strongly Agree
- [ ] Agree
- [ ] Disagree
- [ ] Strongly Disagree
I have adopted a dog from a shelter

I looked at the adoptable dogs online before adopting my dog from the shelter.
- Many times
- A couple of times
- I did not look online at the shelter’s website before adopting my dog

I saw a picture of the dog that I adopted on the shelter’s website.
- Yes
- No
- I don’t remember

The picture that I saw of my dog on the shelter’s website is what made me come in to look/adopt him/her.
- Yes
- No
- Maybe

---

Photo Rankings - Dog 1

For the dog shown below, please scroll through and view each photo. After you have viewed all seven photos rank the photos in an overall order based on which photo stands out to you the most, are drawn to the most. Under each photo choose the number that best represents the number in the order of 1-7 you believe that photo should lay. (** 1 being the photo that you are drawn to the most, 7 being the least**) EACH NUMBER WILL BE USED ONLY ONCE!

Photo 1

![Photo 1](image)

Ranking number for Photo 1

1 2 3 4 5 6 7
PHOTOGRAPHY TECHNIQUES ON DOG ADOPTION

Photo 2

Ranking number for Photo 2

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Photo 3

Ranking number for Photo 3

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Photo 4

Ranking number for Photo 4

1  2  3  4  5  6  7

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Photo 5

Ranking number for Photo 5

1  2  3  4  5  6  7

○  ○  ○  ○  ○  ○  ○
PHOTOGRAPHY TECHNIQUES ON DOG ADOPTION

Photo 6

Ranking number for Photo 6

1  2  3  4  5  6  7

Ο  Ο  Ο  Ο  Ο  Ο  Ο

Photo 7

Ranking number for Photo 7

1  2  3  4  5  6  7

Ο  Ο  Ο  Ο  Ο  Ο  Ο
Please go back and make sure that you have used each number (1-7) only once for this dog!

Description (optional)

Would you adopt the dog pictured above? *
- I would adopt this dog
- I would consider adopting this dog
- I would not adopt this dog

What aspect of the photo you ranked as No. 1, made it the most visually appealing to you? *
- the dog's eyes/ facial emotion
- the background of the photo
- the placement of the dog in the photo
- colorfulness of the picture
- other

Section 7 of 22

Other 1-1

Description (optional)

Please give a brief explanation as to what made the picture appealing to you. *

Short answer text

Section 8 of 22

Other 2-1

Description (optional)

Please give a brief explanation as to what made the picture appealing to you. *

Short answer text
Other 3-1

Please give a brief explanation as to what made the picture appealing to you.

Short answer text

After section 9 Go to section 14 (Photo Rankings: Dog 4)

Other 4-1

Please give a brief explanation as to what made the picture appealing to you.

Short answer text

After section 10 Go to section 15 (Photo Rankings: Dog 5)

Other 5-1

Please give a brief explanation as to what made the picture appealing to you.

Short answer text

After section 11 Go to section 16 (Photo Aspects in General)
Photo Rankings - Dog 2

For the dog shown below, please scroll through and view each photo. After you have viewed all seven photos rank the photos in an overall order based on which photo stands out to you and which you are drawn to the most. Under each photo choose the number that best represents the number in the order of 1-7 you believe that photo should be (**1 being the photo that you are drawn to the most, 7 being the least**). EACH NUMBER WILL BE USED ONLY ONCE.

Photo 1

Ranking number for Photo 1

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PHOTOGRAPHY TECHNIQUES ON DOG ADOPTION

Photo 2

Ranking number for Photo 2

1 2 3 4 5 6 7

Photo 3

Ranking number for Photo 3

1 2 3 4 5 6 7
Photo 4

Ranking number for Photo 4

1  2  3  4  5  6  7

○    ○    ○    ○    ○    ○    ○
Please go back and make sure that you have used each number (1-7) only once for this dog!

Description (optional)

Would you adopt the dog that was pictured above? *
- I would adopt this dog
- I would consider adopting this dog
- I would not adopt this dog

What aspect of the photo you ranked as No. 1, made it the most visually appealing to you? *
- the dog's eyes/ facial emotion
- the background of the photo
- the placement of the dog in the photo
- colorfulness of the picture
- other
Photo Rankings - Dog 3

For the dog shown below, please scroll through and view each photo. After you have viewed all seven photos rank the photos in an overall order based on which photo stands out to you and are drawn to the most. Under each photo choose the number that best represents the number in the order of 1-7 you believe that photo should lay. (*** 1 being the photo that you are drawn to the most, 7 being the least***). EACH NUMBER WILL BE USED ONLY ONCE!

Photo 1

Ranking number for Photo 1

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Photo 2

Ranking number for Photo 2

1  2  3  4  5  6  7

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Photo 3

Ranking number for Photo 3

1  2  3  4  5  6  7

○  ○  ○  ○  ○  ○  ○
Photo 5

Ranking number for Photo 5

1  2  3  4  5  6  7

○  ○  ○  ○  ○  ○  ○

Photo 6

Ranking number for Photo 6

1  2  3  4  5  6  7

○  ○  ○  ○  ○  ○  ○
PHOTOGRAPHY TECHNIQUES ON DOG ADOPTION

Consultant Sample Day 4  50 of 93

**Photo 7**

![Photo of a dog](image)

**Ranking number for Photo 7**

1  2  3  4  5  6  7

- [ ] 1
- [ ] 2
- [ ] 3
- [ ] 4
- [ ] 5
- [ ] 6
- [ ] 7

Please go back and make sure that you have used each number (1-7) only once for this dog!

Description (optional)

**Would you adopt the dog pictured above?**

- [ ] I would adopt this dog
- [ ] I would consider adopting this dog
- [ ] I would not adopt this dog

**What aspect of the photo you ranked as No. 1, made it the most visually appealing to you?**

- [ ] the dog's eyes/ facial emotion
- [ ] the background of the photo
- [ ] the placement of the dog in the photo
- [ ] colorfulness of the picture
- [ ] other

After section 12  Go to section 13 (Photo Rankings - Dog 3)
Photo Rankings - Dog 4

For the dog shown below, please scroll through and view each photo. After you have viewed all seven photos rank the photos in an overall order based on which photo stands out to you/are drawn to the most. Under each photo choose the number that best represents the number in the order of 1-7 you believe that photo should be. (**1 being the photo that you are drawn to the most, 7 being the least**) (EACH NUMBER WILL BE USED ONLY ONCE)

Photo 1

Ranking number for Photo 1

1  2  3  4  5  6  7

○  ○  ○  ○  ○  ○  ○
PHOTOGRAPHY TECHNIQUES ON DOG ADOPTION

Photo 2

Ranking number for Photo 2

1 2 3 4 5 6 7

Photo 3

Ranking number for Photo 3

1 2 3 4 5 6 7
PHOTOGRAPHY TECHNIQUES ON DOG ADOPTION

Photo 4

Ranking number for Photo 4

1 2 3 4 5 6 7

Photo 5

Ranking number for Photo 5

1 2 3 4 5 6 7
Please go back and make sure that you have used each number (1-7) only once for this dog.

Description (optional)

Would you adopt the dog pictured above?

- I would adopt this dog
- I would consider adopting this dog
- I would not adopt this dog

What aspect of the photo you ranked as No. 1, made it the most visually appealing to you?

- The dog’s eyes/ facial emotion
- The background of the photo
- The placement of the dog in the photo
- Colorfulness of the picture
- Other
Photo Rankings - Dog 5

For the dog shown below, please scroll through and view each photo. After you have viewed all seven photos rank the photos in an overall order based on which photo stands out to you the most. Under each photo choose the number that best represents the number in the order of 1-7 you believe that photo should lay (1 = 1 being the photo that you are drawn to the most, 7 being the least). EACH NUMBER WILL BE USED ONLY ONCE.

Photo 1

Ranking number for Photo 1

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PHOTOGRAPHY TECHNIQUES ON DOG ADOPTION

Photo 2

Ranking number for Photo 2

1  2  3  4  5  6  7

○  ○  ○  ○  ○  ○  ○

Photo 3

Ranking number for Photo 3

1  2  3  4  5  6  7

○  ○  ○  ○  ○  ○  ○
Photo 4

Ranking number for Photo 4

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Photo 5

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PHOTOGRAPHY TECHNIQUES ON DOG ADOPTION

Photo 6

Ranking number for Photo 6

1  2  3  4  5  6  7

Photo 7

Ranking number for Photo 7

1  2  3  4  5  6  7
Please go back and make sure that you have used each number (1-7) only once for this dog!

description (optional)

Would you adopt the dog pictured above?

- I would adopt this dog
- I would consider adopting this dog
- I would not adopt this dog

What aspect of the photo you ranked as No. 1, made it the most visually appealing to you?

- the dog's eyes/ facial emotion
- the background of the photo
- the placement of the dog in the photo
- colorfulness of the picture
- other

After section 15  Go to section 16 (Photo Aspects in General)

---

Section 16 of 22

Photo Aspects in General

For the following questions, check all that apply.

When looking at photos of dogs in general, what is the most important aspect(s)?

- clear/well taken photo
- positive emotions/ facial representation of the dog
- background of the photo
- placement of the dog in the photo
- a colorful photo
- other

After section 16  Continue to next section
Background of Photo

What background would make a dog's photo most visually appealing to you?  *

- blurred background
- an outdoor background
- in indoor background
- an in shelter background (i.e., you can see that they are in a shelter just by looking at the picture)
- background does not have a significant impact on me

Emotion/Facial Aspects of Photos

What would be most appealing to you when looking at a dog's face in a photo?

- the dog's eyes are widened and looks happy
- the dog is smiling
- the dog looks happy in general
- the way the dog's face is portrayed in the photo does not have a significant impact on me
Which of the following influence your decision to adopt a dog? (Please choose all that apply.)

- Dog Breed/ Size
- Dog age and health status
- Appearance of the dog
- Temperament of the dog
- Other

Which of the following has the MOST influence over the decision of whether or not to adopt a dog?

- Dog breed/ size
- Dog age and health status
- Appearance of the dog
- Temperament of the dog
- Other

I have adopted a dog from a shelter in the past.

- Yes
- No
- Unsure
Power of a Photo

Seeing a photo of a dog that stands out to me on a shelter’s website would bring me in to look at the dog.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

A visually appealing photo of a dog would influence my decision on whether or not to adopt a dog.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

This survey is complete! Thank you for your input.

Description (optional)
Appendix D

Survey Responses

[Bar chart showing 124 responses where 124% agree to all terms and conditions]

[Pie chart showing the distribution of the number of dogs owned by respondents: 41.1% own 0 dogs, 30.6% own 1 dog, 24.2% own 2 dogs, 4.2% own 3+ dogs]
Non-Dog Owners

I do not own a dog because...
38 responses

- 21.1% living arrangements
- 15.8% dog has passed
- 15.8% workload
- 12.1% Do not like dogs
- 11.1% my husband is allergic to dogs
- 7.9% I have a cat and I am not home during... Allergies
- 6.8% cost specifically boarding when trav...

I am likely to get a dog in the next year.
38 responses

- 52.6% strongly agree
- 31.6% agree
- 13.2% disagree
Dog Owners Continued

I own one or more dogs because...
86 responses

- I love dogs. (2)
- I love dogs. (2)
- They provide unconditional love and companionship
- Kid and family companion. Teach kids care skills.
- Would have more if I could. I believe the pups like the companionship especially when we're not around during the day
- I love them!
- I like to be companions for each other.
- I love them and I can afford to have two and all the obligations that comes with them.
- Dogs provide great companionship
- It makes me feel secure
- I like dogs and helping with rescues

I am likely to get a dog in the next year.
86 responses

- strongly agree
- agree
- disagree
- strongly disagree
Photo Rankings - Dog 1

Ranking number for Photo 1
124 responses

Ranking number for Photo 2
124 responses
Please go back and make sure that you have used each number (1-7) only once for this dog!
Would you adopt the dog pictured above?
124 responses

- 25.4% I would adopt this dog
- 71% I would consider adopting this dog
- 3.6% I would not adopt this dog

What aspect of the photo you ranked as No. 1, made it the most visually appealing to you?
124 responses

- 75% the dog’s eyes/ facial emotion
- 16.9% the background of the photo
- 7.8% the placement of the dog in the photo
- 1.6% colorfulness of the picture
- 1.6% other

Other 1-1

Please give a brief explanation as to what made the picture appealing to you.
4 responses:

You could see all the dog’s body, giving you an idea of size, but also seeing the face

The scarf showed his personality

I don’t know i just thought he looked cuter in that photo than the rest of them

I loved the personality in the very last picture that was zoomed in on his face.
Photo Rankings - Dog 2

Ranking number for Photo 1
124 responses

Ranking number for Photo 2
124 responses
Please go back and make sure that you have used each number (1-7) only once for this dog!
Would you adopt the dog pictured above?
124 responses

- 41.9% would adopt this dog
- 49.2% would consider adopting this dog
- 8.9% would not adopt this dog

What aspect of the photo you ranked as No. 1, made it the most visually appealing to you?
124 responses

- 62.9% the dog’s eyes/ facial emotion
- 24.2% the background of the photo
- 8.7% the placement of the dog in the photo
- 4.9% colorfulness of the picture
- 2.5% other

Other 2-1

Please give a brief explanation as to what made the picture appealing to you.
7 responses

- The dog just looks like a very loving dog, from his loving expression to physical stand.
- It did not make the dog look aggressive
- Which picture? Unsure of what you are asking.
- Just for this type of dog, looks calmer, less intimidating (and I have a rescue dog and know what type of dogs are there).
- This photo looked professionally taken. It was a high quality image that made it look like a high quality doggo.
- It made the dog appear more cute than the other photos did.
- Same as the last. I liked the face/smile.
PHOTOGRAPHY TECHNIQUES ON DOG ADOPTION

Consultant Sample Day 4

75 of 93

Photo Rankings - Dog 3

Ranking number for Photo 1
124 responses

Ranking number for Photo 2
124 responses
Please go back and make sure that you have used each number (1-7) only once for this dog!
Would you adopt the dog pictured above?
124 responses

- I would adopt this dog: 50.8%
- I would consider adopting this dog: 43.5%
- I would not adopt this dog: 5.7%

What aspect of the photo you ranked as No. 1, made it the most visually appealing to you?
124 responses

- The dog's eyes/facial emotion: 65.3%
- The background of the photo: 17.7%
- The placement of the dog in the photo: 8.9%
- Colorfulness of the picture: 5.7%
- Other: 4.8%

Other 3-1

Please give a brief explanation as to what made the picture appealing to you.
4 responses

- The dog is alert, ears are pricked. Make sure the dog's ears are up in photos. Shows less fear.
- The white dog had the look of despair/depression not something you would want your photos to communicate.
- The composition of the photo looked very nice and the dog looked happier there.
- Face looks sweet.
Ranking number for Photo 3
124 responses

Ranking number for Photo 4
124 responses

Ranking number for Photo 5
124 responses
Please go back and make sure that you have used each number (1-7) only once for this dog!
Would you adopt the dog that was pictured above?
124 responses

- I would adopt this dog: 84.5%
- I would consider adopting this dog: 20.2%
- I would not adopt this dog: 15.3%

What aspect of the photo you ranked as No. 1, made it the most visually appealing to you?
124 responses

- The dog's eyes/ facial emotion: 84.7%
- The background of the photo: 10.6%
- The placement of the dog in the photo: 3.7%
- Colorfulness of the picture: 1.6%
- Other: 0.8%

Other 4-1

Please give a brief explanation as to what made the picture appealing to you.
2 responses

- Love the ears up and 'smiling'
- The posture of the dog
Ranking number for Photo 6
124 responses

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Ranking number for Photo 7
124 responses

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Please go back and make sure that you have used each number (1-7) only once for this dog!
Would you adopt the dog pictured above?
124 responses

- 55.0%: I would adopt this dog
- 35.5%: I would consider adopting this dog
- 8.9%: I would not adopt this dog

What aspect of the photo you ranked as No. 1, made it the most visually appealing to you?
124 responses

- 78.2%: the dog's eyes/ facial emotion
- 9.9%: the background of the photo
- 9.9%: the placement of the dog in the photo
- 4.9%: colorfulness of the picture
- 1.2%: other

Other 5-1

Please give a brief explanation as to what made the picture appealing to you.
1 response

like the dogs expression and the pop of color with the bandanna
Photo Aspects in General

When looking at photos of dogs in general, what is the most important aspect(s)?
124 responses

Emotion/Facial Aspects of Photos

What would be most appealing to you when looking at a dog's face in a photo?
124 responses

- The dog's eyes are widened and looks happy (62.7%)
- The dog is smiling (28.2%)
- The dog looks happy in general
- The way the dog's face is portrayed in the photo does not have a significant impact on me
Background of Photo

What background would make a dog’s photo most visually appealing to you?
124 responses

- Blurred background: 43.5%
- An outdoor background: 49%
- An indoor background: 5.5%
- An in shelter background (a.k.a. you can see that they are in a shelter just by looking at the photo): 1.5%
- Background does not have a significant impact on me: 1.5%

General Variable Questions

I would look at shelters for dogs to potentially adopt.
124 responses

- Strongly Agree: 34.7%
- Agree: 55.6%
- Disagree: 0.8%
- Strongly Disagree: 9.1%
I would look online for dogs to potentially adopt.
124 responses

Which of the following influence your decision to adopt a dog? (Please choose all that apply.)
124 responses

Which of the following has the MOST influence over the decision of whether or not to adopt a dog?
124 responses
I have adopted a dog from a shelter in the past.
124 responses

- Yes: 53.2%
- No: 46.8%

I have adopted a dog from a shelter

I looked at the adoptable dogs online before adopting my dog from the shelter.
58 responses

- Many times: 51.7%
- A couple of times: 29.3%
- I did not look online at the shelter's website before adopting my dog: 19%
I saw a picture of the dog that I adopted on the shelter's website.
58 responses

The picture that I saw of my dog on the shelter's website is what made me come in to look/adopt him/her.
58 responses
Power of a Photo

Seeing a photo of a dog that stands out to me on a shelter's website would bring me in to look at the dog.
124 responses

A visually appealing photo of a dog would influence my decision on whether or not to adopt a dog.
124 responses

This survey is complete! Thank you for your input.
A Raw Film Analysis

Introduction

Feminist film theory (FFT) is a theoretical film criticism that bases its analysis in feminist politics and feminist theory. FFT developed through the politics of the second wave of feminism in the 1960s and 1970s, and took hold in the 1980s as a way to understand how portrayals of women on-screen affect women in real life. Film analysis focuses on the meaning within a film's text and the way in which that text affects the viewing subjects. However, FFT is one way to read a film, including both a literary analysis and also explores how the process of cinematic production both constructs and affects women on screen.

Media is important to study, as media does influence both how women and girls shape their identities, as well as others (spectators) perceive them. In order to explore how the film industry presents a portrayal of femininity, I will be utilizing an intersectional, feminist reading of the 2016 film Raw. Raw follows Justine, a young veterinarian prodigy, over the course of her first week at the same university her parents attended and that her sister Alex currently attends. As part of a hazing ritual, lifetime vegetarian Justine is forced to eat raw rabbit kidney, resulting in her realizing she craves meat, eventually progressing to cannibalism. In order to fully analyze Raw, I will be using multiple feminist film theories surrounding spectatorship as well as a gendered reading of hunger in media.

Review of Literature

Gaze and Voyeurism in Film

Gaze, and its tendency to act as voyeurism in cinema, is the basis of FFT as a whole. In her essay “Visual Pleasure and Narrative Cinema,” Laura Mulvey first defined what has become
known colloquially as “the male gaze.” Mulvey argues that “unchallenged, mainstream film coded the erotic into language of the dominant patriarchal order.” This has resulted in mainstream films where the pleasure in looking renders men as active gaze, and women as passive material. This gaze relates to scopophilic intent, as in film women are coded to be eroticized and fetishized, built as a spectacle or icon. This denotes a woman’s “to-be-looked-at-ness” wherein both the male spectator in the audience as well as the male character on screen gain pleasure through looking.

While male gaze is present everywhere, not just the movie screen, it is further perpetuated through the norms of cinema. The camera acts as the audience’s perspective, but its motions are controlled by the action of the protagonist, and invisible editing likewise blurs the limits that exist in real life. This allows for the spectator to identify with the glamorized, main male protagonist as a “screen surrogate,” which allows for both spectatorship and a feeling of omnipotence. This power renders women as passive objects for fetishization as the following gaze is focused and male.

Further, the female figure in its eroticization presents problems, as the female figure often disrupts the narrative, and creates a tension between looks on screen. These problems can be solved through both plot devices or camera techniques that take movies out of the context of realism. Contextualizing the character, for example as a performer, engages their “to-be-looked-at-ness” in a simple way that unites the looks of both spectators, on screen or

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1 See Mulvey, 835  
2 See Mulvey, 843  
3 See Mulvey, 837  
4 See Mulvey, 839  
5 See Mulvey, 838  
6 See Mulvey, 836-837
audience, and resolves the tension between these contrasting gazes.\(^7\) This solves the complication the female figure presents in narrative.

Besides depicting the woman as a performer, camera shots and angles allow unification of on-screen and off-screen gaze. In her book of essays *Femme Fatales*, Mary Ann Doane builds upon Mulvey’s idea of unification to specifically explore how directors utilize conventional close-ups, of faces, legs or other disembodied parts to unite gaze while not disrupting narrative. Doane explains that these close ups act as a “demolition of the dichotomy of surface and depth,”\(^8\) and links this idea to the concealment of truth. Using camera angles and close-ups to depict women renders them as a flat surface and equates them to a cut-out. This, just as choosing to have women perform, does not limit the sexual impact, but rather allows women to become a “sexualized, eroticized, and perfected surface,” without disrupting the narrative or causing tension between the looks of audience and actor.\(^9\)

However, both of these arguments focus only on sexual difference, which suppresses the recognition of othering factors outside of just woman/man. This is known as the “abstraction of women,” a phenomenon Doane acknowledges, and that bell hooks builds upon in her essay “The Oppositional Gaze.” hooks focuses on race as a significant factor that abstraction, and thus FFT, often ignores, but this idea illuminates how gaze analysis must acknowledge factors besides sexual difference as othering.\(^10\) In this way, both Doane and Mulvey’s arguments fall short of complete intersectional analysis in practice.

*The Female Spectator and Hunger*

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\(^7\) See Mulvey, 837
\(^8\) See Doane, 57
\(^9\) See Doane, 56
\(^10\) See hooks, 124
Within arguments of gaze, it is also necessary to address the female spectator. Doane and hooks both discuss the female spectator, something that is almost completely absent in Mulvey’s critical analysis, which focuses on male protagonists, and inherently, male viewers. In contrast, Doane pays attention to the female spectator, and identifies the problems of female spectatorship when, in agreement with Mulvey, cinema has been crafted for the male gaze.

In mainstream cinema, as the male gaze is centered, there is no “female view” to approach cinema from. Thus, Doane argues that the female spectator is only given two options besides resistance: to over-identify with the male view or to become one’s own object of desire. To over-identify with the male viewer, Doane offers that the female spectator may gain masochistic pleasure, as she must sacrifice her femininity in order to enjoy the film through the male-centered gaze. The other option is to participate in the fetishization of the female body, while identifying with her, which leads to narcissism, and proves difficult to maintain throughout a film. Both of these options prove othering and further complicate female spectatorship, often leading female spectators to form an oppositional gaze which allows them to “manufacture a distance from the image.” This distance is necessary to create a spectator that resists either over-identification or fetishization in order to fully analyze women in film.

This is especially true of media’s treatment of women and their hunger. Hunger is inherently linked to gaze, as hunger and gaze both require an active participant. However, as established by Mulvey’s binary, women are passive in film. This overcomplicates the relationship between women and hunger, as it must be avoided or changed in order to maintain

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11 See Doane, 31-32
12 See Doane, 31-32
13 See Doane, 32
14 See Mulvey, 843
woman as passive. This results in what Susan Bordo identifies in her book *Unbearable Weight* as “hunger as an ideology.”¹⁵ For women in media, food, and thus hunger, can never just be food. Bordo cites hunger for women as a unification with narrative, such as a woman’s appetite acting as a metaphor for her sexual appetite,¹⁶ or a woman’s cooking as a metaphor for her love of those she feeds.¹⁷ Just as Mulvey and Doane argue for a unification of gaze, Bordo depicts the necessity of hunger and food as a metaphor for women on screen.

*Application of Theory to Film*

The past decade, films starring women have become more mainstreamed. One example of this is a practice many critics and viewers alike have begun utilizing called the Bechdel Test. Originally created from Alison Bechdel’s comic “Dykes to Watch Out For”, The Bechdel Test has become a commonplace evaluation of “feminist” film. This “rule” states that a film has to follow three basic rules, “one, it [a film] has to have two female characters who, two, talk to each other about, three, something besides a man,” in order for the character in the comic to watch a film.¹⁸ Although this rule started as a joke in a comic strip in 1985, it has become mainstreamed, even to the extent that Swedish cinemas now use it as a rating, alongside those of nudity or graphic violence.¹⁹ However, as pointed out by current feminist film theorists, the Bechdel test is very limited.²⁰

Representation for representation’s sake is a fruitless pursuit, as these portrayals, when analyzed, often devolve into mere tokenism, fetishism and eroticism: the initial problems with

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¹⁵ See Bordo, 99  
¹⁶ See Bordo, 110  
¹⁷ See Bordo, 124-125  
¹⁸ See Bechdel  
¹⁹ See O’Meara, 1120  
²⁰ See O’Meara, 1120
cinema to begin with. Mulvey, Doane, and hooks all agreed that positive representations of women in film were possible, but that they would often only be able to exist as a counterpoint to mainstream or Hollywood film.\(^1\)

In this vein, *Raw*, an independent and foreign film starring two women surrounding their eating habits, presents itself as a cross genre, progressive piece of cinema. *Raw* clearly has the objective to show women not as fetishized or erotic objects, but as complicated characters with a multitude of facets, which makes it an interesting film to analyze for achieving its goals. *Raw* is only one movie, but conducting a gendered reading on this film is one way to understand if the media, especially the media that hooks pointed to, is continuing to uphold and perpetuate the patriarchy with its harmful depictions of women on screen. This is why it is necessary for *Raw* to be analyzed using an intersectional feminist reading, which has not been done before. The intersection of Bordo’s theories in conversation with other prominent feminist film theories leads me to the question: to what extent does *Raw* support and subvert the relationships between gaze and hunger for women?

**Methodology**

I will be conducting an analysis of the film *Raw* using an intersectional feminist lense focused on gaze and hunger, in order to gauge the extent that *Raw* supports and subverts the relationships between gaze and hunger. Gaze marks the viewer as an active participant, which makes women with gaze (or female spectators) go against the typical grain that wants to mark them as passive. This is especially true in Mulvey’s binary, as women as explicitly marked as passive. Because of this complicated relationship, analyzing the gaze in *Raw* is unique. In the

\(^{21}\) See Mulvey, 834
same vein, *Raw* is unique because Justine (the main character) both actively participates in the act of spectatorship and in an active, carnal hunger. I hypothesize that the relationship between gaze and hunger is something intrinsic to the plot of *Raw*, and thus makes it a clear marker of how these relationships are presented when centered in a film, which could be similarly applied to other films where these relationships are subtler.

Some limitations of my project are that I am analyzing a film that is in French, and I do not speak French. Another limit is the nuances of French culture in the film, as I am American. I have emailed the production company but they have not allowed me to have the original script, so I can’t examine that specifically. I will not be looking at other people’s opinions of the movie, or reviews of the movie. I will not take anything outside of the film in its final, published version into account, like box office numbers or director's commentary.

Feminist film theory\(^{22}\) will guide my analysis, focusing on scholars who specifically explore gaze and/or hunger in films, making them appropriate and relevant to my analysis. The process of collecting the data, which includes plot, characters, dialogue, and mise-en-scène, will be conducted by viewing *Raw* multiple times, during which notes will be recorded within a chart. The chart will be split into the actual occurrence and interpretation, based on scholarly analysis. After data collection, a cohesive feminist analysis of *Raw* will be more accessible.

**Findings and Analysis**

I will be assessing the chronological arcs of hunger and gaze throughout the film, and then considering the actions between them in order to come to a conclusion about the

\(^{22}\) Such as Laura Mulvey, Mary Ann Doane, Susan Bordo, Cynthia Freeland, bell hooks
relationships between hunger and gaze, as well as to what extent Raw subverts and perpetuates these norms.

_Hunger_

Justine’s first action in *Raw* is eating. With her head down, she orders a lunch with no meat, much to the dismay of her server. As Justine eats, she finds a meatball in her potatoes, while her mother yells at her to spit it out. This first interaction marks Justine as both a vegetarian and as passive person, as her vegetarianism is shown not as a choice, but rather a tradition her family forced onto her. She follows her mother’s orders, and remains quiet as her mother berates her and then her server. This scene is crucial in first depicting Justine’s lack of control over what she eats. Her parents control her eating habits through their enforced vegetarianism. Bordo extends that in media, the rhetoric of control extends to women wanting control over themselves, where as control for men is over others. In order to code control as feminine, women must master control of themselves, while men are already in control of their own bodies and now must control others. The fact that Justine, throughout the film, struggles with control so often is a clear indicator of her struggle to be feminine, just as Bordo theorized. At first, she struggles for control as her parents police her eating habits. However, as the film continues, she will struggle to control her hunger, which will ultimate be her undoing.

When Justine first gives into her urge for meat, she tries to steal a hamburger. She attempts to extend her control to Adrien, to police his meat eating in the same way her parents did, but he does not react in any way. Adrien is able to partake in such a rich food like beef with no shame or repercussions because, as Bordo explains, a man eating this food is not

\[23\text{ See Bordo, 105}\]
\[24\text{ See fig. 1}\]
transgressive, as a woman surrendering to food would be. Supported by Bordo, the different ways Justine and Adrien react to food illustrates Mulvey’s binary of sexual difference.\textsuperscript{25} Adrien presents his food to the cashier normally, while Justine’s burger remains in her pocket, congealing juice and revealing her lack of control or a healthy relationship with food.\textsuperscript{26} Bordo explains that the ultimate goal is for women is to obtain a “casual relation to food,”\textsuperscript{27} something Justine is clearly lacking. Both the policing over vegetarianism and the hypocrisy presented by attempting to steal the burger (with the implication of eating meat) rather than eating the burger the way society intends (typically on a plate, with a bun) show Justine’s obsession, indicating the continued power of food.\textsuperscript{28}

Fig. 1. “Ringing Up Stolen Hamburger.” Wild Bunch, 2016. Author’s screenshot

The power dynamics between Justine and food come to a turning point during a crucial sequence, where Justine goes from ravaging down schwarma to eating raw chicken breast. In the former, Justine’s eating is coded as fulfilling a ravishing hunger, something that Bordo argues is presentable for a woman who is starved, as typically a women indulging in “rich exciting food, is

\textsuperscript{25} See Mulvey, 837
\textsuperscript{26} See fig. 1
\textsuperscript{27} See Bordo, 100
\textsuperscript{28} See Bordo, 100
taboo.” However, because this is presumed to be Justine’s first time eating meat, this transgression can be allowed, although it does suggest a lack of femininity, shown through Adrien’s and the male truck-driver’s disgusted looks as Justine wolfs down her food. In the latter scene, Justine gives full control to her hunger as she eats a raw chicken breast.

Consuming raw meat is fully taboo, something that acts as a turning point in *Raw*. Justine’s unabashed and wholehearted enjoyment of the raw meat is characterized by the

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29 See Bordo, 110
30 See figs. 2-3
satisfied snapping of the meat, accompanied by Justine moaning and panting as she eats.

Similarly, Justine is in her underwear and a flimsy shirt, linking this enthusiastic eating with sexual pleasure/desire. Bordo explains that, in mainstream media, unadulterated hunger in a woman needs to be coded as sexual appetite in order to explain her lust for food.\textsuperscript{31} This tie between physical appetite and sexual appetite is also shown when Justine visits the school nurse about a rash. Justine tells the nurse, abashedly, that she has never had sex, and later the nurse tells her to fast. Justine responds that “[she is] hungry though. My stomach always feels empty.” This links her lack of sex to her insatiable hunger, once again coding sexual appetite as hunger. This inexplicable connection that Bordo examined remains true in \textit{Raw}, and seems inescapable even in this “independent” film. This relationship continues to develop as both Justine’s sense of hunger and sense of her sexuality grows, developing alongside her gaze.

\textit{Gaze}

bell hooks asserts that “one’s gaze can be dangerous.”\textsuperscript{32} This quote embodies both Justine and Alex (Justine’s sister), as throughout \textit{Raw} they use their gaze to hunt and prey on victims. We meet Alex with her gaze fully developed and intact, something she has honed while away from her parents. Justine, meanwhile, lacks this assertive gaze at the beginning of the film. Justine is routinely told to keep her “Eyes to the floor for an elder,”\textsuperscript{33} by older students as a part of her hazing. There is a power in looking,\textsuperscript{34} and thus by forcing Justine to look at the floor, her power is taken away. Furthermore, when she attempts to resist certain actions\textsuperscript{35} she is urged that she has to because “they're watching.” Justine’s resistance ruins the “active/male passive/female”

\textsuperscript{31} See Bordo, 110  
\textsuperscript{32} See hooks, 115  
\textsuperscript{33} See fig. 4  
\textsuperscript{34} See hooks, 115  
\textsuperscript{35} Like consuming the raw rabbit kidney at initiation.
that Mulvey explains is necessary for a traditional female role.\textsuperscript{36} By reminding Justine of others’
gaze, she is brought back into the reality of herself as someone to be looked at, and thus someone
who needs to be passive. As she allows her sister to push food into her mouth with her eyes
closed, Justine’s resistance dissolves, rendering her as passive, lacking gaze, once again.

![Image](image-url)

Fig. 4. “Justine Looking at Floor.” Wild Bunch, 2016. Author’s screenshot

Immediately after eating the raw chicken breast, Justine is confronted by a teacher about
cheating. Although shot from above, making Justine small, she meets her teacher’s gaze
consistently, already showing growing confidence since her previous confrontations when she
kept her eyes down.\textsuperscript{37} However, throughout the scene, Justine chews on and eats her own hair.
She consumes her own body; reducing herself by making herself smaller, forcing her body to
take up less space. Eating her own hair also acts as punishment for Justine, as after she viciously
struggles to throw it up.\textsuperscript{38} Cynthia Freeland states that in films “women who possess the
gaze...require punishment,”\textsuperscript{39} explaining why Justine’s confronting gaze towards her male

\textsuperscript{36} See Mulvey, 837
\textsuperscript{37} See fig. 5
\textsuperscript{38} See fig. 6
\textsuperscript{39} See Freeland, 744
teacher, a representation of the patriarchy and order, is immediately met by punishment. Justine has just begun to “possess the gaze” and as her ability to wield it effectively grows, so will her punishments.

Alongside confronting the gaze of those around her, *Raw* allows Justine to confront her own gaze. Doane explains the complicated nature of one’s own gaze, as it is inaccessible, except through a mirror which can only create a virtual image.\(^{40}\) Justine uses a mirror to meet her own

\(^{40}\) See Doane, 47
gaze, simultaneously illustrating the problems Doane associates with female spectatorship and with gaze itself. First shot from a wide angle, Justine looks at herself in her sister’s dress timidly.

41. Building alongside an explicit, sexual and violent song,42 Justine regards herself, then eventually approaches the mirror,43 and seems to “become her own object of desire,”44 applying and smearing her lipstick ecstatically.45 Justine has, thus far, asserted herself as a female spectator who possess an active gaze. However, in the mirror her gaze morphs through the lack of accessibility Doane described. As a female spectator, Justine is unable to fully confront her own gaze, and so instead becomes a site of a dangerous and sexual desire, she seems to be “locked within a mirror of narcissism.”46 This scene in the mirror presents femininity as a "closeness,"47 something Justine can be near through the song, her lipstick, and her clothing but is unable to fully possess, a distance resulting from her spectatorship.

Fig. 7. “Wide Shot From Mirror” Wild Bunch, 2016. Author’s screenshot

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41 See fig. 7
42 “Plus putes que toutes les putes” by ORTIES
43 See fig. 8
44 See Doane, 32
45 See figs. 9-10
46 See Doane, 47
47 See Doane, 31
Fig. 8. “Justine Looking in Mirror” Wild Bunch, 2016. Author’s screenshot

Fig. 9. “Justine Putting on Lipstick in Mirror” Wild Bunch, 2016. Author’s screenshot
Gaze and Hunger

Justine’s arcs of gaze and hunger grow in tandem through the first half of the film, but remain rather disconnected. However, after Justine first tastes human flesh, gaze and hunger combine and grow exponentially in Justine, her newfound gaze and hunger becoming insatiable.

Justine’s first taste of human flesh is her sister’s finger. As Alex wakes up after fainting to her sister indulging uncontrollably on her body, she confronts her with only her gaze, saying nothing while a single tear slips down her cheek. While this is happening, Alex’s dog starts to lap up blood, which Justine hurriedly shoos away. This is a reminder that this indulgence in human body remains taboo, whether for Justine or the dog. Dogs are often relegated to a quasi-human status; given names and treated as part of the family. Here, the dog serves to demote Justine to a quasi-animal status, something (rather than someone) with a hunger so uncontrollable that she can’t stop herself from eating her own sister’s finger. Not only does this break boundaries of raw food, escalating from her previous experience with chicken, but Justine is now actively participating in cannibalism, arguably the most taboo and “savage” eating habit.

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48 See fig. 11
Justine’s gaze in combination with her hunger becomes more than just something she can control, it becomes a weapon. After eating Alex’s finger, it is clear Justine’s hunger is growing. She sacrifices any control she had over her hunger to control of her gaze, needing a way to find food. Her looking is utilized to show her hunting, as Justine watches Adrien play soccer with such intensity her nose begins to bleed. Adrien is shirtless and vulnerable, while the camera slices him into closeups of his body and disembodied parts, a method Doane specifically cites as a way to form an actor into “sexualized, eroticized, and perfected surface.” While this method is typically used to break women into sexualized pieces, the power is flipped as Justine wields the gaze, both sexualizing Adrien with a subtext of looking him over as a piece of meat. Justine still remains sexually unfulfilled, amplified by her growing hunger since she has not eaten in days, and this scene illustrates her obsession with both sex and food. Justine is a threat, a woman with powerful gaze, on the hunt, and once again she is “defiled by bodily fluids” as

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49 See figs. 12-14
50 See Doane, 56
51 See Freeland, 744
punishment for her gaze.\textsuperscript{52} Justine’s nosebleed is a reminder that her active gaze is a transgression of the feminine, which both Freeland and Mulvey point out needs punishment in order to maintain patriarchal order.\textsuperscript{53} However, unlike her past punishment of throwing up, this punishment does not interrupt her gaze, and does not cause her real harm. This weaker punishment shows that her gaze and hunger are morphing, moving her from feminine to monster, while also foreshadowing the pain that is yet to come.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{Fig_12.png}
\caption{“Adrien” Wild Bunch, 2016. Author’s screenshot}
\end{figure}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{Fig_13.png}
\caption{“Adrien” Wild Bunch, 2016. Author’s screenshot}
\end{figure}

\textsuperscript{52} See fig. 15
\textsuperscript{53} See Mulvey, 837 and Freeland, 744
After the nosebleed, Justine and Adrien have sex. In a turn on typical film tropes, Justine has an “aggressive masculine gaze” while Adrien is more representative of a passive body. This upsets the patriarchal order, and thus Justine’s active looking and appropriation of the gaze must be ultimately punished in order to fulfill cinematic tropes and Mulvey’s binary. This punishment is shown by the ultimate betrayal of her sister, as they fight in front of the student body. Her sister, in her own weaponization of gaze, takes advantage of a drunk Justine by

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54 See Freeland, 755
55 See Mulvey, 837
inviting people to see her try to eat a cadaver. When Justine sees a video of this, she finds Alex
and they immediately begin to fight. A crowd of mostly male students surrounds them,
watching and filming as they bite and tear at each other, eventually pulling them apart. Justine
and Alex become female spectacles, the active gaze of the (mostly male) students penetrating the
sisters connotes their “to-be-looked-at-ness,” their ultimate punishment existing as they are
regarded as animals by their peers. In their exposure, Justine and Alex once again are demoted
to quasi-animals, their uncontrollable hunger rendering them unable to be tamed, forcing men to
tear them apart so they don’t destroy each other. All the power they had gained through their
appropriation of gaze is immediately sacrificed through their lack of control. Their obsession
with hunger means they can never become more than empty stomachs, can never have any
power. Ownership of their bodies is stolen by those watching, and preserved as they are filmed.
Film within a film layers the complexity of gaze as the narrative is stolen from Justine and Alex,
leaving them only as female spectacles.

Fig. 16. “Alex and Justine Fight” Wild Bunch, 2016. Author’s screenshot

56 See fig. 16
57 See fig. 17-18
58 See Mulvey, 843
In the final scene of *Raw*, revelations abound. Alex is now in prison, likely convicted for the many murders she has committed, both on and off screen. Justine is home with her parents, who are forcing her to eat vegetables. Notably, Justine remarks “I’m full,” a crucial progression showing an end to her seemingly endless hunger. However, as soon as her mother leaves the table, Justine's father begins to explain that he knows about his daughter's cannibalism, and that it mirrors their mother’s. Showing off his scratches and bite marks down his chest, Justine’s
father becomes a vehicle for her gaze.\textsuperscript{59} However, Justine keeps her eyes down, not confronting her father with looks, but down at his chest, a look of sadness on her face.\textsuperscript{60} Although in contrast to Mulvey’s idea of “woman as image, man as bearer of the look,” this scene cements Freeland’s theory of a traditional hierarchy being imposed as the film offers Justine’s father as hero of a noble tragedy; keeping his wife and children alive through the desecration of his body.\textsuperscript{61} Thus, although the majority of the film focuses what Freeland describes as a “nonstandard narrative centered on female characters”, this scene is a reminder of the ultimate hierarchy that is perpetuated, both within the film and the mainstream.\textsuperscript{62}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{Fig_19_Chest_Wild_Bunch_2016_Author_s_screenshot.jpg}
\caption{“Chest” Wild Bunch, 2016. Author’s screenshot}
\end{figure}

\textsuperscript{59} See fig. 19
\textsuperscript{60} See fig. 20
\textsuperscript{61} See Mulvey, 837 and Freeland, 753
\textsuperscript{62} See Freeland, 753
Conclusion

*Raw* aims to be a progressive film, that challenges traditional notions of womanhood on screen, which it partially achieved. However, the relationships between hunger and gaze are so inexplicably linked that Justine remains unable to escape them. Although Justine’s relationship with hunger is unconventional because of her cannibalism, *Raw* ultimately upholds patriarchal norms that are present in films where the relationship to hunger for women is much subtler, such as the media Bordo focused on. Similarly, Justine’s relationship to gaze as a female spectator becomes problematic through her constant punishment for using gaze, which remains in line with the media Mulvey, Doane, and hooks analyzed as harmful depictions for women.

There are moments where the script is flipped, and Justine is able to weaponize her gaze as a female spectator and escape punishment, at least temporarily. Far more often, the women who posses gaze in *Raw* are ultimately punished, as Justine is almost immediately punished right after while Alex is punished more concretely by being sent to prison.
Further, the ending of *Raw* is the ultimate undoing of any feminist message. Having her father tell her the news of her problem, rather than her mother, supports a normalized hierarchy rather than upsetting the patriarchy. Justine’s father confirms that he has essentially kept the family alive, bearing the burden of her mother’s hunger. The feminist frameworks I utilized to analyze *Raw* have led me to the conclusion that it is not a feminist film, because it too closely follows patriarchal norms for gaze and hunger for women. Justine’s hunger is always closely related to a carnal and sexual nature, reinforcing the idea that women cannot partake in food normally in media. Similarly, although the women in the film make notable transgressions of gaze, they are ultimately always punished for them, further maintaining patriarchal order of gaze and hierarchy. Thus, although *Raw* exists as a counterpoint of Hollywood cinema as an independent film, it does not offer effective counterpoints to the tropes associated with women, hunger, and gaze.

Although I attempted a comprehensive feminist analysis of the film, there is still further research to be done within *Raw*. Employing a queer framework to specifically analyze Adrien could be an effective next step in analyzing his relationship with gaze, and how that affects the movie as a whole. Further, there are scenes I neglected, in order to focus on Justine. Doing a deeper analysis of Alex using these same feminist frameworks could also be effective further research. Finally, it is important to acknowledge that *Raw* is by no means the only film attempting to be a subversive, feminist horror film. Although *Raw* deserves praise for taking many risks, as well as filming women in a non-objectifying way, it does contain a lot of conflicting messages that support a patriarchal agenda. However, *Raw* is able to achieve a depiction of womanhood that feels more true than so many of the women that I have seen on
screen. Extending a critical analysis to *Raw* allows for its flaws to be exposed and shows that there is a wide berth for improvement, but also shows how complicated the film is. Continuing to make films that at least attempt to subvert stereotypes and tropes is crucial to challenging the hierarchical order, even when there are flaws and missteps alongside progress.
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A Comparison of NFL and European Soccer League Structures:

How the Structures Affect Competitiveness and Player Values Within Their Leagues

Word Count: 4951
Abstract

Professional soccer in Europe and football in the United States are both industries worth billions of dollars, yet they have completely different economic models. Both sports have a huge impact on the people who live in and work in their markets, which is why I decided to determine which model is superior by comparing the league structures in terms of their effects on competitiveness and player values. By answering the question: How does the economic structure of the NFL compare to that of European soccer clubs in terms of its effects on competitiveness and player values? I hope that my findings could be the beginning of changing the model that is inferior in order to make a better product for the owners, players, and fans. I collected my results using the method of meta-analysis. I compiled statistics on wins, losses, points, and salaries in order to draw my conclusions. I found that the NFL had a superior league structure in both areas of research. I believe the top European soccer leagues should seriously consider changing their structure to be more like the NFL, at least partially, in order to promote parity within their leagues.
Introduction

The National Football League (NFL) and European soccer are both billion dollar industries, with the NFL raking in $14 billion in 2017 (Wagner-McGough, 2017) and the top four leagues in Europe: Serie A, The English Premier League, La Liga, and Ligue 1 bringing in about $13.23 billion combined (Revenue of the Top Five European Soccer Leagues, 2016). It is important to study what affects these leagues both on and off the field because of the astronomical revenues they produce in the modern game. This paper specifically focuses on the competitiveness between teams on the field and the perceived financial value of the players and teams competing in these sports off the field. I hypothesize that the extent and implementation of these areas of study differs in the two sports because the NFL uses a different league structure than the four European leagues studied.

The European soccer clubs’ league structure is set up as a free market economy. This means clubs are not limited in how much they can spend on players or other expenses. In fact, most players switch clubs only after a direct transfer of funds have been paid from the buying club to the selling club for the player. Conversely, the NFL is set up as a closed market. Teams are limited in how much money they can spend on player salaries by a league imposed salary cap. Additionally, all revenue earned through the league is split evenly among all 32 teams. Since these leagues are economic juggernauts, they affect people far and wide across their respective countries: whether that be as consumers, employees, or citizens who reap both the benefits and detriments of these teams being in their areas. Therefore, this research is relevant to anyone who is affected by the leagues discussed in this paper. This research is also pertinent to the owners and players of these teams/clubs as well because this is their livelihood.
In both structures, there has been an increase in the amount of money brought in over time, which has caused player values to skyrocket from where they were only a few decades ago. The NFL has seen its revenue triple from $4.28 billion in 2001 to $13.16 billion in 2016, which has led to an increase in player salaries (Total Revenue of NFL Teams, 2016). Still, all teams are limited in what they can spend on player contracts by the league mandated salary cap (Ware, 2015). The difference between the two structures is that European soccer players and clubs are not subject to strict financial regulations, such as salary caps, within their leagues. This lack of regulation leads to clubs shelling out astronomical salaries to talented players, for example Kylian Mbappe is the highest-paid teenager in European soccer and reportedly makes about $47.1 million in wages a year (McCauley, 2017). Salaries like Mbappe’s are exactly what the NFL is trying to avoid for unproven players by using a salary cap.

The Union of European Football Associations (UEFA) is a confederation made up of professional soccer leagues in Europe and is the only governing body to regulate deals and competitions among European clubs. That being said, UEFA has installed only one notable restriction on spending at soccer clubs, which is the Financial Fair Play (FFP) rules. The FFP rules state that no club in Europe’s top leagues can spend $5.88 million more than the revenue it has earned over the last three years (uefa.com). UEFA can punish clubs that breach FFP with sanctions that range from fines, point deductions, and withholding revenues from UEFA competitions, to prohibitions on new players, disqualification from competitions, or withdrawal of a title or award (uefa.com). The criticism of FFP is that UEFA does not enforce its own rules. As a result of FFP not being enforced, it creates an unregulated free market which creates a gap
in quality and financial backing that is almost impossible to close between the richest and poorest professional clubs.

Competitiveness is a selling point for all sports, watching athletes compete at the highest level is something that entertains millions, which is why parity is important. That being said, European soccer is often criticized for being dominated by a few teams year after year, while the NFL is seen as having great competitive balance between its 32 teams by comparison. The financial structures of these leagues can explain these perceptions. The free, inter-country market that is in place in European soccer allows for the teams with the strongest financial backing to have an advantage in attracting the top talent, which translates onto the field (Thomas, 2014). While the NFL’s model of salary caps, drafts, and revenue sharing is meant to keep all teams competitive, even those in small markets (Wagner-McGough, 2017).

Another difference that may affect competitiveness is the way champions are crowned. Unlike in European soccer, the team with the best record at the end of the regular season is not the champion of the NFL. Instead, the NFL utilizes a playoff system in which seeding is determined based on regular season records. The six teams with the best regular season records from each conference make the playoffs, totaling 12 of the 32 teams throughout the league. The teams are separated into two sides of a bracket based on conference; the four teams with the best regular season records (two from each conference) receive a bye in the first round of the playoffs. Meanwhile, the teams in third-sixth place play each other, with the victor in the first round moving on to the next round. The number of teams left in the playoffs reduces each week until there are only two teams left, one from each conference. Those two then play in the championship game. This playoff model is interesting to note because it reduces the importance
of regular season success to qualifiers for the playoffs, which is an invitation to compete for the championship, rather than a guarantee of winning one. By using this model, the NFL promotes unconventional routes to the championship, adding to the intrigue and widespread appeal of winning the it. Essentially, the concept of playoffs rewards teams for playing well at the right time of the season, rather than over the course of the entire season.

This is a contrast to European soccer’s way of crowning a league champion, which is awarded to whichever team has the most points (points are gained by winning matches: +3 points, and drawing matches: +1 point) at the end of the season. In Europe’s top four soccer leagues, the six teams with the highest point totals at the end of the season from each league qualify for European competitions. European competitions are tournaments in which the best teams from the top leagues in Europe compete against each other, making the trophies that are won in these competitions the most prestigious. Each league crowns its own champion, but there can only be one champion of Europe. In order for a club to be crowned champions of Europe, they do not have to be champions of their own country, they just have to have qualified for European competition the season before. European matches are the most similar competition European soccer has to the NFL’s playoffs, but this paper will only focus on domestic success by European clubs. European soccer’s domestic point system rewards its champions for the body of work they put together over the course of the entire, 38 match season, where they play every team in the league twice. This leaves less up for dispute about what team was really the best in the league over the course of a season, unlike in the NFL.

This research fills a gap because there are no scholarly articles published that directly compare the NFL and top European soccer leagues to each other based on player values and
competitiveness as a result of their league structures. Through this research, the determination of a superior league structure will be attempted by answering this research question: How does the economic structure of the NFL compare to that of European soccer clubs in terms of its effects on competitiveness and player values? Today, the influence that these sports have over the world is major: from cultural, economic, and entertainment standpoints. This means that the quality of the product each model produces, both on and off the field, have wide-reaching, global implications. These are no longer friendly games, but they are large corporate businesses that must be run in the most responsible way possible to ensure these effects are not negative. Besides this reasoning, I have also selected this topic because I am passionate about sports and have spent much of my childhood and adolescence consuming sports entertainment. These structures represent the pinnacle of sporting achievement in their respective fields. Therefore, how players are valued and how money is handled must be done responsibly because these leagues are the driving force of these sports at a professional level.

**Approach**

My approach was that of meta-analysis. This is a process where the researcher draws an original conclusion through the aggregation of data from previous studies on a selected topic. Therefore, the first step was coming up with my research question. The next was searching for relevant sources for my literature review. I did this by searching academic databases for studies on competitiveness and player values. I found moderate success doing this, but most of the data necessary to prove points in this paper needed to come from more recent, and specific sources. That is when I turned to articles and websites to include in my data collection as well, including the official websites of the NFL and UEFA. The main challenge here was making sure that my
information was up-to-date, as data in sports changes from season to season, requiring the accumulation of only the most current and complete data. I combed over these sources for relevant information, including facts and figures relating to player values (salary caps, contracts, salaries, club/team revenue), competitiveness (records, league positions, past champions), and league structures (guidelines, economic restrictions, rules and regulations).

To find my data on player values, I researched data about the highest paid players in the NFL and Europe. I also found data on the total amount of money being spent on player salaries in the English Premier League (EPL) in order to compare that to how much the most costly players were being paid in the NFL. I also found figures on the team which was spending the most on salaries in the EPL order to compare them to the team which was spending the least. Next, I compared those findings to the NFL, where every team has the same amount of money available to them to pay players. I did this in order to show how the inequality of financial backing in the EPL and other European soccer leagues affects competitiveness, tying my two areas of research together.

In order to compute my data on competitiveness, I first looked at four years of league standings in all five of the leagues I studied (NFL, EPL, La Liga, Ligue 1, and Serie A). Next, I picked out the two teams from each league (top three from the NFL because the NFL has a greater number of teams: 32, in the league than the soccer leagues: 20) I studied with the highest portion of the total points/wins over that time period. I added the total points over the four seasons for both/all three teams together and divided that total by the total number of points accumulated in the league over those four seasons. I then created percentages from the product of
this equation. Next, I found the average percentage between the four soccer leagues, a step I could skip for the NFL’s data since it is only one league.

My next data point, the percentage of teams in the league who had at least one successful season over the selected time period, was found by counting the number of teams who had finished in the top six spots at least once over the past four seasons. Then, I found a percentage by dividing that number by the total number of teams in the league over that four year period. I averaged out the data between all four of the European leagues. I completed the same process for the NFL, except that I counted teams that finished in the 12 playoff spots.

My final data point was the percentage of possible teams in each structure who had been crowned champions over the last four complete seasons. I found this by dividing the number of different teams who had been crowned champion over the past four seasons by the total number of teams who had the chance to be crowned champion (20 in European soccer and 26 in the NFL as only 26 of the 32 teams have made the playoffs in that time frame). This gave me the percentage presented in the “Findings & Analysis” section of this paper.

The use of meta-analysis is justified because the base data for my paper is readily available on these topics. Also, as stated by Paul D. Leedy and Jeanne Ellis Ormrod in their book *Practical Research: Planning and Design*, “When a researcher wants to consolidate the results of many quantitative studies related to a particular research problem, the researcher might conduct a *meta-analysis*—a statistical analysis of all of the studies’ individual statistical results—in order to discern general trends in the findings” (2005). I utilized information that had already been published to create my own, new data and to formulate a new understanding in regards to this topic.
Findings & Analysis

My research results were compiled into multiple tables. The statistics for this paper were taken from sources such as Fox Sports, nfl.com, The Pinnacle, premierleague.com, ESPN, and Forbes. It is important that these sources are reliable as the method of meta-analysis depends on the synthesis of outside data and sources. The model by which I compiled my own, original statistics on competitiveness came from Cronin’s article “Which is the most competitive soccer league in Europe?”

Findings: Player Values

I found that the highest paid players in each structure make similar yearly salaries. The nine highest paid players in European soccer make salaries that range from $58 million-$17.2 million a season, while the nine highest salaries in the NFL range from $51 million-$23 million according to Forbes (Settimi, 2017) (Badenhausen, 2017). Next, I found that the big soccer clubs in Europe pay their players substantially more money than the smaller teams in the same division pay their players. This is highlighted by the fact that the EPL team with the highest amount in salaries paid to their players distributes 24 times more money than the team with the lowest amount in salaries paid to their players in the 2016/17 season. These findings are contrasted by those of the NFL, in which the league salary cap was set at $167 million in 2017. This figure of $167 million is still only 45.45% of the amount the EPL team with the highest wages spent on their players in 2016/17.

Analysis: Player Values

The “Findings” section of this paper reveals that the NFL is superior in the category of Player Values. This superiority is due to the fact that NFL players make similar salaries to their
European counterparts, but their money is funneled through more regulated and evenly distributed revenue stream. The NFL’s salary cap stops the teams with the most money available to them (historically successful teams, teams in the biggest markets, and with the richest owners) from being able to buy their way to success. Theoretically, without the salary cap the NFL would resemble European soccer in that the richest teams would be able to offer the best players the most money to play for their team. The salary cap ensures that players who command the biggest salaries, who are usually the most talented players, will be more evenly spread out among all 32 teams in the league. This leads to a more competitive product on the playing field. Revenue sharing in the NFL means that teams each have the same amount of money available to pay for other expenses outside of player values, such as: paying coaches and other personnel, equipment and travel, and marketing.

This directly contrasts the European model which encourages teams to spend as much money as they can in the pursuit of success. The epitome of this spending is the transfer market; by which players move from team to team. In this free market, the buying team pays a fee directly to the club which is selling the player in order to obtain their contractual rights. Since the transfer market is open to every club in Europe, money moves in and out of leagues, unlike the NFL’s closed player market which keeps all revenue domestic. Because the European structure lacks a salary cap or revenue sharing, this leads to the disparities in monetary power which are obvious in every top league. The international nature of this market means that clubs must compete with other clubs from all over Europe for the services of players and personnel. Competition is especially tough for smaller and medium sized clubs as the cost to buy and sign players becomes inflated by big clubs from all over Europe, not just domestically. This structure
also forces small and medium sized clubs to sell their best players to the biggest clubs in order to stay afloat financially. Because of the open market, big clubs can offer amounts of money for players that the financially weaker clubs essentially cannot refuse. This constant buying and selling of players keeps the European leagues financially stable, but it also serves to keep clubs gridlocked in the positions they have historically finished in. The only way this trend has been bucked is by a sudden influx of money into a club, such as if a formerly small or medium sized club is bought by a billionaire owner.

**Findings: Competitiveness**

First, I found that the most dominant teams in European soccer leagues, on average, account for a higher percentage of the league’s total points (16.17%) than the most dominant teams in the NFL account for total wins in their league (13.52%). This means successful results are more spread out among teams in the NFL than they are in European soccer leagues. My next finding was that, on average, 34.3% of possible teams have finished the season in a successful position (top six), whereas in the NFL 81.3% of possible teams have finished in a successful position (playoff spot) over the past four completed seasons. This shows that success is also more evenly distributed among teams from year to year in the NFL when compared to European soccer leagues. Additionally, I found that 8.33% of possible teams have been crowned champions in Europe’s top four leagues compared to the 11.5% of teams in the NFL over the past four seasons. This data shows that the NFL league structure allows for more possible teams to be champions when compared to the European league structure. I have also found that the European soccer league structure makes it easier for teams to dominate their leagues for longer periods of time than in the NFL.
Analysis: Competitiveness

In each of the three fields that I measured for competitiveness, the NFL showed itself to be superior to European soccer. This data serves to prove that positive results are more attainable for a wider variety of teams each week in the NFL compared to European soccer. The next data point, that a larger percentage of teams in the NFL had had a successful season in the past four completed seasons than in European soccer reveals that the NFL is competitive on a year to year basis. Success over the course of an entire season is also more achievable for more teams in the NFL’s structure than it is for teams in the European soccer structure. The rise and fall of teams going from successful to unsuccessful seasons in the NFL’s structure is much more frequent compared to the teams in European soccer’s structure. Success and failure are largely temporary in the NFL when compared to European soccer where the best teams stay the best and the worst teams stay the worst, a trend mirrored by my findings on player values. The ability for upward mobility in the NFL means the league is more competitive over time compared to European leagues as well. This trend is a result of the fact that the worse a team does in the NFL, the higher they get to select in next year’s draft. The draft is when NFL teams can officially gain the contractual rights to the most talented players coming from the collegiate level. This creates a constant influx of talented, cheap players onto the worst teams, which sets them up to perform better in future seasons. Lastly, the fact that the percentage of teams that won the league championship in the NFL was larger than the percentage in Europe cements that the NFL is more competitive. The ultimate success of being a championship team is more attainable for a wider variety of teams in the NFL’s structure than it is in the European structure. The difference in competitiveness in this category is likely because of the NFL’s playoff system. The European
model rewards excellence over the course of an entire season, as opposed to the playoff model which rewards a team for performing at the right part of the season, giving any team that makes it to the playoffs a legitimate shot at the title.

**Discussion**

This is the first study to compare the NFL and European soccer league models by synthesizing data collected from multiple sources to look for trends that reveal which model works better for its league in terms of player values and competitiveness. Previous journals, such as *The New Statesman*, have hypothesized how the sports may be different if their models were tweaked, but did not include statistical evidence to support the claims and did not compare these two structures (Ware, 2015). This is the first study to look at the European soccer structure and average the chosen data points over multiple leagues to gain a more complete understanding of how the structure affects leagues.

There were limitations to my study. As with any study that deals with collecting data, there is no way the researcher can incorporate every piece of relevant data into their study because there is simply too much information to be collected in a limited amount of time. Another limitation is that I only looked at four European leagues, even though there are a lot of other leagues in Europe, even if they are not quite up to the same par as the four I selected. The most prominent league I excluded from my study is the German Bundesliga, which is generally considered one of the top five soccer leagues in Europe, along with the four others I did include. The reason I left the Bundesliga out of my study is because their structure is not exactly the same as the other top four leagues. For example, each club must be majority owned by its fans to protect from foreign investors. Another difference is that there are 18 teams in the league instead
of the uniform 20. An additional limitation is that I only researched European leagues, even though the transfer market is global and there are soccer leagues all over the world. I decided on the European model because it is generally accepted that European soccer is where the highest level of club competition can be found and it is where the best players in the world ply their trade. The most glaring limitation may be that of human error in my calculation of the data, I was sure to check over my calculations, but there is still a chance that they may have contained errors.

The implications of my study take shape in two cycles, one for each structure. As for the NFL’s cycle, it is positive. The equal distribution of funds leads to a better, more competitive product on the field. This improved product leads to increased viewership and fanfare, which allows for an increase in player value. This increase in fanfare brings money into the local economy of the area in which the team plays, which helps it to prosper. This influx of capital into the local market allows more money to be spent on NFL media and products, increasing the revenue of the league as a whole. This increase in league revenue leads to each team receiving more money each season, completing the cycle.

European soccer’s cycle is a distorted version of the NFL’s ideal cycle. To begin, a vast majority of the funds to be had in the free market go to the big clubs, leaving the medium and small clubs unable to compete on the field. This leads to a product, which is less competitive and more predictable than the NFL and a product which sees players at the best clubs making the vast majority of the money in their leagues. This means that only cities with big clubs in them get to reap economic benefits comparable to those which NFL cities experience. In turn, almost all the money from the free market, which is designed to create economic competitiveness, ends
up being funneled in and out of the same big cities and clubs season after season. This cycle is broken and in need of change if European soccer strives to achieve better competitive balance within its leagues.

There was a factor which I did not know how to interpret in my study, which was that of transfer fees in the European market. I was unable to interpret this data because the NFL has no equivalent to compare to it. This is problematic in a study that focuses on the comparison of two structures and their effects on certain data points. That is not to say that the transfer fees are not important, as they are literal cash values put on players, which could certainly be helpful to me in my research of player values.

As with any research method, meta-analysis has its advantages and disadvantages as well. Meta-analysis is effective because it streamlines the process of data collection. By pulling information from others first, it allows the researcher to compute more complex data points to support their argument. A further advantage is that it builds on the ideas of others and in turn connects the ideas of other researchers and studies. This cycle of building on previous studies may continue if my study provides evidence for future papers on this topic. The fact that meta-analysis rely on information that has previously been published in order to draw new conclusions becomes a disadvantage when there is a certain data point or idea that no one else has ever published anything on because then I cannot incorporate it into my study. This access to information issue is also limiting when it comes to the leagues I look at. Most information is published about bigger clubs, while the smaller clubs are steeped in a bit more mystery and privacy because they do not receive as much media attention.
Conclusion

My findings and analysis has led me to a new understanding: that the NFL has the superior league structure when compared to the European soccer league structure. Since the structures are fairly similar in terms of the values they put on players and the money they make, the determining factor of the superior model was the fact that the NFL is a lot more competitive than any of the top four European leagues. The lack of parity in the European structure presents a less appealing product for fans of lower-tier teams, as they know their team will not be able to compete for a successful season, unless there is a sudden influx of money into the club. This lack of parity also puts financial constraints on owners of clubs with less money, they essentially become trapped into finishing in the same position in the league table each season because they will never be able to make money without having money to begin with. For these reasons, and because the NFL shares revenue among its teams, I would suggest to the people who run the top European soccer leagues that they should adopt a league model similar to that of the NFL. A model in which every team in the league would share the total revenue equally and where there would be caps on how much a team could spend in the transfer market and on player salaries. Setting these financial precedents should produce more evenly matched competition on the field. Better competition would benefit players, owners, and fans alike. I do not believe that European leagues should completely conform to the NFL’s structure though. The European leagues should not institute a draft, create a playoff system to determine the league champion, or deal away with the promotion/relegation system, by which teams move into and out of the top league each season. These are elements of European soccer that are unique and give it a sense of identity, therefore they should not be altered. Ultimately, the NFL model is superior because it rewards
teams for spending their funds in the most effective way, unlike the European soccer model which rewards teams for simply having the most money.
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SMA-zing!

WC: 4035

Table of contents

Abstract P2
Introduction P3-4
Materials and Methods P4-7
Discussion P7-10
Conclusion P10
Acknowledgements P10
Bibliography P10-14
Abstract

A tracheotomy is when there is an incision made into the windpipe when breathing through the nose or mouth is no longer possible. Often times a tracheostomy isn't performed correctly and it can lead to hazardous consequences. To possibly replace the need for tracheostomy an expanding nitinol stent would be more efficient. Nitinol (SMA) metals are a fairly new material applied in the medical world. In order to expand the capabilities of nitinol within the human body, and to simplify procedures for opening damaged airways in the lungs, is it possible to construct a stent out of nitinol materials to self expand when placed in the human body. In order to construct the stent, four pieces of 40 centimeter nitinol wire was cut from provided spool. The wires were then bent in half and arranged equi distance around a copper tube with a diameter of 1.27 centimeters and clamped down with a hose clamp. The eight strands were then woven around the copper tube alternating which strand of wire goes on top. The stents were placed in a furnace at 525 degrees celsius to insure shape setting. Three stents were constructed. All have a diameter of 1.27 cm and a length of 10 cm. The length of the stent increased from 10 cm in resting state to 12.5 cm when vertical stress is applied and the diameter of the stent decreased from 1.27 centimeters to 4 millimeters (69% smaller diameter). Three prototypes of the SMA stent were successfully constructed.
Introduction

A tracheotomy is when there is an incision made into the windpipe when breathing through the nose or mouth is no longer possible. Often times a tracheostomy isn't performed correctly and it can lead to bleeding in the lungs, a damaged esophagus, trapped air around the lungs, etc. Intubation is a procedure where a flexible plastic tube is placed in the trachea to open up the airways. Most intubation complications occur as the tube is being placed in the trachea. (Molnar) To possibly replace the need for tracheostomy and tracheal intubation, an expanding nitinol stent would be more efficient. Nitinol (SMA) metals are a fairly new material applied in the medical world. In order to expand the capabilities of nitinol within the human body, and to simplify procedures for opening damaged airways in the lungs, is it possible to construct a stent out of nitinol materials to self expand when placed in the human body.

Nitinol (NiTi) is a metal alloy composed of nickel and titanium. In the right proportions, it creates a shape memory alloy (SMA). A shape memory alloy is able to be deformed and return to its original with the application of heat. The metals “memorized” shape can be transformed when the metal is bent into its new desired shape, clamped down to prevent movement, and placed in an environment of 510 degrees celsius or higher for specific increments of time. SMA’s are able to change shape when heat is applied because they go through a solid state phase change. Similar to water when it goes through a phase change of solid to liquid to gas, NiTi goes from one solid to another solid shape. At room temperature NiTi is in its martensitic phase, in martensite the atoms are arranged in an amorphous structure. Meaning there is no uniformity as to how the atoms are arranged giving it a low yield strength easily allowing deformation. When NiTi is heated to its transformation temperature it reaches its austenitic phase. When NiTi is in austenite the atoms rearrange themselves into their previous shape set into a uniform atomic structure giving it a high yield strength. (Ferreira, Marcelo do Amaral)

Super elastic (pseudoeelastic) nitinol has the the opposite behavior of SMA nitinol. Super elastic metal has a high yield strength at low temperatures (austenite) and a low yield strength at high temperatures (martensite). At room temperature, super elastic nitinol is in its austenitic phase, making it self retractive when bent out of shape. When the metal is in its austenitic state, the “elastic” property is due to the structure of atoms. The atomic arrangement of super elastic NiTi has a face centered cubic structure giving it a uniform pattern. The uniform structure is what gives super elastic nitinol the ability to revert back to its shape at room temperature after stress that has been applied on the metal has been released. Super elastic NiTi can stand up to 689 MPa (MegaPascals, 1 MPa = 145.038 pounds per square inch) before deformation of the metal where the atomic structure
breaks and the NiTi can no longer return to its original shape.

Uniform crystalline cubic structure vs amorphous structure

The application of nickel titanium alloys in the medical field has developed significantly in recent years. Shape memory alloys have been used to structure stents to hold up collapsed and clogged artery walls. There are multiple different geometric designs of shape memory stents. The self-expanding stent is often a coil, mesh, or configured in a zig zag pattern that is restrained with an outer sheath. The sheath is placed in an artery and removed leaving the stent. After separation of stent and sheath, the stent springs into its shape set reacting to the application of the body’s heat to hold the artery walls open. (The Thermal Transformation from Austenite to Martensite and the Origin of Shape Memory)

A balloon expandable stent is crimped after the shape has been set and mounted on a balloon. The balloon is placed during surgery and opens up, expanding the stent. The level of inflation determines diameter of stent. The balloon is then deflated and removed leaving the stent to hold up artery walls. (Mwipatayi)

A coil stent is manufactured as a continuously wound wire in a series of flat sheet coils. Coil stents are the single most flexible developed stents. They are least commonly used due to their poor radial strength and gaps between each individual coil allows for prolapse of surrounding tissue.

Tubular stents are cut from a flat metal sheet produced by being rolled and welded into formal tube shape. The tube stent is less flexible than that of the coil stent but is much more durable with greater radial strength. The tube design is applied more often than the coil.

Shape memory alloys have been applied to broken bones that have been displaced. The metal plate has a memory transfer temperature that reacts to the body’s 37 degrees celsius. The plate is placed on each side of the site of fracture. The plate exerts a compression force on the bone pushing it back in place. After bone has healed, the plate continues exerting a compressive force and aids in strengthening during rehabilitation. Memory metals can also be applied in hip replacement procedures due to the high levels of super elasticity.

Materials and Methods

In order to construct the stent, four pieces of 40 centimeter nitinol wire was cut from provided spool. The wires were then bent in half and arranged equi distance around a copper tube with a diameter of 1.27 centimeters and clamped down with a hose clamp. The eight strands were then woven
around the copper tube alternating which strand of wire goes on top until the length of the weave reached approximately 10 centimeters in length and then were clamped down with another hose clamp.

Then the stents need to be twinned. Twinning is the process of shape setting SMA so that when heat is applied to the metal, after stress has been applied at room temperature, the metal will revert into a new desired structure instead of reverting back to straight wire in the shape it was originally on a spool. To shape set the stents they were placed in a furnace at 525 degrees celsius for 30 minutes at time five times with a five minute cooling break in between each heating increment. For NiTi to reset its shape set it must be placed in an environment of at least 510 degrees celsius. The stents were placed in a furnace at 525 degrees celsius to insure shape setting. After the stents have been twinned and cooled they were kept clamped down and trained by placing them in boiling water for ten seconds and then placing it in cool water ten times to get rid of the two way shape memory effect. The two way shape memory effect is when the metal remembers multiple shapes at different temperatures. (Zanaboni)

By keeping the stents restrained on the copper tube they were able to maintain their shape at lower transformation temperatures (100 degrees celsius) After training the stents in boiling water they were removed from the copper pipes and deformed and then reheated with a heat gun and reverted back to the desired stent shape. (Hu, L., Jiang, S., Liu, S., Zhang, Y., Zhao, Y., & Zhao)

One end of each stent was left with sharp edges where the wire is cut off. Due to this being a safety hazard, the excess ends were clipped and curved inward in order to prevent any exposed sharp ends.

In order for this design of stent to be applied in the medical world it would have to be made with thinner wire in order to minimize the diameter of the stent when the stent is stretched vertically and the sides go in so that the stent is more able to enter an inflamed trachea (the wire used in this project was .25mm). The metal used in the stent would have to have a transformation temperature lower than 37 degrees celsius so that it would expand when reacting to the body’s heat (the transformation temperature of the metal used in this project was 60 degrees celsius). The stent itself would need to be covered in a this layer of silicone. Even though titanium is a hypoallergenic and has been used for in vivo medical applications, nickel would not react well within the body. (10-20% of people will have an allergic reaction to nickel. Nickel inside the body can cause over inflammation and in the case of nickel being placed in the trachea it can trigger an asthma attack. Nickel when it is in prolonged contact with skin can cause visible discoloring of the affected skin. (For example when jewelry is made with high nickel content and the skin in contact with the jewelry turns green)
Up close view of stent pre shape setting

Stent being placed in furnace in order to shape set the stents.

Top view of all three stents before shape setting.

Stent post shape setting placed in cool water in order to get rid of stresses.
of the two way shape memory effect (Training)

Finished stent post construction shape setting and training

**Discussion**

A tracheotomy is a procedure where a hole is cut into the throat and a tube is placed there when breathing through the mouth is no longer possible. Tracheotomies can have dangerous side effects such as bleeding on the lungs, trapped air around the lungs and long term deformation of the throat. A safer and non-invasive option would be to use a metal stent. The stent would be stretched out into an elongated strand and be placed in the throat. Once the metal is placed in the throat it would react to the body’s heat and expand allowing airflow. This is possible because a shape memory alloy is able to be deformed and return to its original with the application of heat. The metals “memorized” shape can be transformed when the metal is bent into its new desired shape, clamped down to prevent movement, and placed in an environment of 510 degrees celcius or higher for specific increments of time. SMA’s are able to change shape when heat is applied because they go through a solid state phase change. Similar to water when it goes through a phase change of solid to liquid to gas, NiTi goes from one solid to another solid shape. At room temperature NiTi is in its martensitic phase, in martensite the atoms are arranged in an amorphous structure. Meaning there is no uniformity as to how the atoms are arranged giving it a low yield strength easily allowing deformation. When NiTi is heated to its transformation temperature it reaches its austenitic phase. When NiTi is in austenite the atoms rearrange themselves into their previous shape set into a uniform atomic structure giving it a high yield strength. (Ferreira, Marcelo do Amaral)

The atomic ratio of nickel to titanium is equal in shape memory alloys. There is less than 1% more nickel in super elastic metals than shape memory alloys. This slight imbalance causes the metal to be austenitic at room temperature. When a metal is in its austenitic state, its yield strength (ability to return to its original state without applied force or heat) is 195-690 MPa (megapascal) 1 MPa is 145.038 pounds per square inch. When metals are in their austenitic state, it is their natural behavior to revert back to their shape set once stress is removed. The melting temperature for Nickel-Titanium is approximately 1240-1310 degrees celsius. Even though the melting point is significantly higher than shape memory, super elastic metals can be shape set at much lower temperatures or
under a high application of stress to rearrange the atomic makeup of the metals. Thin film shape memory NiTi is more reactive than typical shape memory NiTi. Thin film shape memory NiTi is able to react to heat quicker due to the heat being able to travel faster through the thinner material compared to bulk shape memory NiTi resulting in a faster solid state phase change. The amount of time it takes for shape memory nitinol to undergo a solid state phase change transition from martensite to austenite varies depending on the density of the material, the transition temperature of the metal, and the temperature of the heat applied that is meant to start a phase change. Thinner material with a lower transition temperature will have a quicker phase change than denser material and a higher transition temperature. Thin film shape memory NiTi would be more efficient in medical applications (Thin film shape memory alloys for optical sensing applications)


This is a graph of how stress and strain affects nitinol in its different phases. The cycle illustrated in the graph [at point (0,0)] shows that the function returning to the same place as it started, meaning that there is no permanent deformation applied to the metal. As long as the stress remains below 689 MPa the returning function will cross (0,0) which is its original shape. If the stress undergoes more than 689 MPa then the returning function will cross the X axis at any point greater than X=0. The more stress applied after 689 MPa’s the farther away the returning function will be from the origin intersecting the X axis.

The graph of a stress/strain scale of nitinol is not a linear function. The level of stress applied is not directly proportional to the strain of the metal. The parallelogram shape of the graph illustrates where the metal plateaus holding its atomic bonds. This point is called hysteresis, which is where nitinol’s solid phase change occurs from austenite to martensite.

A metal in its solid state forms crystal structures uniformly in all directions. This is the metals shape set. As crystals form uniquely, connection between crystals form grain lines at the connections. This is the metals grain boundary. All the atoms in any metal are held together in uniform by the electromagnetic attraction of its neighboring atoms. If a force or stress is applied to a metal, the electromagnetic bonds stretch out allowing the atoms to move. As a metal is in its martensitic state undergoing deformation, The metal atom arrangement is a monoclinic crystal structure. When the force is removed, the bonds pull the atoms back into its original position. This is the metals austenitic
tendency. If the force exceeds the metals yield strength, the electromagnetic bonds break causing a deformation in the metal. The cubic structure of the atoms in austenite is a simple shape cubic structure which can either be face centered or body centered cubic structures.

The atoms that compose the metal are the basis of its crystal structure. In monoclinic structures, due to the sporadic nature of crystal development, each grain can vary in shape and size as they layer onto each other. In simple cubic structures, the arrangement of the numerous atoms extends uniformly as they stacked on top of each other.

The atomic arrangement in face centered cubic structures in crystal forms, is where as one atom is at the corner of each cube and one atom is in the center of each cube face. The face centered cubic structures have eight corners and six cube faces, resulting in a cubic crystalline structure that has fourteen lattice points.

The atomic arrangement of atoms in cubic crystalline form consists of eight atoms placed at each corner of the cube similar to a face centered crystalline structure. One atom is at the center of the cube resulting in nine lattice points within each cubic structure.

Monoclinic crystal structures consist of three different length vectors. For a crystal structure to be monoclinic, vector one must be perpendicular to vectors two and three. Vectors two and three have no consistent relationship with each other.

Atoms shift from simple cubic structures (FCC and BCC) to monoclinic crystal structures when transforming from austenite to martensite.

Electromagnetic force is the most commonly understood force among scientists. It binds matter together on the atomic and subatomic level. As the electromagnetic force allows for atoms to join together to create larger quantities of mass, it also contributes to the structure of the atom. An accurate diagram of an atom is nonexistent due to the inconsistent orbital path of the electron around the nucleus. The electromagnetic force holds together the atom allowing the electron to orbit the nucleus. As energy is gained or lost by the electron it “jumps” from one orbital path to another without inhabiting the space in between. This is called the quantum leap. In theory, this can apply to shape memory alloys when heat energy is added. Using this logic, shape memory alloys in their austenitic state at the subatomic level (under high heat temperatures) the electron will have a looser orbit path around the nucleus of the atom due to the increased amount of energy. The same applies to super elastic materials, due to their opposite behavior under heat as shape memory alloys, super elastic metals in their martensitic state have an increased amount of heat energy in the electron resulting in a tighter orbital path.

Oxidation in metals is a metals reaction when exposed to oxygen over time. In most metals such as iron, this causes the metals to rust. The oxidation of nitinol
Nitinol oxidizes as a whole but different metals oxidize in different ways at different rates. This can result in rust, a protective layer around the metal to prevent corrosion, or color change. Nickel oxide doesn't result in color change but titanium oxide does which is why we see a color change in the metal when exposed to different levels of heat. It is possible to tell the heat exposure in titanium due to a consistent pattern of color change.

http://techmetals.com/medical-coatings/

Conclusion

Three stents were constructed. All have a diameter of 1.27 cm and a length of 10 cm. Two of the stents were constructed with eight strands of material and the third was constructed with 6 strands of leftover material. After shape setting the stents they were each trained in boiling water while still held in place by the copper pipe and hose clamps in order to set in the new shape and to get rid of the two way shape memory effect. The length of the stent increased from 10 cm in resting state to 12.5 cm when vertical stress is applied and the diameter of the stent decreased from 1.27 centimeters to 4 millimeters (69% smaller diameter). Three prototypes of the SMA stent were successfully constructed. When the stent is at room temperature it is in its martensitic state and can be deformed. With heat applied from a heat gun the wire returns to its shape set circumference. They were able to undergo stress and deformation and revert back to its new set shape.

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Consultant Sample Day 4

Score: 4

The paper earns a score of 4 because it has a narrow topic of inquiry with an identified gap (page 6, paragraph 2: "It is unknown what makes an adoption photo of a dog visually appealing") and explains the relevance of the existing literature to the topic in an engaging and compelling way on pages 2 - 8. The method described (pages 8 - 13) is clear and replicable (including separate sections about "Study Design", "Ethical Considerations", "Selection of Participants", "Procedure-Initiation and Photo Taking, Survey Creation, Survey Distribution" and nicely defended in relation to the project goal (e.g. - limitations that were experienced and defense of sample selection). The analysis of data is thoughtful (pages 13 - 17 and 18- 20) and provides very specific conclusions related to the topic of inquiry (pages 20 - 21: "The data showed a positive emotion is most visually appealing to potential dog adopters near Shelter X..." and that a "...visually appealing adoption photo can influence the adopter’s decision").

The paper does not score a 3 because it defends its original and compelling argument with reference to a narrow gap in literature.

The paper does not score a 5 because discussion of limitations and implications of the research (pages 20 - 21) is not particularly insightful. Writing is strong but not elegant, and contains a number of awkward sentence structures. Similarly, the paper’s impact is lessened somewhat by organizational choices made by the researcher. The topic is highly compelling, but the paper’s overall potential is never fully realized.
Sample D

Score: 4

The paper earns a score of 4 because it addresses a narrow topic: a feminist analysis of the film Raw (page 1, paragraph 2: "In order to explore how the film industry..."), and situates this topic within a substantive literature review that identifies a narrow gap in the literature (see page 6, paragraph 2: "This is why it is necessary..."). The paper uses a replicable method in order to conduct a feminist formal and thematic analysis of the film, focusing on "gaze" (pages 1 - 3) and "hunger" (pages 4 - 5); this method is continued on pages 6 and 7 and is supported by results that clearly accomplish what the student sets out to do, ultimately arguing for a new understanding that patriarchal structures that inform mainstream cinema also apply to this purportedly subversive work (pages 22-24).

The paper does not score a 3 because it mounts and defends its argument in a clearly reasoned, detailed, and effective manner. The paper also uses sophisticated writing and graphics to present its evidence.

The paper does not score a 5 because it assumes the relevance and validity of the body of theory informing the research process, and fails to fully explain the applicability of feminist theory to this particular film.
Sample E

Score: 3

The paper earns a score of 3 because it poses a reasonable question (page 7, paragraph 1: "How does the economic structure of the NFL compare to that of European soccer clubs in terms of its effects on competitiveness and player values?") and situates this question within relevant literature (though these works are exclusively non-scholarly, which is mitigated somewhat by the nature of the inquiry). The research method employed (outlined on pages 7 - 9) could be reasonably repeated, though lack of consideration of some key factors (e.g. - structure of the Bundesliga and role of transfer fees in determining the parity of European soccer franchises) and inability to conduct a full meta-analysis compromise its effectiveness in revealing a compelling new understanding.

The paper does not score a 2 because it does carry its focus/scope within its overall line of reasoning, describes a reasonably replicable research method, and conveys a new understanding (albeit with insufficient evidence).

The paper does not score a 4 because the gap identified on page 6, paragraph 3: "There are no scholarly articles published that directly compare the NFL..." is hyperbolic and the stated conclusion (page 14, paragraph 2: "This is the first study to compare the NFL and European soccer league models by synthesizing data collected from multiple sources to look for trends that reveal which model works better for its league in terms of player values and competitiveness") is presumptive. Most importantly, the paper has insufficient evidence to lead to a convincing conclusion.
Sample F

Score: 2

The paper earns a score of 2 because it identifies a reasonably narrow question (page 3, paragraph 1: "In order to expand the capabilities..."). The research method is present (pages 4 - 5), but unsupported and misaligned because the paper indicates its intent to develop an alternative to tracheotomy, but then engages in a process that is non-practical for the human body (e.g. - page 5, left column: "For NiTi to reset its shape set it must be placed in an environment of at least 510 degrees Celsius" and then page 5, right column: "...the metal used in the stent would have to have a transformation temperature lower than 37 degrees Celsius"). This conflates the purpose of the process in which the student has engaged: is the purpose to create something capable of taking on a certain shape (theoretical/pure research) or something capable of being used in the human body (practical/applied research)?

The paper does not score a 1 because it attempts to describe a method and to engage in a research process which results in a product (i.e. - the creation of stents by the student).

The paper does not score a 3 because the results of the research process are highly oversimplified and provide little new information. In addition, alignment between the research topic and the analysis is largely taken up with an extended literature review that reports on existing knowledge rather than developing a new understanding. Finally, the paper exhibits some weaknesses in writing and also serious lapses in citation, including sources cited in the body of the work that are not included in the bibliography, and vice versa.
Additional Samples
THE FUTURE OF EMOJIS: A STUDY CONDUCTED ON HIGH SCHOOL STUDENTS TO PREDICT THE FUTURE OF PICTOGRAPHIC SYSTEMS IN EVOLVED TECHNOLOGICAL COMMUNICATION

Word Count: 4,929
Introduction

The phenomena of “The Universal Language” is a topic that has been subjected to a history of religious and cultural standards that have been heavily scrutinized and analyzed. Compared to languages as current to today’s most-used languages, English, Spanish, German, and Mandarin, to dead languages or root languages such as Latin, Greek, and Islam, the fantasized story of what will be breaking of all common language barriers consists of varied conceptions of what a universal language entails. One example from German-American linguist, Alexander Gode’s, book, *Interlingua: A Grammar of the International Language*, can be defined by its “auxiliary functions in connecting groups who speak different primary languages by means of communication through verbal speech and written language.”¹ Other examples from the book rely further on mythological examples that state there was once a single universal language among all people, supernatural and natural beings alike. While these definitions have been altered varying on religious folklore, such as *The Tower of Babel* as told in Genesis 9:11², the key commonality of those definitions having been applied to romantic, germanic, and African root languages was noted in the early twentieth century by American historical linguist Morris Swadesh, who pioneered the term “monogenesis,” which is the examination of the possibility of


the derivation of all languages from one natural language, and the potential for it to devolve into that same language.⁳

When researching these definitions, they all precede the twenty-first century’s technological expectations of language and communication that have arisen in commerce, conversations, and written language. There have been studies conducted regarding the impact of music, sign, and mathematics condoning a universal language, however there has been a lack of research vying in favor of iconic images - a singular unit or embellishment, which are usually a simplified representation of a concept, with a unicolored flat design.⁴- and their contribution to, or disintegration of, advancing our written grammar-based systems since the discovery of ancient iconic texts like egyptian hieroglyphics and mayan cave paintings in the early 1900’s. However, since Oxford Dictionaries made history in 2015 for electing the “Face with Tears of Joy emoji” (or better known as the LOL or Laugh Out Loud emoji) as their word of the year, scholars, students, grammarians, and sociolinguists have been perplexed by these small, yellow images and how they’ve contributed to the online global communications community, and the evolution of language as a whole.⁵

According to emojiStats.org - a worldwide emoji analytics platform provided by emojiXpress, the #1 ranked iOS emoji & sticker keyboard - as of this moment, over

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1,159,000,000 emojis are being sent out on the iOS global telecommunications platform. They can be sent from every form of technology dating past 1992 for Japan, and then 2010 for the Western world. Even before that time emoji’s predecessors, emoticons, were being used in an attempt to further bridge the gap of emotional expression in non-verbal or non-face-to-face conversations. With the technological communication user number increasing, the creation of emojis must be investigated to determine where the demographics have risen from.

The History of Emojis

Emojis were created in 1999 by Shigetaka Kurita, a 25 year old man who worked at the mobile phone carrier company NTT DoCoMo. Kurita designed a set of 176 12-by-12-pixel characters that could be substituted in order to streamline the messaging process, and ultimately to provide contextual cues and emotional context on a mobile internet platform. He called these little stickers emojis, which combines the two Japanese words of “picture”, or “絵” (pronounced “eh”) and “letters,” or “文字” (pronounced “mo-jee”). These images were simple in design, based on the everyday emotions and objects Kurita came into contact in his day to day life: traffic signs, the zodiac signs, and comic book style images such as the ticking bomb or an hourglass running out of sand (See Figure 1.) His decision to design five small faces, perplexed, built with :heart: in nyc. this is a mroth :man: project. "emojitracker: realtime emoji use on twitter." emojitracker: realtime emoji use on twitter. http://emojitracker.com/.


8 Ibid.

9 Ibid.
surprised, angry, happy, and sad, became the defining images or characteristics of emojis, which was no surprise considering the usage of emoticons, ( ex. :) , :( , :/ , :P ) on computational interfaces was already prevalent in the technologically advancing city of Tokyo, Japan.\textsuperscript{10} Through financial and political mitigations about whether or not to share such an integral concept of Japanese technology, emojis began to slowly internationalize until they reached the United States in 2010 and onwards through the help of the California Unicode Consortium, a computing database where over 722 emoji character sets have been incorporated into their standard system used for indexing characters so they could be utilized for Western computer interface systems such as Apple and Google, which helped integrate emoji-use as a global trend.\textsuperscript{11}

The world’s technologically advancing society continues to analyze how great of an impact emojis have made on our current social and technological climate and how controversial their significant value on our linguistic interpretations of emotion are. This information, paired with the stand still of graphic universal language research that precedes the twenty-first century, constitutes the following research question: Do emojis have the capability of one day becoming their own, fully functioning universal grammatical language? This question can be answered with the help of one sub-question: What have emojis brought to written word language that amplifies communication? By answering these questions through examining the professional conversation in linguistics, social media, grammar, and technology, they will help aid in the cumulative research to answer the current research question.

\textsuperscript{10} Ibid.

Literature Review

Since the invention of “simple” emojis in 1999, the library of emojis has grown to over 1,800 characters, all of which are “faces, weather, vehicles and buildings, food and drink, animals and plants, or icons that represent emotions, feelings, or activities,” according to the Unicode emoji Subcommittee.\textsuperscript{12} The detractors of emojis have claimed that the introduction of emojis and emoticons into the English language have influenced a devolution of grammatical values, pushing us back to time periods where pictorial representations were used to convey messages, and were overall deemed as less intellectual or intelligent.\textsuperscript{13} However, the complexity of ancient pictorial systems such as ancient Egyptian hieroglyphics have exhibited the opposite of this theory. They have successfully depicted stories in pictorials using humans, animals and other images rather than words in order to preserve and record their history as is seen in Figure 2.\textsuperscript{14}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure2.png}
\caption{Figure 2.}
\end{figure}

\begin{itemize}
\item \textsuperscript{12} Ibid.
\item \textsuperscript{13} Alshenqeeti, \textit{Are Emojis Creating a New or Old Visual Language for New Generations? A Socio-semiotic Study.}
\item \textsuperscript{14} Ibid.
\end{itemize}
Egyptian hieroglyphics was one of the first formal writing systems in recorded history that consisted of logographic, pictorial and alphabetic elements, coming in total to around 1,000 individual signs. It is crucial to examine how this system would have influenced future versions of icons such as emojis due to their complexity in symbolic and phonetic meaning, which was discovered much later after their discovery from the translations given by the *Rosetta Stone* in 1799. Hieroglyphics, along with Mesopotamia’s cuneiform inscriptions from 5,000 years ago, became one of the best documented examples of the *Rebus Principle*; when the use of symbols, such as icons, are interpreted purely for their sounds to represent new words. Emojis have evolved with the same purpose, shifting the previous association of images to specific sounds as was in Ptolmys and Kleopatra to images becoming the specific sound, as is pictured in Figure 3 and Figure 4.

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16 Ibid.

17 Ibid.
These symbols were used in a way that could effectively translate a message or story of importance with little to no grammar structure required, which is crucial to understanding why emojis can only be understood as semiotic objects—because they have the ability to act as analogies, metaphors, and symbols.\textsuperscript{18} They also have the ability to be used as direct semantic functions or to carry out certain grammatical functions such as punctuation or preposition.\textsuperscript{19} For example, an emoji of a car could be indicative towards driving, the car itself, or traveling. The interpretation of that present icon is thus very reliant on knowledge, familiarity, and context, which are a multitude of visual and subjective factors. This information concludes the proposed theory that emojis are a visual communication system that is grammatically ambiguous, therefore leading to further questions in the field of iconic semantics as a whole.

Communication between two human beings is much more complicated than the simple exchanging of dialogue; there are overlooked factors when communicating through written word language towards the understanding of a conversation’s meaning. Body language, tone, and tension are taken into consideration when speaking with someone face-to-face, but it is nearly impossible to tell that through just words. According to Elaine Hatfield’s - a psychology professor from the University of Hawaii - \textit{Emotional Contagion} phenomenon, “as people nonconsciously and automatically mimic their companions’ fleeting expressions of emotion, they

\textsuperscript{18} Wicke, "Ideograms as Semantic Primes: emoji in Computational Linguistic Creativity." (2017.)

often come to feel pale reflections of their partners’ feelings”

Before the introduction of emoticons and emojis, the online community lacked this ability to expose unfettered emotional responses, but with their inclusion to messages that may be mistaken for a lack of enthusiasm, sarcasm, or any other primary physical cue from body language or tone of voice, the ability to translate feelings into visual conversation is possible. An example done by Churches, Nicholls, Thiessen, Kohler, and Keages proves the development of online systems communications with the human brain’s parts that are activated when seeing a real smiling face also activate seeing an online smiley face. This is not something that humans are born with; it is accumulation of increasing online presence within culture. This too is a part of a language’s constantly evolving repertoire of consistent exposure, allowing emotion to be translated into written communication and have our brains react as though it were physically in front of us.

One advantage of written phonetic language is through its creative expression of synonyms, literary devices, and wordplay. It allows for tone and parallelism, which emojis lack in their one-dimensional, straightforward depictions of a scene, conversation, or exchange of information. However, despite emojis being scrutinized for their simplicity, it is the driving force in the continuing demographic of smartphone users. Based on a survey of mobile computing habits in 41 countries, an estimated 2.53 billion people are smartphone users and that number


will only increase exponentially as easier access and more affordable prices are made available to them and their friends and families through shared data plans. These growing audiences have utilized emojis through social authentication and acceptance within interpersonal digital communication sites such as text-messaging, social networking apps, direct-messaging, and note-taking. The included tools and easier accessibility to emojis through emoji-enabled keyboards have encouraged smartphone users to question the materiality of language as a whole, and as Nicole Bliss-Carol explained in her dissertation to Gardener-Webb University, *The Nature, Function, and Value of emojis as Contemporary Tools in Interpersonal Communication*, “Eventually, when we become familiar with the semiotics of language, our brains no longer register the unique formation of letters as they combine in abstract form to create specific meaning. emojis may be easier to decipher because their representations are more direct and less abstract.”

Though emojis convey different moods without much effort, they have their own limitations. Linguists like John McWhorter have even stated about emoji/emoticon limitations, “You couldn't communicate only with emoticons, you have to know what you're talking about, what happened, when, and so on. Emoticons don't do that.” This debate has spurred out from the concerns of illiteracy among teens in the Net Generation that engage in textism - text-message shortcuts that include acronyms, (ex. LOL, LMAO, ROFL), ignorance of punctuation

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(ex. dont, wont, im) and emoticons. Contributing to this discovery of research were Rosen, Chang, Erwin, Carrier, and Cheever, publishers who investigated whether the reported use of textisms was related to teens quality of writing by surveying seven hundred and eighteen young adults with two studies where they were asked to first write a formal letter to a company, and then were asked to write a formal letter to a company along with an informal writing sample on happiness. The data reflected negative associations between reported texism use in daily communications and formal writing and positive associations between textisms use and informal writing. This study illustrates the current debates over whether or not the extension of empathetic conversation from studies of researchers like Hatfield are worth more or less than the recorded degradation of literacy comprehension and ability.

This information discouraged translators from attempting to convert pieces of literature into emoji-translated pieces, but that has not stopped data engineer Fred Beneson from translating every line of the acclaimed novel, *Moby Dick*, into emoji-only lines, and has even had the Library of Congress request a copy of his book for their archives. This example was taken and used for creating mathematical equations that capture the frequency of each individual emoji and their subject purposes, advancing emoji translation from English literature, but not considering how applicable it was as its own universal system.

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26 Ibid.
In terms of emoji visual interpretations, one key psychological factor of emojis rapid usage growth is through Wilson and Sperber’s, *Relevance Theory*, which states that a key point of communication is not what is written or said, but what is meant or understood, and specifically details how to recover meaning in a cognitive process through implicature. Simply put, emojis cannot be read the same way words can, they are often heavily reliant on comprehension through implicature, which is an effect of their pictorial nature. Their inferential communication can be described as metaphorical and metonymic, but while emojis are interpreted almost entirely metaphorically, emojis developed their own sense of interpretation and associative meanings which is widely dependent on the cultural background of the users who interpret them.

To further understand the implications that cultural background can cause, communication was made with Keith Broni, the world’s first proclaimed and hired emoji translator who works for the London-based company, *Today Translations*, which provides international translation and interpretation services to Western Europe. While Broni has provided many news sources with the fine details that his job entails, conducting an over-the-phone interview to learn more about each specific language’s emoji understanding and how similar or contrasting they may be to each other in a final piece of written emoji-specific works would be able to provide key insight from the application of emojis into a more direct audience.

Implementations of Hybridizing Non-Native Grammarian Systems

In order to combine the written language systems of multiple nationalities, research regarding the effect of studying native speakers of certain languages at a time have been an

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apparent advancement to the twenty-first century iconic image linguistics community that explore certain pathways to achieving the theory of a universal syntax. In one Stanford University linguistics paper by researchers Kaplan and Bresnan, “Lexical-Functional Grammar: A Formal System for Grammatical Representation” a formalism, lexical functional grammar (LFG), for representing the native speaker’s syntactic knowledge was designed to serve as a medium for expressing and explaining important generalizations about the syntax of all human languages and has thus served as a vehicle for independent psycholinguistics research. There would be narrowing down on the native languages spoken by individuals because of the acquired knowledge and skills that enable them to produce, comprehend, and make judgements on certain properties of their native language.

The LFG can be broken down into two key component structures: The first structure, a constituent or “c-structure,” is illustrated by “a conventional phase structure tree, a well-formed labeled bracketing that indicates the superficial arrangement of words and phrases in the sentence.” This structure is the basis of phonological interpretation to produce phonetic strings. The second structure is the function or “f-structure” that explicitly represents surface grammatical functions, as seen in figure 5. Because emojis have determined to only constitute surface grammatical functions of precise traditional syntactic knowledge such as subject, “understood” subject, object, complement, and adjunct, the research was focused on the development of the f-structure and its potential in being the sole input to a iconic semantic


29 Ibid.

30 Ibid.
component. F-structures were also promising to research in further detail due to their strict composition of grammatical function names, semantic forms, and feature symbols, which is the only post twentieth century piece of writing giving a base map for symbolistic linguistic development.

Methodology

Based on my current research question, the projected method of study was to test the efficacy of a universal grammar system in a controlled survey. The survey was taken by control groups of students from grades eight through twelve who were chosen based on their native languages of either Russian, English, or Japanese. The decision to choose high school students was based off of the statistics of 25-29 year olds being the most frequent users of emojis, according to Bob Hutchins of NewsCred Publishers, with 75.9% of iPhone users in that age category identifying as “frequent users,” while under-25-year-olds come closely behind with 72.2%. Although 25-29 year olds had the highest percentage, under-25-year-olds are the next age group rising with more exposure to the emoji demographic field and it’s creative capabilities

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than the 25-29. Identifying their comprehension is imperative to the future of emojis affecting our evolving language. The selected languages were chosen due to their frequent usage of emojis into their textisms or any other online communication the most frequently as of 2016. The three languages each follow their own root language and grammarian systems of Germanic, Slavic, and Japonic bases. The conversation of finding those root morphologies of sentence structure has influenced the conclusion to answer the present question by creating a cover morphological iconic system based off the f-structure model. If that were to be interpreted to those three languages with emojis acting as the “universal language”, that enables those target speakers to recognize the creative intent of the specific emoji-style piece just as well as if it were written in their native language. This would also fulfill the gap in data regarding emojis and their creative potential for artistic forms of communication such as creative-fiction writing.

*Writing Emoji Only*

Upon completion of reading the story, the groups were sent a questionnaire survey based off of questions from Kent State University’s “Three Level Comprehension Guide for Active Reading” that asked the subjects fill-in-the-blank questions that pertained to the context, character development, and moral argument of the story, also including whether or not they were able to identify use of tense, metaphor, or analogies. It was concluded that collecting student information from students who are monolingual would be the most effective due to the lack of other languages that might have influenced how they interpreted or tried to dissect the emoji piece grammatically.

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Through analyzing the reasonings behind conducting online surveys of semantic comprehension based on college-level theses, I decided that finding an online survey that has been created by an accredited source, such as a peer review journal or an accredited university, that is based in contextual understanding and grammar syntax would be the most effective to send to my three control groups. For writing the system of emojis, I used the highest rated emoji keyboard among smartphone users in the world, which is the iOS Apple emoji keyboard.

The creation of the story was marketed primarily off of information given from Keith Broni, the emoji-translator, who stated in an interview about what topics were the most universal to attempt connecting with an influential audience, “Romance. Even in our changing world demographic of what a romantic relationship means, it’s always a good basis to have those two characters of a man and woman for the reader to relate to whether they themselves are male or female.” This answer provided me with the genre that I would be writing in. When asked about the continuation of emoji as a strictly syllabic system, Broni stated, “From my experience in marketing towards teenagers and the smartphone generation that is exponentially increasing, it’s been really important to recognize that emojis can be developed and integrated into phonetic language through symbolic (logographic) code and syllabic code. For example, a string, or sentence, of emojis can be read as being translated into a certain phrase or collection of words, but they also can be interpreted just as literally as the spacing between the emojis as a whole picture.” This was the method of choice used for the implementation of metaphors and analogies, to see if those connections could be made without the helpfulness of setting up the subject, noun, verb, of other emojis and simply relying on the lone image itself paired with another, not combining the two individual symbols together to form a cohesive idea.
Keeping Broni’s suggestions in mind to what could be understood over the vast majority of populations, thus began the construction of the dual facing system of emoji as the sole iconic system. The two suggestions above were incorporated into the final project, however, due to the gap in emoji’s research in creative writing without translation, there were creative liberties taken on the final project in order to give readers a fully developed piece that had an engaging beginning, middle, and end, with two protagonists and conflict tension throughout.
After collecting that selective data from those groups, three anonymous individual case studies of three different students who each represented their language control group were conducted and compared to how those case studies reflect or contradict their own control group’s general conclusions.

Results

When comparing the three groups together in their collective emoji usage in their daily communication of text, instant messages, or direct messages, results were analyzed through recorded responses to either “1-10 times”, “10-20 times”, “20-30 times”, “30-40 times”, or “50+ times” with “one time” of emoji usage considered to be using one emoji. Figures 11-13 indicate the responses from each, going in order from English, Russian, and Japanese.

![Pie chart showing emoji usage](image)

Figure 11.
The three control groups were populated by 30 students in each from private high schools in Northern Vermont, except for a group of 19 Japanese exchange students who were participating in an exchange program originally from the [Redacted] in Tokyo, Japan. In their ultimate responses concerning emoji usage, it was evident that Russian students made up the
The highest percentage of total students who populated the frequent to extreme emoji subset of 20-30 times per day up to 50+ times per day, (50.3%). With this predicted information, it was hypothesized that Russian students would comprise the highest level of understanding based off of Kent University’s Three Question Base Model. The Russian population scored in between the other two groups on key understanding points of plot development, with twenty-five out of thirty responses being able to identify at least three out of four main plot points in the story. However, the Russian population had three out of thirty subjects who failed to indicate any use of metaphor or analogy, and also were at a significant misunderstanding of Question 2, “What was the major theme/idea of the story?” with only seven out of thirty responses to correctly answer so. The mean scores calculated for the percentage of answers responded to correctly for each language goes as follows: English, (61.2%), Russian, (54.2%) and Japanese, (67.8%).

<table>
<thead>
<tr>
<th>Language</th>
<th>Q. 1</th>
<th>Q. 2</th>
<th>Q. 3</th>
<th>Q. 4</th>
<th>Q. 5</th>
<th>Q. 6</th>
<th>Q. 7</th>
<th>Q. 8</th>
<th>Q. 9</th>
<th>Q. 10</th>
<th>Q. 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>30/30 (100%)</td>
<td>14/30 (46.6%)</td>
<td>17/30 (56.6%)</td>
<td>20/30 (66.6%)</td>
<td>22/30 (73.3%)</td>
<td>18/30 (60%)</td>
<td>24/30 (80%)</td>
<td>8/30 (26.6%)</td>
<td>9/30 (30%)</td>
<td>26/30 (86.7%)</td>
<td>20/30 (66.6%)</td>
</tr>
<tr>
<td>Russian</td>
<td>25/30 (83.3%)</td>
<td>7/30 (23.3%)</td>
<td>15/30 (50%)</td>
<td>18/30 (60%)</td>
<td>24/30 (80%)</td>
<td>21/30 (70%)</td>
<td>23/30 (76.6%)</td>
<td>3/30 (10%)</td>
<td>4/30 (13.3%)</td>
<td>27/30 (90%)</td>
<td>12/30 (40%)</td>
</tr>
<tr>
<td>Japanese</td>
<td>23/30 (76.6%)</td>
<td>15/30 (50%)</td>
<td>17/50 (56.6%)</td>
<td>24/30 (80%)</td>
<td>29/30 (96.6%)</td>
<td>22/30 (73.3%)</td>
<td>27/30 (90%)</td>
<td>7/30 (23.3%)</td>
<td>10/30 (33.3%)</td>
<td>27/30 (90%)</td>
<td>23/30 (76.6%)</td>
</tr>
</tbody>
</table>

Figure 14. Questions Answered Correctly Out of 30 Participants for Each Language Group.

**Discussion**

In comparing the results of my findings with those of previous studies such as Bliss-Carol’s interpretations of emojis and their increased usage being compatible with increased...
understanding and faster reception of direct messages, the differences were notable in the final collection of data from both my survey groups and individual case studies of one student from each of the three groups. While over 50% of the questions answered were above a 50% range of correct answers, Bliss-Carol’s predictions regarding consistent use failed to indicate a rise of comprehension over another group, as Russian speakers rated the lowest overall percentage score of understood answers. However, my methods were not centered around a communicative platform such as texting, direct messaging, or others previously mentioned.

Keith Broni’s suggestions of romantic inclusion in the story to help develop one of the key plot turning points also was vaguely disproven, as an average of only 23.7% of the total subjects noticed that there were any romantic encounters at all, suggesting that the given emojis may not be as specifically detailed as a fully developed relationship needs to have, which leads to the possibility of confusing symbols and their iconic meaning.

When asked about their empathetic connection to the protagonist of the story, it was clearly stated that there were not any real forms of empathy made, largely in part due to the lack of focus on character development and more effort put into understanding the development of the plotline itself, and while the situation did not occur between attempts to make conversation with someone else, it is valid to indicate Hatfield’s predictions of empathetic connection and Rosen, Chang, Erwin, Carrier, and Cheever’s findings of largely confused intimacy were both proven to be false in this setting, as there was a significant lack of empathy from the subjects for the occurrences happening to the protagonist and also higher textism usage was not linked to the highest levels of complex understanding of the story.
Implications and Limitations

The implications of this study into the evolutionary standing point of where under-25-year-olds, specifically high schoolers, can effectively understand iconic based literature are evident in the statistics collected from the comprehensive survey analyzing three languages that essentially utilized zero iconic systems of communication in 20th century evolutionary influence until the introduction of those digital stickers called emojis from Shigetaka Kurita in 1999. From the individual responses of the case studies to the groups as a whole, there were many responses in the fill-in-the-blank questions that were, “I don’t know”, “I don’t get it”, and general refusal to try and learn something that was never taught to them in their basic and higher forms of education. This confusion was apparent throughout many of the responses, but also had to be taken into account with each person’s individual perspective that is also placed onto anything that is read by someone of a varying international background. With the mean percentages of correct answers to all of the questions for each language group resulting in over 50%, it can be concluded that emojis do have the potential to become further developed into a succinct form of communication in writing to enhance emotional and symbolistic meanings in any form of writing, especially those in creative fiction.

When conducting the research behind this project, many of the limitations were concerning the lingo centric groups and how effectively their insight of the future development of emojis could be captured through writing, not translating, a story that was previously recognizable to them in emoji form. Limitations regarding communication with these groups in their native languages proved to be difficult as well, as when I decided to survey those groups the requirement in their subjectivity was to remain as strictly communicative in their native language
and not English, which was what 68 of the participants were being asked not to do on an
everyday basis due to their being international students at English speaking private high schools.
This notion prompted me to generate an individual survey for each language that was as
correctly translated as possible so the subjects knew exactly what was being asked of them for
each question and would not feel the need to respond in English. Other limitations to this project
included the bias of location in relativity to the subjects and where they were from, as I could
only find willing participants for this study in Northern Vermont schools and some directly from
Tokyo, Japan that could be noted as a form of convenience bias when I could’ve reached even
further with my data and tried to contact international schools from Russia and Japan as well as
from the United States. Another limitation to my work was to the fact that there are
approximately 6,909 actively speaking and writing languages in the world and I chose to focus
on the three languages that were most prevalently associated with emoji culture rather than
looking at the population of the world as a whole.

Conclusions

Examining what languages could be interpreted that have been recorded to span across
continents not as a universal language that can be understood across multiple languages, but
rather as the languages that the world is accustomed to learning for the benefit of international
affairs such as communications, trade, economics, and politics. If this project were to be given
more time and a greater population of varying language groups, different approaches to how the
“Emoji Story” could have been written could have been implemented, such as comparing the f-
structure and c-structure side-by-side, along with creating different plots to each story to see
whether or not certain language groups had an advantage over others when it come to the
symbolism of multiple genres of writing.


Department of English. "Three Level Comprehension Guide for Active Reading." Kent


Goldsborough, Reid. *Putting Your Emotions Onscreen*. PDF. October, 2015


Radford, Will, Andrew Chisholm, Ben Hachey, and Bo Han. :telephone:


Steinmetz, Katy. "Oxford's 2015 Word of the Year Is This emoji." Oxford's 2015 Word of


An Analysis of Banksy’s Artistic Graffiti on Stimulating Public Dialogue Over Socio-Political Issues

Word count: 4413
I. Introduction

In the postmodern world, noninstitutionalized art, or street art, has garnered criticism and praise from the established art community. Street art not only aesthetically transforms, but imbues a sense of reclamation of the public space. Noninstitutionalized street artists disseminate their work through guerilla communication with the intent to generate public dialogue over established norms and preconceptions. This is because art constructs new perceptions on conventional narratives, where new meanings emerge through artistic pictures and images (Edelman 11). This research project will focus on artistic graffiti and its ability to stimulate public discourse over various social issues. By compiling a critical discourse analysis (CDA) of visual semiosis over graffiti pieces, we may discover the extent to which graffiti stimulates and sustains civic dialogue, or issues pertaining consequences to society. This study will further explore Banksy and his various works through a semiotic perspective, modelled after a previous study by Mimi Miyoung Lee and Sheng Kuan Chung. Semiotics enables us to analyze the relationships between signs and their meanings, increases an individual’s ability to understand labels which allows the creation of revolutionary ideas in social discourse while deconstructing the meaning of relations within the current social system (Hutcheson 4-5). The meaningful analysis and interpretation of art within its cultural environment allows the participant to actively engage with socio-political discourses and convey their own understanding. Major themes among existing research includes redefining our understanding of graffiti, an examination of Banksy, and a critique of the current art curriculum. However, investigative research is needed to understand the social context with which noninstitutionalized art falls under as well as the extent to which street art plays in stimulating social issues. Therefore, this paper will explore the extent
to which Banksy’s art stimulates and sustains public dialogue over socio-political issues through a critical discourse analysis and visual semiosis.

II. Literature Review

II.I Analyzing Artistic Graffiti

When discussing and analyzing graffiti, it is important to distinguish between two types: mere graffiti and artistic graffiti. Mere graffiti is generally understood as illegal writing on a public surface, such as “so-and-so was here” (Riggle 251). Artistic graffiti represents the differential consciousness of the public due to its fluid nature, every symbol and technique is emphasized differently depending on the time. The intent and nature of the subject is the biggest distinctions between mere and artistic graffiti. Due to its ability to change, develop, and adapt to the social psyche, artistic graffiti provides the ideal medium for representing the rapid shifts in socio-political thought. As of modern day, graffiti stands formidable as a visual resistance to current hegemonic systems of power. Therefore, artistic graffiti consistently retains the ability to impact the consciousness of one's social reality. Therefore graffiti itself can act as a catalyst of social change (Hutcheson 2). Throughout history, street art has been used as a propaganda tool and influenced the consciousness of society on the basis of someone’s agenda. Due to its ability to change and adapt to the social psyche, artistic graffiti provides the ideal medium for representing the rapid shifts in socio-political thought.

Taking into consideration the potential for artistic graffiti, the importance of this study within a wider context is understood. For the purposes of this study I will focus on Banksy’s artistic graffiti because they serve a message within the greater social context.
In “A Semiotic Reading and Discourse Analysis of Postmodern Street Performance”, Lee and Sheng describe social semiotics and critical discourse analysis as well as the relevance of these methods in interpreting noninstitutional street art (Lee and Sheng 21). They discuss the meaning and ability of noninstitutionalized art in providing provocative sights that compel the viewer to doubt their preconceived notions. This provides new ways street art can be construed as well as the social context it belongs to. However, it is important to note that any semiotic analysis is limited to the degree to which and the manner, the moment, and conditions in which a work of art functions as a sign (Bal et. al 6). Peirce states that the process by which a viewer analyzes an image and applies meaning can be summarized in three steps: (1) It entails a subjective “reading” or first view of an image where the viewer simultaneously analyzes the image and the “reading”, therefore anchoring their relationship. (2) This transforms the initial tangible image into a mental perception that corresponds to the previous. (3) At this point, the viewer has converged the image with their interpretation of the meaning. This adds to the importance of the social identity of a viewer. As a result, any interpretation of the image is “tainted by [their] social position” (Peirce 12). Therefore this study will analyze the differing social discourses over the same images.

II.II Analyzing Banksy and Five of His Pieces

Banksy utilizes postmodern methods of subversion, cultural jamming, and guerrilla communication in order to raise provocative questions about poverty, capitalism, corporate globalization, and social controversies (Chung “Chapter 10” 97-98). He communicates through his graffiti pieces, applying strategic techniques to capture attention and optimize understanding and awareness. His iconic technique of stencilled graffiti is modelled after utilitarian signage and
packaging, characterized by clear, consistent, and instructive images and phrases. The divergence between the aesthetic origins in the utilitarian style and the political origins in the conventional practice of graffiti amplifies his enduring aesthetic appeal (Truman 12). The utilitarian style offers the audience an unambiguous and consistent image to meaningfully analyze. In “An Art of Resistance From the Street to the Classroom”, Chung offers a deeper discussion of Banksy and how his vernacular art form has addressed various social and political issues. His distinctive stenciling technique, accompanied by satirical humor and subversive epigrams, can be seen across the world in “site-specific, ephemeral art” that forces the viewer to reflect upon the related topic (Chung “Art of Resistance” 27). This study will consider five varying works by Banksy: Graffiti Removal Hotline (Figure 1), Breaking the Barrier (Figure 2), Kissing Policemen (Figure 3), Sweeping it Under the Carpet (Figure 4), and Washing Zebra Stripes (Figure 5).
Figure 1: Graffiti Hotline Removal

The image in Figure 1, *Graffiti Hotline Removal*, was seen in the London borough of Islington in May 2006. It is said to illustrate the continuous battle between authority and graffiti artists by portraying a young child defacing a fabricated public notice (Chung “Art of Resistance” 27). Banksy’s distinctive stencilled technique instantly portrays a readable message discussing the conflict between authority and graffiti artists.
His next piece in Figure 2, *Breaking the Barrier*, was installed on the West Bank Barrier, a 425 mile long barrier that Israel constructed in order to disconnect itself from Palestinian territories. Critics of this barrier claims that it infringes on the rights of Palestinians while supporters argue that it provides security and stability against Palestinian terrorism. The UN ordered Israel to dismantle it because it breached international law.
Figure 3, *Kissing Policemen*, portrays two policemen kissing on a wall in Brighton, England. This image represents the controversy around homosexuality at the time. The location of this piece adds another layer to his subliminal message since Brighton is well-known for its prominent homosexual population. His decision to depict policemen, figures of authority, also questions the acceptance of homosexuality in positions of power.
The next piece in Figure 4, *Sweeping It Under the Carpet*, was found on Chalk Farm Road in North London around 2006. This image shows a maid lifting the carpet to hide what one can only assume is dust or garbage. The maid is wearing a traditional French maid uniform, immediately portraying her status as a servant in the western world, or for the purposes of this piece, a representative of the West. The darkness of the exposed brick wall juxtaposed with the white carpet adds to the message, portraying a bottomless chasm for global problems to be stashed. Her reluctance to do her job - clean out the trash - speaks towards the Western world’s reluctance to deal with global issues such as the AIDS epidemic, among others (Chung “An Art of Resistance” 31).
Figure 5: *Washing Zebra Stripes*

Figure 5, *Washing Zebra Stripes*, first appeared in Timbuktu, Mali around 2009. A village woman is seen hanging a zebra’s stripes up to dry after washing it. It is inferred that his image illustrates the absurdity of wasting water in such a frivolous way. During this time, Mali was afflicted with droughts, and this piece brings awareness to this fact as well as bringing a sense of responsibility. Banksy is pointing out the Western world in an attempt to spur them to action.

II.III Understanding Current Art Education

The way students are taught to understand and analyze art directly affects their understanding and perception of the message. Current art education within most public schools within America lacks a connection between classroom instruction and the contemporary art world (Chung “Chapter 10” 96). For the purposes of my study, it is impossible to grasp and evaluate Banksy’s graffiti without first considering the social issues it is rooted in. Without situating the art within a social content, any analysis would lack a comprehensive reasoning.
Total word count = 4413

Therefore, it is critical for students to “develop critical consciousness, aesthetic sensitivity, and a sense of social responsibility for the collective well-being” (Chung “Chapter 10” 96). In a study conducted David Darts, he concludes that it is essential to generate and facilitate student understanding and participation within the socio-cultural realm thorough an in-depth investigation of the current cultural pedagogy of classroom culture (Darts 313). Teachers have a responsibility to move students beyond the superficial understanding that overlooks the true ideological issues embedded within the everyday aesthetic experience (Darts 323). Since students later become functioning members of society, it is of utmost importance for students to “develop meaningful approaches to analyzing the visual culture encompassing their everyday surroundings (Tavin 30). Their understanding directly affects their perception of the message and thus shapes their opinion on the matter. It is recommended for art curriculums to introduce students to art activism, guerrilla, and other forms of counter-cultural artistic production in order to provide a more active cultural production as a student (Darts 324). Since graffiti rewrites, or forces a new perspective, of a social discourse, the student’s analysis provides insight into the education and thought process of their curriculum.

III. Conclusion

The existing literature provides an in depth understanding of graffiti within multiple contexts, an analysis of Banksy, and a critique of the current art curriculum. Noninstitutional art, specifically artistic graffiti, is understood as the differential consciousness of the public over social issues. It offers varying perspectives on the role art plays in offering new perspectives on current issues. This ties into the techniques Banksy applies in order to depict his message.
However, to the best of my ability, I have not found a study that directly studies the relationship between an artwork and the extent to which it impacts others.

There still lacks a deeper analysis of the impact of Banksy’s, a prominent figure and well-known enigma of the post-graffiti and street art style, artwork on influencing the opinions on socio-political issues within the current body of knowledge. It lacks a reflexive analysis of Banksy’s graffiti and the extent to which it stimulates and sustains public dialogue. This guided me to my research question: “To what extent does Banksy’s artistic graffiti stimulate and sustain civic dialogue over socio-political issues?”

Therefore, for the purposes of my study, I have limited the test material to 5 of Banksy’s pieces and analyzed the impact in 2 aspects: the stimulation and sustainment of his message in individuals.

III. Methodology

When considering the complexity of the larger research question at hand, a stimulate and sustain aspect, a concurrent nested (embedded) mixed method design is required. In Table 4.2, taken from “Designing and Conducting Mixed Methods Research”, multiple design types are
shown. The embedded method was chosen as the best method because it could occur concurrently, which was essential considering my time restraints, and addressed multiple aspects of a research inquiry. The embedded design includes two phases of data collection where one phase supplements the other. For the intents and purposes of answering the research question, to what extent does Banksy’s artistic graffiti stimulate and sustain civic dialogue over socio-political issues, a quantitative component will be embedded and remain secondary to the qualitative approach. The priority of this research is the stimulation of civic dialogue, which will be explored through the qualitative short answer response. The supporting role of the sustaining discussion will be explored through a quantitative survey given before and after the qualitative short answer response. This sequential approach adapts the typical two-phase approach in order to explain the impact of the art pieces by comparing the responses from before and after. An embedded mixed method design will be most effective in answering the questions due to the constraints on time and resources.

The ethicality of this study is ensured through (1) receiving permission from the Institutional Review Board (IRB) through Scienteer and (2) receiving the consent of the human participants though a signed consent form either by the parents and participant (if a minor) or just the participant (if a legal adult).

I initially planned on testing 30 participants however, the time commitment required to fully complete all aspects of my study was unforeseen. I was only able to completely test 15 participants. Participants were preassigned a number from 1-30 and incomplete data was removed. This resulted in an nonlinear numbering system for the participants.
To establish a baseline for understanding, a critical discourse analysis and visual semiosis, modelled after the study by Mimi Miyoung Lee, an associate professor, and Sheng Kuan Chung, a professor of art education, in, “A Semiotic Reading and Discourse Analysis of Postmodern Street Performance” is applied.

In order to further analyze the extent to which the message is sustained, I will present 20 scenarios corresponding to the issues within the piece before and after the study in order to see if their opinion changed. I will stagger the time in between the scenarios in order to see if their minds were changed as a result of exposure to the piece. By adding a time break of a couple of days before and after the study, I will hope to reduce the immediate short-term effect of exposure in order to analyze the true impact of the piece on the individual. These scenarios and their responses will offer insight into the extent that the message of the pieces impacted their individual beliefs by analyzing differences from before and after the exposure. Each scenario is adapted from the Levenson Self-Report Test and applies a Likert Scale, 1 for Strongly Disagree to 5 for Strongly Agree. Each response to the individual scenario corresponds to a number which provides quantitative data to compare before and after the exposure to the piece in order to further explore the ability to sustain the message. Within the scenarios, the 5 on the Likert scale differed in alignment with Banksy depending on the opinion statement. In order to remove these differences, I converted the scenarios and data so a 5 would always most align with Banksy’s message. For instance, in the Before Scenario, #7 states “There is no purpose to graffiti.” Banksy would circle 1 - highly disagree on the Likert scale. I would convert the answer to be 5 therefore changing the statement to “There is a purpose to graffiti”. After converting, I totalled the scores to categorize and analyze a potential difference.
After a couple of days, the short answer questionnaire will be administered. For the short answer questionnaire, each human participant will be exposed to the image and answer the following questions. Each human participant will spend one minute analyzing the image and then answer five questions, per image. These questions will aim to understand their perception of the message of the piece. This directly ties into the visual semiotics, or the process an individual interprets a message based on symbols and images. Although critical discourse analysis is usually applied to text or language, because the first piece the human participant studies contains words, the short answer responses will disclose any observation of an implicit message. The short answer questionnaire will aim to answer the larger question at hand, the extent to which the art stimulates civic dialogue, therefore it holds greater majority when analyzing the responses.

I will then code the responses in the short answer questionnaire in order to do a summative content analysis. For each of the 20 questions analyzed for each participant, I compiled a list of specified key terms. The presence of any of these key terms within the right context would result in 1 point. The absence results in 0 points. In order to avoid subjective opinion when differentiating between the non-exact key terms, if the context was correct, they were given a point. For instance, question 3 asks “What is the artist trying to communicate? What do you think the picture means?” Key terms includes but isn’t limited to irony, vandalism, authority, used in the right context. After counting key terms, content, and underlying context related to the message in each response, the sum score was coded into one of five categories: 1 - perceived none of the implicit messages, 2 - perceived a few of the implicit messages, 3 - perceived some of the implicit messages, 4 - perceived most of the implicit messages, and 5 - perceived all of the implicit messages.
A couple of days after administering my study, I will provide adjusted scenarios over the same topics but worded differently in order to prevent similar answers. Therefore the subject of the scenario will differ to a certain extent but the responses will be the same, in order to offer a basis of comparison. I will then compile a T-test in order to test the significance of the effect of the exposure on the individual. If there is no significant difference from before the exposure and afterwards, then we can assume that the differences are due to random chance. There were 5 distractor questions for each of the three parts which will be disregarded when analyzing.

IV. Findings and Analysis

IV.I Scenarios

<table>
<thead>
<tr>
<th>Participant</th>
<th>Before</th>
<th>Category</th>
<th>After</th>
<th>Category</th>
<th>Changes</th>
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<tr>
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<td>4-5</td>
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<td>60</td>
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<td>53</td>
<td>4</td>
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<td>61</td>
<td>4</td>
<td>60</td>
<td>4</td>
<td>4-4</td>
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<td>67</td>
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<td>3-4</td>
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<td>57</td>
<td>4</td>
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<td>21</td>
<td>64</td>
<td>5</td>
<td>48</td>
<td>3</td>
<td>5-3</td>
</tr>
</tbody>
</table>

The chart above reveals the sum scores, categories, and category changes for all the participants for the before vs. after scenarios.
The chart above reveals the conversion scale from sum score to category.

<table>
<thead>
<tr>
<th>Category</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
<td>15-26</td>
<td>27-38</td>
<td>39-51</td>
<td>52-63</td>
<td>64-75</td>
<td></td>
</tr>
</tbody>
</table>

In the chart above, the majority of the participants placed in category 4 in the before scenario.

<table>
<thead>
<tr>
<th>Category</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-26</td>
<td>27-38</td>
<td>39-51</td>
<td>52-63</td>
<td>64-75</td>
<td></td>
</tr>
</tbody>
</table>

In the chart above, the majority of the participants placed in category 4 in the after scenario. There was no change in the majority category from before to after however, there was an increase in category 4 and decrease in category 5.

<table>
<thead>
<tr>
<th>Category</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-26</td>
<td>27-38</td>
<td>39-51</td>
<td>52-63</td>
<td>64-75</td>
<td></td>
</tr>
</tbody>
</table>

The chart above reveals that 3 participants went to a higher category, 8 remained in the same category, and 4 went to a lower category.
This graph shows a comparison for the sum score of the before vs after scenario. The average before sum is 58.67 and the average after sum is 55.26.

This next graph shows the conversions from the sum score to the category for each participant. Category 1 opposes Banksy, 2 slightly opposes, 3 neither opposes or supports, 4 slightly supports, and category 5 supports Banksy.

After compiling a T-test aided by an online calculator, the difference between the sum score from between and after the scenario was proven not significant at p < .05, t-value at 1.40358, and p-value at .085719.
IV. II Short Answer Questionnaire

The graph shows the sum score of each participant and the mean sum score is 12.47. Participant 21 is the outlier with a sum score of 6 points, 6.47 points lower than the average and 11 points lower than the highest score.

This graph shows the category assigned to each participant. The majority was category 3 and thus is understood to have perceived some of Banksy’s messages.
IV.III Discussion

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Category</th>
<th>Sum Score</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>15 - 26</td>
<td>Opinions oppose Banksy’s message</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>27 - 38</td>
<td>Opinions slightly oppose Banksy’s message</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>39 - 51</td>
<td>Opinions neither opposes or supports Banksy’s message</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>52 - 63</td>
<td>Opinions slightly support Banksy’s message</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>64 - 75</td>
<td>Opinions support Banksy’s message</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Short Answer Questionnaire</th>
<th>Category</th>
<th>Sum Score</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 - 3</td>
<td>Perceived none of Banksy’s messages</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>4 - 7</td>
<td>Perceived a few of Banksy’s messages</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>8 - 12</td>
<td>Perceived some of Banksy’s messages</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>13 - 16</td>
<td>Perceived most of Banksy’s messages</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>17 - 20</td>
<td>Perceived all of Banksy’s messages</td>
<td></td>
</tr>
</tbody>
</table>

My initial assumption was that Banksy’s artistic graffiti would have a great impact on stimulating and sustaining dialogue surrounding the issues embedded in his artwork. However, my hypothesis was not supported based off of the data I collected.

My scenario results revealed that a majority of the participants’ opinions slightly support Banksy’s messages however the T-test revealed that there was no significant difference from before and after the exposure. As a result of the exposure, the majority of the participants remained in the same category, while 3 increased and 4 decreased. With only 3/15 or ⅕ of my participants increasing categories, the hypothesis cannot be support by such a low percentage.
This conclusion addressed the “sustain” aspect of the inquiry and serves to support the analysis from the main portion, the short answer questionnaire. My short answer questionnaire revealed that a majority of the participants perceived some of Banksy’s messages, with an average sum of 12.47 points. As the main aspect of the study, stimulation was not as greatly impacted as predicted. This is further supported by the lack of significance in the scenarios.

The significance of my findings, in light of the current body of knowledge, pose no new insights into the larger question at hand.

Due to the complexity of this issue, further experimentation is required for a more in depth analysis. Understanding the current limitations within this study will allow future researchers to improve upon and expand the potential of this inquiry. Some limitations within my study include a small testing population with only 15 participants. It is recommended that any future experiments have a greater number of human participants, an ideal of 50 participants given more time and resources. Taking into consideration provincialism, future experiments might deal with this issue by testing participants from varying schools or age levels. There is a lack of diversity because most participants were seniors in AP classes. One of the biggest limitations was the time constraint. The average time to complete all aspects of the study, when disregarding the time in between is almost 2 hours. When analyzing the responses, the wide variance among answers could be attributed to wording bias. Due to the sensitive nature of the topics, some participants might have felt pressure to provide socially acceptable answers. Despite trying to prevent this by ensuring anonymity, it still could have occurred.

Understanding the limitations, I propose these future adaptations to my study. First is simplifying the research question for a simpler method. An example is researching either the
“stimulate” or “sustain” aspect. Second is longer exposure time to the artwork, from 1 minute to 2-5 minutes. Next is to allow for a group discussion. Due to the intricate interplays of society, a group discussion could offer valuable insight into the varying perspectives of socio-political issues as well as the responses and potential solutions. I could also revise the questionnaire to only ask for the intended message behind each artwork. Another is choosing different artworks for the study to be based upon however this would require all the questions and scenarios to be rewritten to accommodate for the new message. Any of these adaptations could answer varying questions derived from my initial research inquiry. Either way, I highly suggest converting any future surveys to a digital format because it will offer participants more availability to participate on their own time and it will ease the graphing process.

V. Conclusion

This goal of this research was to analyze and answer the question, to what extent does Banksy’s artistic graffiti stimulate and sustain civic dialogue over socio-political issues. The literature reviewed showed that while there is a general understanding for how art is analyzed, taught, and understood, there remains a lack of deeper analysis into the impact of Banksy. As an infamous international graffiti artist with constant media attention, Banksy holds the potential to influence the thought and consciousness of the general public. Therefore a greater understanding of the impact of his works is necessary.

To reiterate, the purpose was to explore the extent to which Banksy’s artistic graffiti stimulates and sustains civic dialogue over socio-political issues. Although my results were inconclusive, it still provides insight into the current body of knowledge within this field. We now have this study as a basis for others to adapt. We know that although this specific research
method did not offer a conclusive answer to the research inquiry, it does have its merits. There is
a basis for content analysis regarding interpreting answers on art as well as how to analyze
differences in opinions.

Regardless, it is essential to further explore this field because of the implications it has on
society. We know that artistic graffiti has influenced the consciousness of society through studies
and historical findings on propaganda, but the extent to which it influences others has not been
discovered. And the implications of these findings have unknown potential in analyzing and
predicting real world conflicts surrounding various socio-political issues.
Works Cited


Booth, Rosemary Reedy. “"Speak Softly but Carry a Big Can of Paint" - Banksy, Wall and Piece: Street Art as Radical Political Activism.” Undergraduate Theses Collection, ser. 107, 14 May 2011. 107,

Buckley, Anne. “Self-Expression in Spray Paint: Graffiti as a Popular Tool for Democratization in Argentina.” Undergraduate Honors Theses, 2014,


Gopnik, Blake. “REVOLUTION IN A CAN: Graffiti Is as American as Apple Pie, but Much Easier to Export.” Foreign Policy, no. 189, 2011, pp. 92–93. JSTOR, JSTOR


Sample G

Score: 3

The paper earns a score of 3 because it represents "basic Research," using a reasonably replicable method and drawing on original evidence to support its argument, which in turn leads to a new understanding (see page 21, last paragraph: "When asked about their empathetic connection...complex understanding of the story"). The question is posed on page 5: "Do emojis have the capability of one day becoming their own, fully functioning universal grammatical language".

The paper does not score a 2 because it moves beyond summarizing the research of others on the topic of semiotics of emojis.

The paper does not score a 4 because its new understanding is not fully supported by the evidence provided, and the stated limitations of the research are oversimplified (see page 22). In addition, while the approach is reasonably replicable, some aspects of the method are not made explicit (e.g. - page 14 lack of control group). The identified gap also seems to shift slightly during the course of the paper (from page 5 to page 15, paragraph 1, last sentence: "This would also fulfill the gap in data...”). Also, the lack of a translation of the emoji story makes interpretation of results from using this story questionable.
Sample H

Score: 2

The paper earns a score of 2 because it identifies a reasonably narrow topic and question (on pages 2 - 3 and restated on page 12, paragraph 2: "To what extent does Banksy's artistic graffiti stimulate and sustain civic dialogue over socio-political issues?"), which mentions social dialogue that does not carry through the paper. The paper also attempts to identify a gap on page 12, paragraph 2: "There still lacks a deeper analysis of the impact of Banksy's, a prominent figure..."), however the student's lack of awareness of literature surrounding the social import of artists is also revealed on the same page in paragraph 1: "However, to the best of my ability, I have not found a study that directly studies the relationship between an art work and the extent to which it impacts others".

The paper does not score a 1 because it does more than simply present a broad topic of inquiry. It presents its topic in the form of a reasonably narrow question.

The paper does not score a 3 because it inadequately situates its topic of inquiry within relevant scholarly works in the field (i.e. - on pages 2 - 5, it discusses semiotics, artistic graffiti, and Banksy's art [in brief], but fails to engage the subject of civic dialogue). In addition, its method (described as: "...a concurrent nested [embedded] mixed method design", page 12, paragraph 3) is ultimately misaligned with the project goal, as it assumes pre-given meanings to the artworks that are not self-evident or explained and has no means of engaging the question of civic dialogue. This paper is a clear example of student work that seems impressive in its initial engagement with academic discourse, and with its presentation of visual and written material, but which ultimately reveals glaring weaknesses of method and argumentation which lead to admitted non-significant findings and an absence of "...new insights into the larger question at hand" (page 21, paragraph 2). The included visual evidence, crucial to the argument, is also not properly attributed.