Proceedings of the 32nd Annual Beacon Conference

A Conference for Two-Year College Scholars

Hosted by Dutchess Community College

June 7th, 2024

Poughkeepsie NY

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A Conference for Student Scholars at Two-Year Colleges

The Beacon Conference is an annual conference that celebrates the achievement of two-year college students. The conference is funded by a coalition of member colleges in collaboration with the sponsors who support this event. The mission of the conference is to showcase the work of students attending two-year colleges in a range of academic disciplines and to promote an exchange of ideas among them. For more information, visit www.beaconconference.org.

The 2024 Beacon Conference is hosted by SUNY Dutchess Community College
Mariana Melo, Mark Condon - co-directors

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We appreciate the assistance and dedication of the following, who contributed their time and energy:
The Beacon Steering Committee Members, mentors, readers, judges, Ray Houston, Alyson Stewart, Cristal Jones-Howe.

A special thank you goes to Jonathan Sponsler, Leigh Carbon Community College, for all his help with the Beacon Conference website and submissions management.

We would also like to thank the volunteer panel moderators:
Eric Chambers, Katherine Espinoza, Alberta Guiles, Carol, Pachar, Jenny Park, Nancy Perretta, Tom Trinchera, Jackie Venuto, Sarah Wheeler

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Conference Program

Session 1 // 9:15 am – 10:45 am

ALLIED HEALTH AND NURSING

The Stress Response, Vagus Nerve and Simple Columnar Epithelium

> Alexandra Lindsay; Mentor: Carol Wolin, Montgomery College

Moderator: Katherine Espinoza

Readers: Amy DiCapua, Westchester Community College; Courtney Fichthorn, Reading Area Community College; Michele Ianuzzi-Sucich, Orange County Community College

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> Joshua Tran; Mentor: Rebecca Eggenschwiler (Montgomery College)

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> Caleb VanRoekel; Mentor: Nathan Zook, Montgomery College

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Readers: Dana Gavin, Dutchess Community College; Meghan McCarthy, Dutchess Community College; Noreen Van Valkenburg, Dutchess Community College

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Jenny Le; Mentor: Rebecca Eggenschwiler, Montgomery College

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Readers: Mary Iatropoulos, Dutchess Community College; Margeaux Lippman, Dutchess Community College

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> Yancey Ramos; Mentor: Rebecca Eggenschwiler, Montgomery College

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> Jessica Sabau; Mentor: Ellen Kreger, Westchester Community College

Judge: Professor Richard Reitano, SUNY Dutchess/Vassar College

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Moderator: Katherine Espinoza

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Alexandra Lindsay; Mentor: Michael Harding, Montgomery College

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David Ribner; Mentor: Heather James, Borough of Manhattan Community College

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Boarded, Shipped and Sold: Indentured Servitude as Temporary Slavery

Joshuah Creswell; Mentor: Jodi Greene, Reading Area Community College

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Giuliana Ceschini; Mentor: Ellen Kreger, Westchester Community College

The Bearer of the Look: Femininity in The Stepford Wives

Alicia Greco; Mentor: Ellen Kreger, Westchester Community College

The Barbie Movie: A Dominant Text Dressed in Oppositional Pink

Carolina Martins Soares; Mentor: Ellen Kreger, Westchester Community College

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Readers: Anne Deutsch, Dutchess Community College; Christine Eubank, Bergen Community College; Michael Hall, Dutchess Community College

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David Berger; Mentor: Rebecca Eggenschwiler, Montgomery College

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Nicholas Cabrera; Mentor: Peter Arvanites, Rockland Community College

Mary Todd: A Life and Legacy

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Josephine Lunsford; Mentor: Rebecca Eggenschwiler, Montgomery College

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Gary Snyder, Mentor: Janet Seggern, Lehigh Carbon Community College

Hate Speech: Constitutionality in History

Cais Vo; Mentor: Jodi Greene, Reading Area Community College

OUTSTANDING PAPERS

Disclaimer: In the compilation of this Proceedings publication, every effort was made to maintain the formatting for each winning paper as close to the original paper as possible. Some slight alignment differences may be evident, but papers should be nearly identical to what was submitted to the 2024 Beacon Conference. No corrections have been made to the content of the papers.

ALLIED HEALTH AND NURSING

The Stress Response, Vagus Nerve and Simple Columnar Epithelium

Alexandra Lindsay; Mentor: Carol Wolin, Montgomery College

Judge's Comments: "Alexandra did an amazing job. The implications of her research have the potential to impact society in a profound way. Through her paper, she makes the call to connect the biological, psychological and social aspects of immunotherapy in a logical and powerful way"

Prof. Katherine Espinoza
Associate Professor of Biology
Dutchess Community Collge

<u>The stress response, vagus nerve, and its effects on simple columnar epithelium</u>

The stress response is one of the most fundamental adaptive biological processes, providing the necessary mechanisms that maintain our survival, both as individuals and as a species. The multifaceted process behind the stress response, in relation to our environment, genetics, and neurological processes, as well as our immune system, epitomizes the nonlinear communication between our mind and body. The body's autonomic nervous system, dichotomized into the sympathetic and parasympathetic nervous systems and unified through the enteric nervous system, is responsible for "regulate[ing] involuntary physiologic processes including heart rate, blood pressure, respiration, digestion, and sexual arousal" (Waxenbaum et al., 2023). A central component of the parasympathetic nervous system—the vagus nerve—is a critical modulator between sympathetic deactivation and parasympathetic activation, "...including control of mood, immune response…[and] establishes one of the connections between the brain and the gastrointestinal tract… (Breit et. al, 2018)." The vagus nerve is paramount to cellular modulation in the body due to the tri-directional relationship of the neurological system, the psyche, and our immune system in combination with our environment— particularly from prolonged stress exposure.

Serving as a vital link between the psychological and physiological, "…[the vagus nerve] has been implicated in many gastrointestinal, neurological, and immunological disorders" (Yu et al., 2020). The fundamental cellular mechanisms influenced by the vagus nerve can have life-altering repercussions, including limitations of cell function in the intestinal epithelium from an overactive immune response. In turn, negative feedback loops such as cytokine and lymphocyte production, in combination with a stimulus that does not allow for a refractory period of the parasympathetic nervous system, can result in negative epigenetic and immunological consequences to simple columnar epithelial tissue, resulting in

diseases such as Inflammatory Bowel Disease (IBD) and Ulcerative Colitis (UC), as well as endometriosis in women.

Relying on feedback from the central nervous system (CNS), the autonomic nervous system (ANS) makes allostatic adjustments to maintain homeostasis "…through the production of mediators such as adrenalin, cortisol, and other chemical messengers" (McEwen, 2005). Split into two subsystems—the sympathetic and parasympathetic—the autonomic nervous systems work as harmonious opponents, inhibiting one another to achieve homeostasis.

With every stressful stimulus received, the sympathetic nervous system (SNS) activates, releasing two main hormones: epinephrine and norepinephrine, "…the two main catecholamines that can activate or deactivate sympathetic receptors within the cardiovascular system" (Gordan, 2015). These chemicals cause an increase in blood pressure, heart rate, and blood sugar levels to help increase blood flow. "In general, stimulation of the SNS brings the body to a state of raised activity and attention, usually called the *fight or flight* response: heart rate and blood pressure increase, liver glycogen is converted into glucose and peristalsis of the gastrointestinal tract is temporarily inhibited" (Koopman et al., 2011). The parasympathetic nervous system opposes the sympathetic nervous system, counteracting the stress response by slowing down heart rate, lowering blood pressure, and diverting blood flow away from muscles (Sapolsky, 23). Through their contradictory nature, the sympathetic and parasympathetic systems ensure our safety by inducing a physiological response.

A critical factor in ensuring this homeostatic modulation is the vagus nerve. "The vagus nerve represents the main component of the parasympathetic nervous system, which oversees a vast array of crucial bodily functions, including control of mood, immune response, digestion, and heart rate. (Breit et. al, 2018). Every activation of the stress response is an attempt to reattain allostasis and, with these efforts to reestablish that balance, uses more energy than to elicit the stress response itself. With

enough repeated activation, the vagus nerve can become damaged, compromising its function and efficacy in producing a biophysiological response to stress. A process that is originally a negative feedback loop (the acute-stress response) can become positive, negatively affecting other body processes such as endocrine hormone production, inflammation levels, and cardiovascular function. "If you repeatedly turn on the stress response, or if you cannot turn off the stress response at the end of a stressful event, the stress response can eventually become damaging" (Sapolsky, 16).

As a part of sympathetic activation, the immune system suppresses to help the body focus on the acute stress response. When the body experiences chronic stress response activation, immune system suppression can also become chronic, particularly affecting the epithelial lining of the gastrointestinal tract—the physical component of the first line of defense against pathogens, bacteria, viruses, and microbes. "With 70-80% of immune cells being present in the gut, there is an intricate interplay between the intestinal microbiota, the intestinal epithelial layer, and the local mucosal immune system." (Wiertsema et al., 2021).

Different than any other bodily system in that it does not have a singular location in vivo, the immune system is highly complex and is divided into innate and adaptive immunity. Innate (nonspecific) immunity consists of skin and mucosal barriers (physical) and their secretions (chemical) (Aristizábal & González, 2013). If the innate immune system cannot remove the microorganism, the adaptive immune system steps in by specifically targeting the problem cell(s) that were previously recognized by the innate immune system.

In relation to the tri-directional relationship between the neurological system, the psyche, and our immune system with our environment, the gastrointestinal tract is of utmost importance in facilitating a response to prolonged stress exposure. "The GI tract receives the majority of the vagal efferent nerve fibers and harbors the most immune cells in the body. It is to be expected, therefore, that

the GI tract may be an important site of vagal neuroimmune modulation" (Browning et al., 2017). While the gastrointestinal tract as a system can be affected by external stressors, it can also be negatively affected on a cellular level.

The gastrointestinal tract, as well as the endometrium of the uterus, is comprised of simple columnar epithelium—a type of epithelial tissue composed of a single layer of epithelial cells. These rectangular/columnal cells secrete and absorb molecules, providing an impermeable barrier against bacteria and pathogens (Muse et al., 2023). Unlike other epithelial tissues that are comprised of multiple layers for protection, our intestinal mucosal lining relies solely on one layer—a heavy burden for our digestive tract to carry with no insurance policy. Simple columnar epitheliums' specialized characteristics, like goblet cells that produce and secrete mucin (Muc2) and Paneth cells that make antimicrobial peptides (defensins), make the tissue particularly susceptible to being influenced by external stimuli like stress due to their protective pathophysiological nature of our innate immune system (Chotikatum et al., 2018).

Goblet cells, an essential component of columnar epithelial tissue in the gut, "...originate from these pluripotent stem cells and form the intestinal mucus layer that protects epithelial cells. This mucus layer system separates bacteria from epithelial cells in a stratified and organized filter." (Dao, 2023). By providing a physical barrier, the intestinal mucus layer in the GI tract is one of our immune system's first lines of defense. Too much or too little mucus can disrupt the gut's microbiome—too little allows pathogens and bacteria to enter the immune system, and too much can limit epithelial cell function, absorption of food, and further production of mucus (Hansson, 2012).

Paneth cells, located in the crypts or bottom of the epithelial lining's surface, are secretory cells like goblet cells. Paneth cells produce and secrete lysozyme, a protein present in tears, saliva, and mucus (Ferraboschi et al., 2021), as well as defensin, a fundamental microbial peptide of epithelial cells that

protects the host indirectly and directly through microbe activity (Lehrer et al., 2005). Defensins also

serve another purpose: inducing and suppressing inflammatory responses, which, in turn, can modify

immune function (Fruitwala et al., 2019). Given Paneth cells' role in microbe activity, too little or too

much lysozyme and defensin production can disrupt the modulation of microbe homeostasis in the gut,

therefore disrupting the gut's microbiome altogether. Although Paneth cells are a function of the body's

first line of the physical portion of our nonspecific innate response, their secretory properties allow for

the introduction of phagocytosis, an essential process by our nonspecific innate response to maintain

tissue homeostasis (Uribe-Querol & Rosales, 2020).

Working hand in hand with one another, goblet cells and Paneth cells' functions are crucial to

maintaining the integrity of the intestinal mucus barrier. Due to their protective role in the intestinal

epithelium, goblet cells and Paneth cells are pathophysiologically more susceptible to taking the

"damage" from a repeated stressful stimulus, allowing pathogens and bacteria to pass the physical

barrier and trigger the chemical side of the internal innate defense.

> The primary job of the immune system is to defend the body against infectious
>
> agents such as viruses, bacteria, fungi, and parasites…If you suppress the immune
>
> function too long and too much, you are now more likely to fall victim to several
>
> infectious diseases and can be less capable of combating them once you have
>
> them. (Sapolsky, 13 &145)

As mentioned previously, phagocytosis is a process in which tissues maintain homeostasis by

enveloping and digesting invading pathogens. There are several different types of phagocytes, including

neutrophils, macrophages, and mast cells, to name a few. Phagocytes, particularly neutrophils, are next

to come to the immune system's aid when the physical barrier is breached. Another process,

lymphocytosis, is very similar to phagocytosis in that it destroys invading pathogens but is achieved

through lymphocytes like natural killer cells and T and B cells. T and B cells are a part of the adaptive

immune system and produce a specific immune response against microorganisms by releasing specific

chemical messengers (cytokines), while phagocytes like neutrophils and macrophages generate the

same response regardless of the microorganism being targeted (Uribe-Querol & Rosales, 2020).

As a part of the adaptive immune system, lymphocytes, a type of white blood cell, produce

messenger proteins called cytokines specifically made to target problem cells that are crucial in

modulating immune function. "Cytokines are the hormonal messengers responsible for most of the

biological effects in the immune system, such as cell-mediated immunity and allergic-type

responses…These cells bear antigen-specific receptors on their cell surface to allow recognition of

foreign pathogens" (Berger, 2000). Cytokines are categorized by whether they are pro-inflammatory or

anti-inflammatory.

> Th1-type cytokines tend to produce the proinflammatory responses responsible for
> killing intracellular parasites and for perpetuating autoimmune responses. Interferon-
> gamma is the main Th1 cytokine. Excessive proinflammatory responses can lead to
> uncontrolled tissue damage, so there needs to be a mechanism to counteract this. The
> Th2-type cytokines include interleukins 4, 5, and 13, which are associated with the
> promotion of IgE and eosinophilic responses in atopy, and also interleukin-10, which has
> more of an anti-inflammatory response. In excess, Th2 responses will counteract the
> Th1-mediated microbicidal action. The optimal scenario would therefore seem to be

that humans should produce a well-balanced Th1 and Th2 response, suited to the

immune challenge (Berger, 2000).

With these classifications, immune cells like macrophages alert other cells using cytokines to either

induce or repress an immune response and start repairing tissue that has been damaged (Th2 cytokines)

and fend off any foreign microorganisms (Th1 cytokines). Cytokines have their own specific protein cells

to help keep the adaptive immune system functioning correctly, including chemokines, interleukins,

interferons, colony-stimulating factors (CSF), and tumor necrosis factor (TNF). Through different types of

signaling, some fast-acting, and while other signaling processes can take hours or days, cytokines alert

certain parts of the body, even peripheral locations, where the problem cells are located. As a response

to inflammation, the most abundant cytokines are interleukins (IL) and Tumor Necrosis Factor-alpha

(TNF-α).

Each serving different purposes in immune system modulation, the overall function of an

interleukin is: "…to modulate growth, differentiation, and activation during inflammatory and immune

responses." (Justiz Vaillant & Qurie, 2022). For example, previously introduced IL-10, an interleukin part

of the Th2 cellular immune response, targets Th1 cells and inhibits other pro-inflammatory cytokines like

IL-2 that activate natural killer cells, B-cells, and increase cytokine synthesis (Justiz Vaillant & Qurie,

2022). Although IL-10 has anti-inflammatory properties that can be beneficial in decreasing

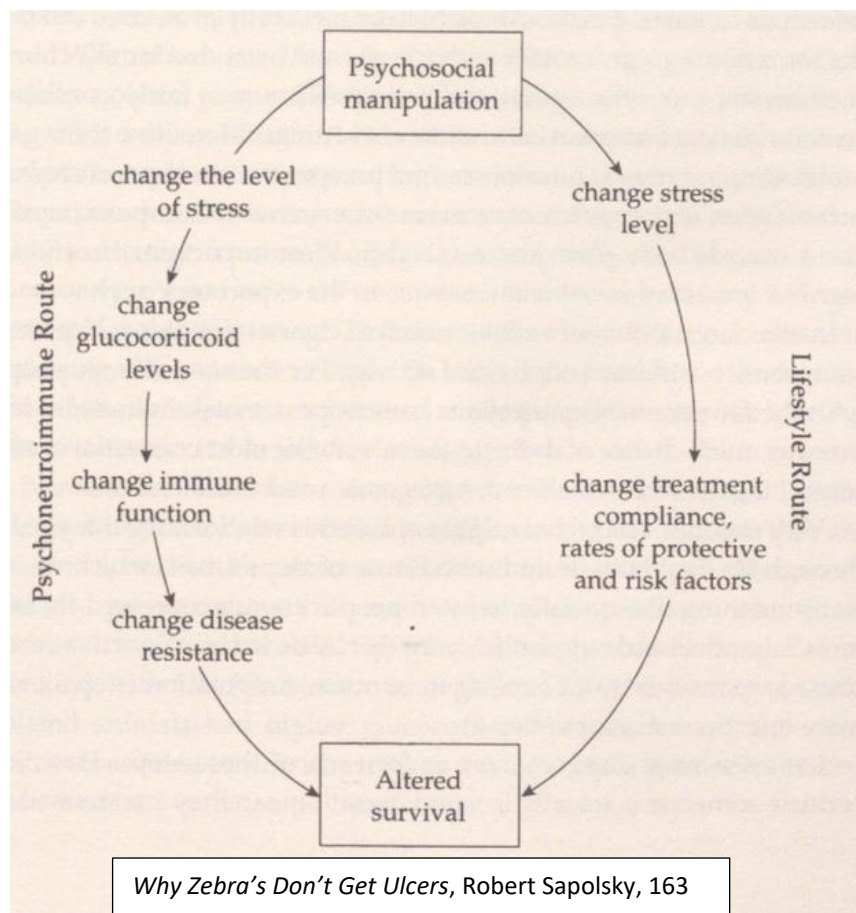inflammation in vivo, too much IL-10 can cause an imbalance between Th1 and Th2 cytokines.

From this imbalance, too many anti-inflammatory cytokines in vivo can contribute to

autoimmune dysfunction, especially in those who already have autoimmune diseases like Lupus,

Inflammatory Bowel Disease (IBD), and Rheumatoid Arthritis (RA), which are inflammation-driven

diseases. TNF-α, a Th1 cytokine, "is a powerful pro-inflammatory agent that regulates many facets of

macrophage function. It is rapidly released after trauma, infection, or exposure to bacterial-derived LPS and has been shown to be one of the most abundant early mediators in inflamed tissue" (Parameswaran & Patial, 2010). Cytokines like IL-10 and TNF-α are heavily influenced by the gut-brain axis and the neuro-immune axis through their direct relationship with glucocorticoids and catecholamines released by the vagus nerve during the acute stress response.

Due to the heavy amounts of vagal efferent nerve fibers found in the GI tract, the relationship between the GI tract, nervous system, and immune system can be seen at a bodily systems level through chronic release of catecholamines and glucocorticoids as well as a biochemical level through cytokine production. "The gastrointestinal tract is constantly confronted with food antigens, possible pathogens, and symbiotic intestinal microbiota that present a risk factor for intestinal inflammation. It is highly innervated by vagal fibers that connect the CNS with the intestinal immune system, making [the] vagus a major component, the neuroendocrine-immune axis." (Breit et al., 2018). While the gut-brain axis and the neuro-immune axis are already interrelated bidirectionally, the combination of the two axes results in a psychoneuroimmunological response to both acute and chronic stress that is ultimately

modulated through the vagus nerve. "The VN, a mixed nerve with 4/5 afferent and 1/5 efferent fibers, is a key component of the neuro-immune and brain-gut axes through a bidirectional communication between the brain and the gastrointestinal (GI) tract" (Bonaz, 2017).

For example, norepinephrine, a catecholamine released by the sympathetic nervous system during the acute stress response, "…inhibits cytokines production, namely TNFα when expressed from monocytes, macrophage, and microglia in response to the lipopolysaccharide (LPS) constituent of the bacterial cell-wall as well as inhibits IL-1β or IL-6 production" (Bellocchi et. all, 2022). Given cytokines' role in adaptive immunity, the chronic release of catecholamines like norepinephrine negatively affects the immune system's ability to respond to foreign invaders and their ability to produce memory T cells that help remember a particular antigen. This can also be seen through the relationship between glucocorticoids and cytokines. Glucocorticoids like cortisol that are released by the vagus nerve through the hypothalamic-pituitary axis (HPA), "… inhibit the expression and action of most cytokines"

Why Zebra's Don't Get Ulcers, Robert Sapolsky, 163

(Brattsand & Linden, 1996). With the prolonged release of essential hormones needed to

activate a stress response within the body, other important immune proteins cannot protect

the host—ultimately making the stress response activation counterproductive.

The stress response in itself is *supposed* to be a short-term process—to provide the biological

conditions to respond to danger effectively. Chronic stress and its effects on the neuro-immune and gut-

brain axis through vagus nerve modulation provide the conditions for stress to have negative

pathophysiological effects on epithelial tissue and cell function in the GI tract and the innate and

adaptive immune system. The long-term psychoneuroimmunological effects of chronic stress response

activation, from a systemic to cellular level, provide a small example of the tridirectional relationship

between the psyche, the nervous system, and our immune system.

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ANTHROPOLOGY

Food or Pests: The Environmental Sustainability and Effects of Insect

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Judge's Comments: "The presentation was outstanding. Solid research, extremely well organized. The thesis was stated at the beginning and supported methodically throughout the presentation. Impressive."

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Food or Pests: The Environmental Sustainability and Effects of Insect Consumption

Insect consumption by human's dates to the prehistoric century. The Romans, both poor and wealthy, consumed insects as a delicacy. In 2020, there were over 2000 edible insect species, the most popular being the cricket and yellow mealworm (Liceaga 131-132). Different insects across the world are boiled, fried, or roasted as part of a meal or a snack (Olivadese and Dindo 8). However, in modern Western society, insect consumption is avoided (Olivadese and Dindo 1). There is a strong neophobia and apprehension towards entomophagy--the consumption of insects. In countries like the United States, Japan, and parts of Europe, insect consumption is frowned upon. Conversely, insect consumption is more popular in countries in Asia, Africa, and South America. (Castro and Chambers 3).

The current academic discussion shows using insects as food could help reduce world hunger. With a growing population estimated to be 9.3 billion in 2050, feeding the world will become a difficult obstacle (Scaffardi and Formici 2). This has led The Food and Agriculture Organization of the United Nations (FAO) and other non-profit organizations to recognize the benefit of edible insects (Scarrdffi and Formici 100). Insects do not require as much food or land to raise compared to other livestock. They are also a nutritious source of food, providing high-quality protein, mono and polyunsaturated fat, vitamins, and minerals (Cunha et al. 1-2).

However, incorporating insects towards a broader audience is difficult if consumers feel disgust towards insect consumption. Besides consumers unwilling to eat insects, food safety issues are a concern. While insect consumption has existed historically, it is unclear how modern mass rearing of insects will impact the food safety of insects (Bertola and Mutinelli 1). Will mass rearing increase the potential for the development of viruses, fungi, and other

determinants for food consumption? The environment and conditions insects are raised in will significantly contribute to the safety of consuming insects. Allergens are also another concern, where studies show insect-consuming countries are more likely to be allergic to insects (Cunha et al. 2). Currently the European Safety Authority has approved the use of whole and ground crickets as a novel food, meaning they can be marketed and sold in the EU (Olivadese and Dindo 8).

The goal is to identify how insect proteins can impact the environmental sustainability and well-being of people around the globe. Furthermore, the paper will explore why is it only that certain countries like China, Brazil, or Uganda consume insects and how insects can be realistically incorporated into a broader global audience, if at all.

Firstly, the health and nutritional effects of consuming insects will be used to evaluate if insects are a healthy source of protein that can be incorporated into the diet. Health effects are defined by the possible human reactions the human body has with a substance. For example, if consumers have certain allergens, inflammation through biomarkers, or impact on the microbiota gut by analyzing collected samples. Health effects can also be determined by nutritional effects such as how well the body can synthesize a nutrient or its satiety. Random controlled trial experiments, literature searches, and research studies will be used to evaluate the information.

 Next environmental sustainability will help determine the benefits of using insects as food. The sustainability of insects is measured on the water usage, greenhouse gas emission, land taken, and cost of manufacturing and processing of the insects. Lastly, the practice of entomophagy in other cultures and how insects can be incorporated into global consumption will be researched.

To determine how entomophagy is practiced in other cultures, the paper will analyze random control experimental trials, interviews, surveys, and double-blind studies from the local country. The paper will then use those results to evaluate the factors contributing to different cultural perceptions of insects and how they could be incorporated into the Western diet.

Insects contain anti-inflammatory bioactive compounds which can help prolong life. For example, omega-3(n-3) and omega-6 fatty (n-6) acids are abundant in insects, such as the cricket and mealworm (Cunha et al. 15). Omega-3 fatty acids are particularly beneficial because they balance the ratio between omega-6 fatty acids. Currently, Western countries have too high omega-6 fatty acids, stemming from foods with refined oils like palm oil or processed refined foods. The recommended ratio between omega-6 fatty (n-6) acids over omega-3 fatty acids (n-3) is 1:1 or 2:1 but the typical Western diet ratio of n-6/n-3 is as high as 15:1 (Saini and Kemun 257). Furthermore, some of the most common consumption of meats like pork, beef, and chicken are low in omega-3 fatty acids compared to fish. Insects are another protein source along with fish where more omega-3 fatty acids can be included in a consumer's diet, reducing inflammation in the body.

Besides insects being anti-inflammatory, insects are a good source of protein, aiding in muscle recovery. Three studies analyzed the ingestion of 25 to 30g of insect protein compared to animal and soy proteins. One 2018 study compared the ingestion of protein between cricket and beef, showing cricket protein had higher amounts of amino acids compared to beef like leucine, BCAA, and EAA. However, insect protein was lower in other amino acids like NEAA and TAA (Cunha et al.10). The difference in amino acid content suggests that insect protein may have an advantage in having higher types of amino acids (Cunha et al. 14). These amino acids

are essential in promoting muscle growth; however, beef and insects had no significant difference in muscle protein synthesis—the growth of muscle tissue (Cunha et al. 10). Nonetheless, the data shows that insects have a complete amino acid profile, meaning the insect alone can fulfill the requirements for muscle growth. In comparison, plant proteins are often not complete protein sources and require pairing multiple foods to create a complete protein source. Complete protein sources are caused to improve muscle growth and repair (Hermans et al. 935). High-protein diets are gaining popularity on social media, especially among adolescents. Furthermore, high-protein diets can help reduce weight and improve glycemic control, contributing to their popularity (Ko. et al. 1) With insects being a high source of protein, they may have a place in sports nutrition, bodybuilding, and people interested in losing weight. Athletes are not the only individuals who would benefit from increased protein intake but growing children and older adults. As elderly muscular tissue breaks down, the demand for protein content will be higher and growing children will also need more energy.

Another 2018-2019 double-blind randomized control trial in Maastricht Netherlands analyzed twenty-four healthy young men's protein synthesis and the production of muscle tissue. Rates of protein synthesis were measured by removing a piece of muscle tissue before and after exercise, and analyzing the number of substances in the blood that contribute to muscle growth. Participants ingested a shake of 30g of lesser mealworm or milk-derived protein after performing a leg workout (Hermans et al. 934-935). Both show increased muscle protein synthesis at rates from similar resistant types of exercise (Hermans et al. 941). Furthermore, the data helps show grinding protein can aid in quick absorption for the body (Hermans et al. 942). Insects also contain an exoskeleton fiber known as chitin which slows the digestion and release

of amino acids. This fiber can help reduce glucose spikes among individuals, being helpful for diabetics managing their blood sugars. Chitin also regulates the intensity of local inflammation, being anti-inflammatory (Cunha et al. 16). With insects like the grasshopper being high in fiber and protein, insects can be incorporated into existing foods to reduce blood sugar spikes and increase protein content. This is like how food manufacturers reduce the glycemic spike of bread by adding coconut flour or seeds like Dave's Killer Bread. While milk protein was slightly higher than the mealworm shakes in protein synthesis, insects' amino acid content and impact on protein synthesis can be attractive to people looking for alternative sources of proteins (Hermans et al. 942). Insect shakes could be a solution for lactose intolerants, such as those in Asian and African countries because they do not contain lactose. The most affected populations of lactose intolerance from highest to lowest in North American communities are Asian, Native Americans, African Americans, and Hispanics (Jansson-Knodell 1500). While plant protein exists, insects contain additional B12 vitamins, an important nutrient many vegans have difficulty acquiring without supplementation. However, whether insects are considered "animals" or not depends on the consumer.

While insects are a more complete protein than plants, how do they compare to meat products? Both products are high-quality protein sources containing similar vitamin and mineral nutritional content. However, insects have the most advantage in their environmental sustainability compared to meat. To create 1 kg of insect protein, less than 100 liters of water is needed, emits only 1 g of CO_2, consumes $15\,m^2$ of arable land, and requires only 1.7kg of cereal. In comparison, creating 1 kg of cattle protein requires 15,000 liters of water, emits 2850g of CO_2, consumes $200\,m^2$ of arable land, and requires 10kg of cereals. Meanwhile, the high

production of livestock contributes to climate change by producing methane gas, nitrous oxide, and ammonia (Scaffardi and Formici 66-67). As of 2021, greenhouse gasses account for between 21% and 37% of annual global emissions, significantly impacting the environment (Scaffardi and Formici 2). Long term-mass rearing of livestock may not be sustainable in reducing climate changes with greenhouse gasses contributing to at least a fifth of the world's global emissions. Especially when the demand for meat and the population growth will increase unless there is another viable farming technique.

If insects are nutritious and environmentally friendly, should insect consumption be promoted in other countries deficient in protein? A world organization known as the State of Food Security and Nutrition in the World revealed that between 691 and 783 million people faced hunger in 2022, a 122 million increase compared to 2019 ("Hunger Afflicts One in Ten Globally, UN Report Finds | UN News"). The World Health Organization also announced that 3.1 billion people could not afford a healthy diet in 2020. Instead, the poorest countries have a diet of nearly 80% cereals, especially those with a GDP of less than five thousand (Scaffardi and Formici 61). However, these cereals lack minerals, vitamins, and nutrients found in meats, fruits, and vegetables. Insects could be a cheaper source of protein, vitamins, and minerals for the less developed countries. Insects do not require as much land as other livestock, meaning not as many forests or other biodiverse environments will have to be destroyed for mass rearing. This could partly be attributed to insects being vertically farmed: where insects are raised vertically. Insects requiring less water would not tax other countries' existing finite water sources compared to livestock. Compared to cattle, insects require one hundred times less water, almost six times less grains, and thirteen times less space. Lastly, insects can reduce

inequality among other countries because their production does not require much machinery (Scaffardi and Formici 67). With insects being less resource-demanding than other protein sources like cattle, their production could help countries suffering from malnutrition or hunger.

Edible insects are usually raised in bins and containers, where they are fed grains or vegetables (Parra and Jr 6). In Thailand, farmers use different containers like plastic drawers, concrete blocks, or plywood boxes to house insects. They are then nourished with chicken feed or plant-based feed like cassava leaves. These insects require macronutrients (lipids, proteins, carbohydrates) and micronutrients (vitamins) which can be given through the feed. (Hadi and Brightwell 8). Similar to how vitamins and other nutrients are fortified into food groups, some nutrients are fortified in the insect's feed. Insects' feeding patterns may be adjusted as they grow or given dietary supplements to maximize the nutritional content (Hadi and Brightwell 8). However, feeding insects grains may not be the most nutritious feed as different feeds impact their nutrition. For example, animal products that are grass-fed are shown to have higher nutrition compared to animal products grain (Daley et al. 1). Meanwhile, feeds like organic waste are strayed away from because of pathogen transmission (Hadi and Brightwell 8). This is because cross-contamination between different organic wastes can occur, producing harmful compounds.

Safety precautions are then taken by insect industries to reduce the transmission of pathogens. Once the insects are collected, they will need to be processed and cleaned. Currently, most insect farms use drying technologies and degutting to preserve and process edible insects (Hadi and Brightwell 9). However, drying impacts the nutritional composition of insects. Some other drying technologies like freeze drying, are an alternative in reducing the

changes in the insect nutritional content compared to vacuum drying or microwave drying.

Studies show thermal processing was effective in making insects safe to consume (Liceaga 139-140). However, the scientific literature on commercial thermal processing's impact on insect nutritional content is limited because the insect industry is novel agriculture (Liceaga 139-140.) Current insect farming also does not utilize chemicals, antibiotics, or hormones as they do for other livestock such as poultry (Liceaga 139). This means insects will have fewer additives (chemicals or hormones) which could impact human development.

If insects are nutritious and environmentally sustainable, should their production be promoted to the global world? While insect consumption has existed for centuries and is still practiced today, most insects consumed were wild caught (Lesnik). With mass rearing of insects, it is unclear what the long-term effects of consuming farm-raised are. Like livestock, overcrowding and poor conditions could lead to the proliferation or transmission of disease, fungi, bacteria, and other pathogens (Bertola and Mutinelli 2). Insect environments are also critical when ensuring safety, as they can be exposed to contaminants like heavy metals, plastics, or pesticides from runoff or metals in the soil. These heavy metals in insects stem from exposure to pollution, insects feeding on animal manure, and agricultural waste material (Malematja et al. 7). However, insects are prohibited from being sold to humans if they consume animal manure or human food waste (Scaffardi and Formici 117). Prohibiting edible insects from consuming harmful material shows there is existing safety regulation on insect consumption. Yet even some wild caught insects pose a risk. One 2020 study examined 6 species of edible insects that were wild caught or reared in laboratories in Kenya and Uganda's capital city, Kampala (Labu et al. 1). Out of 374 screened, a total of nine pesticides were

detected, two insecticides, three herbicides, and four fungicides. Fungicides were the most

detected, from 50-30% of the batches analyzed (Labu et al. 3). While most of these pesticide

samples were within maximum residue limits, those few exceeding the maximum limit still pose

health concerns. Raising insects in controlled environments, like insect farms may be safer than

wild caught. By raising edible insects on farms, they are less predisposed to external bacteria

because their environment is regulated. Furthermore, their feed can be controlled, limiting the

number of pesticides in food. For example, farmers can feed insects vegetable feed not

contaminated with pesticides.

However, less developed countries may not have the finance or stability to raise edible

insects even with insects being more sustainable. One example is a 1994 study by the

Caribbean Tourism Organization which found very few hotels complied with US Environmental

Protection Agency Recommendations when disposing of waste. One of the major problems was

that the ministries of health, who were responsible for regulating sewage legislation, had a lack

of trained staff, money, or monitoring equipment (Gayle 112). Another study showed a high

concentration of heavy metals was found in Mopane worms from two sites at South African

National Park, with cadmium, copper, and zinc being .4 times higher than the recommended

legal level in the United Kingdom and European Union (Hadi and Brightwell 10). Meanwhile, the

concentration of manganese was 20-67 times higher than the food safety standards of the

United States Food and Drug Administration (Hadi and Brightwell 10). If insects are to be raised

as food in other countries, then those countries should have the necessary support and aid to

sustain insect farming. This will help reduce the number of pathogens and meet health

standards. Despite insect farming requiring less technology to develop compared to livestock,

does not mean raising the farms will be easy. Raising edible insects is still a novel agriculture that will require much thought.

Furthermore, Insects for human consumption should not be fed manure and kept away from areas containing metals, such as mines. At the time of this writing, insects in the EU can only be fed vegetables or materials of vegetal origins): not waste derived from urban or domestic (Scaffardi and Formici 117). Once insects are raised safely, their mass production should be monitored. For example, high breeding density areas should be avoided because they can increase cannibalism, encouraging the transmission of microbial agents (Bertola and Mutinelli 18). If insects are to be mass-reared, strenuous efforts and regulations should be met to ensure food safety.

Another concern is the allergic potential of insect consumption. Those allergic to crustaceans like shellfish or shrimp will also have an allergic reaction to insects due to containing similar proteins, tropomyosin, and Arginine Kinase (Cunha et al.17). Furthermore, in countries that commonly consume insects, studies have shown a high prevalence of allergic reactions toward insects. For example, out of 2,500 people in Northeastern Thailand, 14.7% had allergic symptoms after ingesting insects. Meanwhile, 14% of severe allergic reactions or fatalities from 1980 to 2007 were attributed to locust or grasshopper ingestion (Cunha et al. 2). Potential allergens should be labeled to the consumer. However, if people are allergic to shellfish or peanuts should the consumption of those foods be prohibited? Doing so eliminates an important food group, unique recipes, and ways of getting nutrients. Instead, allergen labels should be clear to the consumer.

As of 2023, there are three insects authorized for distribution and consumption in the

European Union, namely Tenebrio molitor larva (mealworm), Locusta migratoria (locust), and

the house cricket (Scaffardi and Formici 89). All insects require a safety assessment before they

are distributed to consumers in the EU (Olivadese and Dindo 10). These safety assessments

help with the safety of insect consumption. Since 2023, there has been no concern about the

dangerous substance in insect species most used as feed or food (Belluco et al. 5). Furthermore,

as of 2021, there is no evidence of these viruses (i.e., dengue fever, West Nile disease, Rift

Valley fever, hemorrhagic fever, chikungunya fever) in edible insects (Bertola and Mutinelli 2).

Meanwhile, the concentration values of insect contaminants were like or lower than those

measured in meat, fish, and eggs; not exceeding the legal limits (Belluco et al. 5). As of now,

insects are safe for consumption, but as mass rearing expands globally, the hygiene and health

of the insects should be carefully monitored.

To help enhance safety, cooking insects through boiling, roasting, or toasting can reduce

parasites, viruses, and bacteria. The distribution of insect products should be terse and clear on

potential allergens. If insects were promoted to other countries, necessary infrastructure would

be required to ensure their safety. For example, raising insects in controlled clean tanks that

avoid external bacteria, fungi, and viruses. Some researchers have discussed using simple

sanitation interventions or advanced antiviral methods to help make mass rearing of insects

safe. These range from RNA interference or transgenic technologies which involve modification

of their DNA (Hadi and Brightwell 9). Some insects are even shown to reduce the amount of

toxins exposed to fungi-contaminated feed because they can metabolize mycotoxins (Hadi and

Brightwell 9). Therefore, even if a human does consume a contaminated insect, the effects may

not be as severe. Nonetheless, contaminated insects should not be consumed. Another

research study reported by the European Food Safety Authority mentioned the safety risk of

food-borne viral pathogens insect consumption is low. These viral infections in edible insects

were specific to insects and not harmful to humans (Hadi and Brightwell 10). Therefore, some

viruses targeted at insects are not as much of a threat to humans.

Another challenge besides safety is whether Westerners will accept the consumption of

insects as a different meat alternative. Instead, plant-based meat alternatives are growing more

in popularity compared to insects. Plant-based foods have been in the top ten global food

trends since 2014, according to New Nutrition and Business, and one of the top three trends in

2020 (Estell et al 1.) Meanwhile, insect consumption as a meat alternative or an addition to the

Western diet faces apprehension and disgust from Western or Japanese consumers (Castro and

Chambers 3). When examining consumers who consume plant-based meat alternatives

(PBMA), researchers found the biggest influences in PBMA consumption were "a new food"

(49.3%), ethical concerns (44.5% n=207), environmental concerns (41.5% n=193), and health

reasons (28.6% n=133) (Estell et al. 7). This study was executed through a self-administered

online survey in Australia between June 2020 and October 2020, where a combination of

nutrition professionals and consumers above 18 years of age were interviewed. Professionals

were considered those with a background in nutrition science or dietetics and participants were

reached through advertisement on social media platforms such as Facebook, Twitter, and

Instagram, and a Grains and Legumes Nutrition Council to five thousand subscribers. Three-

quarters of participants (65.5% n=432) did not have a background in nutrition, but 71% n= (648)

had a bachelor's or postgraduate degree (Estell et al. 3). Both insect-based meat alternatives

and PBMA are environmentally friendly and new. Insects emit fewer greenhouse gasses, reduce

land emissions, have recently been introduced into the European market, and are nutritious.

Despite insects being environmentally friendly, their attributes have deterred the consumption of insects in Western countries. Most consumers are averse to the attributes and the sight of insects in their food. A 2020 study analyzing a group of 101 Polish students' taste in insect bars in Tri-City, prepared different insects into bars ground, visible, and one control bar with no insects. On a 1-10 scale, the researchers found insect bars with visible mealworms had the lowest ranking in taste and appearance 4.8 +-2.6. In contrast the same bar but with non-visible mealworms had a much higher ranking on taste, being 8.0+-1.8 in appearance and 7.7+-1.8 in taste (Bartkowicz and Zielinska 194). Despite both bars containing the same ingredients, the sight of visible insects impacted the taste. Meaning if insect industries wanted to promote insect proteins to Western countries, grinding them or making them non-visible will help make the product more accessible to consumers. Meanwhile, a larger sample size in Beijing and Nanjing metropolitan shopping areas found comparable results. A 2012 face-to-face survey questionnaire that interviewed 201 Chinese consumers found "attributes' ' were the highest influence on insect purchase (48.2%) following safety, (44.6%) (Jun et al. 8). In both studies, the appearance of insects heavily impacts the consumer's perception of the food.

Incorporating insects invisibly into familiar foods could reduce alien feelings toward insect consumption. Without individuals seeing the insect, they do not develop biases based on appearance. Insect bars in London have been offering invisible bug-based brownies by adding cricket flour into the mix ("Insects Cause Change to Novel Foods Regime."). Incorporating something novel into an existing food makes the novelty less bizarre to the consumer; like how certain schools in the USA incorporated vegetables into children's school diets by utilizing

existing food products. Fried rice contains peas and carrots, or pizza may be topped with vegetables. The addition of raw fish was made more palatable to American consumers because of the familiar ingredients such as rice and fish (House 1291). There are plenty of ways to include insects in familiar foods either whole or invisible.

However, hiding insects may not be an effective long-term strategy for promoting insect consumption. If an entire food group must be hidden for consumers to eat it, that could be associated with a negative connotation. To the consumer, insects will only be appetizing if they are invisible through a grounded powder. However, this neglects other cultures' dishes that consume insects upfront. The process of grinding makes some dishes not compatible because they are limited to a powdered form. In Uganda, insects are usually fried and prepared with onions, and in Mexico, crickets are roasted and eaten as a snack (Lesnik 9). Both dishes cannot be achieved by grinding insects into a powder. Over time, if grinding is an over-reliant method for insect consumption, it could replace existing culture recipes. Insects that are eaten invisibly may become the norm in countries that already consume insects whole. This potentially makes insects consumed whole look abnormal as consumers who already consume whole insects become acquired to a grounded form. As a result, different recipes, and ways for insect consumers to get their nutrition are lost. Incorporating insect flour into familiar foods should be a guide to adding insects into new consumer diets rather than replacing existing cuisines. Hence why academic writer Gomez Corona also agrees familiarization does not mean long-term acceptance (2). Currently, this is how insect manufacturers have been promoting insect consumption to Western consumers (House 1298). The current process to make insects accessible to a Western population may reduce other cultures' current eating habits.

Instead, countries should try to create an environment to support insect consumption. Academic writer Jouse House argues infrastructure support can help consumers accept novel foods. For example, the consumption of raw fish in sushi was partly introduced and accepted by Americans in the 1960s through infrastructure support, foreigners creating sushi, and continuing to consume sushi. Sushi had the necessary suppliers and infrastructures to sustain a Japanese restaurant, with sushi bars inviting experienced Japanese chefs (House 1292). Meanwhile, Japanese Americans would continue to consume sushi, sharing sushi with American colleagues (House (House 1292). Symbolic significance also contributed to sushi's consumption, with Sushi being associated with the elites and Japanese Cuisine, later being popular with Americans around the 1960s (House 1293). Overall, if insect manufacturers were to promote insect consumption; symbolic meaning, infrastructure support, and sharing of existing cultural practices should be acknowledged.

While presenting insects as haute may be difficult, including other countries' cooking practices and promoting it to familiar colleagues, friends, and family members may be more feasible. Mexico for example has insects as a significant part of their diet, especially in Oaxaca, a southwest region in Mexico (Gomez-Corona and Valentin 2). In Mexico Oaxaca, crickets are eaten in tacos or as a snack, and in South America Termite Soldiers are rinsed, boiled, salted, and then dried, reminding the author of popcorn (Lesnik 9-10). Familiar colleagues establishing an existing cultural practice will help make consumers less adverse to a new practice. Certain restaurants have already included insect dishes from other cultures such as the roasted cricket taco served in Oyamel Cocina Mexicana in Washington D.C. As insects become more normalized and accepted by people, they will be less averse to consumers.

Edible insects have the potential to help reduce malnutrition while being a sustainable choice of protein or food. They require less machinery to develop compared to livestock and require fewer resources. They are also nutritious, being a high source of protein and omega-3 fatty acids. However, for edible insects to progress as a global food, negative connotations associated with insects should be removed and food safety should continue to be ensured. While insects have been consumed for centuries, the introduction of mass-rearing insects is new. Overcrowding, poor conditions, and improper farming handling can spread unwanted pathogens and contaminants. However, edible insect farmers are aware of this, and regulations are imposed to ensure the safety of insect consumption. Roasting, freezing, and other process methods also significantly reduce potential viruses or bacteria. With insects also having similar allergens to shellfish, allergen warnings should be clearly labeled.

Furthermore, consumers' fear of insects can be overcome by introducing the practice through familiar people one works with. While insect consumption in other countries such as Thailand, China, Mexico, Brazil, and Africa, exists; Western consumers are opposed to insect consumption. Despite insects being environmentally sustainable, most Westerners are disgusted especially when insects are visible in the food. To reduce people's reluctance to consume insects, it is not enough to make insects invisible in a powdered form. While making insects invisible is a viable short-term solution, only hiding edible insects to appease consumers creates a negative schema. Rather, edible insects should be introduced by familiar colleagues like friends and co-workers to reduce consumers' fear of insects. Utilizing existing cooking practices from insect-consuming countries helps preserve the insect-consuming culture's food and traditions compared to grinding them into flour.

It is unlikely Western consumers will adopt insect-eating practices soon. However, that does not discredit its potential as a nutritious and environmentally friendly source of food. As countries struggle to feed their populations, insects could be a possible sustainable option, but only if necessary precautions are taken to maintain safety.

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BUSINESS AND ECONOMICS

Analysis of Regulation of the AI Sector: Problems and Solutions

Caleb VanRoekel; Mentor: Nathan Zook, Montgomery College

Judge's Comments: "Caleb introduced and discussed an important and interesting topic about the regulations on the AI industry. His presentation was thoroughly researched and well organized. He spoke with confidence and had a good engagement with the audience."

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Analysis of Regulation on the AI sector: Problems and Solutions

Welcome to the future. The AI revolution that sci-fi has been hyping up for the past decade is now (more or less) in full swing. It seems like every big tech company in the world is doing something with AI. Google, Microsoft, and even Apple are now coming out with their new "virtual assistants" that can do anything from tell you the date, to paint you a picture. However, this is just the start. AI assistants are only the beginning and soon we are going to have AI powered driverless cars, AI resource management, AI medical analysis, and even AI military drones. However, for all of this to happen as soon as possible we must address a glaring issue with the AI industry, regulations. The same regulations that protect workers and consumers could also be hurting the industries they are placed upon.

This paper will first show the importance AI has for America and its adversaries. This will be accomplished by looking at AI's predicted role in military and economic situations. Next, this paper will discuss why regulations are needed in the first place. This will be accomplished by looking at several articles documenting potential dangers that arise from unregulated AI. Next this paper will discuss how regulation disproportionately impacts smaller businesses compared to larger ones. To do this, this paper will analyze documents written by small businesses, and review studies that show the disparity between big and small businesses. Then this paper will look at how this disparity leads to a decrease in innovation within the AI sector by looking at economic theories and research studies. Finally, this paper will propose two methods of regulating the AI industry that minimizes the negative impacts on said industries. This will be accomplished by analyzing some of the biggest issues with regulations, such as long wait times for testing permits and diverse regulatory requirements. This paper concludes that by creating a standard set of regulations throughout the United States and by investing in the creation of publicly available data sets for AI training, America can secure its lead as the world leader in AI technology.

Before we get into the main purpose of the paper, it is important to explain why this issue is only coming up now despite the fact that we have had AI technology in one form or another throughout the last decade. AI is not something new. It has been around for a while. The main reason for the current focus on regulations is because the AI we have now is nothing like the AI we had ten years ago. I remember when Siri and Amazon Echo first came out. At the time, they were neat and did have some useful features, but they had hard limits. The AI we have now is

much more complex, and is able to achieve human-like levels of communication. Their capabilities have also been greatly enhanced with some AI having the capability to make pictures, mimic people's voices, and even write papers. It is important to note that AI has been used in government sectors for quite a while. UPS, for example, uses computer vision to read mail addresses (Bergstrom), and the FBI has been using facial recognition software since 2018 (GAO). The difference now is that privately owned businesses and corporations are starting to implement these same technologies. To help protect end users and ensure AI is being used appropriately, the United States government puts regulations on the industry to keep things in check. The reasons as to why it is essential to regulate AI will be explored later in this paper. For now, we must discuss the importance of AI to America's economy and defense sector.

The United States government has stated on multiple occasions that they intend to make America the world leader in artificial intelligence development and technology. Vice president Kamala Harris has stated that "When it comes to AI, America is a global leader". However, America is not the only country competing for this title. China has also made it clear that they intend to be the world leader in AI (CQ 2023). Unlike other smaller nations, China has the bite to back up its bark. According to Michele A. Flournoy, a former member of the Undersecretary of Defense for Policy and a chair member of the Center for a New American Security, China has many advantages when it comes to AI. First, their government is able to dictate what takes priority and "allocate whatever resources it deems necessary to meet AI targets." Second, because of China's policy of civil-military fusion, they are able to draw from anywhere in the work pool to find skilled individuals to work for them. America uses similar tactics in regards to outsourcing for military applications. This was the case when America outsourced the creation of a next generation stealth fighter, leading to the creation of the F-35 Stealth Aircraft by Lockheed Martin. However, the process isn't as fluid or seamless as it is within China. It is also predicted that China will have significantly more workers skilled in STEM fields in the upcoming decades (Flournoy). If America truly wants to be the world leader in AI, the US is going to have to step up its game.

It makes sense that both America and China are competing to be world leaders in AI. The field of computer science and AI has grown tremendously over the past decade alone, and it is predicted to increase even further (Flournoy). Ensuring that America's AI technology is up to date ensures that we don't have to rely on other countries for their AI systems. Furthermore,

when American companies sell their AI services to other countries, revenue is brought into America.

However, there are more benefits to AI superiority than just economic ones. AI has many significant applications in the military ranging from resource management to predicting future attacks (Flournoy). The Secretary of Defense has already issued a policy that would help create a framework for incorporating AI into national security (Flournoy). Rob Wittman, a chairman of the House Armed Services Tactical Air and Land Forces Subcommittee, said in a statement that "The DoD recognizes the tremendous capability of artificial intelligence and autonomous technology" (CQ 2023).

Despite the advances AI has made over the past decade, it can still behave unpredictably and potentially put citizens in danger. Nowhere else is this more true than in the field of autonomous vehicles. Autonomous vehicles have been a pipe dream of engineers and commuters alike. Despite this the only company to make mass produced vehicles with "autonomous" capabilities is Tesla. This is because despite the advancements being made, these cars can still malfunction and cause fatal accidents. This was the case in an accident involving a semi truck and Tesla's autopilot feature. In 2019, a man named Jeremy Banner was killed when his Tesla's autopilot system did not function correctly and caused him to crash into the side of a semi truck that was pulling out onto the street (Thadani). Banner was not paying attention to the road when the accident happened, presumably under the assumption that the autopilot could handle things. However, the autopilot system failed to register the semi truck pulling out into the road as a threat and Banner's car went crashing into the side of the semi at roughly 70 miles per hour resulting in his death (Thadani). Tesla has been working on autonomous driving for years. Imagine what would happen if startup companies started testing their own driving systems wildly on public roads. This is why there are regulations in place, to ensure the safety and quality of AI systems. In other words, they are there to ensure the safety of the general public. According to Weiyue Wu and Shaoshan Liu (Cofounder and Chairman of an autonomous driving company respectively), there was a distinct lack of regulations in 2017 when they were testing their self-driving cars in China. They believed that this posed a "fatal risk to the general public." When they got the opportunity, they expressed the importance of proper regulation during an autonomous driving seminar hosted by the local government.

Although autonomous vehicles are a very specific field in AI, the idea that AI can be unpredictable and needs to be regulated can apply to any field. You don't want autonomous drones crashing into your house, you don't want medical AI prescribing you the wrong medicine for the wrong disease, and you don't want facial detection software misidentifying you as an enemy of the state and calling the police. AI military aircraft, for example, could be very dangerous if there were any problems with their weapon or navigation systems.

One of the biggest problems plaguing AI is its perpetuation of biases. AI programs are not made; they are trained. When an AI developer "trains" an AI, it means the AI has gone through tests that (depending on the results) make alterations to the AI that improve its performance. In many cases the training data acts as a sort of guide, telling the AI the correct response. For example, an AI being trained to identify fruits might be given a picture of an apple and told that the picture is of an apple. The next time the AI sees an apple, it will (hopefully) identify the object it sees as an apple without being told. One reason AI is able to do this is because AI is very good at finding patterns and using those patterns to make decisions. For instance, when told to pick out apples from a group of assorted fruit, the AI might look for red round objects which are features it associates with apples. The AI develops and learns these patterns by looking at vast quantities of training data. However, the patterns found and used by the AI might not always be patterns that give a correct or appropriate result. If the data used to train AI is filled with biases, there is a high likelihood the AI will make decisions that conform to said biases. In his book, *Calling Bullshit: The Art of Skepticism in a Data-Driven World*, Carl Bergstrom sums up the issue when he says "Machines are not free from human biases; they perpetuate them…" Bergstrom gives an excellent example of how issues like this surface in real life. Take automated hiring software for example. When Amazon trained its automated hiring AI software using existing resumes, the resulting AI preferentially chose male candidates over female ones. This is most likely because Amazon hires more men than women, and as such the AI noticed this pattern and chose to hire men over women to match this pattern. Even redacting names or gender related pronouns isn't always enough to stop AI from making gender based decisions. If a resume mentions a sport or activity that is primarily done by women, the AI will still be able to determine the applicant's gender. Other instances of AI biases include racial biases in criminal sentencing and racial biases in loan lending (Bergstrom). Furthermore, the issue of racial biases in AI was also mentioned in the 2019 June 3rd edition of CQ Press titled

Government Struggles to Rein In Artificial Intelligence Programs. According to Scientists from the MIT Media Lab, there have been issues with AI showing racial biases when giving out criminal sentences (CQ 2019). There are many factors that could be contributing to this response from AI which makes it difficult to pinpoint the exact source of the problem. It is therefore important that proper regulations are put in place to test AI systems for racial, gender, and other forms of biases.

By now it should be clear that the need for regulation in the AI industry is essential. However, this doesn't mean we should ignore the negative impacts that result from said regulations. By looking at the problems regulations cause, we will be better equipped to find ways to minimize the negative effects associated with it.

Although the purpose of this paper is to look at the effects regulation has on AI businesses, it's important to note that regulation is a factor that affects all types of businesses, not just those relating to AI. Regulations are good; they help protect workers and consumers alike. For instance, companies are not allowed to lie about the capabilities of their product. They aren't allowed to sell snake oil so to speak. This ensures that consumers get what is paid for and nothing less. This is why companies go through the effort of quality control and extensive testing to ensure their products function correctly. However, as one may expect, all these regulations act as hurdles that businesses must overcome to sell their product and make a profit. Most businesses are capable of overcoming these hurdles without significant consequences. For big businesses selling thousands or millions of products world wide, a one hundred thousand or two hundred thousand cost to meet regulations is only a drop in the bucket. However, in many cases the amount spent to meet regulations has nothing to do with the amount of revenue generated. This is one of the reasons smaller businesses are more heavily affected by regulations compared to their larger counterparts. Small businesses simply do not generate the levels of revenue that bigger businesses do, and as such they take a bigger hit when met with regulations they are forced to comply with. This sentiment is enforced by a 1998 government research study by Microeconomic Applications, Inc. that was conducted to quantify the effects regulation had on small and big businesses. The study looked at regulations created by the Occupational Safety and Health Administration, Environmental Protection Agency, Food and Drug Administration, United States Department of Agriculture, and the Internal Revenue Service. The study showed that of the twenty-eight examined organizations, seventeen showed signs of having higher unit

compliance costs (the average cost per employee of complying with the regulation) compared to their larger counterparts (Beale).

A prime example of how regulations can negatively affect small businesses comes from Weiyue Wu and Shaoshan Liu. Weiyue Wu is the chief operating officer of PerceptIn and Shaoshan Liu is the co-founder and chairman. PerceptIn is an artificial intelligence company that focuses on computer vision and AI vehicles. Weiyue Wu and Shaoshan Liu have been working at the company since 2016 and have seen first hand the kind of trouble that revolves around regulation. The negative impacts of regulation were present across the majority of the settings they encountered. Overall, they believe the lack of standardization in regards to regulation is harmful to AI companies and to startup companies in particular. In the EU, their company had spent seven months getting a temporary testing permit that lasted one month. Another issue they had in the EU was the lack of negotiation with the local government. Regardless of the testing environment they were in, they had to spend a significant amount of resources to prepare for all scenarios. Even when testing in private closed off areas (such as a closed off parking garage), the company still needed to expend resources to meet regulations. In America, the situation was slightly different. In the US, regulations regarding autonomous vehicles are controlled by the local city governments. This meant that for every city they went to the team had to go through the process of getting permits all over again. In Weiyue Wu and Shaoshan Liu's own words, it was an "inefficient and costly process." In total, Weiyue Wu and Shaoshan Liu claim that 42% of their annual budget went towards meeting regulations and getting testing permits. They claim that this is much more than the 13% that software companies spend.

At this point it should be clear that regulation causes a significant negative impact on small AI businesses. Now it is time to look at how this can negatively impact the industry as a whole.

One might argue that the current state of the AI industry is doing fine, and that the increase in the number of AI startup companies supports this sentiment. Although it is true that the AI market has been doing well despite the regulations, this doesn't mean that the industry couldn't be doing better. Logically, it makes sense that a small business with more resources would be able to grow at a faster rate than one burdened with regulations. It is also reasonable to believe that the increase to upfront cost the regulations create could also be decreasing the number of small AI businesses that are created in the first place. This decrease in the size and

number of AI startups is important because it affects how much competition is present within an industry.

Competition within an industry is important because it is generally believed to increase innovation and technological advancements. The idea that competition fosters innovation is not a new one and was thought up by Adam Smith in the 1700's (Correa). It is believed that the pressure put on companies by competition encourages them to find new ways to make better products at a cheaper price (Correa). One way to think about it is like this. If a business has a monopoly on a certain market or product, what reason would they have to innovate? If the people buying a product from a business don't have anywhere else to go to buy said product, then they will be forced to purchase the product from that business. In cases like this there is no reason to spend money on R&D (Research & Development) because there is no need to make a better or more affordable product. Plus, the money companies don't spend on R&D can be used to line their pockets with cash. This entire system collapses when a second, fourth, or hundredth company enters the market. All of a sudden, the consumers no longer have to purchase the product from one company. If another company found a way to make a product better or cheaper, customers will purchase from that company instead. With a limited number of businesses and a large group of consumers, businesses will have no need to innovate because the income generated by consumers is (more or less) guaranteed. With a limited number of consumers and a large group of businesses, consumers can and will choose the company that makes the best product for the cheapest price. This forces businesses to innovate their technology and manufacturing capabilities if they intend to stay in business.

In practice this theory holds true. In June 2014, the *Journal of Industrial Economics* published a study by Juan A. Correa and Carmine Ornaghi. Their study sought to determine how competition affects innovation within an industry. To measure innovation they looked at the average number of patents being created in an industry. Patents are usually created when a company discovers or invents something they deem to be valuable. In the context of study, patents are measured because a patent indicates that a company has discovered or invented something to either make their product better or cheaper. The study also measured total factor productivity (TFP) and labor productivity (LP) growth. The study was conducted over the course of several decades. Results from the study showed a "positive monotonic relationship between

competition and innovation" (Correa). In other words, there was a strong correlation between an increase in competition and an increase in innovation.

As previously discussed, there are many benefits that come from having a strong AI industry. However, by this point in the paper, it should be clear that the current way the US handles regulations in regards to the AI industry limits our ability to innovate. If the regulatory issues currently faced are not addressed, we could see America fall behind China and other nations in terms of advanced AI technology. The rest of this paper will be dedicated to the discussion of possible methods of decreasing the negative effects regulation has on the AI industry.

Many of the issues regarding regulation either have to do with time or complexity. To minimize the negative effect regulation has on the AI industry, it is necessary to find a way to simplify the regulation system, or reduce the time taken to verify AI systems and grant permits. The speed at which testing and permits are completed can potentially be increased by expediting the process. However, the solutions being discussed today will focus on how to decrease complexity of the current regulatory landscape.

The first solution is to standardize the whole regulatory landscape within the US. There can and certainly will be different types of regulations for different applications. However, these regulations will apply everywhere within the US, and once met, will allow the use or testing of AI technology throughout the US. With unified regulation throughout the United States, we can greatly decrease the complexity of regulations. By making the regulations the same all throughout America we avoid the issues experienced by Weiyue Wu and Shaoshan Liu in which each city they visited had different laws for acceptable use and testing of autonomous vehicles. Not only does this decrease the complexity of the regulatory landscape by getting rid of regulation variance, it also decreases the time spent meeting regulations. Instead of having to meet regulations in each state a company is working in, they will only need to meet the standard regulations created by the United States. This will result in less permits being filed, less testing for regulation compliance, and less money spent meeting regulations. President Joe Biden has shown this is possible by signing the "Blueprint for an AI Bill of Rights." This "AI Bill of Rights," enacted the Defense Production Act. This essentially gave him the authority to force companies to test their AI systems and prove to the government that they are safe and able to be used properly. From this, it is very easy to imagine how the government could form a new sector

or organization whose sole purpose is to regulate and verify AI companies. In addition to this, the Office of the Secretary of Defense has issued a policy framework for the safe implementation of AI into the Department of Defense. If the United States government could extend or amend this policy for use in the private sector, then we could see the standardization of regulations by means of a policy framework. Standardization is also being pushed for by other countries. On the 30th of October 2023, the G7 released the "Hiroshima Process International Guiding Principles for Organizations Developing Advanced AI system." The paper essentially acts as a policy framework outline that encourages the safe use and development of AI. This leads me to my last point on standardization of regulations. Standardizing the regulatory landscape throughout America is good, but standardizing throughout the entire world is better. President Biden's speech and the paper released by the G7 indicates that both America and most of Europe are on board with the idea of safe and regulated AI. If possible, globalized regulations would make it much easier for American corporations to work outside the US and for outside corporations to work inside the US. This would reduce the time and resources spent on regulations and requirements which would leave more resources available for R&D and expansion.

Another potential solution could be to fund the creation of publicly available datasets for company use. The use of publicly available verified datasets eliminates the need to do extensive testing and research to ensure datasets are rid of biases or other potential issues. The datasets only need to be tested and verified once, at which point any other company will be able to use them without the fear that the datasets are corrupted with bad data. From this point, companies would only need to cite where they got their training data, and confirm that they are using an unaltered copy of the dataset. To confirm an unaltered version of the dataset is being used, a hash value can be calculated from the confirmed dataset and compared with the hash value of the dataset being used by the company. If the hash values are the same then the datasets are the same, but if the hash values are different then there is a high likelihood that the dataset has been altered or tampered with in some manner. The only downside to this solution is that it will cost a significant amount of money to be implemented. The creation of the datasets will have to be outsourced or created by the government itself; both options will cost money. However, an alternative could be to give tax breaks to organizations who donate, or make public, verified datasets that they've created. The tax breaks would also have the added benefit of increasing the available funds for R&D and other types of expansion within the business. However, this will

decrease the revenue generated from tax in that sector. The situation is reminiscent of the decision to fund the creation of the transcontinental railroad. The transcontinental railroad was probably one of the best investments America has ever made. I can't help but feel that funding the creation of publicly available datasets could have a long term positive impact as well.

When thinking about which of these solutions is the most promising, it's important to remember that in both cases the implementation of the solution will require cooperation between the public and private sector to ensure the solution works effectively for both parties. Perhaps the best course of action would be to pursue both options and see which provides the most promising results. In both cases, the effectiveness of each proposed solution could be measured using the same techniques Juan A. Correa and Carmine Ornaghi used in their study to measure the correlation between competition and innovation. One would simply need to measure the number of patents being created before and after each solution is implemented. If the solution is working as intended, one should observe an increase in the total number of patents coming out of the AI industry. If not, then the solution was ineffective at solving the issue and another solution should be implemented instead.

With everything being said, I believe the best course of action for America is to be proactive. America likes to take its time when passing bills or making regulations. Regardless of the solutions chosen, whether it be one of mine or somebody else's, America needs to act quickly so that by the time the solution is implemented, we aren't far behind China or the rest of the world in regards to AI technology.

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COMMUNICATIONS & MEDIA

Toon into Reality: Sketching Out the Animated Family

Shahd Ahmed; Mentor: Pamela Raechel Wilson, Montgomery College

Judge's Comments: "Shahd was very effective in using the slides. She was able to get deep into the subject with clear and relevant details."

Mr. Doug Grunther

Woodstock Radio

Toon into Reality: Sketching Out the Animated Family

Imagine flipping through channels on a lazy Sunday afternoon. You pause at a familiar

scene: a bright yellow, four-fingered cartoon family sitting on their iconic brown couch. It's *The*

Simpsons, a show that's been a household staple for decades, painting a picture of a quirky yet

endearing middle-class American family. Moments later, you switch channels and find yourself

in the midst of *The Boondocks*, complete with the sounds of classic albums and the sharp wit of

wise-cracking neighbors. Here, the narrative centers around African American brothers Huey

and Riley, under the care of their no-nonsense grandfather. The contrast is stark, not just in the

color palette but in the very essence of family dynamics portrayed.

In a world increasingly aware of the nuances of race, culture, and family, these two

shows stand as pillars of pop culture, each offering a unique lens through which we view and

understand the concept of family. As we delve into this exploration, we're not just passively

watching cartoons; we're actively engaging with a societal mirror that reflects, distorts, and

sometimes challenges our perceptions of family norms. Through the lens of these animated

families, we encounter a dialogue that is as relevant today as it has ever been – a dialogue

about race, upbringing, and the diverse tapestry of family life in modern America.

So, this brings us to a compelling question, one that might have been hiding in plain

sight as we followed the adventures of Huey, Riley, and Robert "Granddad" Freeman or

chuckled at Homer, Marge, Bart, and Lisa's shenanigans: How do *The Boondocks* and *The*

Simpsons reflect and critique stereotypes about black and white family dynamics?

The Boondocks, created by Aaron McGruder, is a sharp, satirical take on African American culture and politics. The show first aired in 2005, and originated from a comic strip of the same name. It's renowned for its bold commentary on social and racial issues, encapsulating the experiences and challenges of the black community in modern America (Westengard and Barlow). The narrative revolves around the Freeman family, particularly two young brothers, Huey and Riley, who live with their Granddad after moving from Chicago to the predominantly white suburb of Woodcrest (Westengard and Barlow). The show's distinct style and unapologetic approach to addressing contentious issues make it a standout piece of television history.

The Simpsons, created by Matt Groening and premiering in 1989, presents a satirical depiction of American life through the lens of a typical middle-class family. Set in the fictional town of Springfield, the show humorously explores various aspects of American culture, politics, and society. Unlike *The Boondocks*, *The Simpsons* is characterized by its more universal approach to satire, often dealing with everyday familial and societal situations in a light-hearted manner. The show's longevity and popularity have made it not only a cultural icon but also a significant influence in shaping public perceptions of family dynamics and societal norms (Westengard and Barlow). Both these shows, with their distinctive styles and perspectives, have contributed significantly to the evolution of the sitcom genre, each reflecting and critiquing societal norms in their unique ways.

In *The Boondocks*, the fourth season's "Early Bird Special" episode offers a unique perspective on family dynamics and the challenges they face. In this episode, we see Granddad, continuing his struggle with financial matters, forcing Huey and Riley into wearing uncool, tight

clothes bought with his dwindling funds. The tension escalates when Riley complains, leading to a moment where Granddad's frustration boils over, and he starts to physically discipline Riley. However, Huey intervenes, suggesting Granddad look for a job (McGruder, "Early Bird Special"). This portrayal aligns with Tyree and Krishnasamy's observations, who note the absence of a maternal figure in the Freeman family as a deliberate narrative choice that challenges conventional African American family stereotypes. Here, Granddad's role as both caregiver and disciplinarian illustrates the complexities of black parenting, often seen as authoritarian (Tyree and Krishnasamy).

This depiction of physical discipline within the Freeman family also touches upon a broader discussion about the role of physical discipline in black families. In many African American communities, physical discipline has been historically utilized not only as a method of correction but also as a means to instill values such as respect for authority, adherence to tradition, and the maintenance of order. This form of discipline, while controversial, is often rooted in a deeper cultural context where the authority of the parental figure is paramount, and respect within the family unit is closely tied to obedience. Granddad's use of physical discipline, therefore, can be interpreted not just as an expression of frustration or authority, but also as a reflection of a deeply ingrained cultural practice aimed at safeguarding values and maintaining familial structure.

In Alyse Nicole Jenkins' critical analysis of *The Boondocks*, titled "Boys in the Burbs: A Critical Analysis of The Boondocks," the unique family structure of the Freeman household is highlighted. Jenkins notes that the family, consisting of Huey, Riley, and their Granddad, represents a deviation from the traditional sitcom family. This deviation reflects broader

societal shifts towards single-parent households. Granddad, despite being the guardian, doesn't fulfill the typical mother role. Instead, this role is often portrayed by Huey, who acts as a mediator and voice of reason in conflicts (Jenkins). Jenkins' analysis also touches on the flexibility of roles within the Freeman family. For example, in the season two episode "…Or Die Trying," the Freeman family, including their neighbor Jazmine, engage in behavior typically not associated with parental figures, where they sneak food into a movie theater (McGruder, "…Or Die Trying"). Jenkins points out that Riley and Granddad are often portrayed in a stereotypical manner, creating the satire's base. This role reversal is evident as Huey often assumes a more mature, parental role in contrast to Granddad's occasional childish behavior (Jenkins).

Another key episode, "Granddad's Fight" from the first season, exemplifies the theme of black masculinity. The episode, which shows Granddad engaging in a physical altercation over a parking space (McGruder, "Granddad's Fight"), embodies the "cool pose" – a concept discussed by Howard in Chapter 9 of "Black Comics: Politics of Race and Representation." In this particular scene, Granddad confronts an older, rude driver who has stolen his parking space, deliberately crashed into his car multiple times, and then insulted him by shouting obscenities and treading on his shoes. The confrontation quickly escalates, leading to a tense and physical standoff that challenges Granddad's dignity and authority (McGruder, "Granddad's Fight"). This moment encapsulates the tension and pressure he feels to uphold his respect and assert his position. The "cool pose" (Howard and Jackson 209) is a cultural performance predominantly employed by African American men to cope with and counteract societal pressures and racism. It involves a specific set of behaviors, styles, and attitudes that project an aura of control, toughness, and

detachment. This facade of stoicism and resilience is often adopted as a survival mechanism in a society where black men face systemic inequalities and stereotypes (Howard and Jackson).

In the episode "Granddad's Fight," Granddad's physical altercation is more than just a plot point; it's an examination of how black masculinity is often expressed and perceived. The fight scene is not merely about physical strength or aggression; it demonstrates the interplay between vulnerability, honor, and the societal expectations of being a black man. It signifies a struggle against perceived emasculation and a reclaiming of agency in a world that often renders black men powerless. Furthermore, this portrayal extends to the impact that these societal pressures have on black children. The concept of black masculinity, as symbolized through the "cool pose" (Howard and Jackson 209), sets a particular example for the younger generation. It is concerned with how black children, especially boys, perceive the expectations of manhood and how they are expected to navigate their identity in a society that often views them through the lens of racial stereotypes and prejudices.

Tyree and Krishnasamy explain this representation of black masculinity in *The Boondocks* within the framework of Afrocentricity, where the narrative is delivered from an insider's perspective. They assert, "Afrocentrists and Afrocentric works must be delivered from an insider's perspective. There must be an understanding of what is the African descendant's experience in America, what challenges have been faced by the people, what has been accomplished, what still must be accomplished and what is standing in the way of liberation and equality of African Americans" (Tyree and Krishnasamy 31). This black insider perspective is vividly portrayed in the *The Boondocks* comics, where Huey, in the comic strip released in April of 2019, comments that comedy should "expose the folly" (McGruder) of the world and that

comedians should use their humor to "question the status quo" (McGruder). This aligns with the show's overarching theme of using humor and narrative to challenge existing societal norms and stereotypes, particularly those surrounding African American family structures and masculinity.

Whereas *The Boondocks* confronts and challenges societal norms through its exaggerated depictions and unapologetically direct narrative of African American family dynamics and masculinity, *The Simpsons* takes a different approach, blending satire with the everyday to reflect and subtly critique the norms of American life. In exploring *The Simpsons* and its take on the nuclear family, we enter a world where satire mixes with everyday life, influencing and reflecting our social norms. This show, a key part of American pop culture, showcases the nuclear family in a way that switches between making fun of and honoring it. Marge Simpson represents the overburdened but consistently responsible mother, a role both praised and critiqued in the series.

Paul A. Cantor's analysis highlights the subtle ways *The Simpsons* deals with family life in the context of American politics. The show, through its depiction of the Simpson family, examines and often overturns the usual values linked to the nuclear family setup. Marge, especially, embodies the complex roles of a mother in this family structure. She faces the challenges of being a parent, a partner, and an individual, often showing the struggles and contradictions that come with these roles (Cantor).

Matthew A. Henry adds to this discussion and claims that "Since satire is the means by which The Simpsons most commonly offers oppositional views, it is also important to have a

better understanding of this comedic mode" (Henry 22). This neatly sums up *The Simpsons*. The show serves two purposes: it entertains with its humorous imitation while also teaching important lessons through its satirical approach. It doesn't just copy the nuclear family model; it questions and often challenges it, particularly through Marge's character. Her role as a stressed yet responsible mother isn't just a copy of what society expects but rather a critique of it. This critical view is clear when looking at the family's dynamics and Marge's part in them. In the episode "Marge in Chains," the twenty-first episode of Season 4, Marge is jailed, leaving the family and the city of Springfield in disarray ("Marge in Chains," *The Simpsons*), showcasing how her absence leads to chaos at home, a situation many viewers can relate to. However, this portrayal also has its criticisms. It brings up questions about the burdens placed on mothers and their often unrecognized role in keeping family stability. Through Marge, *The Simpsons* reflects on the societal ideas of motherhood and family life, pushing viewers to question and maybe change their views on these traditional roles.

In *The Simpsons*, the portrayal of the nuclear family delves into the nuances of everyday struggles, particularly through the character of Homer Simpson. As Woo and McDermott point out in their study, the depiction of Homer's experience at work mirrors a common societal phenomenon. They describe a scene where Homer, feeling trapped in a monotonous job at the nuclear power plant, exhibits low energy and a sense of resignation, indicative of someone who is bored but cannot afford to leave due to familial responsibilities. This is poignantly captured in one of their participant's observations: "You can tell from that, he [Homer] doesn't want to be there. But he's there because he needs to support his family" (Woo and McDermott 2868). Such scenes in *The Simpsons* offer a critical lens through which we can view the modern family

man's dilemma – stuck in a job not out of passion but necessity, a scenario relatable to many viewers. This portrayal challenges the traditional image of the family breadwinner, presenting a more realistic, albeit satirical, depiction of the pressures and compromises faced by many working parents.

Homer's character, often depicted as negligent or incompetent in his professional life, is not merely for comedic effect; it is a reflection of the complexities and contradictions inherent in modern family dynamics. This portrayal goes beyond the surface-level humor, resonating with audiences who see their own work-life challenges mirrored in Homer's character. It's a subtle yet profound commentary on how economic pressures and job dissatisfaction can spill over into family life, affecting relationships and personal well-being. *The Simpsons* thus uses humor to highlight these often-overlooked aspects of familial roles, bringing to the forefront the reality that many individuals face in balancing the demands of work with the needs of their family. This approach not only entertains but also invites viewers to reflect on the broader social and economic factors that shape family dynamics in contemporary society.

In *The Simpsons*, the portrayal of white parenting, particularly in the context of the Simpson family, is often depicted as permissive, a notion explored by Jessamyn Neuhaus in her analysis of the show. The Simpsons family, despite their yellow-skinned, four-fingered cartoonish depiction, represent a white American family. Their whiteness, typical of many mainstream American sitcoms, plays a crucial role in framing their narrative and societal perceptions. This realization adds a layer of depth to our analysis, casting their actions and family dynamics in a light reflective of broader societal constructs and assumptions about white families. This is exemplified in the episode "Marge in Chains," where Marge, overwhelmed by

caring for her sick family, ends up being sentenced to prison for inadvertently shoplifting. The ensuing chaos in the Simpson household, with Homer struggling to manage basic household tasks and care for the kids ("Marge in Chains," *The Simpsons*), highlights the reliance on Marge's domestic role and the permissiveness of Homer's parenting style. The scene described by Neuhaus, where Homer, left to his own devices, fails spectacularly at maintaining order, to the extent of sending Bart to school with a pack of sugar and peanut butter on a playing card, illustrates the permissive, almost absent approach he takes to parenting (Neuhaus). The absence of Marge leads to chaos not only in the home but also in the community, as highlighted by the town's inability to function without her marshmallow squares for a fundraiser, leading to rioting and looting ("Marge in Chains," *The Simpsons*).

This episode not only showcases the permissive nature of Homer's parenting but also satirizes the exaggerated dependence on the traditional female role in maintaining family and community stability. The exaggerated chaos in the absence of Marge's domestic presence humorously underscores the taken-for-granted, yet critical role she plays, not just in her family, but in the larger community of Springfield. It reflects a common stereotype in white families in media: the father is often portrayed as less competent in domestic matters, leading to a more permissive, less structured family environment. This satire, while humorous, also invites viewers to reflect on the gender dynamics within family structures and the often underappreciated role of mothers in maintaining both family and societal cohesion.

The stark contrast in how these shows approach socioeconomic themes highlights the diverse ways media can mirror societal norms and stereotypes. *The Boondocks* often portrays its African-American characters grappling with economic challenges, implicitly addressing the

stereotype of poverty in black families. The setting in the predominantly white suburb of Woodcrest acts as a canvas for Aaron McGruder to articulate these racial and economic contrasts. As noted by Silas Kaine Ezell, McGruder uses Woodcrest as "an oppositional viewpoint for his African-American protagonists, making it a primary source of conflict and critique" (Ezell 22). This setting not only highlights the economic disparities but also underscores the racial and cultural dichotomies present in American society.

On the other end of the spectrum, *The Simpsons* presents a middle-class white family whose economic struggles, though occasionally highlighted, are never central to the family's identity or narrative arcs (Westengard and Barlow). This representation aligns with a broader societal perception of white families as inherently belonging to a middle-class environment, regardless of their actual economic conditions. The show's portrayal of the Simpsons as a typical nuclear family with stable employment and a suburban home perpetuates this stereotype, offering a sanitized and often humorous view of economic challenges.

This dichotomy in the portrayal of socioeconomic conditions is not just a matter of artistic choice but is reflective of broader societal narratives about race and class. *The Simpsons* opts for a more universal, relatable approach to family life, glossing over the nuances of socioeconomic struggles and offering a less confrontational view of economic realities. However, *The Boondocks* confronts these issues head-on, often using them as a pivotal element of its narrative, and this compels viewers to confront uncomfortable truths about how race and class are tied to economic disparity.

In exploring the nuanced portrayals of race and cultural context in *The Boondocks* and *The Simpsons*, we see a stark contrast in how each show addresses these themes. *The Boondocks*, with its explicit focus on race and the African American experience, often places race at the forefront of its narrative. The show does not shy away from tackling racial stereotypes and societal norms head-on, presenting a world where race is a defining aspect of character and story. This direct approach contrasts sharply with *The Simpsons*, which, despite its long run and diverse cast of characters, rarely acknowledges race as a central theme.

Laura Westengard and Aaron Barlow, in *The 25 Sitcoms That Changed Television: Turning Points in American Culture*, illuminate this aspect clearly. They acknowledge that "The Simpsons operates in a universe where racial and cultural differences are acknowledged but not forefronted, creating a veneer of a 'post-racial' society that, in its own way, sidesteps deeper discussions about race" (Westengard and Barlow 50). This observation highlights the show's tendency to treat its characters as part of a homogenized community, where racial identities are present but not pivotal to the characters' experiences or the show's humor. *The Simpsons*, in this way, inadvertently reveals a fundamental aspect of white privilege—the option to remain oblivious to racial identities and the complexities they bring, and the ability to navigate life without constantly considering the implications of race. In *The Simpsons*, this aspect of white privilege is depicted through the lens of humor and satire. The white protagonists navigate their lives without the ever-present lens of racial identity affecting their daily interactions and decisions, or the consequences of those decisions. This lack of racial focus in the show's narrative exposes a significant aspect of white cultural experience: the ability to exist in a society where one's race is not a constant source of scrutiny, conflict, or challenge.

In contrast, *The Boondocks* actively engages with the African American experience, reflecting the complexities and challenges of racial identity in contemporary society. The show doesn't just acknowledge racial differences; it builds its narrative around them. It portrays a world where race influences the characters' interactions, decisions, and the very fabric of the society they live in. This is evident in how every episode compels the protagonists to confront issues like racial profiling from their white neighbors, cultural appropriation, and the legacy of segregation, issues that are deeply rooted in the African American experience.

In other words, *The Boondocks* employs its narrative to actively challenge and deconstruct racial stereotypes and societal norms, and *The Simpsons* adopts a more subtle method, using its seeming neutrality to comment on universal themes. This difference is not just in narrative style but also in the intent and impact of the shows. *The Boondocks* forces its viewers to confront and reconsider preconceived notions about race and culture, whereas *The Simpsons* allows for a more reflective observation of middle-class, "American" society, often detached from the intricacies of racial identity.

However, this detachment in *The Simpsons* does not imply an absence of relevance to discussions about race. By appearing as race-neutral, the show inadvertently reflects a societal attitude where whiteness is the unmarked norm, which is a subtle but significant commentary on racial dynamics in media representation. In addition, the universality of *The Simpsons* can be seen as a mirror to society's broader attitudes towards race, where racial issues are often obscured or overlooked in the pursuit of a narrative that appeals to a wider audience.

The Simpsons and *The Boondocks* engage with reality and politics in rather different ways when it comes to animated television. *The Boondocks* is unafraid to dive into the deep end of societal issues, reflecting a reality that is often harsh and unyielding, especially for the Black community. This is evident in the show's nuanced portrayal of its characters, who represent different aspects of Black society. Huey, for example, is seen as the embodiment of the progressive and educated elements, intelligent and knowledgeable about history, yet constantly aggrieved and dissatisfied, struggling to connect his ideals with reality (McGruder). Riley, on the other hand, represents the disenfranchised, being proud of his Blackness but also depicted as uneducated and nihilistic (McGruder). Granddad symbolizes the Black political establishment, having significant past accomplishments but complacent and resistant to change (McGruder). These portrayals highlight the complexities within the Black community, exploring themes of class and generational divides. As Avi Santo suggests in *Satire TV: Politics and Comedy in the Post-Network Era*, The Boondocks community actively uses episodes to debate and discuss Black political concerns, yet these discussions often get mired in classist and generational biases, underscoring the lack of larger group solidarity and the difficulty in bridging differences within the community (Gray et al.).

Thomas de Zengotita, in *Mediated: How the Media Shapes Your World and the Way You Live in It*, echoes this sentiment by emphasizing the media's role in shaping perceptions and narratives, particularly in the context of race and politics. He points out that shows like *The Boondocks* are not just entertainment but also potent cultural artifacts that contribute to the ongoing dialogue about race in America. The show's direct engagement with reality serves as a

means of media mediation, reflecting and influencing the societal discourse around race (De

Zengotita).

In sharp contrast, *The Simpsons* exists in a more fantastical, consequence-free

environment. The show, while tackling various social issues, often does so with a lighter touch,

focusing more on universal themes rather than the pointed critique of societal structures seen

in *The Boondocks*. The Simpson family's adventures, while occasionally touching on political

issues, mostly revolve around humorous, exaggerated situations that rarely have lasting

consequences. This approach allows the show to be more accessible to a wider audience, but it

also means that it does not engage with reality and politics in the same direct manner as *The*

Boondocks. De Zengotita reaffirms this notion, that this form of media mediation allows

audiences to engage with societal issues in a less confrontational way, often serving as a form

of escapism from the harsher realities of life.

In addressing the critique that shows like *The Boondocks* and *The Simpsons* might

reinforce rather than challenge harmful stereotypes, it's essential to delve deeper into the

intention and execution of satire in these series. Critics argue that by exaggerating certain

stereotypes, these shows inadvertently cement these very biases in the audience's mind. For

instance, the presentation of the Freeman family in *The Boondocks* as dealing with an absent

mother figure and a strict, authoritarian grandfather could potentially reinforce negative

stereotypes about Black family structures. Similarly, *The Simpsons*, with its depiction of the

nuclear family where Homer's negligence and Marge's overwhelmed yet persevering character

might perpetuate clichés about White families.

However, this critique can be countered by considering the nuances of satire as a form of social commentary. According to Jonathan Gray and his colleagues, satire serves as a powerful tool in critiquing and exposing societal norms. By exaggerating stereotypes, *The Boondocks* doesn't aim to reinforce them but rather to spotlight and critique the absurdity and harm of such generalizations (Gray et al.). The show uses hyperbole and irony to reflect on serious societal issues, such as race and family dynamics, in a way that invites critical reflection rather than passive acceptance.

Similarly, *The Simpsons*, through its exaggerated portrayal of the nuclear family, offers a satirical critique of societal expectations and norms. As Cantor reminds us in "The Simpsons: Atomistic Politics and the Nuclear Family," the show, while seemingly perpetuating stereotypes, actually invites viewers to question and laugh at the absurdities of these portrayals (Cantor). The permissive parenting style and the seemingly detached family dynamics serve as a canvas to reflect broader societal attitudes towards family and responsibility. This satirical approach serves not only as entertainment but also as a means of social critique, inviting viewers to reflect on and question the status quo.

Another critical perspective to consider is the actual impact these satirical portrayals have on viewer perceptions and attitudes towards race and family dynamics. The alternative viewpoint in this vein is that while these shows are created with the intent to critique societal issues, their comedic and exaggerated nature may not translate into a significant influence on viewers' real-world perceptions. This argument suggests that the satirical and often humorous depictions of race and family dynamics in both shows might lead viewers to overlook the

serious messages beneath the surface comedy, which diminishes the potential for these shows to effect real change in societal attitudes and perceptions.

However, this argument can be effectively addressed through insights from Thomas De Zengotita's *Mediated*. De Zengotita argues that media, including television, significantly influence how individuals perceive and interpret the world around them (De Zengotita). This perspective challenges the notion that viewers passively consume content without it affecting their views. In the case of *The Boondocks* and *The Simpsons*, even though the shows employ satire and exaggeration, they still possess the capacity to shape audience perceptions through their portrayal of family dynamics and racial issues. The exaggerated elements in these shows are not merely for entertainment but serve as a vehicle for viewers to engage with and reflect upon the societal norms and stereotypes being presented.

Moreover, De Zengotita's work underscores the idea that media consumption is not a passive activity but an interactive process where viewers actively engage with the content, interpreting and internalizing the messages presented (De Zengotita). This interaction suggests that the impact of shows like *The Boondocks* and *The Simpsons* extends beyond mere entertainment; they stimulate thought and discussion about important societal issues. These shows, through their comedic lens, invite viewers to question and critique the societal norms and stereotypes they portray, potentially leading to a more profound understanding and awareness of these issues. To illustrate this point through a hypothetical scenario, imagine a viewer named Alex, watching *The Simpsons* episode "Marge vs. the Monorail." In this imagined response, Alex distinctly remembers the moment when Marge insists on the importance of community involvement over flashy and impractical projects ("Marge vs. the Monorail," *The*

Simpsons). This scene led Alex to look into his own community's spending and priorities, sparking a newfound interest in local politics. In this episode, Marge's voice of reason against a seemingly attractive but ultimately hazardous monorail project with corrupt motives ("Marge vs. the Monorail," *The Simpsons*), resonated with Alex's growing awareness of civic responsibility. It illustrated how a single individual's perspective can influence and alter the course of community decisions, highlighting the value of community engagement in addressing civic issues.

This exploration of family dynamics in *The Boondocks* and *The Simpsons* reveals worlds abundant in humor, social commentary, and diverse representations of race and family. This journey through these animated shows has been more than just entertainment; it has shed light on the intricate ways families are portrayed in the media. *The Boondocks* takes a direct look at racial and social issues, presenting a story deeply rooted in the African American experience. Its bold use of satire not only mirrors society but also highlights issues of race and class that are often overlooked. In contrast, *The Simpsons* presents family life in a way that many people can relate to, using a more general approach. This style, while seeming neutral, subtly makes a statement about common views on race and family. While *The Boondocks* and *The Simpsons* both caricature family dynamics, they do so to different ends – *The Boondocks* offers a critical view of racial and societal norms, whereas *The Simpsons* provides a more neutral, universal portrayal, reflecting broader societal attitudes towards race and family.

As we navigate a world increasingly shaped by what we see on screens, it becomes crucial to engage critically with the content we consume. Shows like *The Boondocks* and *The Simpsons* are not just sources of entertainment; they are mirrors reflecting the complexities of

society, imbued with the power of humor to not only depict but also question and potentially

reshape societal norms. But, this creates a conflict: the delicate balance between appreciating

art as a reflection of culture and recognizing its role as a potential prescription for cultural

norms. While these shows offer sharp insights and critiques of family dynamics and racial

stereotypes, they also present scenarios that compel us to define or redefine our societal

values. By presenting exaggerated realities, they encourage viewers to consider what aspects of

these portrayals we might accept, reject, or aspire to change in our own lives. This dual role of

media as both a mirror and a mold of culture highlights the responsibility of creators and

audiences alike to engage with these narratives thoughtfully and introspectively. Satirical

sitcoms such as *The Boondocks* and *The Simpsons* challenge us to confront uncomfortable

truths, to laugh at the absurdities of life, and to ponder the underlying messages woven into

their narratives. As viewers, we are invited not only to enjoy these shows but to actively

participate in the ongoing dialogue they inspire about race, family, and identity.

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SOCIOLOGY

Is the Dining Room Dead? Exploring the Decline of a Traditional Space

Carolina Mendoza; Mentor: Brian Centrone, Westchester Community College

Judge's Comments: "Caroline provided the historical and sociological context comparing different cultural meanings and uses of the dining room beginning with Victorian era England and moving through American time periods to present day. Core sociological themes were stressed throughout the presentation bridging larger macro-level changes in society to altering the use of dining rooms."

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Is the Dining Room Dead? Exploring the Decline of a Traditional Space

When was the last time you used your dining room? Over the years, the daily practice of using the dining room has shifted to dedicated events and occasions. Traditionally, most homes had a designated room for eating, commonly referred to as the dining room, where families used to gather for every meal. In the late 19th century, middle and upper-class families transformed their dining rooms into status symbols, boasting grand decor and exquisite meals. It was a ritual-like experience that the entire household respected. By the mid-20th century, however, nuclear families ushered in a change in dining room usage. Dining rooms evolved from grand showrooms to simpler areas focused on familial bonds, emphasizing relationships over ornate surroundings. In the 21st century, family dynamics have further transformed the role of dining rooms. Families now eat in many ways. Some prefer gathering around kitchen tables for meals due to increased convenience and efficiency. Meanwhile, others eat in living rooms due to space limitations or ease. Architecturally, the expansive dining rooms of the past have given way to smaller spaces or have disappeared entirely from some modern home designs. Some modern house plans have discarded the traditional dining room concept entirely in favor of open floor plans. Why occupy valuable space with a seldom-used room when that space could serve other purposes? Dining room usage declined from the late 19th century to the early 21st century due to societal changes and family dynamics.

For centuries, the significance of the dining room has evolved due to various societal changes. From the late 19th century to the early 21st century, the changes that occurred were

drastic. As discussed in the journal, *Dining, Dinner, and Performance*, formal dinner parties held in affluent households focused on ensuring entertainment for guests throughout the event. The journal states, "[a]t a formal dinner party in prosperous homes, guests were shown upstairs to the drawing room and introduced to the person they were to accompany to the table and then sit beside at the meal; they were paired off in descending order, categorized by social rank, age, and marital status" (Flanders). Once considered a space of great significance, the dining room was a place where punctuality and decorum were expected. In *Victoriana Magazine*, it states, "[s]ome women's magazines implied that the 'food will taste better from table appointments carefully chosen' and proceeded to lecture about the carvings of table legs and the effect of one's choice of silver, glass, and china on the evening's conversation" (Victoriana). The elaborate decor, including intricately carved woodwork, elegant china, and luxurious fabrics, highlighted the homeowner's refinement and attention to detail. The dining room truly functioned as an expression of wealth and class in Victorian society. People would spend their time taking guests on tours of their homes, especially the dining room, to show off their wealth and status.

In modern society, however, social media has become a source where people can show off their wealth and status. Society has moved on from just purely using the home as many cannot afford homes exuding grandeur and wealth. Now it is displayed through expensive meals, luxurious items, and pure bourgeoisie. The article "Appearing Wealthy on Social Media Has Become Its Own Industry" talks about how people use social media to show off their wealth, and how it has become its own industry where people are even able to make money just by showing off. The article mentions how:

> [O]n social media, academic peers see the glass of Prosecco a successful
>
> graduate student raises in celebration, not the late nights they spent rewriting
>
> articles. And because those onlookers are comparing themselves to someone
>
> else's highly curated best moments, it makes them feel inadequate. (Smith)

People are posting themselves with the most expensive objects around them, which leads

others to see that this person has a wealthy status. Similar to how back in the 19th century

people showed their extravagant furniture to indicate their wealth. It leaves onlookers feeling

dejected and wishing to be exactly like the posts they see online. This brings up the trend of

posing with expensive items, but the person does not own the items. It's a "flex" of showcasing

the lifestyle they want to demonstrate to others. Flex/flexing is showing off your wealth and

bragging about your rich lifestyle. Unlike having a tour in their homes, they can hide the bad

common items they don't want others to see. Meanwhile, a *Jane at Homes* article, "Modern

Dining Room Ideas for Beautiful Gatherings," emphasizes the growing popularity of minimalist

decor in contemporary dining spaces. With a focus on functionality and clean lines, these rooms

embrace a less-is-more approach (Jane). Harmony and a clean look create a less clustered

environment than the previous centuries contained. It was more about creating a familial

atmosphere rather than showing off. Overall, the dining room has transitioned from being less

about showing status and more about ensuring everyone feels comfortable.

The shift in the dining room reflects a broader societal change—where once it

symbolized status, it now prioritizes comfort. Similarly, in today's economy, people are earning

considerably less despite overall economic growth. People are paid immensely less compared

to 50 years ago as the economy rises. Millennials struggle with being able to own a home

therefore opting to rent which is still extremely expensive for most people. An article by *Yahoo Finance* details that, " [t]hough millennials have taken the brunt of the blow as housing affordability deteriorates, they are also the largest generation in U.S. history" (Botros). Even for those who have the financial means to afford a home in the current generation, there is still a continuous gap being developed between the wealthy and commoner. In a *New York Times* article describing how older, wealthier, and predominantly white home buyers are causing a decline in first-time home buyers, making it difficult for those with moderate incomes to enter the housing market. The article talks on the imbalance that has been fueled by cash buyers, shutting out younger and moderate-income individuals, deepening racial and generational disparities in homeownership (Kaysen). This trend in the 21st century effectively narrows homeownership opportunities to the affluent, further illustrating how only the rich are increasingly able to purchase homes.

Moreover, historically, intergenerational co-reidence was widespread, signifying a shift from the present trend where increasing homeownership is primarily accessible to the affluent. However, as the economy grew and technical progress accelerated, older generations could afford to live independently. This shift in living arrangements had an impact on the dining room. The dining room was once a space where families gathered to eat, but as children moved out, the dining room became a place where older generations could entertain guests. According to research, "[t]his factor caused an improvement in the economic conditions of older persons, thereby reducing their dependence on children. Underlying this explanation is the idea that parents would prefer to live alone if they could afford it" (Pensiero). The transition from intergenerational co-reidence to independent living arrangements was also influenced by

changes in the relative income of different generations. As stated in the previously mentioned study, "[c]hanges in the relative income of the different generations might have played a role in the transition from intergenerational co-reidence to independent living arrangements, in the period 1850–1950" (Pensiero). Moreover, when technical progress is fast enough, the economy experiences a shift from stagnation to growth, and the social status of the elderly tends to deteriorate. Thus, the dining room, once a shared space for intergenerational families, has become a room solely for older generations to appreciate.

During the rise of nuclear families, things changed. Families started being held at the utmost importance in times of post-war. As noted in "The 1950s Family: Structure, Values and Everyday Life," "during the 50s, there was a deeply ingrained social stigma against divorce, and the divorce rate dropped. So, the stereotypical nuclear family of the 1950s consisted of an economically stable family made up of a father, mother, and two or three children" (Lantz). This emphasis on traditional family structures and the importance of the dining room for family meals was further reinforced by the social activities of the time. As the same article stated, "[m]any families lived close together, and there were all sorts of group social activities" (Lantz). The dining room was thus seen as a central gathering place for family and social events, and it played a significant role in reinforcing the values and traditions of the nuclear family structure. As more families moved to the suburbs, they found themselves in a more affluent position, which allowed them to establish the family as a safe space from the challenges of the outside world. As noted in "The Evolution of American Family Structure," "families moved to the suburbs because they could afford to, and the family became a 'haven in a heartless world,' as well as 'an alternative world of satisfaction and intimacy' for adults and children that had

experienced the ravages of wartime" (McCumber). In this context, the dining room took on a new significance as a place for families to gather and enjoy meals together. Overall, the dining room became a central space for postwar American families to bond and establish a sense of community. Over time however, the nuclear family becomes undone.

In the 21st century, economic stability has empowered women to live independently without the need for a husband, resulting in the rise of single-parent households and high divorce rates. Consequently, the traditional family structure has undergone significant changes, and the dining room is no longer considered a necessary component of a household. The *Journal of Marriage and Family* brings up this previously mentioned idea. The journal states, "in addition, fewer households are composed of families, and of family households, an increasing proportion are not composed of two parents living with their children. It is no longer the case that a child born today can expect to live his or her childhood with both biological parents" (Smock and Schwartz). This trend indicates a shift away from the traditional family model, which emphasized the importance of shared meals in the dining room, towards a more diverse and flexible family structure. There has been an evolution in couples without children as well.

The declining trend in the number of children being born in recent years has led to smaller household sizes, which has resulted in a shift away from the need for a dedicated dining room as well. As the *Journal of Marriage and Family* suggests, "[w]omen with more education have long had fewer children on average than those with less education, and these differentials have remained relatively stable" (Smock and Schwartz). This trend, combined with the decreasing popularity of marriage and the increasing acceptance of non-traditional family

structures, has led to a decline in the importance of the dining room. As noted in the same journal:

> Trends in the 1970s and early 1980s certainly pointed in this direction—declining marriage rates, increases in cohabitation and nonmarital births, declining fertility, and large increases in divorce. In contrast, Bianchi and Casper interpreted the mid to late 1990s a period of 'a quieting of family change,' with smaller changes in many family patterns than in earlier decades. (Smock and Schwartz)

In light of these changes, it makes sense that the dining room has become less important and less commonly found in modern households. The family structure in the 21st century is now completely different compared to the nuclear family era therefore resulting in a dynamic change.

The family dynamic is another reason for the decline of dining rooms as well. As the family members started transitioning their lives from laxer to constant movement, the dining room wasn't a priority anymore. During the twentieth century, the traditional concept of the dining room underwent a significant transformation, and one key factor contributing to this change was the evolving roles of middle-aged women in U.S. households. In the article, "A Sudden Transition: Household Changes for the Middle-Aged U.S. Women in the Twentieth Century," the writer claims "[s]hifts were more imposing and more concentrated at mid-century for proportion employed, high-school education, and higher income, pointing to these as the best candidates to explain the sharp upward tick in women living away from children at

mid-century" (Merchant, et al.). As more women entered the workforce and sought

professional careers, they had less time to devote to maintaining distinct dining areas and

preparing elaborate meals for their families.

Children also experienced a great role change during the twentieth century. Lives were

changing for the adults as much as the children were. According to the Library of Congress:

> In 1900, the U.S. was a diverse nation, and its children lived in a wide range of
>
> circumstances— different geographic settings, economic backgrounds, and
>
> family structures. The country was experiencing tremendous growth, and more
>
> and more families were living in cities, although a majority of Americans lived in
>
> the country until 1920 (Congress).

Children were being moved to the city where they were constantly working long shifts to

provide for the family. This left less time being at home and doing home chores. Consequently,

the dining room's usage as a space for formal meals deteriorated, giving way to more practical

and versatile living areas that accommodated the rapidly evolving roles and lifestyles of the

family during this era. As a result of this shift, the dining room has undergone significant

changes in its role and design. The once-formal space has lost its prominence in modern homes,

with practicality and versatility taking precedence over tradition.

One research paper, "Life at Home in the Twenty-First Century: 32 Families Open Their

Doors," goes into a study of the different living styles of families in the twenty-first century. The

study goes over the overall possessions people place in their environment for personalization to

how often each room is used. The study also explains that from studying 32 families in Southern California, there will be slight differences between each household's lifestyle.

The paper collected data on a family of 4 (see *Image 1*), noting the location where each person in the household spent the most time. The paper stated:

> Eating, of course, is one of the more popular activities for everyone. All of the meals transpire at the kitchen table rather than at the much larger and nearby dining room table. The parents spend much of their time in the kitchen preparing meals and washing dishes, whereas the children spend as much time at the kitchen table doing homework as they do eating   (Arnold, Graesch, et al.)

This family made the kitchen their main hub, where they spent most of their time. Even the father of the household stated, "[w]e really spend all of our time downstairs... and the kitchen is where we spend the absolute most time, 'cause we do the homework there and everything else. We don't spend a ton of time in the dining room" (Arnold, Graesch, et al). The family lives a busy lifestyle where they don't have the time to sit down for a formal meal in the dining room. As home design has evolved to reflect changing lifestyles and needs, the dining room has been shrinking in size and some are now questioning its relevance in modern blueprints.

In 1903, The Radford Architectural Company unveiled "The Radford American Homes; 100 House Plans," a captivating compilation of diverse architectural styles for the growing American suburbs. These enchanting and enduring designs epitomize the early 20th-century

aesthetic, offering a variety of styles and practical layouts. One floor plan presented by the

Radford Architectural Company (see *Image 2*), shows a two-story home. Focusing on the first

floor, the 13' x 18' dining room provides ample space, along with enclosed walls to ensure

intimacy and privacy. To access the room, one would have to walk through both the kitchen

and the pantry to bring the food, as it is situated apart from the kitchen. Alternatively, guests

can access the space via the parlor. In the late 19th century, homes flaunted opulent exteriors

adorned with intricate architectural details such as ornate cornices, grand columns, and

elaborate trimmings, while their interiors boasted luxurious features like richly patterned

wallpapers, intricately carved woodwork, and plush furnishings. Family Home Plans showcases

a range of Victorian-inspired floor plans, blending historical charm with modern updates. The

dining room, (see *Image 4*), is 16` x 12`. While it is more of an open concept to meet more

modern wants, it can be easily enclosed for privacy. In a publishing from Chicago: The Home

Library Association(see *Image 6*), this brick dwelling from the Victorian era showcases the

dining room 13`6" x 20` to be disconnected from the kitchen and even has a sewing room the

size of a bedroom.

In the years of the 21st century, the floor plans have changed the overall size of the

dining room. For example, Zonda Media creates architectural floor plans for people looking for

ideas. People can go on the website and pay for premade floor plans which helps in the process

of building a home. One floor plan presented by Zonda Media (see *Image 3*), shows a one-story

home with a 3 bed and 2.5 baths. The dining room is only 12` x 15`, where the room is

connected to the kitchen. It's an open concept, the dining room is more of a dining area since

there aren't walls to enclose the room. In this century we see the shift in size of the dining room

and overall living space, as well as the location of the home. In New Rochelle, New York, many

apartments are being built due to many people moving out of the city because of the increase

in rent prices. One apartment building that has gone up is called Moderna. It is an upscale,

modern apartment building located in downtown New Rochelle. As urban landscapes continue

to evolve, we're seeing a surge in apartment construction. In many cases, these compact living

spaces don't have the luxury of a dedicated dining room. In this two-bedroom apartment, (see

Image 5), no dining room can be located. There is a kitchen, with a movable island for eating,

and an open living room. Most people can simply just place a small table in the kitchen and eat

there instead of dedicating a whole room to dining.

Yet this paper brings up the question: are the dining rooms actually declining in usage?

Is there a chance the dining rooms are being used more than ever before? One post called,

"Why Experts Say the Dining Room Is Making a Huge Comeback," makes the argument that

dining rooms are coming back:

> Eugene Colberg, the principal at Colberg Architecture, said, "Families are now
>
> recognizing the passing of time and are trying to create meaning in everyday
>
> experiences like a meal. Using formal dining rooms for their intended purpose
>
> has the ability to create a special event in our daily lives…" (Kaliszewski).

As highlighted in the article, the resurgence of dining room usage can be attributed to people's

yearning for deeper connections. The dining room was previously the heart of meaningful

interaction, and although maintaining those bonds has been challenging in recent years, people

are now making an effort to reconnect. The post also mentions that the second reason the

dining room is being used more is because of its transformation into a multi-use room. Rather than just being a room for dining, people also use the room for work, crafts, and many other uses. With such a shift in usage, one might wonder if calling it a "flex-room" would be more appropriate. The article called, "Are Dining Room Tables a Thing of the Past?" counters Kaliszewskis claims. It talks about the dining deteriorating because of modern alternatives. The article states:

> As open-concept homes become the preferred style for home buyers—and
>
> nearly every home improvement show on HGTV—formal dining rooms seem to
>
> be less and less common. Instead, there are eat-in kitchens, breakfast bars with
>
> high stools, and maybe benches around a dining nook. (Locker)

Now there are many more efficient alternatives to having a whole room for dining. Today, alternative dining options such as breakfast bars, separate tables, and eat-in kitchens have taken center stage. Many homes opt for these open concepts since formal dining seems less important to home buyers.

Overall, the dining room is turning out to be a thing of the past. As we continue to witness this change, one cannot help but ponder over the implications it may have on social interactions and family dynamics. While there's no definitive way of arguing in favor or against this argument since there's no concrete data, there has been a change in the use of dining rooms. It's possible to notice how newer buildings are choosing to leave the dining room out of the blueprints. Ultimately, the gradual disappearance of dining rooms leaves us questioning

what these transformations mean for the future of communal gatherings and the essence of
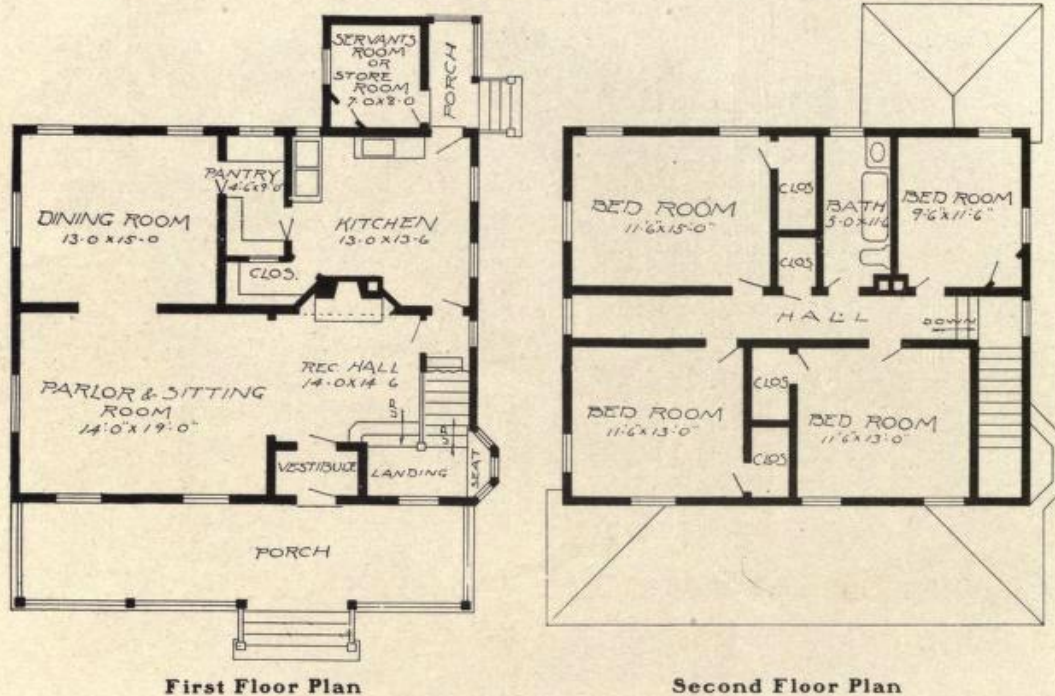
sharing meals.

Image List

Image 1

Each red dot on this map represents the location of a parent or child in the Family 11 household as observed every 10 minutes throughout two weekday afternoons and evenings (Arnold, Graesch, et al).

Indefinite or partial instructions

Floor Plans of Design No. 566

First Floor Plan

Second Floor Plan

Size: Width, 35 feet; length, 28 feet 6 inches, exclusive of porches

See opposite page for perspective of this house

Blue prints consist of cellar and foundation plan; roof plan; first and second floor plans; front, rear, two side elevations; wall sections and all necessary interior details. Specifications consist of about twenty pages of typewritten matter.

Our plans are all substantially and artistically bound in cloth and waterproof paper. The specifications are bound in the same manner, and the two make a uniform set, worth many times the cost.
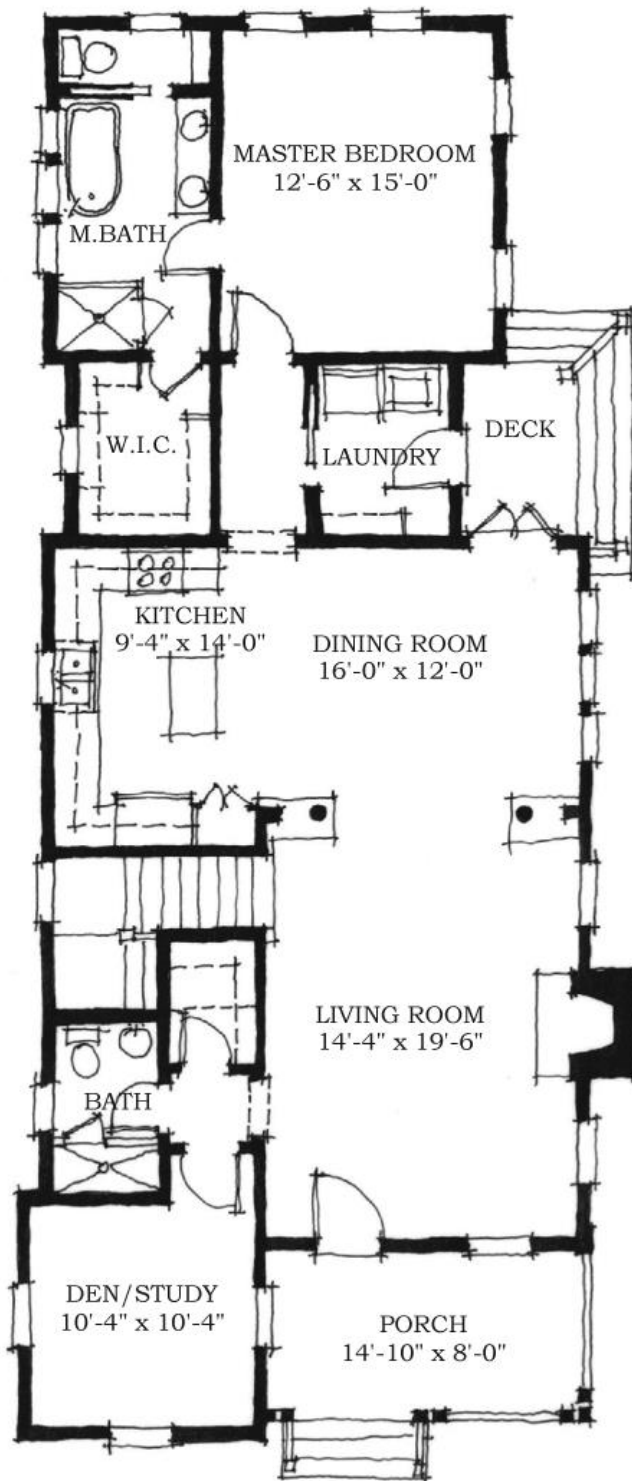
24

Image 2 Floor plan design no. 566 by the Radford Architectural Company

Image 3

With three bedrooms plus an office, this one-story home offers flexibility and a relaxed vibe. Modern touches include the

primary suite's big shower, lockers on the way in from the garage, and abundant storage throughout the home (Zonda Media).

MASTER BEDROOM
12'-6" x 15'-0"

M.BATH

W.I.C.

LAUNDRY

DECK

KITCHEN
9'-4" x 14'-0"

DINING ROOM
16'-0" x 12'-0"

LIVING ROOM
14'-4" x 19'-6"

BATH

DEN/STUDY
10'-4" x 10'-4"

PORCH
14'-10" x 8'-0"

Image 4 2274 feet with a 3 bed and 3 bath (Magbee).

Image 5

Every square inch of this 2-bedroom, 2-bathroom apartment has been thoughtfully designed to envelop you in stylish comfort

and modern convenience. The finest appliances to cook, clean and serve your daily needs. Luxury finishes and flooring that

reward both the eye and the touch. Ceiling heights that let your exhale. And in-home technology that provides unmatched ease
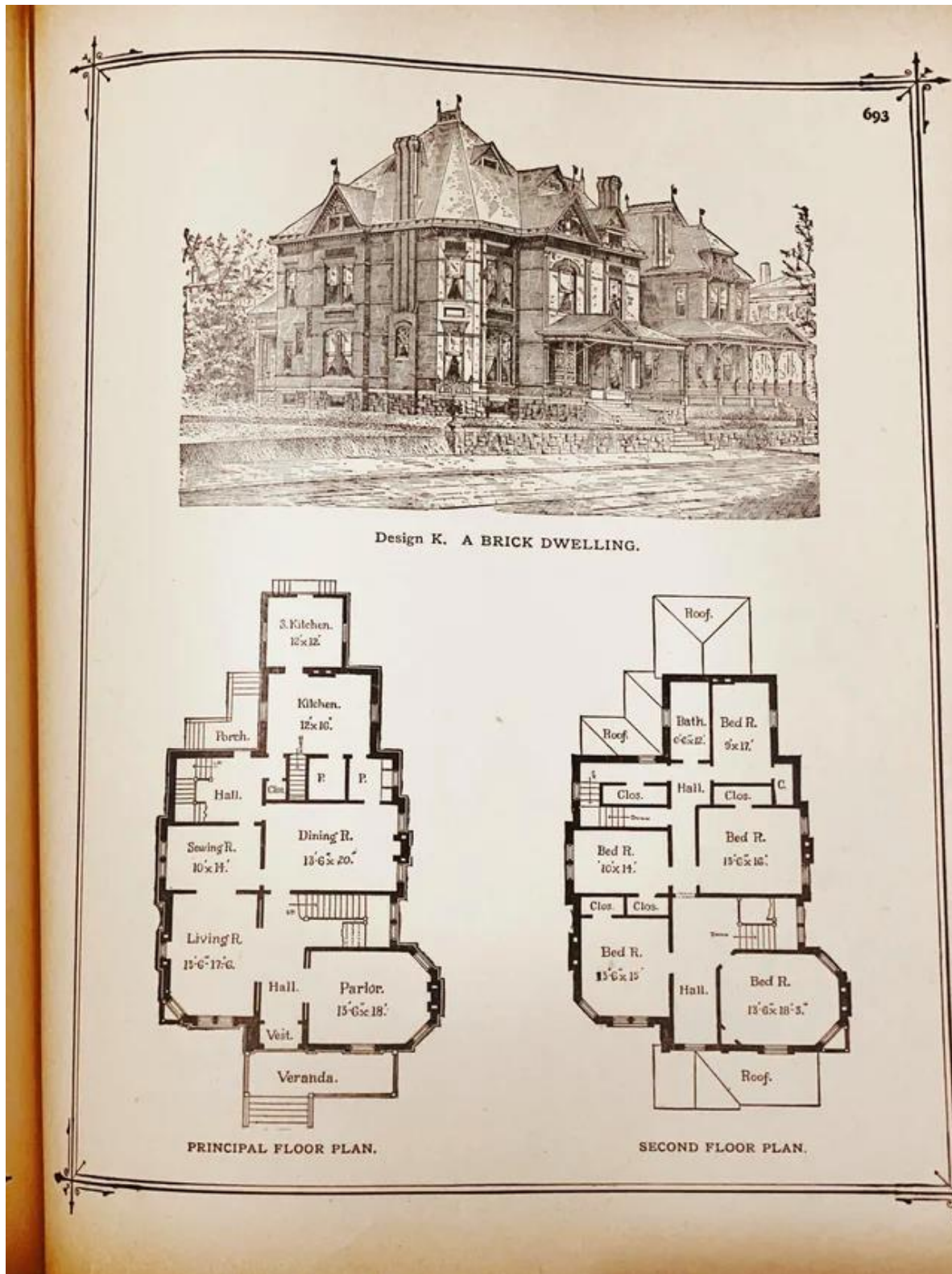
and efficiency (Moderna).

693

Design K.   A BRICK DWELLING.

PRINCIPAL FLOOR PLAN.

SECOND FLOOR PLAN.

Image 6 Brick dwelling from Chicago: The Home Library Association

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Confronting Depression: What the West Has Failed to Address

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Judge's Comments: "She was focused, very well researched, and had excellent interactions with the audience."

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Confronting Depression: What the West Has Failed to Address

Mental health is a concept that has recently gathered more attention and less criticism from the general public than it did before. This effect can be seen in the media and in countries where globalization and Westernization, beginning with the introduction of social media, had such a widespread, personal impact. For example, in the US, between 1990 and 2017, "the number of incident cases of depression worldwide increased from 172 million in 1990 to 25,8 million in 2017, representing an increase of 49.86%" (Liu et al.) Before Westernization made such a lasting impact on many countries, mental health, specifically mental health disorders, was addressed according to tradition and knowledge available at the time. For example, native Japanese belief attributed monarchs as being living deities, and any strange actions that may have been later considered due to a mental disorder were not shunned (Holcombe 557). In more contemporary times in Japan, fear of social norms discouraged discussing topics including mental health and "emotionally loaded issues," and people refused to seek treatment (Watters 156). In the US, clients were institutionalized for over half of the twentieth century (Comer et al. 385). While created with good intentions, public mental hospitals made matters for clients worse with overcrowding and inadequate resources (Comer et al. 385). Since then, globalization has brought more attention to the concept of mental disorders, such as depression, as being both diagnosable and treatable through a Western psychological lens primarily. Due to the importance of culture, the Western definition of depression and its subsequent treatment approach is inadequate and must be changed.

But should depression be addressed within a Western context at all? What of one's culture and the impact it could have on the experience and treatment of depression? To answer these questions, we must first ask: how has globalization fueled the spread of depression diagnosis, and how did different cultures define said problem before and after the impact of globalization? Depression is a real mental disorder that occurs everywhere and across time. Still, the West has been allowed to define it by its own parameters and create treatments by its own parameters, which are subjective and non-inclusive. The major associations that address mental health and the field of psychology, which include the *World Health Organization*, the *American Psychological Association,* and more generally the *United Nations,* were all established by countries whose dominant culture is Western. Therefore, the current definition of depression and its subsequent treatment approach is inadequate in other parts of the world and must be abolished.

Background on Western Depression

Depression is now widely known, in part due to globalization. As defined by Western psychology, it is described as "a low, sad state marked by significant levels of sadness, lack of energy, low self-worth, guilt, or related symptoms" (Comer et al. 174). The *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*, the most widely used classification system in North America, describes depressive disorders as "a group of disorders marked by unipolar depression" or "depression without a history of mania" (Comer et al. 89, 174). It was developed by Emil Kraeplin in 1883 and its most current edition was published in 2013 (Comer et al. 89). However, most other countries rely on a system called the *International Classification of Diseases,* developed by the World

Health Organization, and although there are some differences between the disorders and their criteria listed in the *DSM* and *ICD*, the numerical codes used by the *DSM-5* for all the disorders match those used by the *ICD* (Comer et al. 89). Even if the *ICD* is more accommodating to non-Western culture's experiences of mental disorders, both the *DSM* and the *ICD* have Western roots, which limits the representation of non-Western cultures. More research into non-Western cultures' experiences of mental disorders is needed to establish more inclusive guidelines for diagnosis and treatment.

There are currently six models of abnormality in use for explaining and treating abnormal functioning, and given their assumptions and principles, sometimes conflict (Comer et al., 36). The first model of abnormality, the biological model, "views abnormal behavior as an illness brought about by malfunctioning parts of the organism," including the brain (Comer et al., 37). The subsequent treatment for depression, according to the model, is primarily antidepressant drugs, which affect the brain (Comer et al., 40). However, these drugs do not work for everyone, and even the most successful of them fail to help at least 30% of clients with depression (Comer et al., 185). According to this view of abnormal functioning, as much as our experiences influence our development, including the development of depression, we are all of the same species, sharing the same biological processes. The prefrontal cortex, for example, is "associated with moderating social behavior, decision-making, and personality expression," as Chayil Champion notes in the article "Is Social Media Causing Psychological Harm to Youth and Young Adults?" does not develop until age twenty. If a malfunction in the brain causes depression, then why is there a need to individualize and personalize the psychological diagnosis and subsequent treatment of depression?

That is where the other models of abnormality come in. These are necessary because of our individual experiences of the world, though still insufficient. For example, the psychodynamic model, developed by Sigmund Freud, claims that a person's behavior is determined largely by underlying psychological forces of which the person is not consciously aware, and any conflict of these forces gives rise to abnormal symptoms (Comer et al., 42). Psychodynamic therapies seek to "uncover past traumas and the inner conflicts that have resulted from them (Comer et al., 45). This model emphasizes dependence and loss as the explanation for depression. However, it does not account for a person's culture or any biological predispositions a person may have. The Western definition of trauma may not apply to all cultures. Grief is dependent on culture and customs and one person's grief could be another person's depression.

The cognitive-behavior model of abnormality is another widely known and used model, which emphasizes the behaviors people display, their thoughts, and both variables' interplay (Comer et al., 48, 190). This model describes depression as a result of a combination of problematic behaviors and dysfunctional ways of thinking (Comer et al., 48, 190). As such, cognitive-behavioral therapies (CBT), including behavior activation and cognitive therapy, seek to "get clients [...] to engage in and enjoy more activities [and] guide clients to think in more adaptive, less negative ways" (Comer et al., 193). While CBT seeks to address troublesome thoughts and subsequent behaviors associated with depression, and while negative thinking plays a significant role in the overall experience of depression, this model can only successfully benefit a client in the short term if their surroundings, which may contribute to the development of depression, are not accounted for. Furthermore, not everyone thinks in the same way, much less

have the same thoughts associated with depression, which displays the cognitive-behavioral model's inadequacies. While the biological, psychodynamic, and cognitive-behavioral models of abnormality are the most widely known and applied in Western psychology, there exist others including humanistic, multicultural, and developmental psychopathology, though these are less widely taught and applied. These models of abnormality have been in effect for too long without adequate research on their effectiveness for non-Western cultures. The less widely applied models such as the developmental psychopathology model purposefully include one's culture as a catalyst for mental disorders such as depression but lack both research and educational application, while still not encompassing all of the factors that affect a person with depression. A holistic approach that combines every model of abnormality would be the most ideal so that culture, social issues, family background, and every other factor is treated equally in the face of mental disorders and so that a personalized treatment can be created.

United States Approach to Depression

Depression had not always been such a prevalent diagnosis in the U.S. as it is today. Before the 1970s, depression was considered to be a rare condition that involved symptoms that were much more severe than the symptomology in the current DSM (Horwitz, 113). Depression, before the 1970s, involved "feelings of intense meaningless and worthlessness often accompanied by vegetative and psychotic symptoms and preoccupations with death and dying" and patients with depression were more associated with hospitalization rather than being outpatients (Horwitz, 113). The current symptomology of depression, before the 1970s, was associated with anxiety. Several

factors influenced the change from the common diagnosis of anxiety to the presently common diagnosis of depression, including the changing norms of psychiatric classification, professional and political advantage, and economic marketing (Horwitz, 114).

Initially, the dominant theories surrounding the cultural conception of anxiety emphasized psychosocial stressors such as "family-and-work-related problems," which made anxiety "a symbolic condition of American society [...] in the post-World War II era" (Horwitz, 114). The research that followed relied on measures that reflected a nonspecific view of psychic disturbance, although they emphasized symptoms of anxiety (Horwitz, 115). This overgeneralized view of mental disturbances fails to benefit the people who may have been suffering from depression rather than anxiety, perhaps resulting in extended distress. The prescription of the incorrect medication could also lead to extended distress if the side effects create additional problems for the client.

Beginning in the 1960s, clinicians and researchers began to emphasize the prevalence of depression among patients in primary medical care, which "led advertisers to begin to place ads" for antidepressants (Horwitz, 116). Almost immediately, before any substantial research was conducted to separate symptoms of anxiety from symptoms of depression officially, the capitalist system and large corporations saw an opportunity to profit from suffering. It was not until the end of the decade that "the disparity between anxiety and depressive diagnoses thus had narrowed" (Horwtiz, 116). The shift towards diagnosing depression rather than anxiety may have resulted in some people getting the treatment they needed, but not without a significant change to the field of psychology, which continues to need work.

Social media has been both a catalyst for globalization and vice versa, and this also applies to the transmission of Western depression and its understanding. Since the first platform was released in 1997, the hallmarks of increasing globalization have spread much farther and faster. The positives of this increasing globalization through social media must be acknowledged, which include increased communication and the subsequent spread of culture, but the negatives of the spread may ultimately neutralize gains in connection. Specifically regarding depression, between 1990 and 2017, during which social media was introduced and spread, a study found that "the number of incident cases of depression worldwide increased from 172 million in 1990 to 25,8 million in 2017, representing an increase of 49.86%" (Liu et al.). While these findings only represent correlation rather than causation, there is no dispute that the rate of Western depression is increasing drastically, and social media may have helped spark the drastic increase.

Since social media was created by Western inventors such as Mark Zuckerberg, creator of Facebook, and Kevin Systrom, creator of Instagram, and since many of its first users were of Western culture, non-Western cultures in which social media has a now substantial daily impact are in the most danger of a mass-scale contamination of Western depression. Without adequate interventions or understanding by the psychology field, the subsequent treatment or prevention of depression will fail to happen.

Between 1987 and 1997, the same year that social media was introduced, "the proportion of the US population receiving outpatient treatment for conditions called 'depression' increased by more than 300 percent" (Horwitz, 116). An overall shift in the

country's culture occurred, allowing "the takeover of the stress marketplace, [which] strengthened the association between common mental health problems and depression" (Horwitz, 117). Antidepressants gained unchallenged control of the market, allowing the rapid spread of the diagnosis of depression to mainly benefit pharmaceutical companies that created a monopoly on mental health (Horwitz, 118). Therapy approaches and the influence of culture, including the effect of social media, were shoved to the side to make room for drugs.

The spread of the Western experience of depression has transcended geographical and political boundaries and still lacks adequate monitoring and intervention. This "massive-scale emotional contagion through social networks" was demonstrated through data collected by Adam D. I. Kramer, Jamie E. Guillory, and Jeffrey T. Hancock, authors of "Experimental evidence of massive-scale emotional contagion through social networks." Through Facebook, they tested over 20 years of whether emotional contagion occurs outside of in-person interaction between individuals by reducing the amount of emotional content in the News Feed (Kramer et al.). When positive expressions were reduced, people produced fewer positive posts and more negative posts, and when negative expressions were reduced, the opposite pattern occurred (Kramer et al.). These results indicate that "longer-lasting moods [...] can be transferred through networks" (Kramer et al.). The fact that a person's emotions can be influenced without in-person interaction or nonverbal cues poses significant meaning for mental health, especially depression. While happier emotions can be transferred, news sites and social media in general tend to focus on negative events such as wars and conflicts.

Research on non-Western experiences and symptomology of depression in psychology is very much lacking. That being said, it is known that "depressed people in non-Western cultures tend to have fewer cognitive symptoms [...] and more physical symptoms" (Comer et al. 199). Social media itself influences the mind rather than the body, perpetuating Western depression and its cognitive symptoms. In order to adequately treat depression in non-Western countries and clients, social media should be understood to spread the Western experience of depression rather than depression overall.

Depression itself does not change with time, and as more research is done, the symptomology can be more specific to the disorder. That being said, the reasons for developing depression will change. Even though treatments such as medication will also change, the influence of culture and evolution must be included in the research. Otherwise, any treatment would be inadequate to confront a client's depression fully.

While the US does have a dominant culture, it also boasts a wide variety of regional subcultures, which influences how one may experience symptoms of depression. Joel Lieske, author of "Regional Subcultures of the United States," establishes ten regional subcultures present in the US at the time of the study. Those subcultures are named for differences in race, religion, ethnicity, history, socioeconomic status, and other differences. Lieske established these regional subcultures in 1993 and may no longer apply to today's population. His research implies that within the dominant Western culture of the US, there are subcultures that may define and experience depression differently from how Western psychology prescribes it.

As such, Western psychological diagnosis and treatment is inadequate even in countries whose dominant culture is Western. The experience of depression and the circumstances surrounding its manifestation are a combination of biology and culture, and everyone's combination is different. Because of that, the diagnosis and treatment must be personalized as well. Now, with the spread of the Western experience of depression through social media and similar platforms in non-Western countries, culture is being pushed out by Western diagnosis and treatment. However, its relevance and impact on the client are still the same, if not more impactful. As globalization increases, a person's culture will become more profound as a marker of a person's individuality, and therefore influence a person's experience of depression.

Japan's Approach to Depression

In Japan, the overall clinical picture of psychology existed long before the concept of Westernization even existed. The oldest preserved documentation that accounts for Japan's attempt at creating "a rationally centralized bureaucratic government, based on the principle of universal imperial rule, land allocation, and taxation" is the Taihō Ritsuryō, created between 701 and 718, long before globalization, much less Westernization, had much impact (Holcombe 544). This document included measures on the registration of the population, including the mentally ill, and how to treat those citizens (Holcombe 544). Similarly, in the U.S. today, since the country's government is based on the will of the people, someone who is accused of committing a crime has the option of pleading insanity as long as their state of mental health aligns accordingly. Hundreds of years before the US even existed, Japan had already put similar measures in place.

Rather than separate the mentally ill from the mentally sound, a practice the US participated in during more than half of the twentieth century with the use of institutionalization and public mental hospitals, early Japan saw the monarch as a living deity, meaning that they were not expected to present themselves as models for the citizenry to follow (Holcombe 557). Any perceived "madness," demonstrated by the monarch or others, was attributed to the work of deities or gods.

But after Buddhism, which is considered to be the "most consequential cultural exchange between Japan and China in antiquity" was introduced to Japan during the 6th century, the approach to government and subsequently the treatment of its citizens, changed swiftly (Holcombe 543). Now, "the Confucian ideal of government by virtue was a matter of a hierarchical social system under which leaders were literally expected to lead by good personal example and propagate the Confucian teachings" (Holcombe 557). Anyone who did not "fit the mold" due to mental illness or other reasons, was quickly shunned and covered up for fear of retaliation by the government.

Again, the dialogue surrounding mental health and mental disorders shifted in Japan. Instead of Buddhism as a catalyst for change, the Westernization of psychology and its spread became the catalyst. More people sought treatment for depression, defined as a "cold of the soul," and this new public interest in mental health allowed for large international companies including PhARMA, which functions as the national and international lobby and public relations organization for a coalition of major drug companies, to take advantage of the new mindset in Japan and push medication as a treatment for this "new" disorder, thereby gaining moreprofit (Watters, 157-159). However, any initial benefit that the introduction of the Western approach to psychology

had on Japan quickly backfired. The "mega-marketing of depression," which included campaigns to shape the consciousness of the Japanese consumer, too broadly defined depression (Watters, 158-159).

Many religions and traditions introduced to society change society's ways of thinking and act as agents of globalization, just as how Western culture had gained traction in Japan with the spread of McDonald's restaurants, which spread the Western value of fast service rather than effective service, as well as introduced burgers and fries to their local cuisine (Watson). The effects of Westernization can be seen and felt all over the world, beginning with the experience of colonization and ending with the world that emerged afterward. Postcolonial theorist Franz Fanon, author of "The Wretched of the Earth," believes Western propaganda works to convince the colonized, i.e. Japanese citizens supposedly diagnosed with depression, that their culture or traditional ways of dealing with depression or mental health disorders overall are inferior. The colonizers, i.e. pharmaceutical companies, often look to profit off of the colonized, which is their primary reason for colonizing a group in the first place. This results in "a halt to national culture in almost every field," as Fanon views it.

However, pharmaceutical companies are far removed from traditional colonizers such as Christopher Columbus, and the effect they have on people is very different from the effect the colonizers had on the colonized, which ranged from conquest to outright abuse. In the case of Western psychology brought to Japan, mental disorders including depression were initially ignored and shunned. The initial impact of Westernization allowed people to become more open about their struggle with depression, but it also allowed pharmaceutical companies to swoop in and, looking to profit from a health

concern, attempt to convince the Japanese people and market that depression was "a cold of the soul" rather than "incurable and inborn" (Watters, 158-159). But it was "so broadly defined [...] that it clearly encompassed classic emotions and behaviors formerly attributed to the melancholic personality type" (Watters, 159). As Fanon notes, this takeover of the "depression market" was "total and tends to oversimplify [and] manages to disrupt in spectacular fashion the cultural life of a conquered people," which allows the "colonization" of psychology, in this case, to occur in places where they may or may not be in a position to refuse.

Not only were profits placed above the health of individuals in Japan, but that profit-driven mindset caused people to waste money on a non-existent condition. Research on alternate methods of treating depression, such as psychotherapy, lagged behind the influx of medication, which excluded clients whose symptoms may not be reduced by antidepressants. Furthermore, since not enough research was conducted on what depression looks like in Japan before the widespread circulation of antidepressants as an answer, clients who experienced symptoms that differed from the Western definition may not have received treatment. As Latif Nasser, author of "Do Some Cultures Have Their Own Ways of Going Mad?" points out, "Culture doesn't just shape what a mentally ill person calls his or her illness, [...] it determines what counts as illness in the first place." Even if underlying mental illness is universal and the symptoms experienced by different cultures are all variations of somatic disorders such as depression, culture still tells us "what is normal, what is abnormal, what is deviant, what is not deviant, and where you seek help from" (Nasser). Diagnosis and treatment of mental health disorders including depression must be treated as a local product rather

than culture-free because one treatment for one culture may not work for another culture (Nasser).

Voices of Dissent

Though we are of the same species and we share the same biological processes, the influence of our experiences on both our overall development and the potential development of a mental health problem such as depression is too important to be shoved aside. Besides, not every country has the resources to supply antidepressant medication to its citizens, for which a different approach to both the diagnosis and the treatment of depression is needed. Jessica A. Keith, Helen Verdeli, and Eleni Vousoura note in the article "Evaluating the Clinical Significance of Depression Treatment: Implications for Global Mental Health Research" that the statistical significance of treatment "is no guarantee that treatment improved the lives of individual participants who received it in a real and meaningful way" (5). Rather, clinical significance, which "examines whether a treatment makes a demonstrable, clinically meaningful difference to the recipient" should be used to evaluate the effectiveness of a treatment for depression especially in low-income countries because of their lack of resources and the fact that depression is much more prevalent in low-income countries due to factors that Western countries may lack understanding of (Keith et al., 3).

Since Western psychology's parameters surrounding depression are subjective and non-inclusive of places and people whose current conditions are completely different from the West, establishing clinical significance rather than statistical significance as a measure of treatment would be more inclusive of any extenuating circumstances. It must be acknowledged that the roots of clinical significance were

founded on Western principles, but the demonstrable effect is directly connected to the client. This effect may not appear to be the same for everyone, as everyone's experience of depression varies. But, by noting that there is an effect, the client can indicate whether or not the treatment is working and the therapist can change their method depending on the results. This also applies to people living in the U.S., where your neighbor could be living a life completely different from yours due to circumstances, as well as the impact social media has been having on youth and the need to address changing norms.

The impact of statistical significance is not only felt by the individual but by the group, as Karl Marx's theory on estranged labor suggests. He specifically applies the theory to the impact that a capitalist economy and large corporations that rely on that economic system have on workers and who weigh economic gain against human value in an unfair comparison. Marx asserts that corporations purposefully dehumanize workers and keep them obedient by keeping them separate from the rest of society and the fruits of their labor. In other words, the "political economy conceals the estrangement inherent like labor by not considering the direct relationship between the worker and production" (Marx). This theory can also be applied in terms of how using statistical significance as a form of measuring the effectiveness of a psychological treatment "estranges" the client from their own experience of depression and the subsequent treatment. This only benefits the capitalist system because of how the client's "labor" towards what Western

psychology views as a successful recovery from a mental disorder such as depression, is separate from the client rather than the same. The therapy a client may

go through, depending on the model of abnormality applied, is "merely a means to satisfy needs external to it" (Marx). In other words, any progress that a client sees in Western therapy, which disregards culture, background, and other factors that may contribute to one's experience of depression only satisfies the therapist because their meaning as a therapist has been fulfilled. The experience of progress must be changed to be directly related to the client's efforts rather than the therapist's efforts for change to be noticed and continued.

The Holistic Approach

The overall goal of the treatment of depression should not be just the reduction of symptomology, which is currently the "standard." The end goal must be "remission from the presenting depressive episode rather than simply a reduction in overall depressive symptomatology or a lack of a full *Diagnostic and Statistical Manual of Mental Disorders* diagnosis" (Keith et al., 5). Unfortunately, this is not applied, largely due to the pharmaceutical companies who seek to profit off of a client's disorder. While the reduction of symptomology may be beneficial for the client, to fully treat both the client's mental disorder and eventually resolve it, an approach that encompasses the culture, the community, the history, and any impactful circumstances. In other words, an interdisciplinary approach. Currently, most approaches end once the client no longer experiences the symptoms associated with their disorder. However, those symptoms could easily return if the influences and circumstances behind the client's development of depression are not resolved. This vicious cycle only benefits the therapist and pharmaceutical companies as their pockets are lined.

In the models of abnormality previously discussed, a model already exists that accounts for culture, i.e., the multicultural model. However, as with the rest of the models, it has its limitations. For example, while it does account for culture as influencing abnormal behaviors, it fails to account for a person's background and past experiences, as the psychodynamic model accounts for, as well as any biological components that the biological model addresses. Since most Western models of abnormality have limitations, a different approach must be created, one that is interdisciplinary and integrative of every facet that may contribute to the development, experience, and treatment of depression.

As Dhar and Dixit point out, the first step in a new approach is "knowing if and whether we are needed and welcome, or [if] we are contributing to *making a crisis,"* meaning if the diagnosis of depression is accurate or an incorrect interpretation of something that is considered normal within a cultural context (125). That requires an understanding of both the person and their experiences. In other words, biological, cultural, and personal factors and experiences. The developmental psychopathology perspective is one approach that accounts for a combination of factors. This model emphasizes prevention and early intervention rather than treatment after the fact. Unfortunately, this is taught limitedly in Western psychology classes, whereas the biological, psychodynamic, and cognitive-behavioral methods are often sold as the "most effective." As with every model, developmental psychopathology has its limits, including determining who is considered to be "at risk" or "vulnerable" to a certain mental health disorder such as depression.

The limitations in all of the current models of abnormality demonstrate the need for a more holistic approach to mental disorders such as depression. For any model to be effective across all cultures, the definition of depression must account for and suit cultures according to their experiences. Subsequently, the treatment of depression should address the physical, mental, and social roots and effects of the problem. Just as our world becomes more complex every day, so must the approach to mental health.

Next Steps

Every person, no matter who they are, no matter where they come from, and no matter what they have experienced, deserves to receive psychological services if they desire it, and for those services to be effective for them, not for the therapist. For this shift to occur, we must start with where psychology education starts: schools and higher education facilities. Asking therapists who are already in the field and already practicing to change their entire approach to treatment is nearly an impossible ask. However, addressing how future therapists are educated is possible and must be done. The task will not be easy nor accepted unconditionally, but for the good of the globalized world, it must be done.

All educational-related changes and proposals will be met with criticism and opposition by those who lack education or simply refuse to look beyond their ways of viewing the world. This is no different regarding proposing to change the psychology curriculum in schools and universities. Proponents of the other models of abnormality will most assuredly find fault with the developmental psychopathology approach but what matters is the client and their well-being, the only true considerations needed. As globalization increases with every day that passes, the field of psychology will also change and be

changed by new cultures. Western-based practices can no longer be the standard for

addressing any culture.

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LITERATURE

American Politics Expressed Through Satire

Ricardo Santana; Mentor: Alan Kaufman, Bergen Community College

Judge's Comments: "Ricardo Santana's presentation was well researched and extremely compelling. Attuned to the nuances of the historical and political contexts, Ricardo offered the audience an engaging and highly effective reading of the enduring power of satire."

Dr. Elizabeth Holt
Associate Professor of Arabic
Bard College

American Politics Expressed Through Satire

Using humor, irony, and exaggeration, authors use satire in fictional pieces to

highlight the flaws in socio-political matters. *Catch-22* by Joseph Heller and *The Sellout*

by Paul Beatty effectively use satire to subtly draw attention to some of American

society's most pressing political issues. Through dark humor, Beatty and Heller give the

American reader a hard pill to swallow regarding the sad truths of their country's nature.

American literature does not just address political matters, but it uses them as an

opportunity for the public to weaponize their freedom of speech and go after their

country's terrible policies and societal norms.

Heller and Beatty must shine a light on political concerns because it allows the

reader to see the bigger picture. Whether or not people decide to make a change, it is

still crucial that the public sees literature as a conduit for unforgiving exposure, breaking

from any deception within mainstream media. According to a review of *Catch-22's* use

of satire, "The method of satire is to inflate reality so that all its partially concealed

blemishes turn into monstrous and apparent deformations" (Toynbee). Through the

exaggeration, irony, and humor used by Heller and Beatty, what is at first a laughing

matter becomes a grave truth that lies beneath the surface.

Catch-22 deploys the reader at an Air Force base in Italy during WWII as they

follow the story of John Yossarian, a B-25 bombardier. Yossarian is eager to escape the

Air Force and go home because he knows if he stays any longer, he is bound to die

fighting a war that is unimportant to him. Yossarian is not allowed to leave because of

the "Catch-22" rule, stating that a soldier can be discharged if he is insane; all he has to

do is inform the Doctors. That is where the catch comes into play; any soldier trying to

escape danger is considered sane; therefore, admitting that they are insane to escape the war proves their sanity, forcing them to keep serving. This confusing and seemingly

inescapable situation is Heller's first of many attempts to satirize the American government's tendency to trap or manipulate the public into supporting their international conquests.

Heller writes *Catch-22* from a place of experience. Heller, much like Yossarian, was a bombardier stationed in the Mediterranean during WWII. His time overseas gave him everything he needed to write a novel that captured the soldier's experience for what it was instead of the typical romanticized portrayal.

Catch-22's publishing in 1961 conveniently aligned Americans' disapproval of the Vietnam War, opening doors for discontentment with a government through mainstream literature. The U.S. faced various political issues during the novel's publication, and Heller creatively shines a light on some of the most crucial ones.

In order to convince the public that a war effort is entirely necessary, the government must sell the war to its people using propaganda and uplifting speeches from politicians. Heller shows the effects of this in chapter twenty-three of the novel through Edward Nately, a squadron member used as the symbol of American naivety. Nately and the rest of the squadron are at a brothel in Rome while on rest leave, and Nately gets into a heated debate with the brothel's owner. The owner challenges Nately's patriotism by questioning why anyone would risk their life for a country. Nately proudly responds, "There is nothing so absurd about risking your life for your country!" (Heller 247). Nately is disgusted by the man's lack of patriotism. Because of the ideas that the U.S. government pushed on the public to motivate the war effort, Nately

believes that a lack of nationalism is a lack of integrity, the driving argument for supporting the Vietnam War.

The brothel owner expands on his cynical view of the world and the futility of wars, "You put so much stock in winning wars; the real trick is in losing wars, in knowing which wars can be lost. Italy has been losing wars for centuries, and just see how splendidly we've done nonetheless" (Heller 245). The owner compares the nature of the U.S.'s affinity for war to Italy's lackluster history of them. Italy remains afloat no matter how many wars they lose, so what do the wars do? Heller uses this conflict to challenge Nately's patriotism and provide readers with a moral dilemma that will make them question if wars mean anything. Heller subtly leads the audience into their "ah-ha" moment as they get deeper into the chapter and begin to resonate with the owner's philosophy, making them question if they were manipulated this whole time to believe that wars such as Vietnam were doing any good.

As if the owner of the brothel's admittingly strong argument did not already drain all of the patriotism out of the reader's body, he puts one last nail in the coffin. Nately tries to save his argument by saying, "It's better to die on one's feet than live on one's knee" (Heller 247). The owner responds, "I'm afraid you have it backward. It is better to live on one's feet than die on one's knees" (Heller 247). In this final exchange, the reader becomes Nately and is left speechless as they realize they have been fooled. Heller strategically reveals this trick to the reader so they can recognize the pattern that has been used against them many times before, which will ideally strip the method of its power. Nately's encounter draws attention to U.S. indoctrination, a necessary realization that creates a more skeptical but better-informed public.

Heller supports the idea of the futility of war through Yossarian. Yossarian is the only character in the story with anything close to a rational mind. From the beginning, Yossarian is eager to escape his military service. However, his draconian squad leader Colonel Cathcart keeps raising the number of missions every time the men get close to finishing. Yossarian despises the war and the way that his superiors are controlling him. Yossarian exclaims, "Who's the real enemy? The enemy is anybody who's going to get you killed, no matter which side he's on" (Heller 124). Yossarian is alone in this belief, and no one else is willing to challenge the repressive nature of the situation. As a result, Yossarian becomes Heller's early image of the "woke" American, the pioneer of paranoia.

Catch-22 is purposely ridden with contradictions, highlighting the absurdity of wars. Yossarian's efforts are constantly hindered by these absurdities, which present a comical aspect, but all good jokes contain truth. The constant rejection and reprimanding that faces Yossarian infer that those against the war are seen as against the country. This instance is where one of the most notable contradictions in the book comes into play; Heller states, "The country was in peril; he was jeopardizing his traditional rights of freedom and independence by daring to exercise them" (Heller 405). The government attempts to convince people that every war effort serves to protect their freedom no matter how futile, and when people like Yossarian express distaste, they are deemed ungrateful.

Heller explores other pressing socio-political issues in America through Milo Minderbinder, an ambitious mess officer from Yossarian's squadron. Milo created a syndicate called "M&M Enterprises," where he established a trading system of food and

other goods with various countries. Milo's business grows astronomically lucrative, so much so that he does not have to fly any combat missions because of his duties with the syndicate. Milo even goes as far as to create a contract with the German military in which they would receive goods in exchange for planes to support the business. Milo constantly assures everyone in the squadron that they are all part of the syndicate and everyone gets a share, but no one seems to gain any actual benefit other than him.

Amidst Milo's international affairs, there was one agreement with the German military that the rest of the squadron was unaware of, except for Milo. To keep receiving planes and money from the Germans, Milo would have to bomb his base using the planes given. Milo commits a catastrophic attack on his base, resulting in the deaths of many of his comrades. Yossarian, once again as the only voice of reason, confronts Milo for his heinous actions and exclaims, "Can't you understand that we're fighting a war? People are dying. Look around you, for Christ's sake!" (Heller 256). Milo fails to feel sympathy for all the terror he has caused because he is only looking out for the best interests of his business.

In defense of the attack on the base, Milo says, "But the Germans are also members in good standing of the syndicate, and it is my job to protect their rights as shareholders. Maybe they did start the war, and maybe they are killing millions of people, but they pay their bills a lot more promptly than some of our allies I could name" (Heller 256). Heller makes it evident to the reader that Milo is his symbol of capitalist greed. Milo would rather kill his people and make deals with one of the greatest evils of WWII than watch his profits shrink. Milo's behavior mirrors that of many well-known

capitalists in the U.S. who have made their fortune through unethical choices and exploiting others.

One would think that Milo's crimes would result in immediate punishment, but unfortunately, this sequence is another punch to American society's gut using the darkest joke in the book. Heller writes,

"This time Milo had gone too far. Bombing his men and planes was more than even the most phlegmatic observer could stomach, and it looked like the end for him. Decent people everywhere were affronted, and Milo was all washed up until he opened his books to the public and disclosed the tremendous profit he had made" (Heller 259).

Instead of receiving the well-deserved punishment, Milo is let off the hook when he reveals the amount of money gained for the syndicate from his deal with the Germans. This devastating turn is so incredibly comical because of how true it is. Heller uses this to expose the government officials who let American capitalists off the hook when they commit crimes in pursuit of wealth because they know they can also benefit.

The message that Heller tries to send through Milo becomes prophetic as we see the same dynamic unfold in today's America. During the war on terror in the early 2000s, ex-Vice President Dick Cheney's oil company Halliburton gained $39.5 billion in Iraq-related matters. The company took advantage of the fight against Al-Qaeda in Afghanistan and found an excuse to extend the war to Iraq, which had nothing to do with it—to acquire copious amounts of Iraqi oil. Halliburton got away with profiting from the deaths of thousands of innocent Iraqi people and American soldiers—a collective of modern-day Milos exchanging lives for money (Young).

The Sellout delivers that same tragic truth that the reader has to digest in *Catch-22* but on another side of the coin. *The Sellout* plants the reader in a twenty-first-century agrarian ghetto called Dickens in Southern Los Angeles that is on the verge of being removed from the map. The narrator, Bonbon, an African American farmer, seeks to bring Dickens back with the help of Hominy, the last living Little Rascal conditioned into a state of racial inferiority because of his exploitation during his childhood acting career.

To reinforce Dickens' place on the map and to please Hominy's persistent longing for racial degradation, Bonbon decides to reinstate segregation on the buses and local high school. Bonbon's idea seems to work until his imposed rules get him arrested and sent to face trial at the Supreme Court. This exaggerated attempt at Dickens' revival from Bonbon shines a light on many race-based issues in the U.S. that many readers have yet to notice.

Beatty writes *The Sellout* using inspiration from experiences he has had as an African American man living in the U.S. Through Bonbon and other characters in the novel, Beatty can capture some hard truths about the hardships that minorities in America face. The novel lets loose on America's socio-political shortcomings through humor and exaggeration.

Bonbon aims to segregate Dickens to draw much-needed attention to the town for its recognition on the map of California. Even Bonbon admits that the idea is absurd, but since Hominy cannot live without racial degradation and Dickens needs saving, Bonbon must try to convince himself that it is the only way. Bonbon states, "Who was I kidding? I'm a farmer, and farmers are natural segregationists. We separate the wheat from the chaff. I'm not Rudolf Hess, P.W Botha, Capitol Records, or the present-day

U.S. of A. Those motherfuckers segregate because they want to hold on to power"

(Beatty 214). Beatty uses Bonbon's dilemma to expose a system that always aims to

keep the lower class powerless while convincing them they can climb the social ladder.

Beatty specifically says the present-day U.S.A. because no matter how far the country

has come, it is still socially segregated.

The reader may find it a little absurd to compare the U.S. to a Nazi and a

leaderof South apartheid. However, Beatty purposely does this to allow the reader to

realize that they might not be that different regarding the essence of segregation. Using

these exaggerated examples, Beatty wants the reader to wonder whether the U.S.

stopped segregating or if they are just really good at embedding racism so

systematically that it doesn't even register as anything short of business as usual.

The issue of keeping poor people poor is visited more than once by Beatty.

Marpessa, an African American woman who works in public transportation, and a white

woman argue about opportunities for minorities in the workforce, and it creates a heated

moment. The woman exclaims: "Look, I doubt that black people 'get all the jobs.' But

even if they do, it is because Madison Avenue knows African American people spend a

dollar and twenty cents of every dollar they earn on the crap they see on television"

(Beatty 137). The woman's opinions on the financial habits of African Americans exist

as a result of modern conservative media's continued use of the image of the so-called

"welfare queen." This idea, since its notorious birth in the 1970s, created a more critical

view of the financial needs of low-income communities, leaving taxpayers distrustful

when it came to public assistance. Systemic racism paints the financial disparities of

minorities as a big scam on the working class. Hence why the woman expresses her

opinion to Marpessa with such conviction because she has been conditioned to antagonize lower-class minorities, diverting the attention from the real source of working-class financial exploitation.

Beatty's continuous mention of this subject shows disapproval of American consumerism. The idea presents that rather than people having "bad spending habits," it is, in fact, the fault of big companies trying to push these products down their throats and convince them that they need them so they can make a profit at the expense of others. Beatty puts the reader in the front row to witness these encounters and be captivated by the drama, leaving the reader with a clear image of how greed has plagued the U.S.

Before his arrest and Supreme Court trial, Bonbon's short-term success in segregating Dickens raised some interesting points. One of his first attempts at segregation was buying a piece of land across from the local public school and putting up a construction plan for a new cutting-edge school called Wheaton Academy that would only allow white children to attend. Dickens has a predominantly African-American and Latino population, so the kids felt challenged upon seeing this. The kids in the local schools began to perform much better regarding their grades and behavior. This change may seem optimistic for the kids and the school. However, it is merely the use of highly dark humor to expose a hierarchical dynamic that has persisted throughout American history.

Bonbon points out, "Regardless of your income level, the old adage of having to be twice as good as the white man, half as good as the Chinese guy, and four times as good as the last Negro the supervisor hired before you still holds true" (Beatty 181).

Beatty uses the kid's behavior change in the school to point out that these children need to outperform the white children to be seen as "average," since the white image is presented as the norm. This dynamic promotes an unhealthy mindset that still holds today despite changes in workplace equality, but the implicit biases seem to remain from employers. Beatty creates a fascinating situation highlighting that people want to outperform the oppressor only when the oppression is fully evident. However, the kids failed to realize segregation was already in place; it was just obvious this time. Higher quality schools in the area contain a much more dominant white population and the same things with higher paying jobs. Beatty points out that these things are put in place systematically to keep minorities underpaid and undereducated to leave more room for white people to prosper. This systematic segregation is not evident until blatant segregation occurs. The kids thought they were fine where they were, but when it was in front of their eyes that white people were receiving a better education, they felt the need to over-achieve and prove they were just as capable. The sad part is that the kids always were in a position of imposed inferiority, and it had to take Bonbon's ridiculous idea to make it evident.

Beatty receives much-deserved praise for his controversial yet practical approach to racial issues in America. An article reviewing *The Sellout* states, "If *The Sellout* does anything, it successfully points not only to the problem but all the complexities and nuances of the problem, proving that it's not as simple as (I hate myself for this) black and white. This book doesn't shy away from anything" (Lodge). Beatty's bold plot choice successfully pointed out racial issues in America and their political implications.

Beatty's use of comedy gives a deeper cut than just flat-out saying the socio-political concerns. The realization of the subliminal message within Beatty's humor makes the issue even more painfully apparent. The *New York Times* magazine analysis of Beatty's use of satire states, "He tries instead to go back in time and do what gangsta rap did in protesting oppression through its fantasia — using farce instead of pretend force" (Young). The effectiveness of calling out the oppressor is more prominent when satire is used instead of a blatant attack. These issues at hand can be quite depressing to read in their raw form but the use of the comedic element provides the water that helps wash down the hard pill to swallow.

Beatty and Heller published their novels in two different periods with distinct issues. No matter the most pressing political issue of the age, satirical literature never fails to chew it up and spit it out. Satire does this effectively because it takes the ugly truth and puts a big red bow on it to make it appealing to the consumer while leaving them with a heavy subject to ponder for the rest of their lives. For every terrible thing the U.S. has done, there is a piece of literature or media that airs out its dirty laundry and inevitably finds itself in the hands of the public. In this way, the effect of American satire is irreversible because it permanently brings to light the political pitfalls that lay dormant in the minds of all who witness them.

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Multi-Output Combinational Logic Circuit Optimization

Anthony Dcosta; Mentor: Kam Yee, Montgomery College

Judge's Comments: "The speaker's understanding of the topic was evident. His speech was articulate, providing many details and making it easy to follow his points. He handled the questions from the audience very well and provided thoughtful answers."

Dr. Jeungeun Park
Assistant Professor of Mathematics
SUNY New Paltz

Multi-Output Combinational Logic Circuit Optimization Beyond Well-Established Techniques

It is imperative for engineers to upgrade their systems to be more economical and efficient, and digital circuits are no exception. There are various systematic tools already developed to simplify the logic circuits: Boolean Algebra, Karnaugh Map (K-map), Quine-McClusky method, Petrick, Espresso, to name the major ones. Computers can be used to apply these tools for large scale digital circuits and make them much less resource intensive. However, these tools might not always produce the most simplified design possible for combinational logic circuits. Some combinational circuit design problems require additional "tricks" to achieve their most optimized form. One such example of a design problem, and the "trick" that likely produces its most optimized form where the current established method fails, will be explored in this paper. The above tools primarily focus on reducing the Boolean Expressions that describe the combinational logic, and this method focuses on reducing the total propagation delays and total required gates during the circuit construction step. The purpose of this paper is to show that while the currently established tools for optimizations are useful, there could be unconventional methods for a particular combinational circuit that can produce an even more optimized design.

The following is the design problem to be used for the demonstration. The design problem asks for a combinational logic circuit to keep track of 3 votes. The votes can be either "Yes" or "No", and a seven-segment-display (SSD) must display in human-

readable form the total number of "Yes" votes amongst the three available votes. Finally, a light emitting diode (LED) must light up if the number of "Yes" votes are greater than the number of "No" votes.

Just like any combinational circuits, there is a plethora of ways to design a circuit for this problem. If performance and cost are of no concern, then adders and decoders can be used to easily solve this design problem. However, since the goal is to arrive at the most optimized design, a gate-level design with more control over the functionality is preferred. Also, since NAND gates are universal, they will be used as the basic building block for the circuit.

Inputs and outputs

Since the design must use a digital circuit, the inputs and outputs must be represented by binary inputs. The circuit will have 3 input switches for three different votes. The bit "1" will represent a "Yes" vote for the circuit and the bit "0" will represent a "No" vote for the circuit. This results in $2^3 = 8$ possible unique combinations of 3-bit binary numbers. In other words, there will be eight different input combinations corresponding to different combinations of "Yes" and "No". For design purposes, the three inputs will be denoted S_1, S_2, S_3. An image of a seven-segment-display is shown below in figure 1 to better illustrate the outputs.
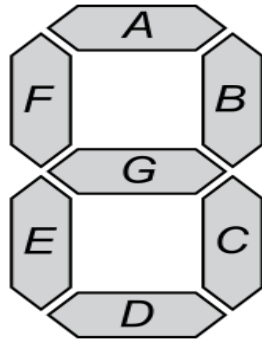
Figure 1: A Seven Segment Display. *(Uln2003, 2013).CC0*

A seven-segment-display (SSD) requires 7 inputs for its 7 segments. This design
will use a Common Cathode Display (CC SDD); therefore, the circuit must provide a '1'
bit to light up a segment. Each of these segments is denoted the letters
A, B, C, D, E, F, G . This dictates that the circuit must have 7 outputs to light up the 7
seven segments of the display. One more output is needed to light up the LED for the
majority of "Yes" votes, resulting in a total of 8 outputs. Seven of them will correspond to
the seven segments of the display and have the name A, B, C, D, E, F, G and the LED
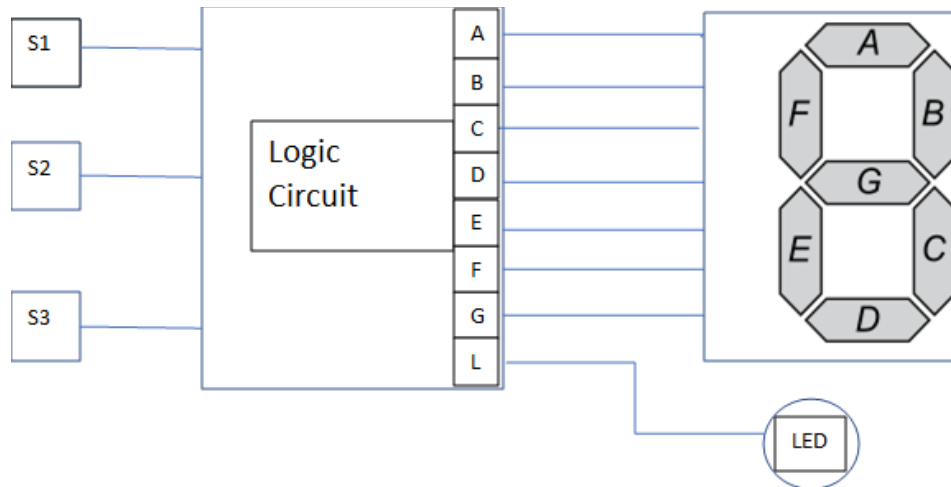will have the output L . A block diagram of the design is shown below:

Figure 2: Block Diagram of the circuit.

Next step is to construct the truth table for the design problem. Table 1 shows the truth table and an explanation for the truth table following it.

| S1	S2	S3	A	B	C	D	E	F	G	L
0	0	0	1	1	1	1	1	1	0	0
0	0	1	0	1	1	0	0	0	0	0
0	1	0	0	1	1	0	0	0	0	0
0	1	1	1	1	0	1	1	0	1	1
1	0	0	0	1	1	0	0	0	0	0
1	0	1	1	1	0	1	1	0	1	1
1	1	0	1	1	0	1	1	0	1	1
1	1	1	1	1	1	1	0	0	1	1

Table 1: Truth table for the design problem

Explanation for the truth table

Decimal readout from the SSD is either 0, 1, 2, or 3, depending on the number of "yes" votes by the user or the number of "1" bit in the input combination.

Output L: Output L is 1 when there are more 1 bits than 0 in each combination. In the truth table above, any combination with more 1s than 0s has L = 1; L = 0 otherwise.

Output ABCDEFG : These outputs correspond to the pins of the SSD. Two simple ones arise in the first and last row of the truth table. First row output for SSD is that of zero.
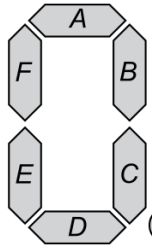
There is only one input combination for 0, that is 000. Decimal 0 lights up the segments ABCDEF, so the output is 1111110. The figure on the left shows the segments that will light up in this combination. Segments that are not shown (G) will have the "0" state and will not light up.
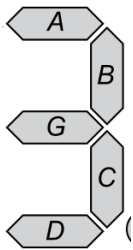
Similarly for the last row, there is only one input combination for the decimal readout 3, namely 111. Decimal number 3 lights up the segments ABCDG, so the output is 1111001. The figure on the left shows the segments that will light up in this combination. Segments that are not shown (EF) will have the state "0" and will not light up.

Decimal readout 1 is represented when most of the bits are 0. So, any combination with more 0 bits and 1 bits have the output 011000. This combination lights up only the B and C segments. The figure on the left shows the segments that will light up. The segments not shown (ADEFG) will have the 0 state and will not light up.
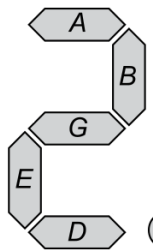
Finally, readout 2 is represented by any input combinations with more 1 bits than 0 bits. Readout 2 is represented with the segments ABDEG. That corresponds to the output 1101101. The figure on the left shows the segments that will light up. The segments that are not shown (CFG) will have the state '0' and will not light up.

Optimization Criteria

Before moving further into the design process, we should establish how the optimization of the circuit will be determined. It will be through Power Delay Product (PDP). The combinational logic circuit's performance is determined by its worst-case delay, D_{wcd} , measured in seconds (s) , and the total power consumed by all the gates during the worst-case delay, P_T, measured in watts (W) . If P_{avg} is the average power dissipated by each gate, then $P_T = n \cdot P_{avg}$, where n is the number of gates in the circuit. Also, if Δ is the average delay posed by the gates, then $l \cdot \Delta$, where l is the largest number of gates an input propagates through. These two quantities are multiplied, and their product is called the power delay product (PDP) in standard unit of energy Joule (J):

$$PDP = P_T \cdot D_{wcd}$$

$$PDP = n \cdot l \cdot P_{avg} \cdot \Delta$$

$$P_T = Total\ Power\ Usage, \quad D_{wcd} = Worst\_Case\ Delay$$

$$PDP = P_T \cdot D_{wcd}\ [Unit\ of\ Energy]$$

$$if\ n = total\ gates,\ and\ l = \ of\ levels,\ where\ n,\ l\ are\ integers$$

$$P_{avg} = power\ per\ gate\ (mW),\ \ \Delta = delay\ of\ each\ gate\ (n\sec\ \ )$$

$$P_T = n \cdot P_{avg}\ and\ D_{wcd} = l \cdot \Delta$$

$$PDP = n \cdot l \cdot \left(P_{avg} \cdot \Delta\right),\ where\ \left(P_{avg} \cdot \Delta\right)is\ unchanging$$

In other words, PDP is the energy consumed by the circuit per switching event. The lower this quantity is, the lower is the energy expenditure for operating this circuit. At a gate level design, we only have control over the number of gates (n) used and the worst-case delay (l) and with no control over the energy consumed by each gate (P_{avg}) and the delays posed by each gate Δ. The PDP of circuits presented in this paper are evaluated by considering $P_{avg} \cdot \Delta$ as constant and controlling the values for $n \cdot l$. So, the PDP reduces to $PDP = n \cdot l \cdot C$, where $C = P_{avg}\Delta$, is a constant that is identical for all the circuits examined in this paper. Since C is a constant, the only two parameters of interest are n and l.

Designing the Circuit

The following assumptions were made for analyzing the design:

- All gates use the same power (average power), P_{avg}.

- All gates have the same delay (average delay), Δ.

- The number of inputs supplied to the gates does not affect the gate's performance.

- The number of fanning out does not affect the gate's performance.

The following image lists the most simplified Boolean expressions for all 8 outputs using the Petrick's method. The method was applied using the software LogicAid. Identical Boolean expressions can be achieved through Quine-McClusky method.

```
    Simplification Routine:   Petrick 5
A  =  S1'S2'S3'  + S2 S3  + S1  S3  + S1  S2
    Input Cost = 13            Gate Cost  = 5
B  =  1
    Input Cost = 0            Gate Cost  = 0
C  =  S1'S2'  + S1'S3'  + S2'S3'  + S1 S2 S3
    Input Cost = 13            Gate Cost  = 5
D  =  S1'S2'S3'  + S2 S3  + S1  S3  + S1  S2
    Input Cost = 13            Gate Cost  = 5
E  =  S1'S2'S3'  + S1'S2 S3  + S1 S2'S3  + S1 S2 S3'
    Input Cost = 16            Gate Cost  = 5
F  =  S1'S2'S3'
    Input Cost = 3            Gate Cost  = 1
G  =  S2 S3  + S1 S3  + S1 S2
    Input Cost = 9            Gate Cost  = 4
L  =  S2 S3  + S1 S3  + S1 S2
    Input Cost = 9            Gate Cost  = 4
```

Figure 3: The most simplified Boolean Expressions derived using LogicAid.

As we will see, even though these Boolean Expressions are in their most simplified form, without slight modifications to the representations of some outputs, they do not produce the most optimized (lowest PDP) circuit given the assumptions. In the above expressions, each of the labels, A to L, represents the outputs as defined in the truth table (Table 1). Each expression describes how the logic gates (NAND gates in our case) need to be wired or connected to mimic the result of the truth table. The (') on the variables, such as S_1', denotes the inversion of the input signal S_1.The multiplication operation between the variables such as $S_1 S_2 S_3$ denotes the AND operation between the variables. The addition operation between the "product terms" (ANDed terms) denotes the OR operation. For example, in the expression for G , $S_3 S_2$ ORed with $S_1 S_3$; the result is then ORed with $S_1 S_2$. Following is an attempt to sketch the circuit with as much gate sharing as possible using the above Boolean Expressions, the following combinational logic circuit was sketched using the CircuitMaker software.
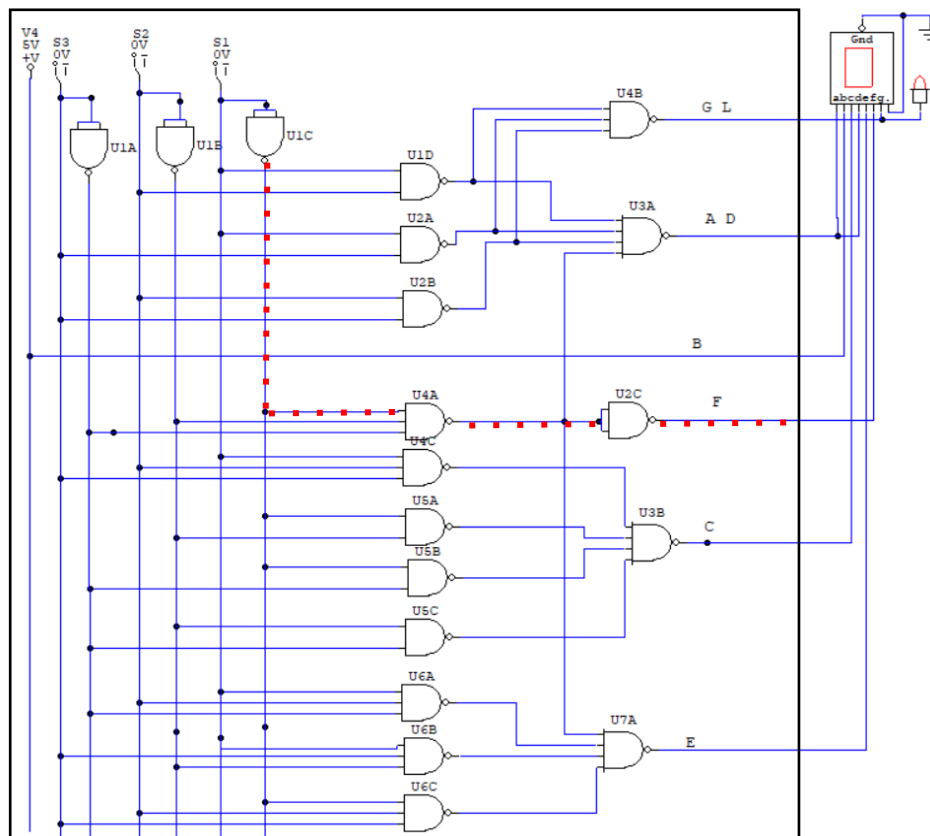
Figure 3: The circuit constructed using Petrick simplified Boolean Expressions.

The part of the circuit encircled by the black rectangle is the designed circuit. Along with the simplified Boolean Expressions, the following gate sharing was done for further optimizing this circuit:

- Output A contains the minterm $S_1'S_2'S_3'$ which is the logic expression for the output F. So, F was used to construct A.

- Output A and D are identical. So, the output A was reused for D.

- All the minterms of G and L are also present in A. So, G and L were derived using the minterms of A.

- F was reused for output E as well.

One of the worst-case delay paths for the circuit is highlighted in red dots. In this path, there are three gates through which input must propagate before expressing the output, and the total number of gates is 19. This makes the PDP of the circuit:

$$PDP = (19 \cdot 3) \cdot \left(P_{avg} \cdot \Delta\right) = 57 \cdot P_{avg}\Delta$$

However, this is not the lowest possible PDP possible with the given assumptions. The following simple manipulation of the outputs could be used to further lower the circuit's PDP. For this design, not all outputs have the same worst-case delays, and each requires a different number of logic gates to implement. We can reduce the number of gates used by deriving "similar" outputs from each other while keeping worst-case delay constant. This certainly results in a lower PDP circuit. For this design, the outputs G and C are one such example. The truth table columns for these two outputs are shown below.

S1S2S3	C	G
000	1	0
001	1	0
010	1	0
011	0	1
100	1	0
101	0	1
110	0	1
111	1	1

Table 2: Truth table of the outputs C and G

Looking at the truth table for both outputs, besides the input combination 111 , C is essentially the complement of $G : G'$. Furthermore, the minterm 111 can be included in the Boolean expression for C using an OR operation. This produces the output $C =$

$G' + S_1S_2S_3$. For a NAND gate to OR the G' and $S_1S_2S_3$, it must be supplied with G and

$(S_1S_2S_3)'$. G is already constructed and $(S_1S_2S_3)'$ requires 1 gate. Paired with the fact

that we only need 1 more NAND gate to combine the minterms for G and $S_1S_2S_3$, we

reduce the implementation of C from 5 gates to 2 gates. Furthermore, the worst-case

delay is still 3Δ because G originally had 2 stage delay and with additional NAND gate,

we added one more delay stage. This makes the current $PDP = (16\ gates\ \cdot\ 3)\ \cdot$

$P_{avg}\Delta = 48 \cdot P\Delta$

Following is a circuit showing this implementation. The red, dotted line highlights the
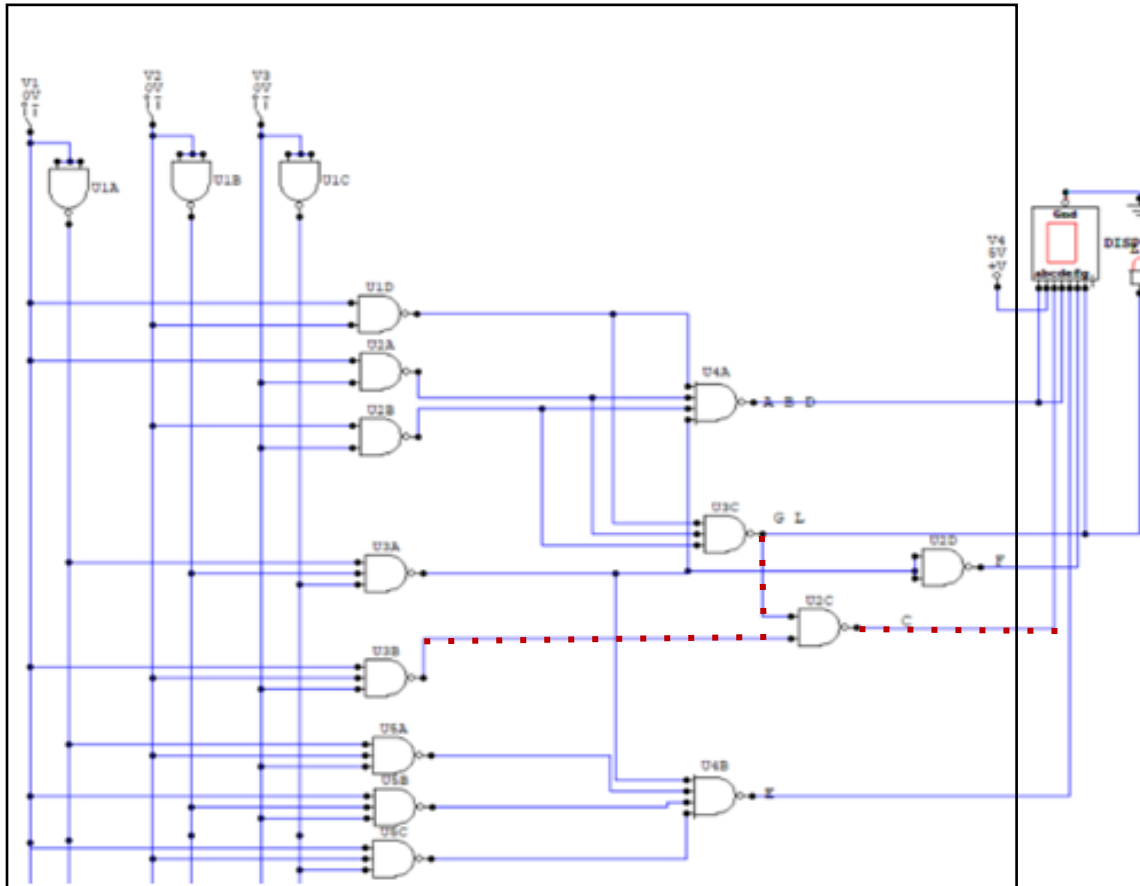
part where the manipulation was made:

Figure 4: The circuit with PDP = $48P\Delta$.

The possibility of combining the two outputs in such a way is not explicitly described in any of the currently established methods. However, with trial and error, such an opportunity could be discovered, and circuits can be further optimized. To find out if $48 \cdot P_{avg}\Delta$ is the lowest possible PDP, we should try other combinations of outputs and examine if they produce lower PDP.

- C was already derived from G in the design above, so we must try other combinations. The major outputs are G, C, and E. Every other output can be derived by combining them. F is just one gate. To keep our worst-case-delay (WCD) at 3 stages, we cannot derive any output from E or C since E and C both require 3 stages. Trying to derive another output using them will add another stage. This leaves us with only G and F to derive other outputs. Here is a list of combinations that we tried to further reduce the circuit PDP:

- Deriving C from A. $C = A' + F + S_1 S_2 S_3$. with WCD 3 stages, since we don't need to invert A before sending to a NAND gate. Let's see if it is better than our presented design. We derived C from G using $C = G' + S_1 S_2 S_3$(E1) for our final design. Now, observing that $A = G + F$ (E2) and $C = A' + F + S_1 S_2 S_3$(E3), the previous three equations show that this method is just a variation of the method we used in our design. As a result, this circuit will also make PDP 4800 pJ, which is equal to what we have for our design. This shows there could be multiple combinations that produce the lower PDP. We chose our design over this because our design has lower input cost. E1 requires 2 input NAND while E3 requires 3 input NAND gate.

- Deriving A from G. $A = G + F$. This combination is extremely useful as it constructs A from two outputs we already have and keeps WCD to 3. Also, A = D. If we tried the expression $A = G + F$, our PDP does not change, but it lowers the input cost.

- Derive output E from G. $E = (S_1' + S_2' + S_3') \cdot G + S_1' \cdot S_2' \cdot S_3'$. Doing this will require 2 gates for $S_1' \cdot S_2' \cdot S_3'$ and increase the WCD to 4 stages because the output G needs be inverted, then NAND-ed with ..., and then NAND-ed again for collecting the terms. Input will travel through a NOT gate, OR Gate, AND gate, and then another OR gate. This combination does not reduce our PDP.

- Since $A = G + F$, deriving E from A is also 4 stage WCD, even if we derived A in 2 stage delay with a 4 input NAND gate.

Even though 3 stage is the minimum delay we can achieve, that does not imply 4 or more stages delay cannot produce a more optimized design. Therefore, we give ourselves some flexibility and design the same circuit with new combinations. With 4 delay stage, we have 12 gates to work with. 3 of them will be used for inversion, leaving us with only 9 gates.

- For our first design, we could start by implementing A in 2 stage delay using a 4 input NAND gate (as we did in our final design). This will take up 5 gates. F is already implemented as part of A, and with one more NAND gate, we can implement G. Now, we have 3 more gates for E and C. We do have the flexibility to delay by one more stage, so we can derive C or from A. $C = A' + F + S_1 S_2 S_3$, which requires 3 more gates for C and 1 more gate for inverting F. It leaves no room for E. On the other hand, $E = A + S_1 S_2 S_3$. We can implement it using 2

extra gates, and leave us with one gate to implement C. We can do so with one NAND gate, but remember, we need to add another 1-input NAND gate for F. So, this gives PDP 13 * 4 = 52.

- For the second design, let's start by implementing C and use up 5 gates. This time, however, F is not implemented. So, we must implement F with 2 more NAND gates and that leaves us with 2 gates for E and A. $E = C' + F$, which needs 1 extra gate for NAND-ing C with F', leaving us with 1 gate for A. $A = C' + F + S_1 S_2 S_3$, which is not possible with 1 gate. We cannot derive A from E, or we will go up to 5 stage delay.

- Let's start by implementing E first. This takes 5 gates and F' is a part of E. After using 1 NAND gate to invert F, we are left with 3 gates to implement A, G, and C. It is already established that deriving G from E will take 3 gates, so we will not do it. $A = E + F$, so we need 1 NAND gate to invert E and another to NAND E' with F'. This will require 2 extra gates, leaving us with only 1 gate. We cannot get C from A, or we will go up to 5 stage delay. We cannot get C from E using 1 NAND gate since $C = E' + S_1' S_2' S_3'$. Also, we must implement G. G. cannot be derived from A or C, or we will increase the stage by 1. Since $G = (S_1' + S_2' + S_3')(E + S_1' S_2' S_3')$, we cannot derive with just 1 NAND gate. So, this design also has a higher PDP.

We could try 5 stage delay circuit, but that leaves us with 7 gates to implement all the outputs to achieve a PDP lower than 48 $P\Delta$. Despite this, we still cannot be sure that this design is the most optimal. We are clearly not trying ALL the possible combinations.

All these 'failed' designs, however, give confidence that this design has the lowest PDP for this design problem. So, we can say our design is 'likely' the most optimal design.

It should be noted that $48P\Delta$ of PDP is not impossible to achieve without the method described above. The following image shows the most simplified Boolean Expressions using the Espresso method by LogicAid.

```
     Simplification Routine:  Espresso Multiple
A =  S1 S2 S3 + S1 S2 S3' + S1 S2'S3 + S1'S2 S3 + S1'S2'S3'
B =  S1 S2 S3 + S1 S2 S3' + S1 S2'S3 + S2'S3' + S1'S2 S3 + S1'S3' + S1'S2'
C =  S1 S2 S3 + S2'S3' + S1'S3' + S1'S2'
D =  S1 S2 S3 + S1 S2 S3' + S1 S2'S3 + S1'S2 S3 + S1'S2'S3'
E =  S1 S2 S3' + S1 S2'S3 + S1'S2 S3 + S1'S2'S3'
F =  S1'S2'S3'
G =  S1 S2 S3 + S1 S2 S3' + S1 S2'S3 + S1'S2 S3
L =  S1 S2 S3 + S1 S2 S3' + S1 S2'S3 + S1'S2 S3
```

Figure 5: Espresso simplification for Boolean expressions.

If 8 input NAND gates can be used, then using the Espresso multiple output minimization, a delay of 3Δ and 16 gates could solve the design problem. Given the assumption of input fanning, this design is equally as good as the method described above. Practically, the application specification will decide between the Espresso and the method described above.

An Alternate Design Solution for Full Adder circuit

The two outputs, SUM and C_{out}, of a 3-input Full Adder (A, B, C_{in}) can also be combined to produce an alternate, functional design. While this does not produce the lowest PDP circuit, it can reduce the number of gates and input costs at the cost of higher delay. With a few of its positive contributions, perhaps this design could be applicable for some specific applications. Here is a truth table for the circuit:

A	B	Cin	SUM	Cout
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

Table 3: The truth table for the Full Adder Circuit

Looking at the truth table, SUM is the complement of C_{out} except for the minterms at

000 and 111 . Those two minterms could be combined with C'_{out} to produce $SUM =$

$(C'_{out} + ABC_{in})(A + B + C_{in})$, and this can be simplified to $SUM = ABC + AC'_{out} +$

$BC'_{out} + C_{in}C'_{out}$. The circuit will have a total delay stage of $l = 5$. Output C_{out} initially

had a delay of 2 stages, and implementing SUM will add 3 more stages to it: 1 for

inverting C_{out}, 1 for NANDing with the rest of the inputs, and 1 more for collecting all the

minterms with OR operation. The total number of gates will be 10. $PDP = 10 \cdot 5 \cdot P_{avg} \cdot$

$\Delta = 50 \cdot P_{avg}\Delta$. As noted, this implementation does not provide the lowest possible PDP,

but it could be useful on certain applications since it eliminates the implementation of

SUM with four 3-input NAND gates and one 4-input NAND gate. It reduces the total gate

required and input fanning at the cost of higher delay.

Conclusions

The method shown in this paper is certainly not a universal method. It may only

prove useful if the design requires multiple outputs and some outputs have a higher

delay than the others. As shown with the design problem in this paper, deriving some

output using other outputs can lead to diverse solutions. While most of them may not be

the most optimal design, some of them could be useful for some specific applications. It

may even be possible that the most optimal design of a combinational logic circuit can only be obtained by combining the outputs. Therefore, if the goal is to produce as many circuits as possible to arrive at the most optimal circuit, then combining outputs (which is not done by traditional, well-established methods) may prove useful for producing these circuits.

Reference

Image of Seven Segment Display

Uln2003. (2013, June 8). A 7 Segment Display with Labeled Segments. Wikipedia.

https://commons.wikimedia.org/wiki/File:7_Segment_Display_with_Labeled_Segments.svg

Effects of Politics on Music Culture

Meena Niazi; Mentor: Cheryl Tobler, Montgomery College

Judge's Comments: "Nazelly's presentation was well structured, promoting a great discussion of politics as a structure of power that can be used to purposefully force assimilation, disrupt cultural transmission, and create language/cultural barriers between generations of marginalized cultural groups."

Professor Jason Bishop
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Effects of Politics on Music Culture

Music culture refers to the beliefs, values, traditions, and practices surrounding music within a community. A music culture can be specific to one group and is typically passed down through generations. Music culture can manifest in various forms including classical music, folk music, traditional music, popular music, and can be expressed through different styles and instruments. Music culture can be influenced by several factors including politics. Government policies that seek to regulate or erase traditional practices can have a significant effect on music cultures. One of the major effects of political policies on the music culture of the Navajo, Irish, and Scottish Travellers is weakening cultural transmission.

Cultural transmission refers to the process by which customs, ideas, behaviors, and belief are passed from generation to generation within a social group (Taylor and Thoth). Cultural transmission is essential because it enables continuity and adaptation of cultural practices. In the context of music, cultural transmission can be prevented by several things including creating a language barrier, disrupting cultural practices, and displacing social groups.

In the early 1900s, the American government established boarding schools in an attempt to assimilate Native American children into American culture (Mejia). Many Native American children were sent away from their families and communities to attend these schools. Due to separation from their families at a young age, the children were unable to attain their long-standing cultural traditions and practices including language and music. An example of this assimilation can be seen in the ethnographic film, "*A Weave of Time: The Story of a Navajo Family*". In this documentary, an elder weaver named Mabel used to be a teacher in an Indian Boarding school. She mentions that the Beurre of Indian Affairs asked the teachers to speak English to the children. Native American children were punished if they spoke Navajo or practiced their cultural traditions including music. They were forced to learn and play western musical instruments. In this film, it is evident that Mabel cannot speak English and her

grandchildren cannot speak Navajo. Due to the language barrier, there is minimal interaction between the elders and children. This language barrier prevents the transmission of Navajo music culture that has been orally passed down through generations, from Mabel to her grandchildren.

Unsettled: From Tinkers to Travellers is a documentary that explores the culture and history of an Irish nomadic group known as the Irish Travellers. The Irish Travellers have a unique and distinctive music style. A lot of the songs in the tradition tells stories of Irish Traveller life. These songs are orally passed down from generation to generation to ensure the musical traditions are preserved. The ethnographic film mentioned above discusses how the Irish government attempted to compel Travellers to assimilate into mainstream Irish society. One way they achieved this was by passing the Housing Act of 1998 (Traveller inclusion). This government policy disrupted the Irish nomadic cultural practices which in turn affected their music culture. Travellers had to give up their lifestyle which contributed to the loss of traditional Traveller music. The younger generations of Irish Travellers might be less likely to learn and practice traditional Traveller music as they settle into permanent housing and assimilate into mainstream schools. Disrupting the cultural practices of the Irish Travellers prevents the transmission of traditional Irish Traveller music. This is because the Irish Traveller songs were mostly about their Traveller lifestyle. When the lifestyle is not the same anymore, it is very hard to transmit the culture to the youth who have not experienced the lifestyle.

In addition, the Scottish Travellers are a nomadic ethnic minority in Scotland. They have their own language, customs, and musical practices. The Scottish Travellers have a distinctive music style because of their use of tin whistle and storytelling. Tin whistle is a small and simple wind instrument used in many traditional Scottish music. Many of the Scottish songs are stories of Scottish Traveller life. While the Scottish Travellers have had a long history in Scotland that dates back centuries, they have still been subjected to discrimination, persecution, and

marginalization from the Scottish government. In the YouTube video, "Scotland's Gypsy, Roma and Traveller History with Nawken (Scottish Traveller) Davie Donaldson", Donaldson talks about an inquiry called the "Tinker problem", that was launched by the government to get rid of Travellers. The conclusion of this inquiry stated that "Eradication [was] the only cure" (Donaldson). This example highlights the extent to which the Scottish government despised the Scottish Travellers. They saw Travellers as a burden on society and tried to get rid of them. One way the Scottish government tried to get rid of the Traveller community was by forcibly taking Traveller children away from their families (Donaldson). Due to children being separated from their families and communities, they were unable to learn the traditional Traveler music that had been orally passed down through generations. As a result of this displacement, the community struggled to restore and transmit much of the traditional Scottish Traveler music.

Accordingly, there is a very similar pattern in the examples mentioned above. In all these cases, policies were regulated that intended to brainwash children and assimilate them into the larger and more dominant society. A culture is kept alive by transmitting it from generation to generation. When the younger generation does not learn their ancestral values and traditional practices, the decline of a culture begins which can gradually lead to the loss of cultural practices like music. In the Traveller and Navajo case studies, the integration of young children into mainstream societies blocked the transmission of the music culture of these communities into the younger generation. In the case of the Navajos, the children could not speak their language and were unable to communicate with their elders. In the case of the Irish Traveller, the disruption of their cultural practices affected the transmission of Irish music culture because they did not live the same way anymore. Similarly, In the case of the Scottish Travellers, because of displacement, the Scottish Traveller children grew up living a lifestyle far different than that of their nomadic families. Due to separation from families and community, the traditional Traveller music and songs could not be transmitted to the youth. Preventing cultural

transmission can lead to long term effects on the music culture like loss of cultural songs and heritage. These three case studies are a very good illustrations of how forced assimilation can lead to long term effects on the music culture of a society like loss of traditional musical and instrumental practices.

In conclusion, one of the most common strategies used by the government to fundamentally alter long-standing cultural customs and practices including music is preventing cultural transmission. These three case studies are a very good illustrations of how forced assimilation can lead to long term effects on the music culture of a society like loss of traditional musical and instrumental practices. Changing the school system, forcing communities to give up their lifestyle, and displacing young children from families, are some of the few political tactics used to permanently alter music culture within minor ethnic groups.

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NATURAL SCIENCES

Organic Chemistry and Penicillin: A Review of Literature and Mechanism

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Judge's Comments: "Presenter gave a well organized and clearly delivered presentation. He used diagrams to assist explanation and came up with thoughtful and insightful responses based on their knowledge of the topic and broader scientific background."

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Organic Chemistry and Penicillin: A Review of Literature and Mechanisms

I.   Introduction

Penicillin is known by clinicians, scientists and patients as a family of antibiotics that can be used to treat infections. However, what is not commonly known is the role of Organic Chemistry in the development of Penicillins, and the proliferation of their use as an antibiotic. In this paper I will first contextualize the significance of Penicillin by discussing the discovery of Penicillin, the mechanism of its antibiotic properties, and the subsequent development of semi-synthetic Penicillin derivatives. The mechanism and clinical relevance of beta-lactam antibiotics are explained by the molecular structure of Penicillin. The principles of Organic Chemistry that are used to explain the antibiotic mechanism of the original Penicillin compound were also used by researchers to change the molecular structure of Penicillin and to develop Penicillin derivatives with additional desirable qualities. Understanding the molecular structure of Penicillin from the perspective Organic Chemistry was crucial to the development of one of the most widespread antibiotic drugs in the world.

II.   History of Penicillin

Although one might assume that the discovery of Penicillin was a highly intentional process, in reality the discovery of Penicillin was unplanned. Nearly 100 years ago Alexander Fleming published his novel findings of the antibiotic properties of a mold that had fallen into a petri dish in his laboratory. In his 1929 article "On the Antibacterial Action of Cultures of a Penicillium, with Special Reference to their Use in the Isolation of B. influenzæ" Fleming explains "a number of culture-plates were set aside on the laboratory bench and examined from time to time" (Fleming 1929). In these culture-plates Fleming "noticed that around a large colony of contaminating mould the staphylococcus colonies became transparent and were obviously undergoing lysis" (Fleming 1929). When Fleming states that the staphylococcus colonies were

undergoing "lysis" he is referring to the process by which the cell wall of the staphylococcus cells is bursting open, killing the cell. Fleming inferred that the "contaminating mould" inhibited the growth of microbes and further tested this theory by growing the mould in a special broth and using that broth as a medium to test the antibacterial properties of the mould on various pathogens.

Through numerous trials of treating microbes with various concentrations of penicillin broth, Fleming demonstrated that "penicillin contains a bacterio-inhibitory substance which [was] very active towards some microbes and not affecting others" (Fleming 1929). He noted that "many of the Gram-negative cocci found in the mouth and throat are, however, quite insensitive" to the penicillin broth (Fleming 1929). The distinction between gram-negative and gram-positive bacteria is significant because gram-negative bacteria have a thin membrane that envelopes the entire exterior of the cell and is on top of the peptidoglycan layer, whereas gram-positive bacteria do not have an outer membrane, allowing the peptidoglycan layer to be stained by the gram stain. The fact that penicillin is more effective on gram-positive bacteria suggests that the interaction of penicillin with the peptidoglycan layer of bacteria is relevant to its antibiotic activity.

Fleming extends his findings to an *in vivo* context by testing the penicillin broth in both mice and humans. It would take another 10 years for the process of producing Penicillin to be refined to the point where it could be mass produced by researchers Florey and Chain. Florey and Chain used an industrial fermentation process to produce larger quantities of Penicillin (Tan et al. 2015). Although Florey and Chain were able to mass produce Penicillin by fermentation, naturally fermented Penicillin had several weaknesses that necessitated further research and development (Gaynes 2017). Ultimately, synthetically derived versions of Penicillin were created that answered many of the pitfalls of Penicillin obtained via fermentation.

III.   Structure of Penicillin

In order to understand how Penicillin functions as an antibiotic, we should first look to the structure of Penicillin G, a naturally occurring penicillin. Penicillins are easily identified by the presence of a β-lactam ring. The characteristic β-lactam ring from Figure 2 is observed in Penicillin G and can be identified by the 4 members: 2 carbons, an amide, and a carbonyl.

The β-lactam ring is significant to the activity of the antibiotic because it makes Penicillin highly reactive. We know that it is highly reactive because it is a 4 member ring. The most stable bond angle would be 109.5°, however a 4 member ring has internal angles of 90° putting it under an immense amount of strain. The strain leads to a tendency for the ring to be highly reactive because the ring wants to break open.

The β-lactam amide ring is also unstable because the nitrogen in this amide is not resonance stabilized. In a planar configuration, amides are resonance stabilized, however, because of the adjacent 5 member ring in Penicillin, the structure is non-planar, which reduces the orbital overlap of the nitrogen and the carbonyl. The orbitals need to overlap for resonance stabilization to be possible. The lack of resonance stabilization makes the carbon in the carbonyl more electrophilic and reactive.

In Figure 1 we see that the β-lactam has a benzylic ring attached to it, this R group can be swapped out with other substituents to produce other synthetic derivatives of Penicillin.

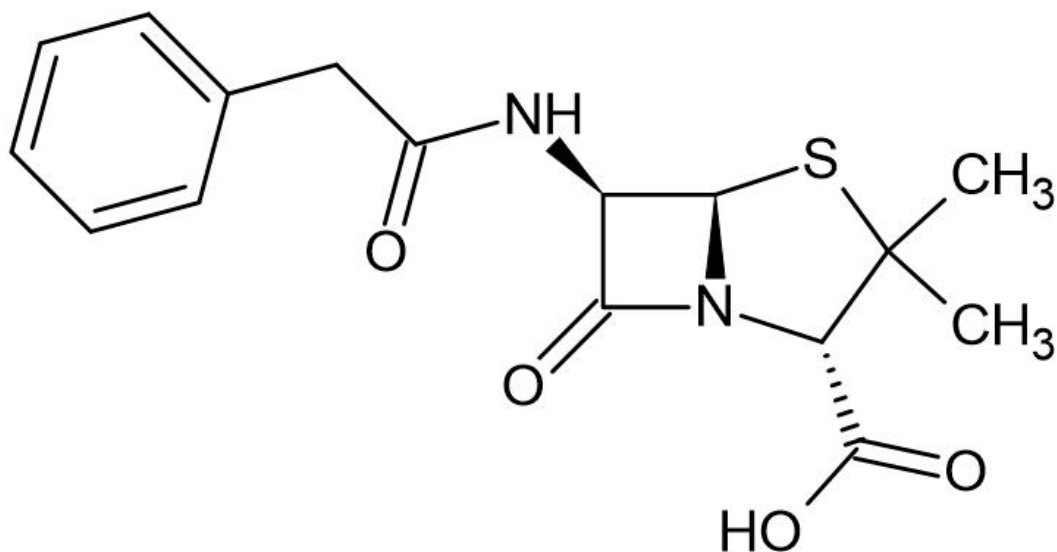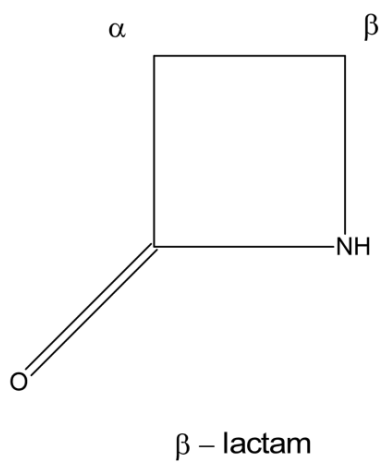Figure 1. Penicillin G (Benzylpenicillin)

Figure 2. β-lactam ring

β – lactam

With regard to the structure of Penicillins, we can conclude that they are highly reactive due to the high ring strain in the 4 member β-lactam ring, and the lack of resonance stabilization because of the non-planar amide configuration.

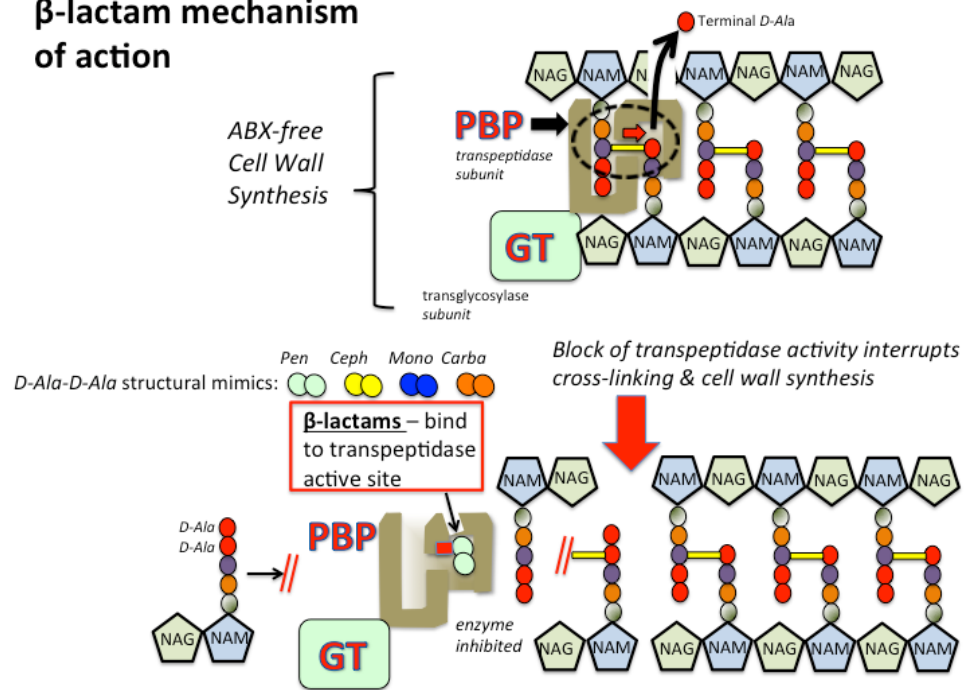IV.   Antibiotic Mechanism of Penicillin

Fleming identified that Penicillin inhibited the growth of gram-positive bacteria, which suggested that the outer envelope of gram-negative bacteria impacted the mechanism of Penicillin. Nearly 30 years later, Tipper and Strominger began to develop a hypothesis for a mechanism by which Penicillin inhibits the growth of gram-positive bacteria. They first established that Penicillin impacts the synthesis of the cell wall by growing gram-positive bacteria in hypertonic solutions with Penicillin. They observed that "in hypertonic sucrose broths, sensitive bacilli are not lysed but are converted to spherical forms" (Tipper et al 1965). Subsequently, these sensitive bacilli were placed in a solution that had a lower concentration, such that the concentration was higher inside the spherical bacilli. To equalize the concentration, water rushed into the cells causing them to lyse. The fact that the Penicillin pre-treated cells lysed in a normal solution, but the untreated cells did not lyse, suggests that penicillin inhibits the formation of the cell wall which stabilizes gram-positive bacteria.

The cell wall is made of a layer of "linear glycopeptides [that] are crosslinked to form a three-dimensional network" (Tipper et al. 1965). The crosslinked linear glycopeptides (peptidoglycan layer) are illustrated in Figure 3. The linear glycopeptides are alternating N-acetylglucosamine (NAG) and N-acetylmuramic acid (NAM). In Figure 3 we see that NAM glycopeptides have a 5 peptide chain attached, where the final two peptides are D-alanine, referred to as D-ala D-ala. The opposing NAM glycopeptides are crosslinked by the enzyme transpeptidase. The mechanism of this cross linking would be considered a nucleophilic acyl substitution in Organic Chemistry. This mechanism is shown in Figure 4. The oxygen on the serine active site of transpeptidase acts as a nucleophile due to its lone pairs. The lone pairs are seeking a site with low electron density. The lone pairs attack the carbonyl group of D-ala, causing the terminal D-ala to be cleaved off of the peptide chain, allowing for the cross linkage of the NAM glycopeptides.

In Section III, we discussed how the instability of the β-lactam ring causes Penicillin G to be very unstable and reactive. Penicillin G has a similar structure to the structure of the 2 terminal peptides D-ala D-ala. The similarities are illustrated in Figure 4, where it is evident that the R group, amide, and carbonyl are in similar positions. The similarities between the terminal peptides of the NAM glycopeptide and the β-lactam ring allows the β-lactam ring to act as a competitive inhibitor of the transpeptidase enzyme. One of the key features of the unstable β-lactam ring is the electrophilic site on the carbonyl group. The lone pair from the oxygen on the transpeptidase will attack the electrophilic site of the carbonyl group on the β-lactam ring. The acylation of the β-lactam ring causes it to break open and stay permanently bound via a covalent bond to the active site of the transpeptidase, inhibiting any future formation of the cross linkage. The inability of the peptidoglycan layer to form ultimately results in lysis and cell death because the cell does not have enough structure to hold the osmotic pressure within the cell.
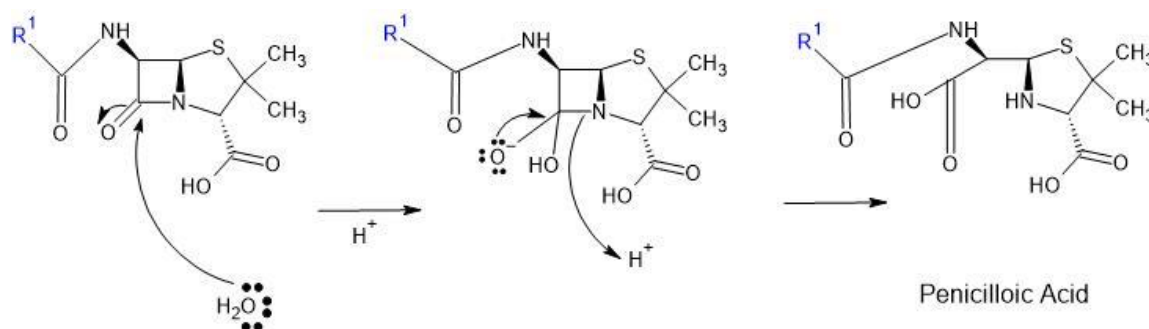
Figure 3. β-lactam and the Peptidoglycan Layer.

Reprinted from Tulane School of Medicine Pharmwiki 2015.

Figure 4. Mechanism of β-lactam antibiotics.

Fig. 38.16. Cell wall cross-linking and mechanism of action of β-lactams.

Reprinted from Foye's Principles of Medicinal Chemistry 2008.

V.   Penicillin Structure/Activity Challenges

In Fleming's early experiments Penicillin was used to treat surface wounds by irrigating the wound with penicillin broth. Eventually, clinicians and scientists began to show interest in administering penicillin orally. There is one major problem with the oral administration of penicillin. Penicillin is sensitive to acidic environments and will easily degrade in stomach acid. In stomach acid, the high PH facilitates hydrolysis of the β-lactam ring, ultimately leading to the ring breaking open. This process is illustrated in Figure 5. The lone pair on the water molecule attacks the electrophilic carbonyl group leading to the formation of Penicilloic acid, which eliminates the ability of the drug to competitively inhibit transpeptidase.

Figure 5. Degradation of Penicillin in Acidic Environment

In addition to being susceptible to hydrolysis, Penicillin is also likely to self-destruct because the lone pair on the oxygen of the side chain acyl group will act as a nucleophile and attack the carbonyl group of the β-lactam ring, causing the ring to break apart. This nucleophilic attack is shown in Figure 6.

Figure 6. Self-Destruction of Penicillin
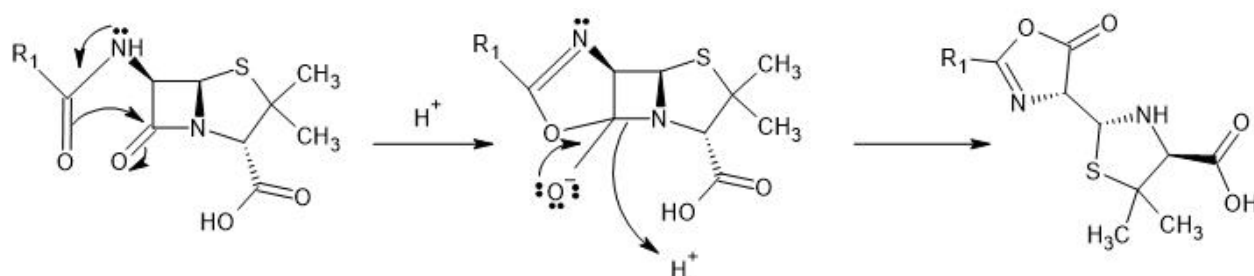
In addition to the challenges caused by the acidic environment of the stomach, the efficacy of Penicillin is also reduced by an enzyme called β-lactamase. β-lactamase is produced by bacteria such as *S. aureus,* causing the bacteria to be resistant to penicillin. For instance, "Serine β-lactamases acylate β-lactam antibiotics, much like PBPs, and then use strategically positioned water molecules to hydrolyze the acylated β-lactam" (Drawz et al. 2011). The hydrolysis of the acylated β-lactam causes the acylated β-lactam to break off of the β-lactamase

enzyme, which in turn allows the β-lactamase to continue breaking the β-lactam rings of other penicillin molecules (He et al. 2020). The process of acylation and deacylation is illustrated in Figure 7.
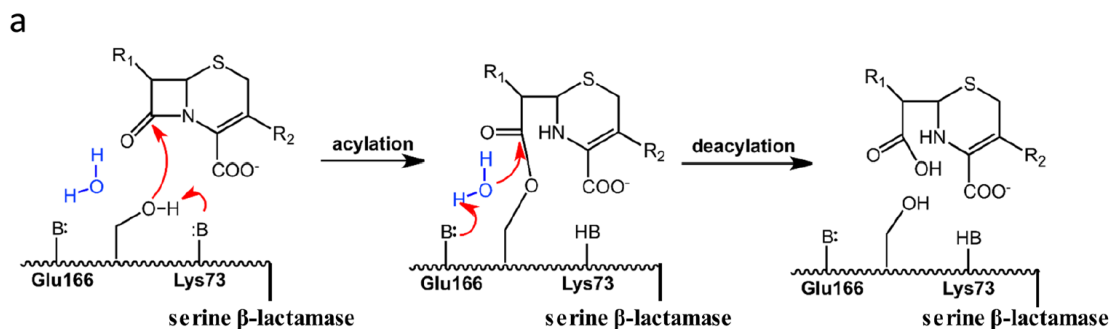
Figure 7:

a

Figure 7. Serine β-lactamase mechanism for acylation and deacylation of penicillin. Reprinted from He et al. 2020.

VI.   Different Generations of Penicillin and the relationship between Structure and Activity

Several different generations of Penicillin have been developed by organic chemists to

address the various difficulties experienced with Penicillin.

Figure 8. Penicillin V
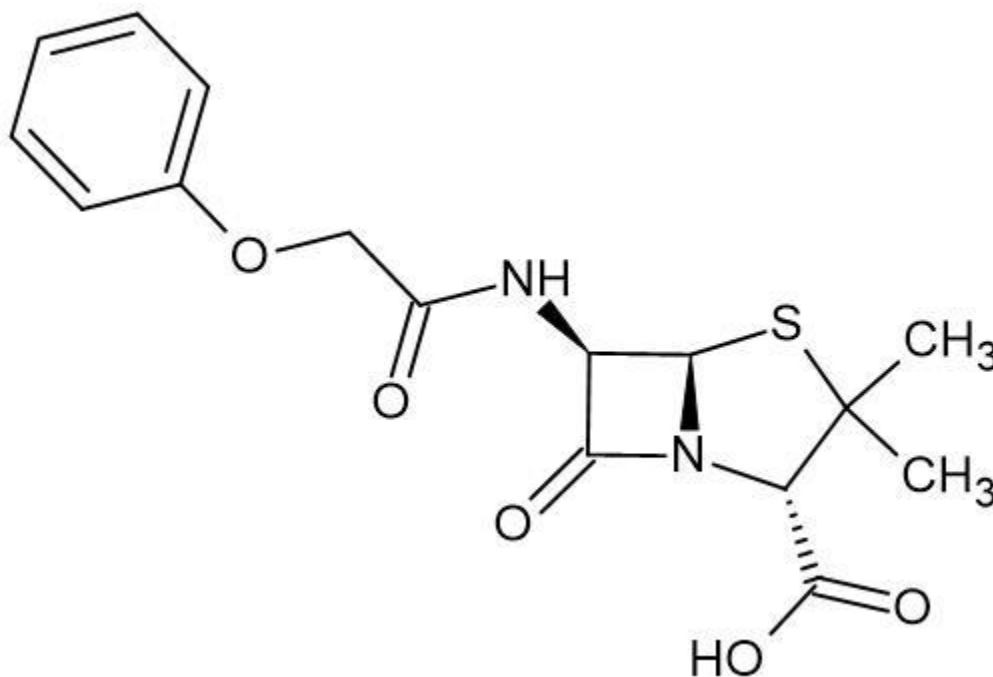
Penicillin V is distinguished from Penicillin G (Benzylpenicillin) because on the primary

side chain, there is an ether connecting the benzylic ring to the amide. The ether functional

group is an electron withdrawing group, and thus takes electron density away from the carbonyl

oxygen on the side chain. This is desirable because it prevents the lone pair on the carbonyl

oxygen from attacking the electrophilic carbon on the carbonyl of the β-lactam ring. Essentially,

it is more protected from self-destruction and hydrolysis, which would cause the β-lactam ring to

open. The stability conferred by the ether allows Penicillin V to be consumed orally, as it will be less susceptible to acid attack in the stomach.

Figure 9. Methicillin
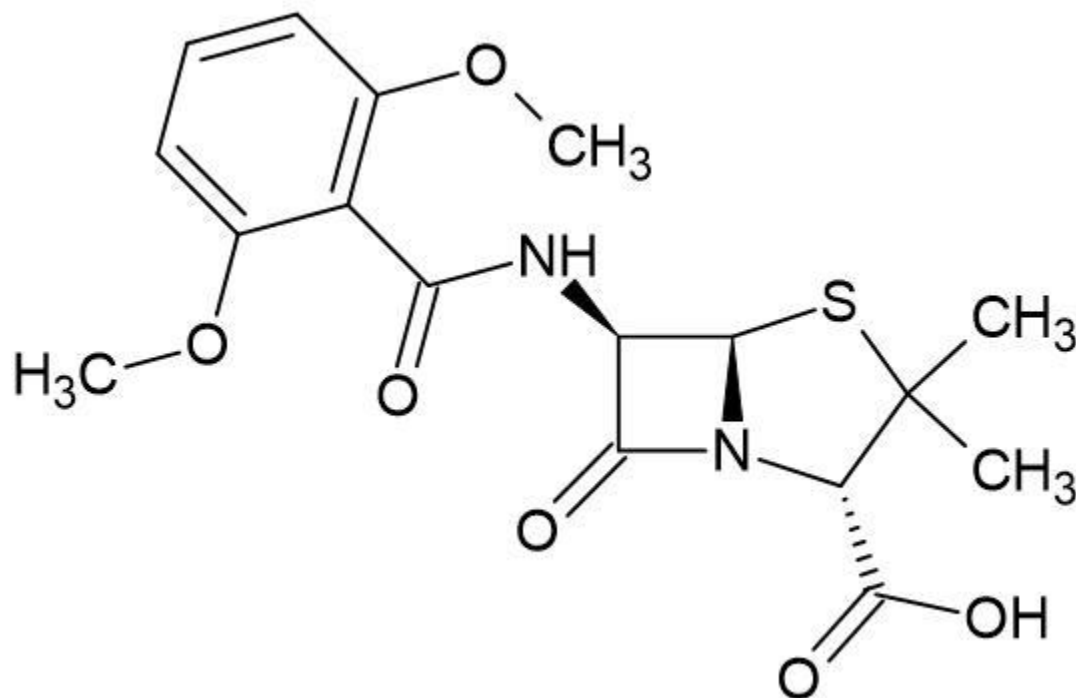
The synthesis of Methicillin attempted to address the issue of β-lactamase susceptibility by attaching two methoxy groups to the ortho positions of the benzylic ring. These methoxy groups increase the steric bulk of the side chain. The increased steric bulk of the structure increases the resistant activity of the molecule by making it difficult for the β-lactamase to access and hydrolyze the β-lactam ring. Unfortunately, widespread use of Methicillin led to Methicillin Resistant *Staphylococcus Aureus* (MRSA), causing its use to fall out of favor.

Figure 10. Ampicillin
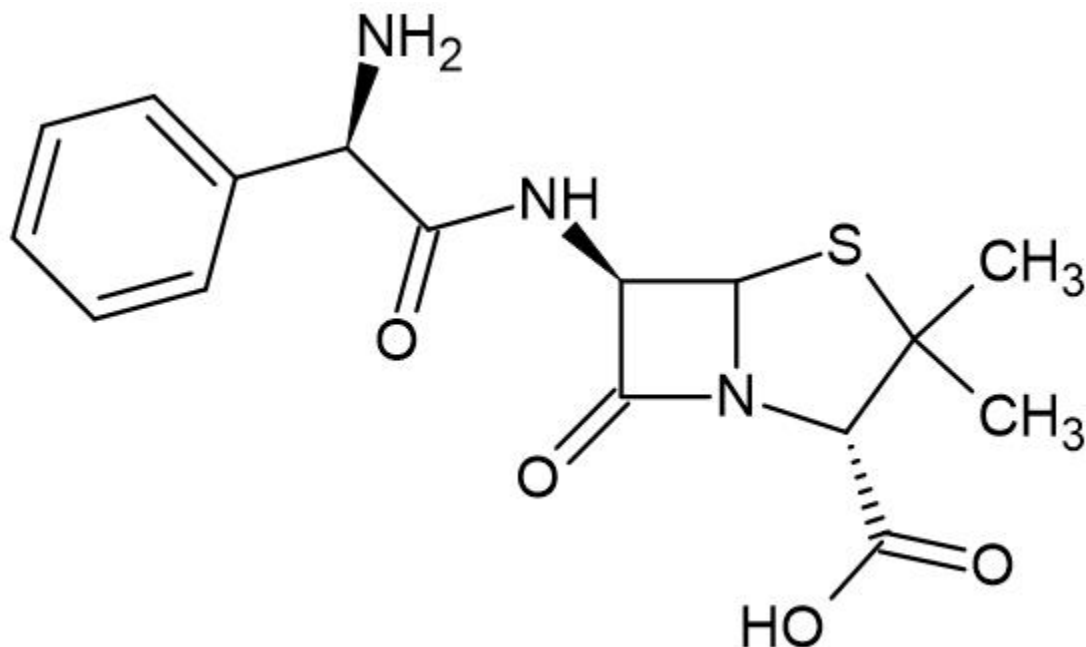
Ampicillin is another derivative of Penicillin, and is similar to Penicillin V. Penicillin V

uses an ether group between the benzylic ring and the amide as an electron withdrawing group.

Ampicillin instead uses an amine as an electron withdrawing group. The amine withdraws

electron density away from the carbonyl oxygen in the side chain, which reduces the likelihood

that the β-lactam ring will be hydrolyzed and split apart (Lobanovska et al. 2017). Methicillin

employs the ortho methoxy group to confer β-lactamase resistance, but Ampicillin does not

have methoxy groups on the benzylic ring. The lack of steric bulk on the benzylic ring means

that it is somewhat susceptible to β-lactamases.

VII.   β-lactamase inhibitors

Although modifications to Penicillin have been successful in addressing β-lactamase susceptibility and degradation in acidic environments, it is difficult to simultaneously address these issues with one drug. For example, Methicillin is resistant to β-lactamases, but must be administered peritoneally because it degrades in acidic environments, whereas Ampicillin is resistant to acid but not resistant to β-lactamases. This problem can be addressed by creating a combined therapy by introducing a drug with two compounds: one compound is a β-lactam that has antibiotic properties and a second compound specifically functions as a β-lactamase inhibitor. One such inhibitor is Clavulanic acid.

Figure 11. Clavulanic Acid
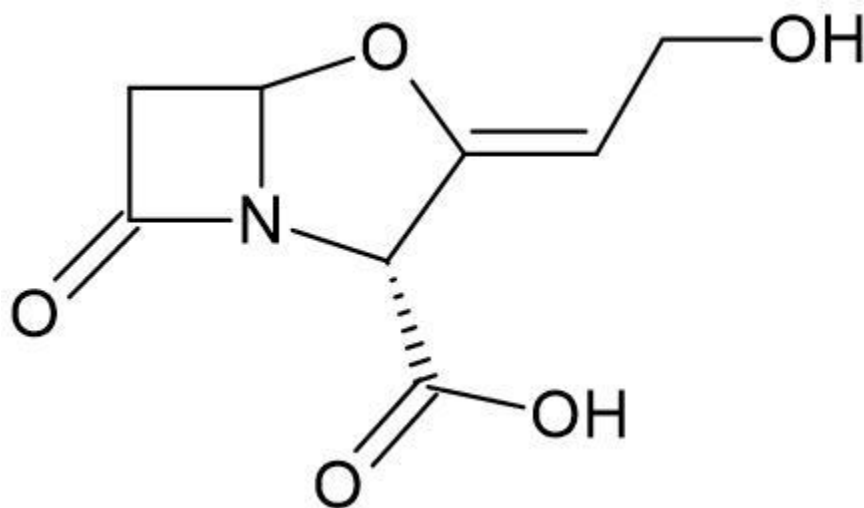
Clavulanic Acid has the characteristic β-lactam ring that we have to come to recognize in Penicillin, however, it is not effective as an antibiotic on its own, instead "these inhibitors react with β-lactamase active site serine to form an acyl-enzyme complex" (Hamed et al. 2013). The β-lactamase is effective because it has the same serine active site as the transpeptidase which catalyzes the synthesis of the peptidoglycan layer. The serine active site of the β-lactamase

causes the β-lactam ring to open, disabling it. The structure of the β-lactam ring in Clavulanic Acid is similar to the structure of Penicillin derivatives because they both have a β-lactam ring. The β-lactamase is expecting Penicillin as a substrate, but Clavulanic Acid has a similar structure so it can also be the substrate for the β-lactamase. In this mechanism, Clavulanic Acid irreversibly binds to the β-lactamase and prevents the β-lactamase from breaking the rings of Penicillin. Without a β-lactamase inhibitor, the β-lactamase would be free to acylate the Penicillin, break the β-lactam ring, deacylate, and move onto the next Penicillin molecule. By permanently disabling the β-lactamase, the repetitive process of acylation, breakage and deacylation is stopped.

VIII.   Conclusion

Fleming's accidental discovery of Penicillin in the 20th century led to a wave of research into antibiotics and their mechanisms. By examining Penicillin through the lens of Organic Chemistry, it is evident that there is a deep linkage between structure and activity. Namely, the structure of the β-lactam ring in Penicillin is similar to the structure of the d-ala d-ala peptide chain in the cell wall of gram-positive bacteria. In effect, the similar molecular structure allows Penicillin to act as a substrate and competitively inhibit the enzyme transpeptidase, which builds the cell wall of gram-positive bacteria. The transpeptidase is permanently disabled because the serine in the transpeptidase binds to the β-lactam ring of Penicillin by acylation, preventing any other substrates from accessing the active site of transpeptidase. After the antibiotic mechanism of Penicillin was understood, researchers used other techniques from Organic Chemistry to address roadblocks to the clinical usage of Penicillin. They introduced electron withdrawing groups to allow Penicillin to withstand stomach acids and they added steric bulk on the 6-APA side chain to reduce susceptibility to Penicillin destroying β-lactamase. Experimentation and improvement through Organic Chemistry has allowed scientists to transform Penicillin from an accident in a petri dish to one of the most widely used drugs.

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Lincoln's Interdisciplinary Approach to Emancipation

Alexandra Lindsay; Mentor: Michael Harding, Montgomery College

Judge's Comments: Alexandra's presentation proposed a very original and creative discussion. She was an excellent speaker: dynamic, knowledgeable and confident."

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Lincoln's Interdisciplinary Approach to Emancipation

While salutary, the textbook understanding of Abraham Lincoln does not adequately present the manner in which Lincoln, as president of the United States, as a politician, and as a human being, embodies classical virtue. Without the application of classical virtue, emancipation would not have taken place. Lincoln's presence of mind – what we might describe as his high emotional quotient – allowed him to integrate the past with the present, the particular with the universal, and rhetoric with the political context in order to further actualize the principles of the Founding. Employing what we would today recognize as an interdisciplinary approach drawing upon psychology, philosophy, and politics, Lincoln profoundly transformed the American understanding of national sovereignty and Union by ushering in what he described in the Gettysburg Address as "a new birth of freedom" ultimately grounded in the natural rights principles of the Declaration of Independence.

Lincoln always saw the link between the controversy over slavery and the preservation of the Union. On August 24, 1855, Lincoln wrote to his friend Joshua Speed:

> You suggest that in political action now, you and I would differ. I suppose we
> would; not quite as much, however, as you may think. You know I dislike
> slavery; and you fully admit the abstract wrong of it. So far there is no cause of
> difference. But you say that sooner than yield your legal right to the slave --
> especially at the bidding of those who are not themselves interested, you would
> see the Union dissolved. I am not aware that *any one* is bidding you to yield that
> right; very certainly *I* am not. I leave that matter entirely to yourself. I also
> acknowledge *your* rights and *my* obligations, under the constitution, in regard to
> your slaves. I confess I hate to see the poor creatures hunted down, and caught,

and carried back to their stripes, and unrewarded toils; but I bite my lip and keep

quiet. In 1841 you and I had together a tedious low-water trip, on a Steam Boat

from Louisville to St. Louis. You may remember, as I well do, that from

Louisville to the mouth of the Ohio, there were, on board, ten or a dozen slaves,

shackled together with irons. That sight was a continued torment to me; and I see

something like it every time I touch the Ohio, or any other slave-border. It is

hardly fair for you to assume, that I have no interest in a thing which has, and

continually exercises, the power of making me miserable. You ought rather to

appreciate how much the great body of the Northern people do crucify their

feelings, in order to maintain their loyalty to the Constitution and the Union.

There is no façade in Lincoln's stance on abolition, he feels deep in his soul that slavery is wrong and is

bothered to see slavery at work. It offends him on a moral and intellectual level. His objection is not

merely theoretical; it is a moral rejection that prompts a visceral response from him – the sight of slavery

makes him "miserable," and even knowing that it exists across the border of the Ohio river pains him. He

also knows, as the excerpt above makes clear, that the issue of slavery and the issue of preserving the

Union are indissoluble.

From an individual standpoint, the adversities that Lincoln had to face before taking on

the presidency including his career a a lawyer, being self-educated, growing up in poverty, as

well as the loss of two children. These experiences equipped him to perceive a profound moral

injustice at work and actualize it acting upon this emotional intelligence in a way that wasn't

undignifying given his office. William Henderson, Lincoln's law partner, described his former

partner as such: "…not only had he accurate and exact perceptions, but he was causative; his

mind apparenyly with an automatic movement, ran back behind facts, principles, and all things

to their origin and first cause—to the point where forces act as one as effect and cause (Fornieri, 31)."

Among the classical virtues enumerated by Aristotle, the following are especially relevant to understanding Lincoln's political activity: prudence, wisdom, and courage. In *Nicomachean Ethics*, Aristotle defines prudence or *phronesis* as "the active condition by which someone discerns the right means to the right end in particular circumstances" (1141b 23-24). Aristotle's point is that the prudent person, or *phronimos*, perceives what ought to be done in the particulars. Book VI of the Ethics distinguishes *phronesis* from mere cleverness in that cleverness is about any goal, while *phronesis* is about the best goal. Prudence is always oriented toward the noble or beautiful, and "prudent person" proves, in Aristotle, to be synonymous with "just person" and "virtuous person" (since all the various virtues turn out to be forms of applied prudence). On many occasions throughout his presidency, Lincoln's prudence, wisdom, and courage were exemplified through actions such as his consideration of border states at the time of Emancipation (as well as the time leading up to it), the social impact of ending slavery (and how this impact placed limits on his options for doing so), as well as understanding, to the fullest degree, the exact time in which emancipation, via the Emancipation Proclamation, needed to take place. Prudence, then, was a fundamental character trait of his statesmanship. Joseph Fornieri, the author of "Lincoln and the Emancipation Proclamation: A Model of Prudent Leadership," argues that a consideration of prudence "will reveal the Emancipation Proclamation as a model of prudent statesmanship in furthering the principle of equality under a myriad of perilous social, legal, political, and military circumstances."

Breaking out approximately six weeks after he was elected president, the Civil War provided the unfortunate yet opportune circumstances in which emancipation could occur. Seeing the country's polarization as a major obstacle to both preserving the Union as well as the abolition of slavery, Lincoln used the principles of the Founding as embodied in the Declaration of Independence and the Constitution to guide his political action; he looked to the timeless, universal principles of political right to guide him. In Joseph Fornieri's *Philosopher Statesman*, he credits Lincoln for "probing beyond the rhetorical surface of an argument…determining whether or not they were in conformity with the transcendent 'laws of nature and nature's God' in the Declaration." In the Gettysburg Address, Lincoln's explicit claim that 1776 was the point of origin for conceiving liberty was not the first time Lincoln had made clear that the Founding Fathers' principles were at the forefront of his political prudence. In the address, he states, "Four score and seven years ago our fathers brought forth on this continent a new nation, conceived in liberty, and dedicated to the proposition that all men are created equal." "Four score and seven years" prior to 1863 would be 1776 – the announcement of the philosophic principles of the American Founding to the world (not 1787, when the Constitution was drafted, not 1789, when it was adopted, and not 1630, when the Puritans landed). Lincoln's ability to actualize the universal principles of the Founding within his particular context exemplifies that prudence is an indispensable political virtue.

At the time of emancipation, Lincoln's political prudence led him to see the necessity of mollifying the border states: Kentucky, Maryland, and Missouri. At one point, Lincoln states, "I hope to have God on my side, but I must have Kentucky" (Library of Congress). Lincoln understood that just as the precondition for the possibility of abolition was the Union, the precondition for maintaining the Union required that he keep those states in the Union that would

be tempted to waver – in other words, the ideal he pursued had to be prudentially considered in light of the moral demands imposed by both his oath of office (First Inaugural Address) and the principles of 1776 as well as the practical need to ensure the Union had enough military strength to prevail. Thus, while the aid of the Almighty is desirable, the aid of Kentucky is indispensable.

Lincoln's prudence did not emerge in a vacuum; it was grounded in wisdom understood as both knowledge of the principles of political right and knowledge of himself. Lincoln's 1838 Lyceum Address, in which he speaks of men who are of the "family of the lion and the tribe of the eagle" as a threat to political order, is taken by some scholars like Michael Zuckert in his discussion of the speech in *A Nation So Conceived: Abraham Lincoln and the Paradox of Democratic Sovereignty* as suggesting that Lincoln, himself, is of such family and tribe. Lincoln, on this account, knows such men from the inside out because he is tempted by the same things they are tempted by – honor, glory, and immortal fame. He knows them because he knows *himself*. The difference between them is that Lincoln's greatness is subordinated to both self-knowledge and the principles of 1776. His excellence and virtue are deployed in defense of and in furtherance of those principles, and while he is not indifferent to honor, he will not pursue honor at any cost. Natural right and natural law as embodied in the Declaration of Independence are one limit on his action, and his oath of office to preserve the Union is the other. In this we can see that Lincoln truly is the Aristotelian *aner spoudaios* – one who is serious about the things one *ought* to be serious about (*Nicomachean Ethics* III.4). With the alignment of his personal moral commitments as well as the good of the state, Lincoln understood the right means necessary in order to attain emancipation—a true *aner spoudaios*.

Warren Kinghorn's essay "Presence of Mind: Thomistic Prudence and Contemporary Mindfulness" integrates Aristotelian and Thomist principles into contemporary psychiatry. Kinghorn writes: "Prudence integrates intellect and will; theory and context; reason and emotion; agent and action; past, present, and future; the individual and his or her community; and the proximate and ultimate ends of the moral life." Culminating in Aristotelian *sophia* or wisdom, prudence or *phronesis* is the knowledge of the changing, or the dependent things, while wisdom is the knowledge of the unchanging, the independent things. Without prudence, one cannot act well. Along with classic Aristotelian virtue, Lincoln seems to actualize the 8 "quasi-integral" components of prudence described in St. Thomas Aquinas' 13th-century *Summa Theologiae*. St. Thomas's exploration of prudence draws upon Aristotelian, Ciceronian, and Macrobian principles, stating:

> Now five of these eight parts have to do with prudence insofar as it is cognitive, viz., memory (*memoria*), reasoning (*ratio*), understanding (*intellectus*), docility (*docilitas*), and shrewdness (*solertia*), whereas the other three have to do with prudence insofar as prudence gives commands by applying the cognition to an action, viz., foresight (*providentia*), circumspection (*circumspectio*), and caution (*cautio*) (II-II.48)

From an integral standpoint, the Thomist understanding of prudence is cohesive with Lincoln's politically practical agency through contemplation and action, unifying prudence and wisdom with American political theory. Michael Zuckert, in his book *A Nation So Conceived: Abraham Lincoln and the Paradox of Democratic Sovereignty,* suggests, "*This* might be the single most important truth about politics; this disparity sets *the task* for statesmanship—to make the true and good and right *also* the effective, or to bring those elements as close together as possible." This is what political prudence aims at.

For Aristotle, wisdom is grasping the permanent, unchanging truths. Lincoln found those permanent, unchanging truths in the principles of equality at the heart of the Declaration of Independence. In correspondence with classical virtues, Lincoln's wisdom allowed him to grasp the eternal and unchanging; prudence puts this wisdom into action, and distributive justice is the result. This property would not be actualized without courage since the pursuit of justice requires courage.

In the *Ethics*, Aristotle's' prolonged happiness, *eudaimonia*, or human flourishing is considered an unintended byproduct of the pursuit of the noble or beautiful in accordance with virtue over a lifetime. It is a consequence, not a reward. For Lincoln, the end goal of government is the quasi-Aristotelian pursuit of happiness and the means to this end is the maintenance of the natural rights republic and liberty—thus *requiring* emancipation.

While drafting the Emancipation Proclamation, Lincoln focused carefully on Jeffersonian political theory. Jefferson's political theory—in that it was also quasi-Aristotelian—embodied in the claims about life, liberty, and the pursuit of happiness in the Declaration, was used to define and defend the principles of the Founding, which had been increasingly under attack in the antebellum south. The claims of Jefferson and modern philosophers like Locke about human equality were publicly and vigorously attacked by pro-slavery Southern politicians, most famously John C. Calhoun, who denounced them on the floor of Congress (The Speech on the Oregon Bill, 1848; Speech on the Abolition Petition, 1837). Lincoln continually had to defend the natural rights theory of the American Founding, both rhetorically and, ultimately, as a war president during the Civil War. We often lose sight of this today, but the antebellum South was very openly and explicitly *rejecting* the principles of 1776. Lincoln explicitly salutes Jefferson's political philosophy in a letter to Henry Pierce in 1859, stating:

> "All honor to Jefferson--to the man who, in the concrete pressure of a struggle for national independence by a single people, had the coolness, forecast, and capacity to introduce into a merely revolutionary document an abstract truth, applicable to all men and all times, and so to

embalm it there, that to-day, and in all coming days, it shall be a rebuke and a stumbling-block to the very harbingers of re-appearing tyranny and oppression."

During his speech in Lewiston, Illinois, in 1858, Lincoln paid particular attention to the Founder's philosophic principles, stating:

"These communities, by their representatives in old Independence Hall, said to the whole world of men: ``We hold these truths to be self evident: that all men are created equal; that they are endowed by their Creator with certain unalienable rights; that among these are life, liberty and the pursuit of happiness." This was their majestic interpretation of the economy of the Universe. This was their lofty, and wise, and noble understanding of the justice of the Creator to His creatures. [Applause.] Yes, gentlemen, to all His creatures, to the whole great family of man. In their enlightened belief, nothing stamped with the Divine image and likeness was sent into the world to be trodden on, and degraded, and imbruted by its fellows. They grasped not only the whole race of man then living, but they reached forward and seized upon the farthest posterity. They erected a beacon to guide their children and their children's children, and the countless myriads who should inhabit the earth in other ages. Wise statesmen as they were, they knew the tendency of prosperity to breed tyrants, and so they established these great self-evident truths, that when in the distant future some man, some faction, some interest, should set up the doctrine that none but rich men, or none but white men, were entitled to life, liberty and the pursuit of happiness, their posterity might look up again to the Declaration of Independence and take courage to renew the battle which their fathers began---so that truth, and justice, and mercy, and all the humane and Christian virtues might not be extinguished so that no man would hereafter dare to limit and circumscribe the great principles on which the temple of liberty was being built. [Loud cheers.]"

Both of these comments on the Declaration illustrate Lincoln's wisdom in the Aristotelian sense of *sophia* – he doesn't just grasp the argument as a piece of political rhetoric but rather as a claim about the nature of the cosmos and the place of human beings within it. In other words, Lincoln sees it as what

it is: a philosophical claim. "Natural right" and "natural law" are not merely rhetorical tropes. Lincoln sees that our reflection on the universe gives us moral knowledge, and that the job of the statesman is to put that moral knowledge into action. In doing so, the statesman – i.e., Lincoln himself – reconciles the ideal with the possible. In the 1858 Lewiston speech quoted above, he refers to the Declaration as "that immortal emblem of humanity." Lincoln had to do something that hadn't been done in decades: he is defending the natural rights doctrine of the American Founding. That took courage, but it also took wisdom. Doing so successfully took prudence as well, further exemplifying how Lincoln embodies these classic virtues.

Prudence requires courage to be enacted. Lincoln's political courage leads him to stand up to opposition within own party and within his administration. It is courageous to pursue and hear the truth (specifically surrounded by "rivals" in his cabinet, i.e., people who disagree because disagreement helps us see the truth, but this takes courage). A famous example of the last: Lincoln accepted modifications to his inaugural address from Seward, but "Seward was far more anxious to avoid civil war than Lincoln was. The final version of the speech and the policy it announced did not make an outbreak of violence less likely but made the Union far less blamable when it came" (Zuckert 276). Lincoln showed his courage in this insofar as he maintained his oath even in the face of secession and war. This courage is exemplified when he closes his First Inaugural Address:

> In your hand, my fellow countrymen, and not in mine, is the momentous issue of civil war. The government will not assail you. You can have no conflict without being yourselves the aggressors. You have no oath in Heaven to destroy the government, while I shall have the most solemn one to preserve, protect, and defend it (First Inaugural Address; March 4, 1861).

Yet nonetheless, knowing full well that war is likely, Lincoln concludes the address on a magnanimous note. In addressing the southern states, he says:

> I am loath to close. We are not enemies, but friends. We must not be enemies. Though passion may have strained it must not break our bonds of affection. The mystic chords of memory, stretching from every battlefield and patriot grave to every living heart and hearthstone all over this broad land, will yet swell the chorus of the Union when again touched, as surely they will be, by the better angels of our nature (First Inaugural Address; March 4, 1861).

During the bloodiest war in American history, Lincoln took it upon himself to personally speak with and get to know soldiers fighting for the Union. In one famous story, future Supreme Court justice Oliver Wendell Holmes saves Lincoln's life. Lincoln was exposed to fire at the battle of Fort Stevens on July 12, 1864; Holmes allegedly shouted, "Get down, you damn fool!" at Lincoln when he had come under fire by Confederate snipers.[1] Lincoln's courage led him directly to the front lines. There is a level of courage that comes with finding the truth but also unveiling it through concrete law, i.e., the enactment of the 13th Amendment and the Emancipation Proclamation. With this courage, justice as a virtue was able to come to light.

Further embodying quasi-Thomistic prudence, Lincoln's cognitive awareness actualized through courage and justice required deep pragmatism given the ultimate state of the Union. Justice was also tempered by mercy; his First Inaugural Address was not the first time this had occurred.

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[1] (https://www.nps.gov/articles/president-lincoln-under-fire-at-fort-stevens.htm).

"Tenacious yet tenderhearted, Lincoln would prosecute the war to victory while also

spending three hours each day reviewing and overturning the execution orders of Union

soldiers guilty of desertion. He would intervene personally and spare 300 Sioux braves

from execution, overturning a vengeful reprisal that would have punished the entire tribe

for the actions of a few miscreants (Fornieri, 30)."

Doing so meant taking a controversial and arguably unpopular stance.

Going against all racial cleavages established since America's colonization and into

independence, Lincoln considered the social impact of ending slavery from different

perspectives, including that of those who would eventually be newly emancipated. In August of

1862, Lincoln hosted the first black delegation inviting five black leaders to the White House to

discuss the difficulties of co-existence post-emancipation. At this point, Lincoln still considered

colonization as an ideal solution. This is seen in early drafts of the Emancipation Proclamation

itself. Lincoln, like other advocates of colonization, sees colonization as just because it allows

freed slaves to return to their ancestral homelands or to establish for themselves new nations as

they see fit. Lincoln also thinks, at this point, that it is the most practical solution, since the

alternatives would be either placing freed slaves in a socially subordinate position (which would

be bad for and unjust to the newly emancipated) or placing them on immediate social equality

with the white majority (which would just engender hostility from the white majority). There are

economic reasons to oppose colonization, however. Michael Zuckert writes "Broadscale

emancipation, if accompanied by colonization or some other form of relocation, would leave the

South with a huge gap in its labor force. It would soon be clear that it would be very desirable to

have many or even most of the emancipated remain as a labor force in the south" (Zuckert 360-

361). Reconstruction would have been even more burdensome without such a labor force in place.

In *On Lying and Politics* by Hannah Arendt, she discusses the relationship between political lies and their effects on society by claiming, "Lies have always been regarded as necessary and justifiable tools not only of the politician's or the demagogue's but also of the statesman's trade (Adredt, 1)." Arendt's contemporary political and psychological theory (yet still applicable to any point in American history) suggests an unfitting title to bestow upon Lincoln. His apparent lack of ulterior motive and incorruptibility from a quasi-Thomistic and quasi-Aristotelian prudence verifies Lincoln as a statesman and not "a mere politician" (Washington's Farewell Address, 1796).

What is of particular importance is that Lincoln at no point used his high EQ immorally or in a way that would purely serve himself rather than the good of the people. According to Arendt in *On Lying in Politics*: " Aristotle warned against giving philosophers any say in political matters. (Men who for professional reasons must be so unconcerned with "what is good for themselves" cannot be very well trusted with what is good for others, at least all of with the "common good," the down-to-earth interests of the community (Arendt, 31)."

Much like an Old Testament prophet, Lincoln calls the American people back to what he calls their "ancient faith"—the principles of the Founding (Peoria Speech, October 16, 1854). He embodies this ancient faith in both his speeches and his actions. They are not discordant, and taken together, they present the most effective sort of philosophical persuasion. In *On Lying and Politics* Arendt speaks of this kind of persuasion by example as "rather unusual" yet also extremely effective. She continues:

> Socrates decided to stake his life on the truth—to set an example, not when he appeared before the Athenian tribunal but when he refused to escape the death sentence. And this teaching by example is indeed the only form of 'persuasion' that philosophical truth is capable of without perversion or distortion; by the same token philosophical truth can become 'practical' and inspire

action without violating the truths of the political realm only when it manages to become manifest in the guise of an example. This is the only chance for an ethical principle to be verified as well as validated (Arendt, 33).

This is precisely what Lincoln does. His whole life, both politically and even before he entered into politics, is an act in defense of the truth. He embodies America's Founding principles as no prior politician had, or could, because he is not tainted by involvement in a violation of natural right while nevertheless defending the principles of natural right. While Jefferson knew slavery to be wrong, he nonetheless owned slaves. Hypocrisy, it is said, is the tribute that vice pays to virtue – Lincoln was no hypocrite.

In Eric Salem's *In Pursuit of the Good: Intellect and Action in Aristotle's Ethics*, he suggests that,

Aristotle's hints about equity and his discussion of *phronesis* suggest a solution to the problem faced by the good of man, or at any rate, suggest the necessary condition for a solution. Only if the wise man can look beyond the self-understanding of his city to an understanding of the human good that makes sense of his predicament, only if he possesses a knowledge of his own good and the city's good that shows him the connection between them, and only if he can reason well about that connection and thus correct the city's understanding of the good by way of his own, there will be any chance for him to find a true place for himself within his city—or any city (Salem, 122)."

This serves to describe Lincoln well. A great-souled man, or *megalopsychos*, Lincoln brought his virtues to bear on the political situation he faced. He proved to be the indispensable man at the historically right time to preserve both the Union and liberty, and in doing the one, he accomplishes the other. He proves to be wise in that he can see the human good clearly and unencumbered by selfish concerns; his concern is only for justice, and his prudence allows him to enact that justice in service of the human good. His defense of natural rights also proves to be the embodiment of natural rights, which allows him to bring the

promise of the American Founding to fruition. The "new birth of freedom" accomplished by Lincoln through emancipation and the maintenance of the Union could only have been accomplished by a man who embodied the classic virtues – he is a *megalopsychos* precisely because he possesses all of these virtues *in act* (Aristotle is clear that the virtues are active) and greatness of soul is the crown or ornament of these virtues.

POLITICAL SCIENCE

Environments of Rampage School Shootings

David Ribner; Mentor: Heather James, Borough of Manhattan Community College

Judge's Comments: "David's presentation was well thought out and clearly delivered. The hypothesis was stated, the methodology was clearly explained and the outcomes were clearly stated."

Gregg Pulver
Dutchess County Comptroller, Former Dutchess County Legislator

Environments of Rampage School Shootings: Gender Performance as a Necessary Condition

I. Introduction

Incidents of violence involving firearms and multiple victims in K-12 schools have been a phenomenon in the United States since the 1990s.[2] Separate from other forms of in-school violence, rampage school shooting are defined as shootings which take place before an audience on school grounds or in a school-related setting, involve multiple non-targeted victims, and are committed by a current or former student(s) (Newman, Fox, Harding, Mehta, & Roth, 2004).[3] Newman et al. (2004) contend that rampage school shootings differ from other forms of youth violence mainly in that there is no easily discernible motive and that they are a relatively new genre of youth violence.

The U.S. Secret Service Report (2021) maintains that not enough is known about the shooters' backgrounds and motives to establish a profile of the typical attacker. However, extant research focuses on the environments in which shootings occurred and the shooters' psychosocial conditions. Existing research can be categorized as atheoretical risk factor approaches, psychological theories, and environmental cultural or sociocultural theories (Rocque, 2012). In this paper I synthesize existing literature to establish a set of necessary environmental conditions for shootings to occur and, supported through original quantitative research, hypothesize that normative expectations of gender performance in male adolescents in rural areas characterized by gendered partisanship contribute towards creating the necessary conditions for a rampage school shooting.

II. Literature Review

Most primary literature on the topic is qualitative in nature and was produced in the early-to-mid 2000s. Researchers developed typologies of shooters, searched for common causal themes, or compiled set of necessary conditions for shootings to occur. Using Rocque's (2012) categorization of existing research, I focus on sociocultural theories on the shooters' environments rather than on atheoretical risk factors (see Langman, 2015). In the review section, this paper critiques existing arguments, synthesizes various theories into a comprehensive conditional model, and summarizes the research questions that emerge from the literature.

Katherine Newman et al. (2004), in their qualitative analysis of the Westside Middle School and Heath High School shootings, develop a set of five necessary, but not sufficient, conditions for a rampage school shooting to occur: the shooter experienced social marginalization, the shooter suffered from a psychosocial vulnerability, there existed a cultural script connecting violence with masculinity, there was a systemic failure to identify a troubled adolescent, and the shooter had access to a firearm. They found that this model fit all cases of rampage school shootings to their date of publication.

Newman et al. (2004) note that all of the shooters were young males and had experienced some degree of social marginalization. They argue that a rampage school shooting is an act of asserting masculinity. For adolescent males, social marginalization is not only a social failure but one at

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[2] This paper finds 102 shootings from 1990 - 2023.

[3] This definition is accepted by the authors reviewed in this paper, although it is subject to some debate (see Sommer, Leuschner, & Scheithauer, 2014).

masculinity as well. Masculinity is central to popularity; it's "what makes a popular boy the king of the mountain" (Newman et al., p. 144) and social marginalization is emasculatory since "to be a man is to be physically dominant, competitive, powerful in the eyes of others" (Newman et al., p. 144). Given a local cultural script tying the assertion of masculinity to acts of violence, a rampage school shooting, as an act of exaggerated strength, can appear as an appealing solution to marginalized youth who see no peaceful respite to their situation. The school is targeted for its symbolic significance as the intersection of their social life and where their marginality is enforced by the students and tolerated by the faculty and administration.

Newman et al. (2004) further found that 60% of rampage school shootings occurred in rural areas, and the remaining 40% in suburbia. They theorize that both social marginality and systemic failures are exacerbated in rural areas with high social capital. The repercussions of adolescent social status are often lifelong, there exist few outlets for expression outside of high school, and social life and adult involvement often revolves around the local schools, their events, and sports teams. Systemic failures to identify troubled adolescents are also exacerbated in rural areas where observers often interpret behavior through the lens of family reputation and are reluctant to relay negative information to parents with whom they must continue to interact throughout their lives.

Rocque (2012) notes the following:

Newman et al. do not, however, spell out a causal model detailing how each of the factors relate to one another or how these factors arise. Thus, their theory is, simply a constellation of factors that contribute to school shootings. (p. 309)

This is only partially true; Newman et al. (2004) link both social marginality and systemic failures to rural characteristics. However, it's likely that Newman et al. (2004) are hesitant to propose a causal model since it would include countless adolescents in like situations who did not commit shootings. It's more likely that given a set of necessary conditions, adolescents are driven to commit shootings when prompted by some unknown factor.[4] This paper adopts the conditional framework provided by Newman et al. (2004) to incorporate other approaches into a comprehensive conditional model.

Kimmel and Mahler (2003) similarly explore the role of traditional masculinity in rampage school shootings. Noting that all of the 28 shooters between 1982 and 2003 were male, Kimmel and Mahler argue that gender, or "specifically the constellation of adolescent masculinity, homophobia, and violence" should be a focal point for researchers (p. 1440). While they find, like Newman et al. (2004), that most rampage school shootings take place in a rural setting, Kimmel and Mahler suggest that partisanship is a more salient variable. 20 of these shootings took place in Republican-controlled states, and four of the remaining eight in Republican counties within Democratic-controlled states. They therefore suggest focusing on "local school cultures and hierarchies, peer interactions, normative gender ideologies, and the interactions among academics, adolescence, and gender identity" (Kimmel & Mahler, p. 1444).

Kimmel and Mahler found that all of the 28 shooters had been bullied in school as gay, although no evidence suggested that any of them were actually homosexual. They therefore propose that relentless homophobic bullying made these shooters desperate to prove their masculinity. Previously established

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[4] Bonanno & Levenson (2014) find that 98% of the shooters experienced "a major loss prior to the attack" (p. 4).

research places homophobia (in this context, the fear that others might perceive one as gay) among the organizing principles of heterosexual identity and by extent, masculinity. Given a prevalent U.S. cultural script connecting masculinity with violence,[5] a hypermasculine revenge in the form of a violent rampage school shooting poses an appealing solution. Shooters are therefore in fact over-conformers to a masculine narrative as well as local narratives questioning their masculinity.[6]

Kimmel and Kalish (2010) revise the argument to state that shootings are not an act of revenge but an opportunity for a masculine suicide. The identity crisis resulting from the questioning of their masculine identity through homophobic bullying can turn victims suicidal (see Girard, 1993). Reaching out for help as masculine men is viewed as stigmatized, but suicide for men is viewed as weak, especially nonfatal suicide as male suicide is understood as instrumental rather than expressive (Canetto, 1997, as cited in Kimmel & Kalish, 2010). Young marginalized male adolescents can turn to rampage school shootings as a form of "masked suicide" (see Katz, 1998; Andriolo, 1998; Fast, 2008; Rocque, 2012) or "suicidal explosion" as a masculine solution. This sense of "aggrieved entitlement" (p. 454) allows a marginalized and humiliated adolescent (with access to a firearm) to explode on the community who wronged him and, to paraphrase the 1999 Columbine High School shooter Dylan Klebold, "kill them all."

By arguing that homophobic bullying causes rampage school shootings, Kimmel (2003, 2010) embraces a causal model which presents the 'null hypothesis' problem noted above. To address this, Kimmel and Mahler (2003) conjecture that male adolescents in like situations who do not commit shootings have outside validations such as a charismatic adult, successfully masculine friend, romantic interest, or hobby they excel at, to counteract the emasculatory effects of bullying. Being truly isolated with no affirmation of masculinity is rare. Kimmel and Kalish (2010) more cautiously add that "in addition to their own psychological predisposition, we believe that it is important also to consider the environment in which they lived" (p. 463).

Kimmel's central premise that bullying alone can cause an otherwise well-adjusted teenager to massacre his peers seems unlikely, especially in face of the shockingly high percentage of adolescents who are bullied in the US.[7] Kimmel also over-relies on homophobia; in the near 20 years since Kimmel's analysis, public opinion towards homosexuality had drastically reversed. 61% of Americans as well as 64% of Republicans aged 18-20 were in favor of the legalization of gay marriage (Borelli, 2022). If Kimmel is correct that homophobic bullying is responsible for rampage school shootings, shootings should have correspondingly abated. Yet the data compiled in this paper shows that they have increased in frequency in the 2010s.

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[5] Kimmel & Mahler point to (among other anecdotes) early U.S. psychologists who encouraged violence as a healthy boyish outlet. Also see Kimmel & Kalish (2010) who point to an ingrained American script of regeneration through violence embodied in Westerns and other popular culture.

[6] Kimmel and Mahler do not explicate how this theory ties in with the sociopolitical trends highlighted earlier in their work. Rocque (2012) understands this to do with "a particular emphasis on masculinity and gun culture" (p. 309) in conservative areas. Kimmel may also believe that homophobia is more prevalent in conservative areas. Pew Research found in 2004 that 60% of Americans opposed gay marriage, and although the poll doesn't provide a partisan breakdown, their 2022 poll found that 55% of older Republican or Republican leaning respondents opposed gay marriage. Also see Larkin, 2010.

[7] 19% of all high schoolers have experienced bullying (U.S. Department of Health and Human Services, 2021), at least some of which is likely routine and severe, and some of these bullied students would have little outside validation. Many bullied students may have access to firearms; in 2017, 42% of American adults told Pew Research that there is a gun in their household (Parker, Horowitz, Igielnik, Oliphant, & Brown, 2017). Yet, rampage school shootings remain rare.

A synthesis of both Kimmel's and Newman's theories reveals a stronger model. Newman et al. (2004) and Kimmel (2003, 2010) both agree that an emasculatory social situation, be it either general social marginalization or specific homophobic bullying, is a factor in shootings. They further agree that other environmental factors also contribute to shootings. But Newman et al. (2004) suggest that it is a cultural script connecting masculinity to violence, without examining local cultural norms around the importance of a traditionally masculine performance. Alternatively, Kimmel (2003) points to specifically partisan culture that makes the emasculatory effects of bullying severe enough to be a causal factor. This begs a synthesis of both theories that would not overlook local cultures yet negate the 'null hypothesis': a local culture with normative expectations of a traditionally masculine performance of male adolescents is a necessary but not sufficient condition for a shooting to occur. This approach modifies Kimmel's (2003, 2010) suggestion that such an environment can cause a shooting, as well as that of Newman et al. (2004) that a mere cultural script connecting masculinity with violence is enough. Although Kimmel and Mahler (2003) vaguely suggest that such a culture is best measured by general partisanship, this paper will point to specific features of conservative ideology that retain gendered undertones, the local support for which can measure the local expectations of gender performance in male adolescents. In areas with high support for these elements, the emasculatory effects of social marginalization or homophobic bullying are more socially crushing than in communities that don't ascribe to them. This hypothesis can be proven if shootings are indeed concentrated to communities which can be deemed as supportive of such gendered partisan ideals.

III. Gendered Partisanship

Traditional masculinity, defined as "a particular constellation of standards… including: anti-femininity, achievement, eschewal of the appearance of weakness, and adventure, risk, and violence" (The American Psychological Association, 2018), is often seen as struggled for by young men from an unworthy, incomplete, and inferior position (Kimmel and Mahler, 2003). But the social importance of such gender performance may vary according to normative local expectations, especially as perceptions of gender roles relate to its dominant political discourse.

Men have been more likely than women to identify as Republican or Republican leaning since the 1960s (Center for American Women and Politics, 2023). Public polling also places masculinity as a directly partisan issue. In 2017 58% of Democrats believed that society looks up to men who are manly or masculine, although only 49% of them believed it was a good thing. In contrast, while only 47% of Republicans believed that society looks up to men who are manly or masculine, 78% of them believed it was a good thing (Parker, Horowitz, & Stepler, 2017). This evidence points to a partisan divide on opinions on both descriptive and normative attitudes towards traditional masculinity.

The centrality of traditional masculinity is prominent both on the far-right (Gökarıksel, Neubert, and Smith, 2019) as well as on the center-right. A New York Times analysis that the popular Fox News talk show host Tucker Carlson spent 50 hours out of 400 hour-long episodes between 2016 and 2022 promoting the conspiracy of an organized effort by Democratic politicians to replace America's white population with minorities through immigration. Carlson also posited that feminism and gender non-conformity threaten masculinity and contribute towards falling birth rates among white Americans, highlighting threats to masculinity in more than 200 of these 400 episodes (Yourish et al., 2022). While Carlson can hardly be considered a centrist conservative, Forbes found in 2023 that 'Tucker Carlson Tonight' averaged 2.5 million viewers per night and was the most viewed show on cable news (Joyella, 2023), making Carlson highly influential.

In an analysis on the 2016 presidential election, Deckman and Cassese (2021) argue that the 2016 election was generally themed with elements of gendered nationalism (the view of American society through gender stereotypes). They find that a belief that "America had grown weak and feminine" was the best predictor that an individual would vote for Donald Trump. They build on previous scholarship which posits that the Republican party is generally viewed as the more masculine party, and that gendered nationalism is more common amongst men than women.

It remains be determined as to what extent beliefs on the far-and-center-right influence mainstream conservatives. Iyengar, Sood, & Lelkes (2012) introduce the concept of "affective polarization" (p. 406), expressed as a social distance based on political affiliation. They found political affiliation to be a more salient social divider among both political activists and non-activists than any other social cleavage including race, gender, or religion. In their analysis, the strength of people's ideological positions mattered less than their partisan identity in forming an animosity towards members of the opposite party. This theory can be applied to sociopolitical values such as gender roles if the Trump electoral base can be considered a group that has demonstrated at least a tolerance for traditional masculinity. As demonstrated by the above-cited research, the Trump electoral-base contains elements that not only tolerate this value but support it and at times center political goals around it. Considering the repercussions of affective polarization, Trump-voting communities can be considered more likely to be influenced by intra-group social perspectives, with whom they share a support for Trump (and more generally, partisan affiliation), than they are to be by non-Trump voters. This may hold especially true in politically homogenous communities (see Iyengar, Lelkes, Levendusky, Malhotra, & Westwood, 2019). The degree of local support for Donald Trump can therefore be used as to ascertain social identification with gendered undertones in partisanship (of which traditional masculinity is a central feature). If the emasculatory effects of social marginalization are exacerbated by normative expectations of traditional masculinity in adolescents, then local support for Trump can indicate the presence of this necessary condition for a rampage school shooting.

IV. Research Questions

Three central questions emerge from the literature reviewed above. First, the literature reviewed concurred that rampage school shootings typically occur in rural and Republican areas. But firstly it must be determined if this is true of the incidents that occurred in the roughly 20 years since the publication of the reviewed works. Secondly, despite this concurrence, Newman et a. (2004) and Kimmel and Mahler (2003) diverge on their primary attribute. Newman et al. (2004) consider shootings to be a rural phenomenon, while Kimmel and Mahler (2003) consider them a Republican one. Since Republican and rural areas by-and-large overlap, it must be determined which of these attributes (rural or Republican), if any or if both, contribute mainly to the necessary conditions of rampage school shootings.

Additionally, since Kimmel (2003, 2010) highlights the centrality of both traditional masculinity ideology and partisanship in rampage school shootings, it remains to be determined if degree of association between the two in the form of gendered partisanship is a necessary condition for a rampage school shooting, or if they are separate, non-interactive conditions. If they are interactive, the hypothesis of this paper that gendered partisanship (measured by support for Trump) and by extent, performance of gender is a necessary condition for a rampage school shooting, can be validated if rural, Trump-supporting communities are found to be positively associated with shootings.

V. Variables and Methodology

To address these questions, I ran a multiple regression analysis in R with rampage school shootings as the dependent variable (0 if no shooting, 1 if shooting), to estimate the relationship between shootings and a group of county-level variables extrapolated from the literature reviewed above. The regression was limited to environmental factors which can create the necessary conditions for a rampage school shooting and did not include individual-level risk factors, which are better suited for a qualitative work.

Incidents of gun violence in U.S. K-12 schools from January 1990 – April 2023 were obtained from the U.S. Center for Homeland Defense and Security's (CHDS) *School Shooting Safety Compendium* (2022) dataset (*N*=2,310). To find incidents of rampage school shootings as defined above, I excluded incidents marked "gang related", and incidents not listed as committed by student(s) or former student(s). Incidents with the following situational narratives were also excluded: accidental, bullying,[8] domestic with targeted victim, drive-by shootings[9], escalation of dispute, escalation of illegal activity, intentional property damage, self-defense, psychosis[10], and suicide or attempted suicide, leaving only the following narratives: anger over grades/suspension, hostage/standoff, indiscriminate shooting, murder/suicide, and one unknown. Under "weapon caliber", I excluded incidents where a non-lethal firearm (BB or pellet gun) was used. Incidents where all the victims were targeted were further excluded, along with shootings that took place off school property. 40 additional incidents with incomplete data were also excluded, for a total of 102 rampage school shootings.[11] The independent variables included in the regression are described below, with acknowledgment of the pitfalls of assigning quantifiable metrics to qualitative phenomena.

Considering the research presented above, voting homogenously for Donald Trump can be taken as an indication of at least a tolerance for traditional masculinity in leadership positions. Since the far-to-center right relies on gendered partisanship to stress the value of masculine performance and the theme of gendered partisanship was emphasized in the 2016 and 2020 presidential elections, the degree of support for Trump was used to measure gendered partisanship and by extent, normative expectations of gender performance. County-level election results compiled by McGovern (2016, 2020) were used to find the average percentage of votes for Donald Trump in the two elections.[12] The average was used in order to best capture gendered partisanship over time.

The regression also included county-level rural-to-urban continuum codes from the U.S. Department of Agriculture's Economic Research Service which places counties on a 1 – 9 spectrum. The

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[8] Per the CHDS description, bullying in this context refers to directly targeting the bully; since rampage school shootings involve multiple non-targeted victims, they were deleted.

[9] For lack of data on the shooter.

[10] The incidents marked as "psychosis" refer to a preparator visibly suffering from a psychotic episode during the attack, which occurred mostly in schools designed for students who suffer from mental illnesses. This is not to be confused with Peter Langman's (2015) typology of shooters which include psychosis; in fact, none the case studies classified as psychosis by Langman were marked "psychosis" in the CHDS data.

[11] Most of the remaining incidents met the "Active Shooter" definition which blends the law enforcement definition of an ongoing, multiple-victim incident of violence with Newman et al.'s (2004) definition of a rampage school shooting cited above (CHDS).

[12] McGovern's results for the 2016 election in Alaska was not provided by county, which were instead adopted from RRH Elections Although a self-acknowledged partisan website, its results were verified as reliable by cross-referencing its listed results for the 2020 election with McGovern's.

label 1 is used to designate counties in a metropolitan area with a population over 1,000,000; 2 for counties in a metro area with a population from 250,000 – 1,000,000; 3 for in a metro area with a population under 250,000. 4 designates counties with an urban population of 20,000 or higher which are also adjacent to a metropolitan area; 5 for an urban population of 20,000 or higher and not adjacent to a metropolitan area; 6 for an urban population of 2,500 - 19,999 and adjacent to a metropolitan area; 7 for an urban population of 2,500 - 19,999 and not adjacent to a metropolitan area. 8 for a completely rural, or an urban population under 2,500 and adjacent to a metropolitan; and 9 for completely rural counties, or with an urban population under 2,500 but not adjacent to a metropolitan area.

The model additionally factored county-level data compiled by the University of Wisconsin's Population Health Institute (PHI, 2022) on the average number of mentally unhealthy days reported in each county in 2022 on a scale from 0 – 365 to assess mental health. Reported physically and mentally unhealthy days have been found to be a "valid summary measure of county health status" (Jia, 2008) although attitudes towards reporting mental health vary by community (PHI, 2023a). Mentally unhealthy days are generally understood to be inversely associated with mental health in local communities but with regards to rampage school shootings, stigma associated with requesting assistance for mental health is of more interest than the actual state of mental health. A larger number of mentally unhealthy days reported may signify less stigma associated with reporting mental health issues.

Data compiled by the University of Wisconsin's PHI (2022) on the ratio of people per mental healthcare provided from 1 *ad infinitum* was factored in the model. The PHI ratio obtained through the U.S. Centers for Medicare and Medicaid Services (CMS) National Provider Identification (NPI), although the NPI includes obsolete practitioners (PHI, 2023b). Resources available for mental health can indicate of the degree of importance that mental healthcare is assigned in local cultures, although many male adolescents struggling with psychosocial issues may not feel comfortable reaching out for help. Many eventual shooters stay below the radar designed to identify troubled adolescents (Newman et al., 2004). Additionally, urban counties consistently show a higher ratio of people per mental healthcare provider which is probably not indicative of actual increased stigma. But since stigma around mental illness has been found to affect people systemically through the availability of fewer mental health resources for research and treatment (Link et al., 2001), the presence of resources therefore likely signifies an absence of stigma.

The model also included state-level estimates of the percentage of firearm-equipped households 2007 to 2016 compiled by the Rand Corporation to measure access to firearms. The estimates are based on a compilation of survey estimates, firearm suicides, hunting licenses, subscriptions to the Guns & Ammo magazine, and background checks (Schell et al., 2020).

The Everytown Research for Gun Safety 2023 measure of statewide gun control strength from 0 – 100 was included for gun safety regulations. Everytown Research, a nonprofit research and advocacy organization, compiles rankings based on 50 key gun policies divided into four levels of importance, each assigned a value from 0 – 100 (see Everytown Research for Gun Safety, 2023). Gun safety regulations were included since 80% of rampage school shooters stole the firearms they used (National Institute of Justice, 2022), which the owners had likely obtained legally.

Lastly, while the literature cited above does not indicate income as a factor in rampage school shootings, county-level 2021 median incomes from the U.S. Department of Commerce's Bureau of Economic Analysis (2022) were included for access.

VI. Results

The R output (Table 1) showed a statistically significant relationship between a rampage school shooting, rural-to-urban continuum codes, and support for Donald Trump, 95% CI. No other variables measured retained statistical significance. When measured separately, both rural areas and Trump-supporting areas were inversely related to shootings, meaning that urban areas, as well as those with lower support for Donald Trump, had more shootings. However, consistent with this paper's hypothesis, when rurality and support for Donald Trump were interacted, they showed a positive relationship with rampage school shootings, suggesting that rampage school shootings occurred more commonly in areas that are both more rural and had higher average votes for Donald Trump than in areas without both characteristics.

Table 1

Variables in Relation to Rampage School Shootings

Variable	p-value (Estimate in parenthesis)
Rural-to-Urban Continuum Codes	0.000000844*** (-0.03490)
Average Votes for Donald Trump	0.00000000000409*** (-0.3267)
Mental Health Days Reported	0.912
People per Mental Healthcare Provider	0.128
Firearm Availability	0.426
Gun Control Strength	0.266
2021 Median Income	0.444
Rural-to-Urban Interacted with Average Votes for Donald Trump	0.00000000999*** (0.04331)
Constant	0.000000844*** (0.2541)

Notes.
*$p < 0.05$ **$p < 0.01$ ***$p < 0.001$
$N = 3{,}143$
Adjusted R^2: 0.0447

VII. Discussion

The interaction term demonstrates that rurality and support for Donald Trump is positively correlated with the occurrence of a rampage school shooting, supporting the hypothesis that normative expectations of gender performance, signified by gendered political ideologies, is a necessary condition for a rampage school shooting. However, it's difficult to reconcile the model's results when the factors were run individually, which runs contrary to existing qualitative literature which assert that shootings occur more in rural areas. It's possible that the method in which the measure is calculated does not fit the purpose of the model well. The Department of Agriculture codes are based on proximity to a metropolitan

area, which leads a disproportionality large number of counties close to U.S. Census-designated metro area to be designated as urban, as evidenced by the distribution of the rural-to-urban counties (Table 2). This may not fit the purpose of measuring levels of social capital typically found in small, highly interconnected towns which would likely remain high even in those close to metro areas. With regards to the Trump variable when measured individually, it's possible that the inverse relationship results from the higher number of counties which voted for Donald Trump (since Republican counties overall outnumber Democratic ones) but did not have a rampage school shooting that exists in the data. When interacted together, the relatively low (due to the measures used) number of counties that were both classified as rural by the continuum codes and that had voted for Trump generated more accurate results. Additionally, since that model measured only conditionality, a large number of counties with ideal conditions for a shooting but without the unknown causal factor may have skewed the results towards an inverse association with shootings.

Table 2

Distribution of U.S. Counties on the Rural-to-Urban Continuum Codes

Histogram of Countymodel2$ruralurban
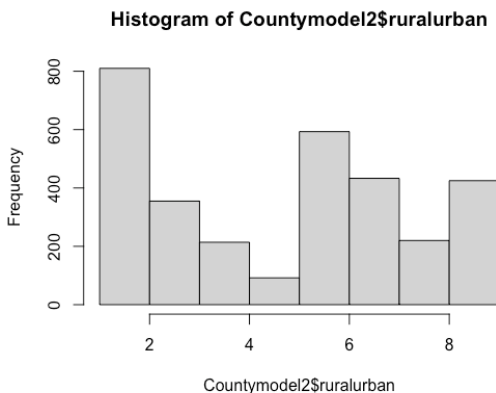
Additionally, although family stability has been noted as a possible factor in rampage school shootings, it was not included in the analysis since it's an individual-level variable and difficult to disaggregate. A further weakness in the model is that there was no measure included for general partisanship (opposed to specifically Donald Trump) factored against gendered partisanship.

It is important to note that this paper does not argue that anyone who voted for Trump must be a masculine-crazed far-right ideologue, or that Trump is somehow responsible for rampage school shootings. The argument, insofar as it relates to Donald Trump, is that local sociocultural normative expectations of gender performance in male adolescents can be measured, as best they could, by the degree support for gendered elements in conservative ideology, itself measured by support for Donald Trump. Assuming that's correct, the model output supports the hypothesis that community values encouraging traditional masculinity in adolescents is a necessary but not sufficient condition for a rampage school shooting.

VIII. Conclusion

The analysis demonstrates a statistically significant positive relationship between rurality, support for Donald Trump, and rampage school shootings, demonstrating a connection between the high social capital of rural areas, gendered partisan values, and the conditions for a rampage school shooting. In light of the literature reviewed above, this suggests that a local normative expectation of traditional masculinity in male adolescents (associated with such political values) is a necessary condition for a rampage school shooting. Along with the rural characteristic of highly interwoven communities, this creates an environment for an unknown factor to trigger a shooting.

The tragic nature of such shootings, factored against extreme polarization around gun regulations, has led to a national stalemate on solutions to this horrific problem. Nothing in this paper dilutes the importance of proper firearm safety regulations or of proposed alternatives, nor does this paper propose any novel solution. The significance of this research lies in identifying the social circumstances in which shootings typically occur so that harmful expectations can be mitigated. While sociocultural values are not easily changed, identifying their effects on forming environments ripe for tragedy can allow struggling adolescents to be helped before they feel prompted to such horrific actions.

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PSYCHOLOGY

The Impact of Social Media on Adolescent Brain Development

Franzen Quicho; Mentor: Laura Ochoa, Bergen Community College

Judge's Comments: "Franzen's presentation did not feel like an assignment; it came off as being a true passion. The topic is relevant to today's world and focus on social media."

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The Impact of Social Media on Adolescent Brain Development

Introduction

As society becomes saturated with technology and various digital advancements, social media holds a profound meaning and leaves an extensive presence in the overall growth and development of the current generation of adolescents. Social media is one of the highly used inventions developed in the 21st century, with it being purposefully used as a means of entertainment. Additionally, social media is frequently used for communication purposes through various applications like YouTube, TikTok, Instagram, and Twitter. Media-related activities in American adolescents comprise around six to nine hours of their day, excluding homework and schoolwork (Crone & Konjin, 2018). These numbers show how social media has been heavily integrated into the routine followed by the current youth, especially their social lives.

Adolescence is a transitional and transformative stage wherein peers become more significant and influential in their development. According to Crone and Konjin (2018), to be categorized as an adolescent, the individual must be between the ages of 10 until 22. However, this age range is not absolute and can vary across cultures. Social acceptance and rejection become more salient in this particular life stage, which is why it becomes imperative to navigate through how adolescents process the information they see on social media (Crone & Konjin, 2018). Since adolescence is a time of extensive brain changes related to different aspects of life, most importantly in the social realm, it would indicate that social influences are

strong during this time, especially concerning media use. This implies that an adolescent's brain

development is impacted by social experiences from any source, offline or online.

Characteristics of the Adolescent Brain

Intensive growth and development, influenced by heredity, environment and hormones,

occur in the adolescent neural pathways. Brain remodeling occurs until the person reaches

their mid-20s to achieve the function of an adult brain (Brain Development in Preteens and

Teenagers, 2021). In this particular stage, the principle of 'use it or lose it' occurs to make the

brain more efficient. Neural circuits that remain unused in the cognitive part of the brain are

'pruned' away (Brain Development in Preteens and Teenagers, 2021). Simultaneously, rapid

growth of additional synaptic connections and enhancement of brain pathways occur. Myelin,

an insulating coating formed by nerve cells, aids cell communication. These modifications are

required to improve cognition, action, and behavior (Brain Development in Preteens and

Teenagers, 2021).

Brain remodeling begins at the back of the brain and then all the way to the front in

later development. A specific region called the amygdala develops early on during adolescence.

This region processes emotions, immediate reactions, and impulses (Teen Brain: Behavior,

Problem Solving, and Decision Making, 2017). Contrastingly, the prefrontal cortex, which sits at

the front of the human brain, develops and matures later into adulthood. This portion of the

brain facilitates the decision-making abilities of a person. It is responsible for rational and

logical thinking, solving problems, and controlling impulses (Teen Brain: Behavior, Problem

Solving, and Decision Making, 2017). Since the amygdala develops faster relative to the

prefrontal cortex, adolescents function more by their amygdala rather than the prefrontal cortex. Due to this reason, adolescents are more likely to be emotionally reactive, irrational, and impulsive in various life aspects.

Online Social Exclusion and the Adolescent Brain

Despite decades of widespread digitalization, little is known about how social media affects the social parts of the brain's maturational trajectory. To gain a better understanding of developmental sensitivity connected to social media, Crone and Konjin (2018) used medical imaging technologies to examine neural development during adolescence. Crone and Konjin (2018) claim that adolescents are particularly attuned to social acceptance and rejection on social media. Their increased emotional sensitivity, along with the prolonged development of reflective thinking and cognitive control portions of the brain, might make them especially responsive to certain media.

The neural effects of social exclusion have been captured through the Cyberball Paradigm. The ball is between the study participant and two other participants in this virtual game. After a fair play, the study participant is excluded from the other two players in the game, which induces a feeling of exclusion. This feeling of exclusion would then proceed to negatively affect the subject in terms of their "sense of control, feeling of belonging, and self-esteem" (Crone & Konjin, 2018). A brief period of exclusion is shown to activate neural regions that regulate emotional processing. Chronically excluded adolescents were found to have an increased activation in the dorsal anterior cingulate cortex (ACC) during deliberate exclusion (Will et al., 2015). This heightened activity in the dorsal ACC in "excluded participants" could

indicate that they process this moment of exclusion as an emotionally significant "conflict" or "disturbance" (Will et al., 2015). Chronic exclusion causes these adolescents to be more hypersensitive to signs of potential exclusion as their neural circuitry becomes more responsive to cues related to exclusion (Will et al., 2015).

Online Social Acceptance and the Adolescent Brain

Significant brain responses to social rejection and exclusion are demonstrated in another behavioral study known as the Social Judgement Paradigm, which included participants ranging in age from 10 to 23 years old. To achieve feelings of social rejection and acceptance, other people judge their profile pictures based on their first impressions. This creates an environment highly reflective of social media activity, such as "giving hearts" on Instagram and "liking" on Facebook. Compared to their young adult counterparts in the study, adolescents did not show self-protecting biases. In young adults and adolescents, fMRI results have shown increased activity in the medial frontal cortex (Crone & Konjin, 2018). Heightened activity in this neural region indicates that the brain is becoming more active and attentive in thought and emotional processing. Although emotional responses were exhibited by young adults and adolescents alike, the adolescents were more emotionally reactive, shown through pupil dilation (Crone & Konjin, 2018). Pupil dilation is often considered a physiological marker of mental effort and emotional arousal. In this case, the enhanced pupil dilation among the adolescent participants reflects that they are experiencing an increased cognitive load and emotional response to rejection (Crone & Konjin, 2018).

In a more positive online environment, which can manifest as any form of social acceptance, such as liking and having an ideal followers-to-following ratio on social media, activates neural regions that also govern the reward pathways. The fMRI results show that the areas of the brain with the most activity in this case were the ventral striatum, ventromedial prefrontal cortex, and ventral regimental area. According to Crone and Konjin (2018), these three areas in the brain are regions for the subjective experience of rewards and pleasure. The three brain regions showed reduced neural activity in adolescents who had experienced depression or a history of negative parental effects compared to those who did not (Crone & Konjin, 2018). This suggests that an adolescent's sensitivity to social media can be affected by their social experiences, both in-person and online. Their social experiences predispose them to be in situations where they rely on likes and popularity as a coping mechanism for depression. They can also potentially develop a one-sided socio-affective relationship with media icons and figures (Crone & Konjin, 2018).

Social Media and Emotions

Braams, Van Duijvenvoorde, Peper, and Crone (2015) conducted a gambling and reward paradigm that was used to study the activity in the reward pathways of the adolescent brain. Results showed that the left and right nucleus accumbens (NAcc) showed significant activity in response to the experimental paradigm used. Moreover, the researchers have also stated that the activities of the NAcc in the ventral striatum, about monetary rewards, peaked in mid-adolescence (Braams et al., 2015). The findings are unaffected by the sex of the participants, indicating that the results are exclusively based on the ages of the participants, the majority of

whom are adolescents. The heightened sensitivity to monetary rewards in this case implies that the adolescent brain has increased responsiveness in its reward centers. This idea can also be extended to positive social rewards, considering that similar neural regions activate and respond similarly in both circumstances. In fact, this is supported by results from a controlled study where middle-to-late adolescents experience increased activity in their ventral striatum when viewing Instagram posts with many likes compared to fewer likes (Crone & Konjin, 2018).

From this aforementioned information, it could be deduced that changes in the biological systems, specifically neural and endocrine pathways, contribute to how adolescents process socio-affective information, marking a critical period of vulnerability. The restructuring of the adolescent brain, especially in the regions of emotional regulation and social cognition, can influence their responses to certain social stimuli. These changes predispose adolescents to increased social sensitivity, which heightens their susceptibility to emotional and behavioral health problems. Substance abuse, mood disorders, and risky behaviors become prevalent as adolescents experience the intricate interplay of hormonal changes and cognitive development. Since adolescents spend more time with their peers in-person or online, the environment their peers provide significantly impacts them emotionally and mentally.

Heightened sensitivity in social settings may also be associated with the development of frontostriatal-limbic systems that respond to social and emotional stimuli (Silk et al., 2014). The extent wherein neural and endocrine changes during adolescence contribute to the increased significance of peer social status among adolescents, but factors such as the frontostriatal dopaminergic systems and sex hormones may influence behaviors related to obtaining and

defending a particular social status among their peers (Silk et al., 2014). Sex hormones have a crucial role in adolescent brain remodeling and the activation of certain neural circuits, specifically the frontal cortex, the limbic system, and the striatum. Emerging evidence from self-reported research shows adolescents experience increased sensation-seeking, heightened responsiveness to particular emotional stimuli, and stronger brain responses to affective faces (Silk et al., 2014).

Social media usage is increasingly prevalent because it is a widespread and accessible free space where individuals can express their opinions. This could lead to either social rejection or social acceptance. Studies show that social rejection via social media has been linked to suicide cases and depression among adolescents (Silk et al., 2014). Amygdala activity is affected in response to threatening faces, and there is also a decreased striatal response to monetary reward in adolescents with depression. Furthermore, although healthy adolescents experience an increase in sgACC during periods of exclusion as well, depressive adolescents' sgACC activity is more heightened (Silk et al., 2014). In fact, in the Cyberball Paradigm, the altered sgACC activity to social exclusion is predicted to increase symptoms of depression over a year (Silk et al., 2014). Adolescents with depression when presented with a positive and tranquil social ground responded to acceptance with increased amygdala activity (Silk et al., 2014). This signifies that the brain of a depressed adolescent may react differently towards monetary rewards and social responses relative to their counterparts.

Exploring interventions and comprehensive strategies to address this neural response is essential in preventing potential lifelong effects for adolescents diagnosed with depression.

Potential interventions for this neuropsychological effect apart from cognitive-behavioral therapy (CBT) could be mental health promotion, establishing nurture groups, and school-based preventive programs and healthcare (Das et al., 2016). However, it is significant to acknowledge that these alternatives to CBT have their limitations as well, such as a lack of theoretical foundations, process evaluations, and youth viewpoints (Das et al., 2016). Additionally, these interventions need further comprehensive studying to validate their effectiveness, especially since these are mostly conducted on a short-term scale and there is limited one-on-one interaction in these programs (Das et al., 2016).

Summary

The existing relationship between social media and adolescent brain development signifies how profoundly these platforms affect the neural development of adolescents. Various researches have found that social media significantly impacts the current generation's adolescents, even affecting their neural pathways and impacting their responses to a particular social stimuli. Substantial brain remodeling occurs in adolescence to improve the efficiency of neural pathways. This includes the 'use it or lose it' principle of neuroplasticity. Brain maturation begins at the amygdala, which is responsible for emotions and impulses. The prefrontal cortex, which facilitates rational and logical thinking, develops later relative to the amygdala. The incongruence of the amygdala and the prefrontal cortex in their developing rates explains why adolescents tend to have emotional reactivity and impulsivity. For this reason, adolescents become more receptive to the influence of social media, where their neural reward centers can be activated through either positive or negative receptors.

The interplay between biological and neurological systems, such as the frontostriatal-limbic pathways and the production of sex hormones, induces certain behaviors in adolescents based on their social standing. The sensitivity of the adolescent brain is emphasized in the Cyberball Paradigm and Social Judgement Paradigm, wherein varying levels of neural responses in different neural regions occur due to social rejection and acceptance. Positive online environments, reflecting social acceptance, activate the ventral striatum and ventromedial prefrontal cortex. These neural regions are the reward pathways, which are significant in motivational functions and reinforcing certain behaviors. On the other hand, social exclusion heightens emotional responses and creates a sense of hypersensitivity to cues that can indicate potential exclusion. Adolescents who experienced exclusion could start developing coping mechanisms to seek validation and social rewards online. Common examples of these can be relying on the number of likes they receive and their popularity, and they could also potentially develop socio-affective bonds with media figures they identify with. As such, these findings heavily highlight the importance of creating a healthy online environment and changing social media to become a positive tool for people's mental and emotional well-being, not only for adolescents but for the general public.

Conclusion

Overall, existing observations and insights indicate that there is indeed a profound impact existing between these two aspects, affecting an adolescent's emotional reactivity and thought processing. These findings serve as an excellent foundation for future research and studies that addresses existing knowledge gaps within a similar context, while simultaneously

exploring beyond existing methods and formulating newer innovations and techniques to gather more neural data. It is also significant to explore possible strategies and interventions to encourage a more positive online environment conducive to the overall development of adolescents at this time.

Reactions and Recommendations for Future Research

Potential implications of research in this field are valuable to consider. These findings may assist in developing stricter guidelines to ensure a sense of safety in the online world. Moreover, it is crucial to investigate the long-term effects of identified neural sensitivities in research. This could contribute to formulating a comprehensive approach in exploring potential methods in creating a more positive online space.

This study contributes to the existing knowledge within neuropsychology, aiding future investigations and interventions in promoting and maintaining a healthy online environment for adolescents. Since the adolescent brain is vulnerable to social acceptance and social rejection online, this underscores how essential it is to have a nuanced understanding of how various factors contribute to a developing individual's emotional reactivity and cognitive processing and how it can cause lifelong neural sensitivities. A handful of scholarly texts explore the relationship between social media and the maturational trajectory of the developing brain, all of which lead to similar conclusions.

The Cyberball Paradigm and the Social Judgement Paradigm add empirical weight to the argument. Through the implementation of these two experimental frameworks, it was revealed

that there are distinct neural responses to social rejection and acceptance unique to the

adolescent brain. The Cyberball Paradigm gathered neural activity data that was mainly

associated with social exclusion. Contrastingly, the Social Judgement Paradigm collected neural

activity data that was induced by social acceptance. Moreover, data regarding the activation of

reward pathways emphasizes the role of social media in terms of its motivational and

reinforcing aspects. This suggests that although social media is commonly associated with

adolescent disorders, there exists a potential for it to be beneficial, through positively-inclined

algorithms and creating stricter rules to adhere to to prevent cyberattacks.

Although substantial progress has been made in understanding the neuropsychological

effects of social media on adolescents, there are existing knowledge gaps that need to be

addressed and investigated. Studies conducted in this research domain focus on the

detrimental effects of social media on the adolescent brain, overlooking the potential positive

effects it might have. Additionally, oxytocin release should be researched within this context to

gather additional information on the relationship between social media and the adolescent

brain.

Oxytocin functions crucially in establishing and maintaining social bonds throughout life.

It might influence amygdala activity, altering fear response and analyzing social cues (Fineberg

& Ross, 2017). It is known that in-person interactions produce higher oxytocin release due to

physical closeness. Susan Pinker highlights the importance of in-person interactions and

conversations that improve human connections in her book, "The Village Effect." According to

Pinker, during the occurrence of physical interactions between coworkers, such as extending

handshakes and giving a pat on the back, oxytocin is released due to these actions producing

feelings of trust and allowing for a healthier work environment (Evans, 2014).

While Susan Pinker's findings report on the positive correlation between oxytocin and

in-person social interactions, there are also existing studies that concluded with contrasting

perspectives. Paul Zak, a neuroeconomics professor from Claremont's School of Politics and

Economics, assessed his oxytocin levels through communicating with his significant other on

Facebook. The findings indicate that the man produced high levels of oxytocin, providing an

impression that the oxytocin levels produced in face-to-face setting is also replicable in a digital

setting (Adams, 2011). According to Judith Olson, a cognitive psychologist and a professor at

the University of California, Irvine, interactions carried out through virtual settings can

potentially elicit high levels of oxytocin among individuals, under the circumstance that both

parties were provided an ample amount of time to foster a connection with each other (Adams,

2011). Considering the widespread isolation globally during the COVID-19 pandemic,

investigating oxytocin production and release would become crucial to study in the context of

adolescent neural development amidst the digitally-evolved landscape.

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SOCIAL JUSTICE

Making Over American Prisons: Reducing Recidivism Through Reform

Nazelly Chira; Mentor: Rebecca Eggenschwiler, Montgomery College

Judge's Comments: "Nazelly provided clear definitions and compared U.S. prison conditions versus Norway, Netherlands, Sweden, showing that prison policy differences led to different prison conditions."

Professor Jason Bishop
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Making Over American Prisons: Reducing Recidivism Through Reform

As of 2023, there are a rough total of 1,566 prisons around America (Sawyer). Recidivism is the term that measures the amount of people who have been reconvicted after their initial release. The United States has a 70% recidivism rate within the first five years of release, one of the countries with the highest recidivism rates worldwide (Hayden 1). This drives the question of what may be contributing to the national high re-incarceration rates. A possible contributor may be the conditions inside prisons. American prisons tend to be very overpopulated and understaffed, especially with medical care workers specializing in mental disorders. Prisons also require prisoners to take part in strenuous jobs. Lastly, punishments such as solitary confinement play a part in causing negative mental and physical side effects. To investigate possible practices that may reduce recidivism, this paper investigates Norway, Sweden, and The Netherlands, which are countries with some of the lowest recidivism rates. I will be using multiple case studies, articles, and books that describe various prison conditions, how these conditions affect a prisoner's quality of life, and prisoner's personal opinions on how they feel during their time of incarceration. American prison systems should be required to implement stronger practices and protocols that focus more on the positive rehabilitation of prisoners to decrease the nation's recidivism rates.

Starting, American prisons have been known to be very overpopulated and are usually operating at capacity or over it. With the overpopulation of offenders, prison guards have to look over dozens of prisoners at a time to make sure they are not only safe from one another but not causing any trouble. Every prison guard is estimated to be assigned 350 prisoners to look over (Dreisinger 178). With so many offenders in one location and not enough guards, it puts the prison and the people inside it at risk for violent breakouts caused by high tensions. Moreover,

the violent environment created inside prisons also causes prisoners to develop major psychological and mental health problems. In fact, "37% of prisoners have been diagnosed with mental health conditions" (Hayden 13). As mentioned previously, prisons in America lack strong mental health units, it's been reported that 66% of prisoners communicate having absolutely no mental health care received (Hayden 13). Mental health units with professionals like psychologists and psychiatrists are not being brought to enough prisons to be able to properly address the development of mental health illnesses.

Also, the jobs offered to offenders inside prison are usually hard labor and low-paying jobs. These jobs require offenders to do back-breaking work for hours on end for only a few cents an hour, and when they choose not to work, officers revoke some of their privileges or they get written up (Sainato). Prisoners who have medical conditions are also expected to work no matter how much they may be in pain or in need of medical attention (Sainato). Based on the American Civil Liberties Union report on captive labor showed that 70% of prisoners are paid so little that they barely have enough to be able to buy personal necessities through the prison commissary and 64% reported not feeling safe while on the job (Sainato).

Lastly, A common punishment throughout American prisons that has been utilized for years is solitary confinement. This type of individual imprisonment is a "short"-term punishment of total isolation, away from the rest of the prison population. It is a practice that has been administered throughout the nation for years, with an estimated 80,000 prisoners who live in solitary confinement (Dreisinger 174). Solitary confinement in American prisons has grave consequences for the well-being and mental health of prisoners. David Polizzi's book "*Solitary Confinement : Lived Experiences and Ethical Implications*" highlights the strong physical and psychological toll solitary confinement may cause a prisoner stating that "severe depression,

hallucinations, and obsessed thoughts" are some of the symptoms that prisoners develop from this punishment (76). Aside from causing damage to initially healthy individuals, solitary confinement also harms prisoners who already have mental and psychological problems, to begin with. Prisoners who are mentally ill suffer even more from the consequences of solitary confinement since this type of total isolation can be "intolerable" and may cause a mentally ill prisoner to "lash out, either at themselves or someone else " (Polizzi 7). A study by doctor Keramet Reiter and her colleagues in 2017 measured the symptoms caused by solitary confinement, their severity, and prevalence. Using the Brief Psychiatric Rating Scale or BPRS, these researchers interviewed 106 prisoners from the Washington State Department of Corrections over two years. Prisoners assigned to solitary confinement in this prison were confined for durations of several months to years with "highly restricted access to phones, radios, televisions, time out of cell, and visitors" (Reiter et al. 57). The results of this study show that during their time in solitary confinement prisoners suffered from long-term psychological distress, specifically, 19% had Serious Mental Illness titles, 22% had documented suicide attempts, and 18% showed signs of other types of self-harm (Reiter et al. 58). Anxiety exhibited through hypersensitivity and a loss of identity were two other symptoms developed by the prisoners being researched. One of the 16% of prisoners that mentioned hypersensitivity explained how the correctional officers would constantly slam the door to show their power which resulted in their development of anxiety and the percentage of prisoners that developed a loss of identity, 25%, described it as being "in the hole so long that it defines the person" (Reiter et al. 59). The mental disorders that solitary confinement cause affects healthy offenders but it also worsens the mental state of offenders that already have a delicate mind. Moreover, mental illnesses such as depression and anxiety are not disorders that go away once these prisoners are

released from prison. Rather, they have to continue to live the rest of their lives with these new

mental disorders that are not cheap to take care of. Ex-convects with severe mental disorders can

also become more motivated to continue their previous criminal behavior especially if they feel it

is a way of rebelling against the institution that caused them to develop mental problems that

they did not have before. In all, the punishment of solitary confinement may very well have a

direct impact on recidivism because it mentally changes offenders and based on the research, it is

not the good type of change.

Taking a look at countries globally shows that other countries have considerably lower

recidivism rates compared to the U.S. and it begs the question as to why that is, what they could

be doing within their system that may be contributing to their lower rates, and how they carry out

those systems effectively. Norway, the Netherlands, and Sweden are three countries with some

of the lowest reincarceration rates in the past few years with focuses on restorative justice and

rehabilitative practices. These three countries will be used in this investigation to further explore

the specific practices they use within their prison system that rehabilitate prisoners to be able to

successfully rejoin society once they are released.

Firstly, Norway has a recidivism rate of 20% after two years of release. The Norwegian

justice system has a very contrasting approach to punishing criminals than in the U.S. Back in

1990, the Norwegian Correctional Service underwent a series of reforms that put all focus on

rehabilitation (Kirby). With this new focus, the way that correctional systems and institutions ran

in this country changed dramatically and has continued to develop to this day. Norwegian prison

systems aim to value the people within their system, that being all workers and prisoners by

wanting them to be "seen, heard, and respected as human beings" (Johnsen et al. 516). Mindset

and perspective are two very powerful things that can shape how a person views life and their

actions. In the context of prison systems, the mindset and perspective of prison staff can shape the environment within that prison. The way guards view and treat prisoners has a strong correlation with how prisoners may act and the way their sentences will be. In Norway, prison workers do not just guard and patrol prisoners, but also focus on social work, therefore providing a more hospitable environment for prisoners. Prisoners and staff in Norway value "respect, humanity, trust, and support" to be able to build positive relationships with each other (Johnsen et al. 517). These values create a stable environment where prisoners can grow as people and truly learn from their mistakes with the support of the institution they are in and the institution's representatives. Prisons in Norway are very rarely overcrowded due to the way they sentence new prisoners, rather than throwing them directly into prison after their conviction, new prisoners are "placed on a waiting list to serve their sentences" if the prisons are already at their capacity (Johnsen et al. 518). By using a waiting list process, each prisoner in Norway can get the proper attention and resources needed to successfully rehabilitate without putting them at risk for physical and mental illnesses due to overcrowding. Smaller prison population sizes in Norwegian prisons overall put the focus on the rehabilitation process of prisoners and less on the action of locking every criminal up immediately.

Furthermore, the following programs and prison descriptions are from one of Norway's largest maximum security prisons, Halden Prison, located in Halden Norway. In Halden prison, each prison officer is in charge of only three prisoners and becomes the prisoner's main point of contact. Dynamic security is the system used within this prison, this system requires prisoners and their assigned officers to do everything together such as eat meals, play games, and perform activities. Using this system allows the officers and prisoners to build proper relationships with one another, aiding in the development of a mutual relationship that better motivates prisoners to

talk to the officers (Kirby). While prisons are still rather isolated in Norway, their general location is much more pleasant overall for a long sentence. Halden Prison was designed and built to reduce the "sense of incarceration" and to lessen "psychological stress and to put them in harmony with the surrounding nature" (Kirby). Alongside open architecture, this prison uses a much more discreet way of securing the prison by only having a 25ft high wall that encases the prison and hidden security cameras with motion detectors (Kirby). The hidden security measures used by Halden Prison seem to further support the goal of lessening prisoner's perception of being incarcerated. Another area in which this notion is exhibited is in prisoner's cells. Prison cells in Norwegian prisons look very different from the ones in the U.S. The personal space of prisoners is taken into account with each prisoner having the privilege of a personal cell that is equipped with a toilet and shower, fridge, desk, flat-screen TV, and window (Kirby). Prisons in Norway have changed their way of perceiving prison sentencing and have worked on constructing institutions that value the possibility of growth by creating an environment that is not typically seen as a prison. Rather, what has been described as Halden Prison seems to be more of an isolated retreat than a place to be punished. Halden Prison puts a lot of importance on educational and work programs as part of the daily routine of prisoners.

In addition, this prison has educational programs that allow prisoners to receive diplomas in subjects such as mathematics, physics, and even graphic design. Also, work training programs are implemented which ensures that many inmates are released as qualified mechanics, carpenters, and chefs. Both of these programs are established to give prisoners the tools they need to be able to get a stable job once released, allowing them to successfully reintegrate into society. As one of the prisoners at Halden explains "If you don't have opportunities and you are just locked in a cage, you don't become a good citizen" (Kirby). Lastly, another unique program

Halden prison runs is one for prisoners with families called "Daddy in Prison". This program allows prisoners to have their families over and stay with them for a few nights in a private separate chalet that is within the grounds of the prison which allows prisoners and their families to spend some quality nights with each other (Kirby). Still, to be approved to take part in this program, prisoners must first be approved by passing multiple safeguarding tests and showing continuous good behavior within the prison. Overall, Halden prison as well as the other prisons in Norway operate in a way to give prisoners a second chance and to be able to learn from their crimes. It highlights rehabilitation through the structure, location, staff, and programs all of which when combined give prisoners the tools to reform themselves.

Secondly, another Scandinavian country that has a unique prison system is Sweden. Sweden has a recidivism rate of 43% after two years and similarly to Norway, it also prioritizes the use of different programs to help prisoners rehabilitate during their sentence time. The Swedish prison system has a program called the Reasoning and Rehabilitation Program, or R&R program for short. This program is centered around the idea that criminal offenders have failed to fully develop the basic cognitive and social skills needed to resolve life problems in prosocial ways (Berman 86). To attack this issue, the program works to teach prisoners "problem-solving, social skills including negotiation, managing emotions, creative thinking, value analysis and critical thinking" (Berman 86). To evaluate the effectiveness of the Reasoning and Rehabilitation program both short-term and long-term outcomes of the program were examined by investigating three different variables. For the short-term outcomes, the study focused on test results from program participants and the volunteered control group, and for the long-term outcomes, the study looked at the reconviction results of program completers, program dropouts, and a control group. For the short-term outcomes, the tests used were the Sense of Coherence Scale, the

Impulsiveness, Venturesome-ness, and Empathy Questionnaire, and the Criminal Sentiments

Scale. These three measures were used to see if the cognitive and social skills taught within the

R&R program were able to show "increased coherence, coping capacity, and meaningfulness in

life…diminished impulsiveness once problem-solving tools were acquired" and better social

behavior (Berman 89). The short-term outcome results showed that within program completers

and the control group have a lower probability of 2% for Venturesomeness and 0.1% for

Tolerance of Law Violation. In contrast, prisoners who dropped out of the program have more

antisocial scores. Additionally, program completers also showed significant pro-social scores

(Berman 93). For long-term outcomes results revealed that program completers had a 42%

reconviction rate, program dropouts had a 58% reconviction rate, and the control group had a

49% reconviction rate (Berman 95). Overall prisoners who completed the program were 25%

less likely to reconconvict compared to the control group. The findings of this case study reveal

the power a rehabilitation program has on both the ability to impact prisoners and their personal

development to become better civilians. It also shows that it has decreased the probability of

prisoners reoffending in the future once they are released.

Next, Sweden prisons also utilize drug treatment programs to help prisoners who were

sentenced for drug-related crimes. Back in 2010, 21-28% of the prison population was from

drug-related crimes in Sweden among other Scandinavian countries. Additionally, 50-60% of

prisoners had reported having drug problems (Giertsen et al. 149). Due to the high statistics in

these two categories, Swedish prisons have been implementing rehabilitative programs geared

toward prisoners with drug abuse problems since the 1990s. Specifically, two kinds of drug

programs can be seen in Swedish prisons, the first being "day programs" in which prisoners from

the general wing, meet up for a "few hours, once or twice a week, for a period of some months"

and become involved in activities such as "education, courses or work with fellow prisoners" (Giertsen et al. 149). The second program option is Drug Treatment Units which involve prisoners staying in a special prison wing for up to 6-12 months to take part in group counseling sessions led by an external specially trained prison officer or counselor (Giertsen et al. 149). Of these two kinds of programs, there are also two different approaches: cognitive-behavioral and twelve-step facilitation programs. The first targets prisoner's "individualistic management of one's thoughts, at times, connected with individual training and control over one's behavior" and the second is more "collective and relies heavily on the faith-based twelve-step programme, drug users' confessions to others, drug use as a disease, and on participation in self-help groups" (Giertsen et al. 153). In Sweden specifically, the counselors who run the twelve-step drug programs are often non-uniformed officers who have a personal history of drug abuse (Giertsen et al. 154). This first-hand connection to what the counselors are teaching to manage strongly helps build a positive connection between them and the prisoners because they can preach about getting clean. After all, they have also done it. It also allows the prisoners to see them as a role model and allow more trust to build. This is evident when the environment within the treatment unit is described as being both positive and relaxed, so much so that a Swedish female prisoner has stated that within this unit she can be who she is and does not have to play a role unlike in the regular prison wing (Giertsen et al. 155). The group therapy sessions and counselors with first-hand experience with drug abuse both help create an atmosphere where prisoners can feel comfortable enough to talk about their struggles and become encouraged enough to accept the help they are receiving. Moreover, going through a drug program with other fellow prisoners with the same problem builds a community where they can keep each other accountable for their recovery.

Lastly, the third country that was researched for their prison conditions was The Netherlands. This country has a recidivism rate of 35% after one year. The Netherlands follows the pattern of the previous two countries by seeking to accommodate mentally ill prisoners with units called "extra-care units" that are for prisoners who are either vulnerable or have mental health problems. Prisoners with severe mental health issues are separated from the general population and placed in Psychiatric Penitentiary facilities (Esther 254). Furthermore, The Netherlands also has a rehabilitative program called the Prevention of Recidivism Program. This specific program is catered towards prisoners with a sentence of at least four months who were willing to participate and were cleared to take part by their probation officer (Bosma et al. 859). The program is carried out towards the end of a prisoner's sentence, where they are moved into low-security facilities where they will have more opportunities to go on leave with an individual reintegration plan formed based on a prisoner's risk and need profiles (Bosma et al. 859). This program uses behavioral interventions such as "cognitive skill training, substance abuse treatment, or job skill training" all to help reduce an offender's probability of reoffending once released (Bosma et al. 859). This program is carried out towards the end of a prisoner's sentence, it assures that prisoners be punished for their crimes by forcing them to complete the majority of their sentence before being offered the opportunity to join a program that will help them get back on their feet once they are released. Also, this program is designed to be personalized for each prisoner meaning that no one plan for one offender will be the same for another. This program also highlights each point of conflict that an ex-convict may face such as mental difficulties in becoming and staying a law-abiding citizen, turning away from drugs, and having the skills necessary to find themselves a good job.

Moreover, Prisons in The Netherlands have also incorporated a new regime that motivates prisoners to demonstrate continuous good behavior by promising them five extra hours a week of out-of-cell activities that include education, extra hours for visitations, and rehabilitation courses; the prisoners in this new regime are also "allowed to stay out of cell in between activities and they are also eligible for placement in minimum-security facilities at the end of their sentence" (Esther 254). Dutch prison services pay attention to the prison climate. That means that the social, emotional, and organizational relationship between prisoners and prison officers is worked on. A positive relationship between offenders and officers ensures that constant tension and the risk of violence will be avoided. This positive relationship was examined by a study conducted to find how prisoners in The Netherlands viewed their quality of life through prison climate, and in this study, they found that prisoners felt positive about their safety meaning they did not fear excessive violence or being victims of violence and they also felt positive about their relationships inside prison (Esther 260).

A possible solution that could help lower the recidivism rate in America could be applying new reforms that would transform the current correctional system by changing person conditions. However, implementing new reforms into the American correctional system would not be an easy process. Obstacles will be faced in the journey of applying new practices within all prison systems in America in the hopes of reducing the nation's high recidivism rate. The main two obstacles that could be faced are money and the public opinion of the American people. Over the years the number of private prisons in America has progressively gone up, private prisons receive money from the government for each inmate they have and generate a higher revenue than public ones. On the other hand, the construction of Scandinavian and Dutch prisons cost them a lot of money. With all the accommodations and special units built into the

prisons, it took thousands of dollars to build. To be able to reconstruct the prisons in America it would cost a lot of money. Money that the American people and government may not be too inclined to give. On that same note, another obstacle that will be faced to put in place these new reforms would be the public opinion of the American people. The belief about prisons in America is that they are institutions that punish people who commit crimes, however by the way our prison systems look, it is clear that it is not only about punishment but also revenge. Furthermore, when offenders complete their sentences and leave prisons it's incredibly hard for them to get jobs, live in certain areas, or be around certain people because of the tough stigma surrounding ex-convicts. Our society looks down upon ex-offenders even if they have rehabilitated themselves. It's a perspective that is hard to get rid of, and may make it even harder to reform American Prisons without people believing that criminals are getting treated too "nicely" or "comfortably".

The research I conducted showed that reducing the recidivism rates in America could be possible by applying global perspectives in the form of reforms. All three countries developed and used some form of rehabilitation program designed to help prisoners get ready for their release with a lower probability of being reconvicted. For that reason, I am proposing implementing rehabilitation programs that require all inmates to participate, specifically toward the end of their sentence. The programs would require inmates to participate in group counseling with other inmates who have been convicted of the same crime to help create an environment for open discussion and reflection. The counselors in charge of the group sessions would either be professionals from outside the prison or professionals with a past or relation to the same criminal history. This would further allow prisoners to feel more accepted and see that reform is a real possibility. These rehabilitative programs would also help prisoners get their lives organized

once they are released such as preparing them with job options, assuring they have a place to live or stay in, and ensuring that they continue any therapy or counseling once they are released if needed.

To add on, another reform that could change the recidivism trend is updating the way prison officers are trained for the job. By this, I mean integrating psychology classes within the training or requiring future workers to have degrees in social work. The reasoning behind this is that for rehabilitative programs to be executed properly, there must be a supportive environment within the prison, and that can only be achieved if officers see prisoners as having the ability to be rehabilitated rather than forever condemning them for their crimes. To be able to apply proper rehabilitative programs there must be more investment in mental health professionals and mental health units within prisons. Psychologists and psychiatrists are crucial for the rehabilitation of prisoners and for the proper sentencing of prisoners with mental health issues. Prisoners should be able to talk to mental health personnel to be able to understand why the crime they committed was wrong and to be able to work on themselves to become better law-abiding civilians once released. Prisoners with mental health issues should also be treated differently than the general population because the way they may react to regular treatment or punishment may further inhibit them and prevent them from rehabilitating.

Lastly, all prisons in America should implement various work and educational programs. Many offenders commit crimes due to being stuck in poverty and surrounded by bad influences. Work and education programs can provide prisoners with the skills they need to get a job once they are released from prison. With a stable job and income, ex-convicts may be motivated to stay away from crime and continue the working routine they started in prison.

When it comes to keeping our communities safe, all possible efforts should be considered. People do bad things, and of course, they should be punished for them. However, if they keep getting back into trouble and getting locked up over and over again, then something has to change. The recidivism rates in our country are at an all-time high, with some of the highest rates in the world. Stopping crime together is an almost impossible feat, but helping people learn right from wrong, showing them compassion, and giving them the tools to become better could make a great change. Ultimately, the reforms proposed in this paper are not solely for the benefit of incarcerated offenders, but for the people in our communities. The best way to safeguard our society is to ensure that once these offenders are released, they will be rehabilitated and not fall back on criminal habits. If we treat offenders like animals inside prison, then they will be released not knowing how to act any differently than animals.

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HISTORY

Boarded, Shipped and Sold: Indentured Servitude as Temporary Slavery

Joshuah Creswell; Mentor: Jodi Greene, Reading Area Community College

Judge's Comments: Joshuah's was an outstanding presentation, well delivered. He captivated the audience!"

Mr. Richard Reitano
Professor Emeritus of History
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Boarded, Shipped and Sold: Indentured Servitude as Temporary Slavery

Starting with the creation of the Pennsylvania colony in 1621 and lasting until the 1820's, indentured servitude was instrumental to the colonial economy as a useful alternative to slavery while providing an opportunity for people to work towards a better life in North America.[13] In the European depression following the Thirty Years War, many unemployed people migrated from German speaking countries as well as Great Britain to work as indentured servants or redemptioners in Pennsylvania. Between one-half to two-thirds of European immigrants to the colonies arrived in servitude.[14] After serving for a predetermined period of years to pay off the expense of their voyage, they could enjoy the freedom and prosperity that the colonies had to offer. Although many people were able to live productive lives in colonial Pennsylvania after their term of service, there were many hardships such as death and disease during travel, years of hard labor, separation of families, a heavily restricted lifestyle and having the status of property without basic rights.[15] Indentured servitude was a way for many people to transition to life in the New World; however, the experience itself was often involuntary, cruel, unjust and rife with deceitful and harsh practices that were akin to temporary slavery.

For the many people in Great Britian, the hardships began in their home countries. Years of war had left many homeless, unemployed and unable to care for their children. Rather than deal with these social problems at home, one solution was to forcibly send these people, labeled

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[13] Miller, William. "The Effects of the American Revolution on Indentured Servitude." *Pennsylvania History.* Volume 7: Issue 3 (July 1940): Pg. 131.
[14] PBS Staff Writers. "Indentured Servants in the U.S." PBS WHYY. Philadelphia, PA February 27, 2023. https://www.pbs.org/opb/historydetectives/feature/indentured-servants-in-the-us/
[15] Mittelberger, Gottlieb. "Gottlieb Mittelberger's Journy to Pennsylvania, 1754." Historical Society of Pennsylvania. Philadelphia, PA: Philadelphia's Library of American History, March 1, 2023: 5.

"unwanted persons" or "underserving poor," to the North American colonies. It was thought there was a need to cleanse society of these "problem populations."[16] With the passage of the Elizabethan Poor Laws, it was recommended that the children of the poor be sent against their or their parent's will, permanently separating families.[17] It did not help that many contractors involved in the human trade also held positions in government and could shape policy for their own self-interests. They profited from laws that forced vagrants, the poor and orphans into indentured servitude.[18] Additionally, a common punishment for outstanding debt was to transfer the debt to the merchant, who would then make money by selling the transgressor in the colonies.[19] Irish Catholics were also targeted for removal with the government setting quotas resulting in many Irish who had stable lives being forcefully gathered and shipped to the New World.[20] To make matters worse, these people were seen as less desirable by the colonial purchasers, leading to longer terms of service. While willing participants in indentured servitude typically worked for four years, the people forced into agreements usually worked for seven, or until the age of 21 if they were a child under 17.[21]

Aside from the poor, vagrants and Irish Catholics, another group that suffered the same fate were convicted criminals and enemies of the state.[22] Many were rebels from the English Civil War while others were convicted of major offenses and offered servitude over execution or

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[16] Suranyi, Anna. *Indentured Servitude: Unfree Labour and Citizenship in the British Colonies (States, People and the History of Social Change).* London, Quebec, Canada: McGill-Queen's University Press, 2021: 132.

[17] Suranyi, Anna. *Indentured Servitude*: 133.

[18] Suranyi, Anna. *Indentured Servitude*: 132.

[19] Harrick, Cheesman A. *White Servitude in Pennsylvania. Indentured and Redemption Labor in Colony and Commonwealth.* Baltimore, Maryland: Clearfield Company, 2011: 105.

[20] Suranyi, Anna. *Indentured Servitude*: 142.

[21] Suranyi, Anna. *Indentured Servitude*: 134.

[22] Suranyi, Anna. *Indentured Servitude*: 132.

long prison sentences.[23] The majority, however, were accused of petty crimes such as stealing

bread to feed one's starving family or "preaching abroad," meaning speaking out against the

crown.[24] Many were convinced that traveling overseas for servitude would be a lesser

punishment than their sentences, not aware that exploitation, hardships and even death were

likely.[25] Coercion between merchants and the judicial system led to those convicted of crimes

being served much harsher sentences in an effort to make servitude more appealing.[26] In

addition, many merchants received additional money from the government treasury as an

incentive to take convicts as cargo, since they were usually more difficult to sell to colonists.[27]

The length of service was usually five to seven years depending on the crime committed and the

skill level of the servant.[28]

The most egregious practice done by merchants was known as "spiriting," where people,

mainly children and women, were kidnapped or conned and forced onto the ships, which would

then sail away, trapping them into bondage for sale as indentured servants.[29] People were even

paid by the merchants to walk the streets looking for unattended children to steal.[30] While the

government attempted to limit this practice through law, corruption made this difficult to

enforce. The kidnapped would usually be deemed to be potential vagrants, and ships were

allowed to proceed with the abducted. There was also no attempt to punish the merchants when

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[23] Suranyi, Anna. *Indentured Servitude*: 138.
[24] Suranyi, Anna. *Indentured Servitude*: 144.
[25] Suranyi, Anna. *Indentured Servitude*: 135.
[26] Suranyi, Anna. *Indentured Servitude*: 138.
[27] Smith, Abbot E. *Colonists in Bondage, White Servitude and Convict Labor in America 1607-1776.* New York, NY: Norton, 1971: 114.
[28] Harrick, Cheesman A. *White Servitude in Pennsylvania*: 116.
[29] Smith, Abbot E. *Colonists in Bondage*: 68.
[30] Suranyi, Anna. *Indentured Servitude*: 136.

they were caught, thus there was no incentive for them to follow the rules.[31] On occasion, a

child would be rescued and given back to their family; however, this was rare.[32] England's

Council of Foreign Plantations attempted a registration system designed to combat spiriting by

keeping a list of names of those who boarded the ships. As it was both voluntary and cost a fee

to register a passenger, it was mostly unused and ineffective at reducing this practice.[33]

Regardless of the reason for boarding the ship, the most dangerous hardship was the long

voyage across the ocean. For people from the German speaking countries within the Holy

Roman Empire, the voyage, and its related horrors, began sooner. It would take a full seven

weeks for a ship starting out in Heilbronn to reach the port at Rotterdam after passing through 36

custom houses.[34] As with the British, the German people were also deceived and conned by the

merchants into boarding the ships. As passenger Gottleb Mittelberger wrote, "for they steal, as it

were, German people under all manner of false pretenses, and deliver them into the ships of the

great Dutch traffickers of human souls."[35] The ship would be filled in England, and from there

set off on its journey to the New World, a journey of 11 to 15 weeks.[36] The vessels were packed

densely by around 400 people, although there are reports of ones having up to 600. The people

were packed "like herrings" with an area of two feet across by six feet in length per person.[37] To

maximize profits, the merchants were known to stock the ships with as little food and water as

possible.[38] Gottleb Mittelberger stated that on his voyage, the water became infested with worms

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[31] Suranyi, Anna. *Indentured Servitude*: 153.

[32] Suranyi, Anna. *Indentured Servitude*: 153.

[33] Smith, Abbot E. *Colonists in Bondage.* Pg. 73.

[34] Mittelberger, Gottlieb. "Gottlieb Mittelberger's Journy to Pennsylvania.": 1.

[35] Mittelberger, Gottlieb. "Gottlieb Mittelberger's Journy to Pennsylvania.": 2.

[36] Mittelberger, Gottlieb. "Gottlieb Mittelberger's Journy to Pennsylvania.": 1.

[37] Mittelberger, Gottlieb. "Gottlieb Mittelberger's Journy to Pennsylvania.": 3.

[38] Salinger, Sharon V. *To Serve Well and Faithfully, Labor and Indentured Servants in Pennsylvania, 1682-1800.* Westminister, MD: Heritage Books, 2007: 94.

as did the bread rations.[39] There were many deaths at sea from starvation and disease, with the

bodies tossed into the ocean.[40]

As horrendous as the trip was for adults, the voyage was much worse for children. In

England children were sent on a larger scale than adults as many were deemed "destined to

become beggars and vagrants" by the law.[41] The unfortunate reality was that most were destined

to die.[42] On Mittelberger's ship, 32 children had perished at sea. He claims that around one in

seven survived.[43] Smallpox and measles spread rampantly upon the crowed ships. It was

observed that mothers who gave birth during the voyage usually perished along with their

child.[44] The Pennsylvania colony passed laws in 1750 with amendments in 1765 to require more

space per person on the servant vessels in an effort to minimize the spread of disease.[45] They

even required a doctor on board any ships containing Germans. Unfortunately, these laws were

practically unenforceable and did little to curb the suffering endured by the servants during their

time at sea.[46]

Eventually the horrors of the voyage across the Atlantic were over and the ships made

their way to the Philadelphia market. While this may seem like it would be a relief, this would

lead to further problems for the soon-to-be servants. Everyone was forced to remain on the

vessel until they were able to be sold. For the sick, this meant an extra two or three weeks, as

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[39] Mittelberger, Gottlieb. "Gottlieb Mittelberger's Journy to Pennsylvania.": 5.
[40] Mittelberger, Gottlieb. "Gottlieb Mittelberger's Journy to Pennsylvania.": 4.
[41] Suranyi, Anna. *Indentured Servitude*: 145.
[42] Suranyi, Anna. *Indentured Servitude*: 147.
[43] Mittelberger, Gottlieb. "Gottlieb Mittelberger's Journy to Pennsylvania.": 5
[44] Mittelberger, Gottlieb. "Gottlieb Mittelberger's Journy to Pennsylvania.": 6
[45] Smith, Abbot E. *Colonists in Bondage*: 211.
[46] Salinger, Sharon V. *To Serve Well and Faithfully*: 96.

they were the least desirable.[47] When it was time to be sold, family members were typically

available separately, meaning that many families were divided, sometimes indefinitely as it was

difficult to trace where one's family members went within the colony. According to

Mittelberger, the merchants would "trade away children like heads of cattle."[48] As for the

families that suffered deaths more than halfway through the trip, the survivors were responsible

for paying the fare of the deceased. This meant serving more years on their indenture

agreement.[49] Eventually the Pennsylvania colony put an end to this practice in 1765.[50] In

addition, in 1741 the colony would also create a "pesthouse" for quarantining the sick passengers

rather than forcing them to stay on the ship.[51]

Once the servants were indentured to a master, their experiences would vary. Some

would work in agriculture and others in industries. Their status was as personal property to their

masters.[52] They were to be fed, clothed and boarded during their time of service, although not

every master would fulfill these requirements, and many were underfed and wore rags.[53] One

thing was universal, the indenture contracts were absolute and nearly impossible to break

regardless of the servant's conditions.[54] There were frequent attempts by indentured servants to

run away, however they were almost always caught and returned to their owners.[55] One reason

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[47] Mittelberger, Gottlieb. "Gottlieb Mittelberger's Journy to Pennsylvania.": 5.
[48] Mittelberger, Gottlieb. "Gottlieb Mittelberger's Journy to Pennsylvania.": 6.
[49] Mittelberger, Gottlieb. "Gottlieb Mittelberger's Journy to Pennsylvania.": 6.
[50] Salinger, Sharon V. *To Serve Well and Faithfully*: 96.
[51] Harrick, Cheesman A. *White Servitude in Pennsylvania*: 161.
[52] Miller, William. "The Effects of the American Revolution on Indentured Servitude.": 133.
[53] Moraley, William. "The Infortunate, 1743 (Excerpts)." Toolbox Library: Primary Resources in the U.C. National Humanities Center. Research Triangle Park, NC. National Humanities Center. Feb 20, 2023: 1.
http://nationalhumanitiescenter.org/pds/becomingamer/peoples/text1/moraley.pdf

[54] Moraley, William. "The Infortunate, 1743 (Excerpts).": 2.
[55] Moraley, William. "The Infortunate, 1743 (Excerpts).": 3.

they were usually caught was the high rewards paid to anyone who could capture and return these runaways. Examples of these reward notices, which were published in papers and posted in public places, still exist.[56] One such notice advertised eight dollars for two runaways or 30 shillings for one. They carried descriptions of their physical stature as well as their clothing.[57] The penalty for runaways was added time to their indenture. For one day, they added one week, for a full week, they added one month and for one month, six months was added.[58]

In the eyes of the colonists, not every indentured servant was entitled to be in North America. The Irish Catholics that were forced out of Great Britain were equally not welcome in the colonies. They were thought of as lazy and rebellious, mainly due to the involvement of Irish Catholics in revolts on the island of Barbados.[59] As for the criminals, the Pennsylvania colony attempted to pass laws banning the importation of those accused of crimes in their home countries, however this law was struck down by the British government.[60] Benjamin Franklin wrote an open letter in the Pennsylvania Gazette calling for an end to the sending of "rattlesnakes and felons," wanting an "improvement and well peopling" of Pennsylvania.[61]

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[56] Mittelberger, Gottlieb. "Gottlieb Mittelberger's Journy to Pennsylvania.": 7.

[57] Author Unkown. "Run-Away Notice, Philadelphia, July 24, 1769." The Encyclopedia of Greater Philadelphia. Philadelphia, PA: March 2, 2023. https://philadelphiaencyclopedia.org/wp-content/uploads/2014/08/10764-Am3054_1.jpg

[58] Harrick, Cheesman A. *White Servitude in Pennsylvania*: 291.

[59] Suranyi, Anna. *Indentured Servitude*: 140.

[60] Harrick, Cheesman A. *White Servitude in Pennsylvania*: 136.

[61] Franklin, Benjamin. "Felons and Rattlesnakes." The Pennsylvania Gazette, May 9, 1751. Founders Online. The National Archives, Washington, DC. February 20, 2023. https://founders.archives.gov/documents/Franklin/01-04-02-0040

Eventually, the period of servitude would end, and the people could finally enjoy freedom and perks of their indenture. Their masters were required to provide them with a new set of clothing and usually a horse or cow.[62] Pennsylvania would also provide 50 acres of land.[63]

Over time the conditions for indentured servants improved as well. In response to the Revolutionary War, there was more sympathy for those without freedom, and in 1785 there began a series of new laws to alleviate the "horrors" of indentured servitude. In response to these laws, the practice of indenture began to diminish and became rare by 1817.[64] The German Society of Pennsylvania was also influential in the writing of these laws after two decades of petitioning for better conditions for German speaking servants.[65] These laws are another testament to the harsh treatment of the indentured and the need for reform.

The practice of indentured servitude brought over the workers and settlers that Pennsylvania needed during the early days of the colony. Not everyone came voluntarily, and of those that did, many did not survive the harsh conditions of the voyage. Their families were split, and their children were sent away, many times never to be seen again. They were at the mercy of their masters for the years they were indentured, with little regulation or help from the government. There was nowhere for them to run if their conditions were unbearable. Many of them were looked down upon because of their backgrounds and they lived as property of their owners. Despite all these hardships, thousands of indentured servants worked hard and fulfilled their contracts to become prosperous citizens of the colony and the new republic. The practice

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[62] Mittelberger, Gottlieb. "Gottlieb Mittelberger's Journy to Pennsylvania.": 7.
[63] McDaniel, Marie Basile. "Immigration and Migration (Colonial Era)." The Encyclopedia of Greater Philadelphia. Philadelphia, PA: Rutger's University Essays, 2014. https://philadelphiaencyclopedia.org/essays/immigration-and-migration-colonial-era/

[64] Moraley, William. "The Infortunate, 1743 (Excerpts).": 136.
[65] Moraley, William. "The Infortunate, 1743 (Excerpts).": 134.

ended after the early 1800's, but the influence of indentured servitude lives on in the history and

descendants of Pennsylvania.

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WOMEN'S/GENDER/LGBTQ STUDIES

The Barbie Movie: A Dominant Text Dressed in Oppositional Pink

Carolina Martins Soares; Mentor: Ellen Kreger, Westchester Community College

Judge's Comments: "Ms. Martins-Soares' paper stood out in terms of the cogency of the argumentation and the incisiveness and nuance of her critique. She showed uncommon skill in thinking on her feet and did an outstanding job fielding questions from the audience."

Dr. Robert Weston
Associate Professor of Humanities, Gender and Sexuality Studies Coordinator
Bard College

The *Barbie* Movie: A Dominant Text Dressed in Oppositional Pink

The year is 2022, and the internet has its eyes on the release of the first teaser trailer for

Greta Gerwig's *Barbie*. With its cryptic narration and its clear reference to the 1968 sci-fi film

2001: A Space Odyssey, this 75-second-long trailer sparked debates and speculations over what

the movie could possibly be about. Anticipation continued to build as a second teaser trailer

was released four months later, this one embedded with slightly more content than the first,

but still equally as vague regarding the plot of the film. It isn't until the first main trailer is

released a month after the second teaser that audiences can finally gauge what the plot for

Barbie will be about, and by then, opinions were already formed and sides had been taken: one

side fully subscribed to the aesthetic, hype, and pro-feminist narrative, while another side was

severely skeptical and judgmental of how much the satire and supposed self-awareness would

break the stereotypes of femininity that Hollywood knows and is comfortable with (Javaid).

Within the first 5 minutes of the movie, the audience is presented with a lengthy line of

Barbie iterations checking almost every diversity box: there are white, black, brown, and Asian

Barbies; there is a Barbie in a wheelchair and another with a prosthetic leg; further down the

line, we even see a Barbie wearing a hijab. Barbie Land demonstrates how strong, independent,

and diverse women can run the perfect nation where everyone is happy, all the while sporting

perfect up-dos, frilly dresses, and gravity-defying heels. Throughout the film, there is no bra-

burning, no disgust toward all things feminine, no fights over men, and no competition

between the female characters. *Barbie* curated a world where women can be both girly and girl

bosses, and audiences and critics alike found this to be revolutionary for a movie about a

sentient doll. But did *Barbie* truly crash through glass ceilings and contest the way women,

feminism, and the patriarchy are portrayed on screen? I would like to argue that no, it did not, even though most audiences seemed to walk out of the movie theater with that mindset.

The film was released during the summer of 2023, and it quickly became a box-office phenomenon, grossing almost 1.5 billion dollars worldwide, with opening earnings grossing over 160 million dollars domestically (Box Office Mojo). Considering its history-making success, as well as critical acclaim for its pro-feminism agenda and female-led production, it's easy to argue that *Barbie* provided an oppositional text regarding the way femininity and feminism are usually portrayed in films, but upon a deeper inspection, there are many aspects of a dominant narrative that are encoded in the script, and that audiences and critics seemed to miss while engulfed in a sea of pink, female friendship, dance numbers, and deadpan jokes.

Barbie begins by introducing Barbie Land, an alternative universe where all the Barbies released by Mattel live in peaceful harmony. Every day is perfect for the Barbies, who sport perfectly manicured hair, flawless complexions, and dreamy outfits, all the while being at the forefront of every job position in Barbie Land, from construction workers to Nobel Prize winners, as well as dominating the Supreme Court and being astronauts. Amidst the bubbly introductions to the different characters, and disguised as a funny tidbit, audiences are then introduced to Midge, a Barbie released in 2003, who was discontinued for being a pregnant doll. Portrayed by Emerald Fennell, Midge is labeled as being "too weird" for being a pregnant doll (Barbie 6:14–22), and –unlike the other Barbies shown– she isn't as glamorous or conventionally attractive. Her hair is dull and frizzy, she barely has any make-up on, and her dress sits unflatteringly over her heavily pregnant stomach. Throughout the film, Midge's quick appearances on screen consist of her acting eager or awkward, while still looking nowhere near

as dolled up – pun intended – as the other Barbies. While never directly ostracized or excluded, there is a distinct difference between Midge and the other Barbies, which perpetuates the dominant viewpoint that pregnant women are considerably less physically attractive than non-pregnant women (Danel).

After Stereotypical Barbie, portrayed by Margot Robbie, asks the other Barbies if they ever think about dying during a house party, she starts to malfunction (her feet go flat instead of standing on tiptoes, she has bad breath in the morning, her milk expires, and, of course, she starts thinking about death). Doctor Barbie instructs her to go see Weird Barbie, who helps fix dolls that experience malfunctions. Weird Barbie's backstory is that she used to be the most beautiful Barbie of all, but the little girl who owned her played too hard with the doll. Due to that, Weird Barbie is now "fated to an eternity of making other Barbies perfect while falling more and more into disrepair herself" (Barbie 19:04–10). The main characters in Barbie Land are judgmental and exclusive of Weird Barbie to the point she is pushed to live on the outskirts of Barbie Land, where her "Weirdhouse" is found atop a hill with its sharp angles, overly saturated colors, and literal dark clouds thundering over it.

Weird Barbie is the embodiment of the tomboy trope in films: she has an alternative hairstyle (a spiked short hairdo with pink and blue highlights when she is first introduced in the movie, while later she fashions a mohawk with her hair shaved on the side); an equally alternative fashion style (she sports a bright pink dress with colorful splotches paired with knee-high snakeskin boots at the beginning of the film, and later she changes into combat boots, a utility jacket, and cargo pants); dark make-up around her eyes, and a crude sense of humor packed with sexual innuendos. Toward the end of the movie, when offered a job position at

President Barbie's cabinet, Weird Barbie begs to be in charge of sanitation, a field of work that is predominantly male (Zippia) and considered a masculine job. Despite wearing pink, Weird Barbie doesn't fit the mold of girly and feminine, filling the position of being the outcast female character with masculine traits who is made fun of throughout the movie for having these characteristics. While she did get a small apology from President Barbie for how they treated her at the end of the film, audiences don't get to see that change happen – and if the future of the Kens is any indication of how much change will truly take place in Barbie Land (the narrator delineates that one day the Kens will have as much power in Barbie Land as women currently have in the Real World), it's not far-fetched to assume that the same level of change will apply to the outcasts if we consider the Real World is still very much into shunning people for being different. The depiction and treatment of Weird Barbie reinforce the dominant narrative that tomboys are too masculine to be accepted by the girls, but not masculine enough to be accepted by the boys, leaving them in a limbo of ostracization from both sides.

Allan, played by Michael Cera, is in a similar limbo as Weird Barbie: he is too effeminate to hang out with the Kens, but he is still a guy, so the Barbies don't embrace him either – that is, not until he brings the humans Sasha and Gloria to Weird Barbie's house and becomes an ally in their fight against the Kens taking over Barbie Land. Up until that point, however, Allan is ignored for the most part, even though he does seem to be emotionally attached to other characters as he reacts to things that happen to them while he stands by himself in a corner. To further his lack of belonging within the two social groups, Weird Barbie gets an apology and an offer to be included at the end of the movie, but Allan doesn't get the same treatment – in fact, when President Barbie announces that "[n]o Barbie or Ken should be living in the shadows",

Allan responds with "or Allan", but his presence is not acknowledged by anyone and he is only

seen again for a brief moment when everyone waves Stereotypical Barbie off as she goes on a

walk with Ruth Handler. It is unclear if Allan gets accepted and integrated like Weird Barbie, but

his situation reinforces another dominant viewpoint: men who do not subscribe to society's

notions of masculinity will never fully be accepted and embraced by either male or female

social groups.

The Kens and the men from the Real World are also victims of the dominant agenda

against feminism. While it has been disproven that the feminist movement is rooted in and in

favor of misandry, it is still a well-known stereotype that feminists see men as beneath women

and that a matriarchy would be the solution to the patriarchy (Hopkins-Doyle et al), and *Barbie*

does very little to fight this stereotype – in reality, it reinforces this idea throughout the entire

film. All of the male characters appear to be half-witted, with nonsensical conversations and a

far-away look in their eyes that tells the audience they have nothing but elevator music playing

in their heads at any given moment, and these characteristics apply to both the doll males and

the Real World males.

Although it could be expected that the Kens would have very little brain activity as they

are supposed to be just an accessory to the Barbies, the same level of asininity is shown in the

men who are not dolls: Gloria's husband is only ever shown helplessly trying to learn and speak

Spanish, with a thick American accent and some questionable phrases for comedic effect.

Mattel's executives are depicted as clumsy, unaware, and downright child-like grown men who

are constantly outsmarted by Stereotypical Barbie and Gloria. While some characters

experienced growth and evolution toward the end of the movie, the men in *Barbie* never got a

chance to be smart, well-spoken, or at least a little less dimwitted, which pushed the dominant

idea of radical feminism that women are intellectually superior to men and that the world

would function better if a matriarchy was established, which sets the movement back several

decades as this harmful stereotype continues to damage the image of what feminism stands

for.

On top of not being the sharpest tools in the shed, the Kens also perpetuate another

dominant viewpoint: the stereotype that the perfect and attractive man has a chiseled, almost

Greek-sculpture-like body type. It's no surprise that the representation of the male body in film

has reached superhuman status – much like women often have to compare to inhumanly

skinny and toned ladies on screen, the male counterpart is overly muscular and buff bodies who

are seldom seen wearing a shirt. Research has found that "movies portray muscular males

more favorably than their less muscular counterparts in terms of positive outcomes, physical

aggressiveness, romantic involvement and sexual activity" (Morrison 70), and this conclusion

stands true for *Barbie*. Allan, who does not share the same tight abs and protruding biceps as

the other Kens, is pushed to the side and ignored throughout the entirety of the film – and

interestingly enough, he is also never seen shirtless. The Kens, on the other hand, all share a

toned body, a lack of sleeves for displaying their arms, and unbuttoned shirts so the audience

can count how many abs each one has – and they're the ones that get a happy ending. Ryan

Gosling's Ken gets closure, a little self-esteem, and a new purpose in life, while the other Kens

are offered a job at the Supreme Court and the opportunity to wear robes.

Despite all of the ways the movie promotes dominant ideas and reinforces stereotypes

that have long been ostracized in media and by society, Gerwig does believe Barbie is an

uplifting feminist film. In an interview with ABC News, Gerwig says the movie is "feminist in a way that includes everyone. It's a rising tide, lifts-all-boats version of it" (Ferguson 14:10-18). However, in another interview for 60 Minutes, Gerwig admits that she didn't think *Barbie* "is man-hating any more than Aristophanes' Lysistrata was man-hating" (Alfonsi 5:12-20). For reference, Lysistrata is an ancient Greek play known for its portrayal of men as the weaker sex. While it seems like Gerwig's intentions were to create a movie that embraces everyone, it's clear she came up short in several aspects, despite her efforts to encode an oppositional narrative in her message.

Through analyzing Stuart Hall's Encoding/Decoding Model, he claims messages are created by the sender, who embeds them with meaning, and these messages are then passed on to the receiver. Hall believed this process to leave little room for mistake or distortion, which he further explored in his 1973 essay. His focus was on the way audiences won't always receive a message with the same meaning intended by its sender because audiences aren't passive beings. For Gerwig, the message she wanted to send was one of acceptance and inclusivity, primarily amongst women – which, in current days, goes against the patriarchal hegemony, and in turn, would make *Barbie* an oppositional text. The message the audience received was akin to what Gerwig had intended – which would make it a dominant decoding of the text. However, the ideas the film perpetuates are not oppositional, as demonstrated by the treatment of Midge, Allan, Weird Barbie, the Kens, and the other male characters, which would actually make *Barbie* a dominant text. Thus, the audience's response to reading the film as something other than what it portrays, makes it an oppositional decoding instead of dominant, which is

not at all bad – after all, it makes the film's message seem much more positive and

revolutionary than it truly is.

According to user ratings on IMDb, over 65% of the 411,000 reviewers gave *Barbie* a

rating between 10 and 7. Similarly, the audience score on Rotten Tomatoes for *Barbie* indicates

that 83% of reviewers rated the movie 3.5 or higher on a 0 to 5 scale. In numbers alone, this

means audiences thoroughly enjoyed the film and related to its message, and one of the

reasons audiences were able to bond with the material despite its narrative shortcomings is

that they created an emotional connection with the film before it was even released. Part of

Barbie's marketing strategy involved the use of an AI app to generate movie posters with the

user's photo. With the app, audiences were able to turn themselves into Barbies, accompanied

by a slogan of their choice – similar to the actual movie posters. The app was used over 13

million times since its release (Gauci) three months before the film's opening date, which

created buzz and excitement amongst awaiting viewers who shared their creations across social

media platforms. Brands, social media influencers, and celebrities also joined in on the AI fun,

helping promote the film to their huge following whether unknowingly or purposely.

Additionally, in the months leading up to *Barbie*'s release, the production's marketing

campaign ensured audiences would tap into the nostalgia of their childhood by collaborating

with several brands in different markets to generate anticipation and help promote the film.

Among the mile-long list of collaborations, consumers were able to rent a Barbie-themed

Airbnb house, purchase Barbie-themed dental products, indulge in Barbie-themed pink

lemonade, pamper themselves with Barbie-themed make-up products, and acquire Barbie-

themed underwear and shoes (Pauly). The widespread of Barbie-themed everything brought

audiences back to their childhood selves when Barbies painted their worlds a colorful shade of pink.

By engaging with the nostalgic aspect of the film – either by purchasing an item from one of the dozens of collaborations between the production and different brands, by crafting Barbie outfits based on the film and past Mattel products, or even by watching the film and reminiscing on which dolls and accessories they owned as kids –, audiences nurtured an emotional connection to the material. Research shows that "nostalgia also affects experiences users may undergo when using media they had already contact with: On the one hand, media-induced nostalgia contributes to hedonic experiences, fun and pleasure arisen during media consumption; on the other hand, it contributes to non-hedonic experiences, giving food for thought in many directions" (Wulf 78), and this hedonic feeling brought about by *Barbie* led audiences to gloss over the dominant agenda it pushed, so they could indulge in all of the nostalgia and feel-good plot points instead, and walk out of the movie theaters believing *Barbie* to be the feminist representation modern society needs.

Although the director, the actors, audiences, and critics alike found *Barbie* to be an uplifting feminist film that is self-aware enough to bypass criticism, and that provides the public with an oppositional message regarding what femininity, womanhood, and patriarchy look like, a deeper inspection of its characters and how they are represented shines a light on the barely concealed dominant undertones that are disguised as punchlines or outright ignored (albeit present) throughout the film. While *Barbie* is undoubtedly a step in the right direction for better feminist representation in media, there is still a long road ahead for stereotypes to be broken, monologues on the plight of womanhood to be given, and work to be done before

Gerwig's statement that *Barbie* is "feminist in a way that includes everyone. It's a rising tide,

lifts-all-boats version of it" (Ferguson 14:10-18) rings true.

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