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The Overlooked Role of Psychological Resilience and Well-Being in Adolescent Mental Health Interventions by Aiswarya Senthil

Abstract

The adolescent mental health crisis has been a hot topic for the past few decades, and it's not showing signs of stopping. With mental health disorders and suicide rates in adolescents being higher than ever, researchers and the United Nations are attempting a new approach to tackling this societal issue: a focus on developing well-being and resilience in adolescence. This new approach places equal value on exploring the possibilities of the preventative side of adolescent mental health and what methods can be used with today's youth to guide them to an adulthood of stronger psychological resilience in the face of mental health challenges. This paper will review an array of topics regarding adolescent psychological resilience and well-being, including definitions/conceptual frameworks, current interventions, promotion of possible interventions, and societal effects and benefits regarding instilling adolescent psychological resilience and well-being.

Keywords: Adolescent Mental Health, Psychological Resilience, Adolescent Well-Being, Adolescent Mental Health Crisis, Mental Health Interventions

Introduction

The United Nations has made adolescent well-being a 2030 Sustainable Development Goal. Will a focus on psychological resilience and well-being be the answer to the adolescent mental health crisis? Twenty percent of adolescents have had a serious mental health disorder in their lives, and the second leading cause of death in people aged 10 to 24 is suicide (Farley 48-53). Prevention is as equally important as treatment, therefore research in the field of mental health should not only emphasize the decrease of psychopathological issues, but also the increase of well-being and resilience in order to improve mental health. Many benefits may be reaped from a focus on improving well-being and resilience, including decreasing suicide rates, to adolescents being able to respond and cope efficiently to challenges they may face. Theories of adolescent psychological resilience and well-being suggest that defining resilience and well-being and what affects them, developing educational programs/resources to focus on prevention, and recognizing the benefits of improving the prevention aspect of adolescent mental health using resilience will contribute to better adolescent functioning across a range of domains.

Background on Adolescent Psychological Resilience and Well-Being

The turn of the century marked a period of rapid growth in the understanding of adolescent psychological status, leading us to our current position: attempting to define psychological resilience and well-being, and figuring out how to promote resilience and well-being in our society for the betterment of mental health and wellness. In that period of rapid growth, however, a decline in adolescent well-being was present. This decline was ascribed to an increase in suicide rates, unplanned pregnancy, depression, and sexually transmitted diseases, just to name a few (Compas et al. 265-93). In response, researchers expanded their focus on three important themes to broaden the spectrum of adolescent psychological study: integrative models including non-biological factors, pathways and trajectories that contribute to adulthood, and the processes that come into play when facing adversity in the real world (Compas et al. 265-93). This expansion in focus suggested a step away from adolescent mental health relying solely on psychopathological and biological factors (as it did in the early 1900s), and a step towards viewing adolescent mental health as multidimensional and reliant on other contextual concepts.

Despite researchers recognizing adolescent mental health and psychology as a field in need of a multidimensional approach, our society is here three decades later from that recognition with no visible improvement in adolescent mental health issues. Rates of mental health disorders in adolescents are still shockingly high. Much of our society places the blame regarding the current mental health crisis on the recent pandemic, but even with COVID-19 worsening universal mental health and suicide rates, we hadn't shown much improvement prior to the pandemic either. The suicide rates from 1995 - 15 per 100,000 in adolescent males and 3 per 100,000 in adolescent females - are nearly identical as they were in 2015 - 14 per 100,000 adolescent males and 4 per 100,000 in adolescent females (Center for Disease Control and Prevention 816). That is, despite a change in research approach towards adolescent psychology nearly 30 years ago, no significant improvement was accomplished in the bettering of adolescent mental health. In spite of the addition of interventions such as adolescent mental health screenings at physician checkups and the topic of mental health and illness being destigmatized in some parts of the world, adolescent mental illness and suicide rates have not decreased. Society's adolescents are going through a mental health crisis and now researchers and the UN are taking an alternate approach to solve this issue: expanding the adolescent mental health focus

in order to consider additional preventative factors such as developing resilience and ensuring true well-being in our youth. The UN has recognized that “maintaining and improving the well-being of its citizens is the fundamental duty of all governments,” includes adolescent well-being (Ross et al. 472-76). Ensuring the well-being of adolescents includes ensuring the well-being of their mental state.

Similar to the preventative medicine approach towards physical health, which includes exercising and maintaining a good diet, a preventative approach towards mental health may result in improved mental health. Studies discussed in this paper suggest that promoting resilience by providing education regarding mental health and how to address it may strengthen an adolescent’s ability to face mental health challenges (Booth & Neill 47-54). Such interventions may also provide a certain amount of psychological protection from the later possibility of developing mental health problems, with the chance that these adolescents are educated about the processes and development of these mental health problems. The discussion of these interventions and how they point towards the improvement of mental health and well-being may be what the UN and our society are looking at to achieve the Sustainable Development Goal of universally expanding and achieving adolescent well-being.

Adolescence is an optimal time to develop psychological resilience in an individual. This is suggested from the fact that coping mechanisms develop in childhood (Skinner & Zimmer-Gembeck 119-44). Since adolescents are at the most impressionable and change-susceptible time in their lives, adolescents are a favorable age group to promote psychological resilience in our society. Since a large portion of foundational learning happens at this period of an individual’s life, investing in resources for this age group is crucial for advancement (Dahl et al. 441-50). In addition, many abilities, including those that are cognitive and self-regulatory, are developed during adolescence (Dahl et al. 441-50). This suggests that intervening in the adolescent period provides the greatest opportunity for learning and growth in regards to resilience and understanding mental health. In terms of trials performed within the study of resilience-based interventions, many revolve around the execution of interventions in a school setting. The reason for the choice of a school setting is how universal it is amongst adolescents. Additionally, school may be a more comfortable environment for adolescents to undergo such trials due to the lack of formality in a school setting (contrasting to the formality and discomfort that may be amplified in a hospital setting) (Hoover & Bostic 37-48).

The significance of adolescent mental health in all of our lives increases every day, as current interventions regarding adolescent mental health fail to protect our youth from their vulnerability to mental illness and suicide. By enhancing the preventive side of mental health at an age where psychological responses and coping styles can be improved and remodeled for greater benefit, adolescents can grow up with the ability to be resilient and maintain wellness in their lives. In order to better adolescent resilience, mental health, and well-being, this paper will discuss why defining resilience and well-being and what affects them, understanding the current frameworks and interventions supporting well-being and resilience, promoting future programs and interventions, and recognizing the benefits of improving psychological resilience and well-being at a young age is a step in the right direction for our society.

Defining and Conceptualizing Adolescent Psychological Resilience

Graber et al. have defined psychological resilience as: "...a dynamic psychosocial process through which individuals exposed to sustained adversity or potentially traumatic events experience positive psychological adaptation over time" (Smith et al. 194-200). Resilience can also be viewed as an umbrella term encapsulating factors such as "resistance to illness, adaptation to stress, and functioning above the norm in spite of stress" (Smith et al. 194-200). The concept of resilience first took hold in the 1950s and 60s, when children who had gone through difficult situations emerged from the other end seemingly secure in themselves. This discovery marked the identification of resilience as a personality trait that exhibited a positive reaction to difficult circumstances (Smith et al. 194-200). Though, that concept of resilience has evolved; we now understand that resilience is a quality that is developed and can change depending on various factors non-reliant on personality. Since psychological resilience is a malleable quality, there is a possibility of using psychological resilience in mental health treatment as a trait to strengthen in adolescents. By understanding universal factors that affect resilience within a growing adolescent's relationships and environment, resilience-based interventions can be developed in order to assist them in how they better adapt to what life throws at them, making them more effectively functioning adults (Smith et al. 194-200). Despite the lack of attention towards psychological resilience, the role that it plays in our mental health, therefore our physical health, is significant.

The current system in place for adolescent mental health is very treatment-oriented, only paying genuine attention to the mental health of adolescents when symptoms of a disorder appear or start to worsen. Promoting psychological resilience in our youth may prevent symptoms of these disorders from occurring in the first place. Adolescent resilience is affected by numerous factors, including past trauma, interpersonal relationships, knowledge of maintaining wellness, and much more. Resilience has not yet been significantly considered as a form of preventative intervention due to how its development differs between individuals - a result of everyone's unique experiences and environment. Yet, the only way that we can improve resilience in adolescents is if we are able to somehow measure it.

Measuring Psychological Resilience

To measure psychological resilience, there is the original Resilience Scale. Published in 1993, The Resilience Scale was formed from a study in 1987 done on older women who had successfully coped in the aftermath of difficult events in their lives (Wagnild & Young 105-13). The questionnaire representing the scale consisted of 25 items that mirrored the 5 characteristics of resilience (perseverance, equanimity ["balanced perspective of life and experiences"], meaningfulness [understanding of life purpose], self-reliance, and existential aloneness ["realization that each person is unique and that while some experiences can be shared, others must be faced alone"]), with a possible scoring range of 25-175 (Wagnild & Young 105-13). A score above the 145 mark indicated medium to high resilience levels, with 145 and below indicating medium to low resilience levels. Studies at the time of the development of the Resilience Scale that were performed in order to test its validity suggested that resilience, morale, and life satisfaction were correlated with each other, and lower levels of resilience were correlated with depression. From these results, it was concluded that resilience was an outcome of two factors: "acceptance of self and life" and "individual competence" (Wagnild & Young 105-13).

But, it has been suggested that this method of the original "Resilience Scale" only accounts for a limited definition of resilience and its factors, rather than viewing resilience as a method of bouncing back in the face of adversity, stress, and illness (Smith et al. 194-200). It's reasonable for newer studies to claim that the original Resilience Scale is much more limited in definition in our current age, seeing that the original Resilience Scale was developed in the 90s

and our understanding of mental health and resilience has grown since then. To ensure that resilience can still be applied to a scale in order to measure factors that promote resilience (ex. optimism, social environment, coping styles), the “Brief Resilience Scale” has been created to confirm that a resilience-targeted scale and approach would be ideal for better understanding mental health (Smith et al. 194-200). The Brief Resilience Scale was tested using four different sample groups who responded to a questionnaire that required them to indicate their level of agreement or disagreement in regards to six different statements that addressed how they face challenges in their lives. The results of the Brief Resilience Scale study presented a positive correlation between the Brief Resilience Scale and having purpose in life, being optimistic, having social support, and engaging in active coping/positive reframing (Smith et al. 194-200). On the other hand, a negative correlation of the Brief Resilience Scale and alexithymia (inability to understand one’s own emotions), pessimism, negative interactions, denial, behavioral disengagement, and self-blame was suggested (Smith et al. 194-200). Despite the Brief Resilience Scale being a more contemporary way to approach the measurement of psychological resilience, it’s important to acknowledge that it derived from the original Resilience Scale. The establishment of such scales in order to measure and understand resilience from a more comprehensive perspective is important when improving resilience.

The reason that resilience should be a primary factor in the research and study of adolescent mental health is its notable role in the well-being of adolescents. Well-being is a concept that is now being recognized as far more than just the “absence of a disorder” (Davydov & Stewart 479-95). Similar to how building physical “immunity” is a significant goal in our lives, building mental “immunity” also speaks volumes to ensuring well-being. While the definition of resilience and the conceptual frameworks around it continue to evolve, acknowledging what we already know regarding psychological resilience in adolescents may be of great use when developing resilience-based interventions.

Defining and Conceptualizing Adolescent Well-Being

As aforementioned at the beginning of this paper, one of the UN’s Sustainable Development Goals is to achieve adolescent well-being. The UN H6+ Technical Working Group defines adolescent well-being as, “Adolescents have the support, confidence, and resources to thrive in contexts of secure and healthy relationships, realizing their full and potential rights”

(Ross et al. 472-76). Unlike the concept of psychological resilience, the overarching topic of adolescent well-being covers an array of topics, ideas, and indicators that all build up to the conceptual framework of well-being. Similar to adolescent psychological resilience, adolescent well-being also relies on multiple factors, such as culture, socioeconomic status, environment, and even legislative policies. The reason that resilience and well-being must be discussed together is because of how they coexist and how resilience can improve well-being, therefore overall bettering mental health.

The conceptual framework developed by the UN is split into five domains, with each domain containing subdomains and requirements that indicate what is needed for a child to be considered “well” in that domain. The five domains are: good health and optimal nutrition; connectedness, positive values, and contribution to society; safety and a supportive environment; learning, competence, education, skills, and employability; and agency and resilience. First, is the good health and optimal nutrition domain that is a domain of physical, nutritional, emotional, and sociocultural well-being. Its subdomains include good physical health and capacities, good mental health and capacities, and optimal nutritional status and diet. The requirements of these subdomains include: access to information, care, and services; a healthy environment; physical activity; and diet (Ross et al. 472-76). It’s important to note that “mental health and capacities” is a subdomain of good health and optimal nutrition, suggesting a larger emphasis being put on mental health in the realm of physical health wellness than was in the past.

Next, is the connectedness, positive values, and contribution to society domain which is an emotional and sociocultural domain. Its subdomains include connectedness; values and respect by others and accepted as part of the community; good attitude; good interpersonal skills; activity regarding interacting with the world around them; and being able to healthily undergo and implement change in their own lives (Ross et al. 472-76). Resilience heavily relies on one’s ability to adapt to their circumstances and how quickly they can adapt, which ties in to the “healthily undergo and implement change” subdomain of this domain.

Third, is the safety and a supportive environment domain that is a physical, emotional, and sociocultural domain. Its subdomains include safety; that material conditions in the physical environment are met; equity; equality; nondiscrimination; privacy; and enriching opportunities available to adolescents (Ross et al. 472-76). Although this framework is a good basis to refer to when attempting to better the well-being of adolescents, some aspects of it seem overly

ambitious for a universal 2030 Sustainable Development Goal. For example, global issues such as countries at war, world hunger, human trafficking, and poverty are a few examples of problems that impede on the well-being of children everywhere, but likely cannot be solved by 2030.

Fourth, is the learning, competence, education, skills, and employability domain that is an emotional and cognitive domain. Its subdomains include learning; education; resources, life skills, and competencies; skills; employability; and confidence that they can do things well (Ross et al. 472-76). Since many of the subdomains under this domain rely on an individual's ability to effectively handle negative situations they may come across, it can be concluded that resilience plays a big role in the foundation of the life skills present in this domain.

Finally, is the agency and resilience domain that is an emotional and cognitive domain. Its subdomains include agency, identity, purpose, resilience, and fulfillment. This domain has resilience in its name, therefore this can be viewed as a more concrete meeting of the two factors of resilience and well-being as intertwining ideas that heavily affect each other. The UN's framework defines resilience as, "Equipped to handle adversities both now and in the future, in a way that is appropriate to their evolving capacities and stage of development" (Ross et al. 472-76). This definition builds on the further need for resilience based-interventions being promoted to further increase the chances of adolescents being properly "equipped to handle adversities both now and in the future."

Ensuring the resilience and well-being of adolescents as they grow older solidifies the foundation for a better future overall. As seen in the well-being framework consisting of the five domains, resilience is an important part of the fifth domain. This suggests that a proper establishment of well-being cannot be complete without the presence and development of resilience. Hence, resilience and well-being are intertwining concepts that build on each other, and the next section of this paper will discuss adolescent mental.

Interventions for Adolescent Psychological Resilience and Well-Being

Current interventions in place for adolescent mental health aren't reaching the majority of the target group, and therefore, cannot be effective. Interventions for combating the adolescent mental health crisis are only a viable option to a small part of the adolescent population, and are even less of an option to adolescents of minority populations (Alegria et al. 1-10). SAMHSA

reports that “...almost half of adolescents with mental health issues do not receive any mental health services” (Lipari et al.). This suggests that available mental health services aren’t universal nor effective enough to improve adolescent mental health, which is why a driving point for the development of newer interventions is to focus on the universal delivery and execution of the chosen interventions. The CDC has provided statistics suggesting that adolescent suicide rates haven’t decreased, but have stayed the same since the 90s. In 2020 statistics, the CDC has also reported suicide as a leading cause of death amongst adolescents. These values suggest that the mental health interventions that have been put in place in recent years are not exhibiting the desired effect of bettering mental health and well-being in adolescents.

The root problem of adolescent mental health interventions are not being addressed: most of the more effective interventions (screenings, therapy) only focus on the identification and treatment of adolescents exhibiting symptoms of disorder, and not the prevention of these symptoms themselves. This concept can be tied back to physical health. We exercise, eat healthy, and sustain optimal health to build immunity in order to prevent physical illness. One can even say that the quality of one’s physical health relies on the mental health of that individual. From this, we can deduce that “exercising” our brains and building “immunity” to psychological illness is as important as these practices are with our physical health. So, one way to approach the preventative side of mental health is brainstorming what approach would exercise the minds of adolescents and help them learn how to protect themselves from development of psychopathological illness. To achieve this, we must identify what strengthens psychological responses and coping mechanisms. This is what we know as developing psychological resilience.

The first study that will be discussed in resilience-based interventions- performed by Esin Cerit and Nuray Simsek- aimed to improve the communication skills, optimism, emotional intelligence, and resilience in adolescents through the implementation of a program at a high school in Turkey. The students (aged 14-17) were initially given an emotional intelligence and resilience questionnaire to fill out, based on the RS (Resilience Scale by Grgan, 2006) and the EIES (Emotional Intelligence Evaluation Scale). For the next seven weeks, the students participated in a training program to improve their resilience and emotional intelligence levels based on their scores from the initial questionnaire. This training program consisted of many academically-inclined methods of learning, such as homework, questioning, warm-up exercises, dissemination of information, etc. The topics that were covered included psychological

resilience, self-awareness, problem-solving skills, social skills, controlling emotions, and similar topics. Despite a lack of significant increase in emotional intelligence and resilience directly after the study had concluded, a month after the study had been completed, a significant increase in the emotional intelligence and mean resilience was evident in the adolescents that had undergone the 7-week training program (result of a follow-up questionnaire). Another hypothesis that was accepted by the study's outcome was higher mean psychological resilience scores being seen in the students who underwent the training versus those who did not. A notable finding in this study was the significant increase found in the adolescents who participated in the program showing an improvement in being optimistic, communicating, and building relationships (Cerit & Simsek 610-16). It's reasonable to conclude from the results of this study that a structured program that teaches children about psychological resilience, emotional intelligence, and the array of topics that fall under resilience and emotional intelligence has positive long-term effects. Overall, Cerit & Simsek's study suggests that teaching the concepts behind developing and promoting psychological resilience and emotional intelligence in the lives of adolescents will help improve their levels of resilience, emotional intelligence, ability to form relationships, and approach to life.

The second study that will be discussed, conducted by Dray et al., aimed to observe and evaluate the results of adolescent mental health interventions based on universal resilience, in school (Dray et al. 813-24). The study was conducted by choosing 57 randomized controlled trials of resilience-based interventions being used in school settings and identifying how the trials decreased 7 mental health outcomes in adolescents aged 5-18: depressive symptoms, anxiety symptoms, conduct problems, hyperactivity, externalizing problems, internalizing problems, and general psychological distress. As observed in these resilience-based trials, they were effective in decreasing both internalizing and externalizing problems, depressive symptoms, and general psychological distress. In the discussion section of this study, the authors mention that according to their observation of these studies, intervening with these resilience-based interventions in childhood and adolescence suggest beneficial results. The primary finding of this paper is that resilience-based interventions are most effective within a year's time. Past a year, the decrease of mental health outcomes is still present, just at lower levels (Dray et al. 813-24). This suggests that the consistency of such a program in the childhood of adolescents is important in ensuring the effectiveness of the program long-term.

While the first study discussed was an actual trial with students, the second study was an observation of multiple trials such as the first one. Both of these studies suggest that resilience-based interventions, particularly in a school setting, increase emotional intelligence and resilience, and decrease negative mental health outcomes that adolescents are often susceptible to. The first study discussed was crucial to include in this paper in order to understand the direct and immediate effect of a structured program used on high school students to accomplish the goal of increasing resilience and emotional intelligence (Cerit & Simsek,). The second study discussed was significant because it was a review of the success of multiple trials in resilience-based interventions, providing an overview of the general success rate of resilience-based mental health interventions in schools (Dray et al. 813-24).

By understanding the effectiveness of resilience-based interventions in school settings, we can emphasize the importance of including them in our school systems. The studies reviewed provide a strong foundation of the effectiveness of resilience-based interventions, such as classes on resilience, well-being, and emotional intelligence being taught in school. Teaching such concepts in school did not only show an increase in resilience, but a decrease in negative mental health outcomes, pointing towards the possibility that resilience-based interventions also provide a protective measure for those who are unable to engage in available forms of mental health interventions.

The need for more effective resilience-based interventions is rampant as suicide rates in adolescents and their susceptibility to psychopathological illness increases. Recent studies have suggested that the approach of using resilience-based interventions in the universal setting of school to educate adolescents about their own psychological health increases resilience and decreases negative mental health outcomes. Of course, there would need to be certain conditions for such interventions to work, such as schools taking these types of programs as a serious matter in need of attentive care and funding, and parents approving of what their child is being taught; bias plays a huge part in the execution of such an intervention. The large role of bias in such interventions comes from the ongoing demolition of stigmatization of mental health and the vast variety of opinions that accompany it from different cultures and generations. Also, it may be extremely difficult to even discuss the implementation of these programs in more conservative areas of the world and communities that barely have funding for a basic education system. But, the studies reviewed have suggested that resilience-based programs delivered through the

universal school system may prove helpful when addressing levels of psychopathological illness in adolescents, and it's crucial to be able to display the importance of programs that take care of mental health and well-being to parts of the world that have the means to implement these programs. However, it's also important to start to introduce these ideas to promote well-being in parts of the world that don't have the means to implement mental health intervention programs, since these well-being and resilience ideologies may help with the progression of these communities.

Benefits of Interventions Regarding Adolescent Psychological Resilience and Well-Being

The success of the discussed studies speaks to a promising future in adolescent mental health if resilience-based interventions are promoted. It's especially important to note that a vast majority of the trials discussed were performed on adolescents who were not diagnosed or being treated for mental illness. But, they did show general symptoms of mental health disorders that many adolescents do exhibit on a daily basis, such as pessimism, depressive symptoms, and anxiety symptoms. The reason that this was an important factor to bring to attention is because it shows that these resilience-based interventions are particularly helpful for your everyday adolescent, even those without diagnosed mental illness. Even though the success of these trials did not completely ensure the well-being of children and make them "immune" to psychopathological issues, the mere fact that they now have the knowledge, training, and information necessary to better handle mentally-challenging situations they may face regarding mental health or their emotions may prove helpful.

If resilience-based intervention programs are promoted in our youth, adolescents may carry and apply this knowledge into adulthood (Smith et al. 194-200). If we are able to provide mental health education and normalize learning about and discussing mental health, we can promote more knowledge regarding how to handle mental illness and challenges while young people are still at the age of foundational learning, and this provides the possibility that they will carry this understanding of themselves into their older years. To confirm the validity of such a theory, a longitudinal study would need to be performed after a program is implemented in a school system, for example. In that case, we would be able to see the effectiveness of continuous resilience-based learning in school when the students are middle-aged to older adults. If continuous resilience-based mental health education is provided at school, long-term effects may

include lowered suicide rates overall increase in well-being of adolescent populations as they age.

Overall, these resilience-based interventions in schools may provide many benefits that aren't available with current adolescent mental health interventions. Not only do these resilience-based interventions provide support to adolescents who may not feel comfortable reaching out about their emotional struggles, but also can prepare a future generation of adults that can better our community by understanding factors such as internal and external emotional conflict, communication, resilience, building relationships, and how to appropriately handle mentally challenging situations. Drawbacks and flaws of the execution of such interventions are present, such as the conservatism and stigma surrounding mental health in many parts of our society, the inconsistency of mental health education execution already present in schools, and poverty affecting the education system in developing countries. Therefore, more trials and studies being performed in the exploration of resilience-based interventions may help to establish a more solid foundation for the universal promotion of resilience-based programs and interventions. Programs and interventions emphasizing resilience may improve the well-being of our society, seeing as it is the fifth domain of the UN's well-being framework and therefore is recognized as a necessity for well-being.

Conclusion

The purpose of this paper was to review the role of resilience-based interventions and well-being in adolescent mental health. Psychological resilience and well-being in adolescents is an expansive topic with evolving definitions. Recent studies suggested that a more preventive approach to adolescent mental health including resilience-based interventions can decrease the rates of poor outcomes in adolescent mental health and increase the effectiveness of their communication skills and approach towards life. Theories of adolescent psychological resilience and well-being suggest that defining resilience and well-being and what affects them, developing educational programs/resources to focus on prevention, and recognizing the benefits of improving the prevention aspect of adolescent mental health using resilience will contribute to better adolescent functioning across a range of domains, now and in the future.

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To Be Moral Or Immoral? Self-Dehumanization and the Duality of Morality By Khanh Vu

Abstract

Self-dehumanization is a consequence of immoral behavior. While it has been under-explored in moral psychology, existing studies by Bastian et al. (“Losing our humanity”) and Kouchaki et al. have reported contradictory findings on self-dehumanization’s implications on morality. This paper aims to consolidate the current literature and present a dual model to explain the psychological processes of this phenomenon. The model hypothesizes that moral self-regulation moderates the effects of self-dehumanization on morality. This makes the success of the regulatory pathway the prime predictor of whether self-dehumanization leads to moral or immoral behavior. The following sections explain the individual processes involved in those moral and immoral pathways. The main arguments are that 1) successful moral self-regulation appeals to our innate desire for self-completion, thus motivating future reparative actions, and 2) unsuccessful moral self-regulation enables disengagement, which leads to future immoral behavior. This can initiate a self-fueling cycle as more failed self-regulation occurs. Together, these hypotheses produce a nuanced, dynamic model that highlights the importance of understanding the role of self-dehumanization in moral psychology.

Introduction

From objectifying women to treating individuals as pawns in political schemes, dehumanization is an essential psychological phenomenon to recognize and research. Characterized by denying full humanness to others, it can cause discrimination towards out-group members (Haslam and Loughnan) and increased instrumental violence (Rai et al.). To consolidate these findings under one theoretical framework, Haslam proposed the dual model of dehumanization. He defines humanness using human uniqueness (UH) and human nature (HN) traits and consequently argues for two corresponding forms of dehumanization: animalistic and mechanistic. Animalistic dehumanization involves perceiving individuals as uncultured or unintelligent. Mechanistic dehumanization hinges on denying that individuals have emotions and individual agency (Haslam).

Yet, our perception of others is not the only dehumanization we experience. Although sparse, the literature on self-dehumanization has defined it as the phenomenon where individuals deny human characteristics to themselves. Individuals can reflect a lowered perception of humanity when they are ostracized or ostracize others (Bastian et al., “Losing our humanity”), engage in violent video games (Bastian et al., “Cyber-dehumanization: Violent video game”), experience distressing situations (Sakalaki et al., “Is suffering less human?”) and powerlessness (Yang et al.). This effect is unique from regular negative experiences (Bastian et al., “Losing our humanity”). Although there are multiple contexts for these occurrences, according to Bastian et al. (“Losing our humanity”), self-dehumanization is typically thought of as an “adaptive response to cope with one’s transgressions and immoral treatment of others” (p. 157).

Not only is self-dehumanization a consequence of reflection on one’s immoral behavior (Bastian and Crimston), but it also influences our future moral behavior. Morality is fundamental to “what makes us human” (Kouchaki et al. p. 1234). Although it is difficult to define, it can refer to the codes of conduct put forth by society or accepted by individuals for their behavior (Gert and Gert). However, the literature on this relationship has shown contradictory findings. On the one hand, Bastian et al. (“Losing our humanity”) found that self-dehumanization motivates “moral cleansing” behavior in participants, which entails remorse and compensatory prosocial behavior. Interestingly, Kouchaki et al. contest these findings by providing evidence that self-dehumanization increases dishonesty, suggesting that it leads to future immoral behavior.

To better explain these contradictions, this paper constructs a model that explores the psychological mechanisms behind the relationship between self-dehumanization and moral behavior. The primary aim is to consolidate this gap in the literature and provide a better understanding of the long-term implications of self-dehumanization on morality. First, this paper will review the findings and discussions of Bastian et al. (“Losing our humanity”) and Kouchaki et al.. Then, the paper will define the constructs of salience, moral self-regulation, and moral self-schema, which are relevant to the model. Finally, the pathway will be applied as a moderator to explain the relationship between self-dehumanization and immorality or morality. Thus, the model argues that high salience of one’s failure of the moral self encourages successful self-regulation, allowing self-dehumanization to induce compensatory efforts and future moral behavior.

Current Literature on Self-dehumanization and Morality

Through their studies, Bastian et al. (“Losing our humanity”) found that the extent of participants’ self-dehumanization after perpetrating social ostracism predicted their prosocial tendencies. Bastian et al. postulates that this involves “[motivation for] interpersonal reconnection and prosocial behavior” (p. 161). This is consistent with research on increased altruism to reestablish one’s moral status (Jordan et al.; Sachdeva et al.). Furthermore, Bastian et al. (“Losing our humanity”) suggest that a caveat to this link is the extent to which individuals view their actions as in line with their identity. In other words, when individuals believe their actions do not comply with who they are, this encourages them to engage in prosocial behavior to reaffirm their identity. As such, the paper draws upon the self-completion theory as a relevant framework that can be applied to explain Bastian et al.’s (“Losing our humanity”) findings.

Self-completion occurs when an individual is motivated to achieve goals that help them resemble their cherished identities (Jordan et al.). This applies in the moral domain, where committing immoral behavior can induce a sense of incompleteness; the extent to which individuals view moral traits as essential to their identity thus informs their response to this failure of moral self (Aquino and Reed). When individuals self-dehumanize due to immorality, they perceive their inability to achieve cherished “moral” identity as a reflection of inhumanness. Hence, the desire to self-complete enables the relationship between self-dehumanization and future moral behavior. Although this is only one possible assumption, based on Bastian et al.’s findings (“Losing our humanity”) and the relevant theorizing, it is proposed that:

Proposition 1: The extent to which self-dehumanized individuals feel the need to self-complete motivates future moral behavior.

Current Literature on Self-dehumanization and Immorality

The literature on self-dehumanization and morality also documents occurrences where self-dehumanized individuals may engage in future immoral behavior. Contrasting Bastian et al. (“Losing our humanity”), Kouchaki et al. found that self-dehumanization increased participants’ cheating tendencies.

Kouchaki et al. explain that when individuals dehumanize themselves, they perceive their actions as out of their control or insignificant to themselves. Acting immorally “may prompt people to subtly internalize an image of themselves as lacking the basic mental capacities

required to resist the temptation to behave dishonestly” (p. 1235). An individual’s view of themselves as less human might reduce their moral obligations because they are not “equal” to or “as capable” as others. This argument is supported by Gausel, who proposes that one strategy for self-defense in response to condemnation of immoral behavior is to direct anger or blame onto one’s environment. The lack of ownership prevents perpetrators of immoral actions from being confronted by their moral wrongdoings.

However, this definition lacks the nuance to explain cases where individuals explicitly repeat immoral behaviors. To extend Kouchaki’s proposition, the paper suggests that individuals might also foster a sense of disengagement that allows them to not recognize the implications of their behaviors on their moral selves. As such, they are more likely to shun responsibility or personally reflect.

Research on Machiavellians found that through the attribution of mechanistic traits to self, they were more likely to morally disengage (Sakalaki et al., “Self-dehumanizing”). Other research on players of violent games identified that in comparison to new gamers (Bastian et al., “Cyber-dehumanization”), long-time video gamers deflect responsibility for killing human-like game characters to maintain entertainment experiences (Klimmt et al.). This is an extension of Kouchaki’s theorizing in that it does not only suggest that individuals internalize an image of themselves as lacking mental capabilities, but also accounts for circumstances where they are aware of their actions, but view them as insignificant to their identity. Therefore, it indicates that self-dehumanization can be an advantageous mechanism for unethical behaviors.

Proposition 2: The extent to which self-dehumanized individuals disengage from their behavior causes future immoral behavior.

Salience of Failure of Moral Self as Moderator of Self-dehumanization and Morality

Bastian et al. (“Losing our humanity”) proposed that an individual’s judgment of their actions based on their sense of identity is a moderator of self-dehumanization and morality. Kouchaki et al. explained that the extent of people’s awareness of their past immoral behavior strengthens the relationship between self-dehumanization and immorality. Drawing on these discussions, it is suggested that the moderator of this relationship stems from the salience of the failure to achieve self-relevant standards – in other words, the failure of the moral self.

The salience of the moral self is one's awareness of how moral behavior affects self-perception. For example, individuals who identify as morally righteous might be more aware of personal actions that bear moral implications, and as such, their decisions will be more cautious. However, those who view morality as less central to the self will likely have lower salience towards their failures of the moral self. Their perception of personal consequentialism may be lowered upon processing those immoral actions. These standards of morality can be affected by individual factors like personality or upbringing (Capozza et al., Jiang et al., Aquino et al.).

This common theme has been prevalent across the literature on self-dehumanization. When people reflect on a time when they lost human capabilities (Kouchaki et al.) or find themselves lacking power (Yang et al.), they are likely to believe they can not exercise control over their circumstances. Hence, they likely failed a self-enforced standard. Similarly, when individuals become perpetrators of social ostracism (Bastian et al., "Losing our humanity") or varying forms of violence (Bastian et al., "Cyber-dehumanization"), they may fail self-standards relevant to interpersonal relationships. A further example shows that Machiavellian individuals' self-awareness of their lack of humanity favors their exploitative dispositions (Jiang et al.; Sakalaki et al., "Self-dehumanizing"). Since they do not view their immoral behaviors as out of line with their identity, they are more likely to conclude that they have not failed a self-standard. From these examples, the failure to achieve identity-relevant goals can affect our self-perception and our perception of our humanity.

This paper believes that the explanation for the contrast between Bastian et al. ("Losing our humanity") and Kouchaki et al. lies in understanding self-dehumanization as a result of the failure to fulfill a desired "moral identity." Future sections will dig into the role of the salience of failure of the moral self in the moderating pathway.

The Method and Its Tool: Moral Self-Failure and the Activation of Moral Self-Schema

This paper proposes that salience of moral self-failure serves as the input that activates a known cognitive process called the activation of moral self-schema. A self-schema refers to the organization of our thoughts, beliefs, and values that are abstracted from past experiences (Seel). They construct our self-definition by providing us with blueprints to evaluate our moral standards. Consequently, our moral self-schema can determine the relationship between self-dehumanization and morality.

When we recognize a failure in our moral self, our moral self-schema is invoked to process and generate a behavioral output. Aquino et al. propose that our moral intentions and behavior are affected by the current accessibility of the moral self-schema within our working self-concept. From these findings, it can be inferred that once we recognize that our actions are not aligned with our moral self, we use our schema as the set of information to evaluate our behavior and determine future courses of action.

Once the schema is activated, it leads to an established behavioral output. Monin and Jordan explain that most individuals strive to maintain a reasonable level of morality to satisfy their self-perception. However, the concept of moral self is dynamic, fluctuating often due to situational factors. Despite striving to preserve a positive self-concept in the moral domain, individuals can feel less obligated to act morally in future instances if those standards are satisfied (Monin and Jordan). For example, while people's desires to repair their identity after immoral actions can manifest through physical cleansing practices – such as religious baptisms – they also experienced reduced direct compensatory moral behavior as they feel “free of sins” (Zhong and Liljenquist). Therefore, a reasonable explanation is that while the salience of one's failure of the moral self invokes active reflection within the self-schema and results in positive behavioral changes, the lack of this salience would not induce activation of schema, and therefore no behavioral changes would occur.

The activation of moral self-schema is dependent on multiple factors. Aquino et al.'s study found that individuals experience higher rates of moral identity deactivation when contradicting schemas are activated simultaneously. Whilst this dissonant state can be combated by making moral self-schema salient, situational factors that activate other schemas – such as ones that prioritize self-interest – can reduce the accessibility of moral schema within working self-concept. This highlights the possibility that the schema can not always be activated.

Moral Regulatory Pathway

Moral behavior is often dynamic. Much like the abbreviated title of Sachdeva et al.'s study “Sinning Saints and Saintly Sinners,” humans are not always strictly moral or immoral. Sachdeva et al. proposed that moral cleansing along with moral licensing – individuals can allay concerns about the morality of future actions based on temporary satisfaction with one's moral self-concept– converges as part of *moral self-regulation* (Jordan et al.).

Successful moral self-regulation motivates self-dehumanized individuals to rehumanize themselves through regaining moral self-worth, whereas unsuccessful self-regulation might allow them to allay moral concerns. However, this paper seeks to clarify the concept of moral regulation by asserting it as a component of a moral regulatory pathway. As established in the preceding section, the existence of multiple identity schemas in the working self-concept means that moral identity schema can not always be activated. However, when individuals engage in self-reflection, they can activate their schema if they recognize a failure of the moral self. Consequently, this should enable moral regulation and encourage individuals to repent from immoral behavior. Previous theories have suggested that salience of substandard performance can produce affective self-evaluation by motivating individuals to intensify efforts to fulfill valued standards (Bandura). Contrarily, decreased salience of identity failure limits the activation of schema, thus inhibiting future moral behavior. In sum, the regulatory pathway begins with high salience of failure of moral self activating the moral self-schema, and thus, enabling moral self-regulation.

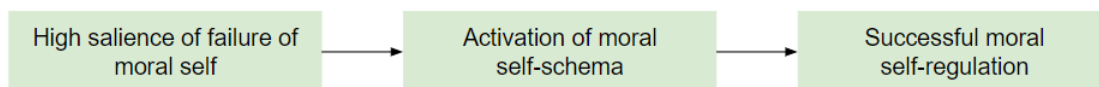


Figure 1: Moral Regulatory Pathway

The following sections will investigate the moderating role of this regulatory pathway to determine its effects on each self-dehumanization and moral behavior relationship.

Moral Regulatory Pathway and Moral Behavior after Self-Dehumanization

Our desire for completeness – the satisfaction of moral self-identity – motivates our future moral behavior after self-dehumanization. However, the degree to which individuals will recognize their incompleteness depends on the moral regulation pathway. Gausel found that moral failures lead to a core appraisal indicating a defect in self. When this defect becomes

salient, it ignites feelings of shame and generates intense self-criticism, which is the first step to reform (Gausel). Thus, it is proposed that the motivation for self-completion is determined by the evaluation of whether the behavior has a significant impact on one's moral self-concept.

Proposition 3: When the moral regulation process becomes successful due to the salience of failure to attain moral identity, individuals will pursue future moral behavior to override the induced sense of incompleteness.

If the inability to fulfill one's self-standards is salient, it activates the moral self-schema, enabling successful regulation that drives the relationship between self-dehumanization and moral behavior. For example, if lying is an apparent contradiction of one's identity, the recognition of this failure leads individuals to perceive themselves as defective. As such, they feel incomplete. On the contrary, if people lie or cheat but do not view this failure of the moral self as essential, then their sense of incompleteness would not be induced. Therefore, the extent to which individuals feel incentivized to self-complete is moderated by the regulatory pathway.

As most of us view our "cherished" identities as a standard to maintain and uphold (Jordan et al.), salient flaws in the moral self can encourage people to behave morally to atone for their actions. Participants in Jordan et al. had increased prosocial intentions to compensate and restore self-concept upon recollecting past immoral behavior. Furthermore, this can be observed through the Macbeth effect, where self-dehumanized individuals who recognize their immorality engage in acts of cleansing to reinforce their moral integrity (Gollwitzer and Melzer).

Summarizing the main points in this branch, the paper hypothesizes that the extent to which moral self-regulation was successful appeals to our desire to feel complete and satisfy identity-relevant goals. As a result, we pursue self-reformative measures to regain our moral self and, consequently, a renewed sense of humanity.

Moral Regulatory Pathway and Immoral Behavior after Self-dehumanization

In this section, the model is expanded to explain self-dehumanization and immoral behavior. This occurs when low salience of failure of the moral self does not activate the moral self-schema, therefore preventing self-regulation. Since disengagement drives the relationship between self-dehumanization and future immoral behavior, the moral self-regulation pathway moderates the effectiveness of this mediator.

Proposition 4: When the moral self-regulation process fails due to low salience of failure of the moral self, individuals will not seek reparative measures.

When immoral actions are deemed inconsequential to an individual’s self-perception – such as in the case of Machiavellians (Sakalaki et al., “Self-dehumanizing”) – they would not have the incentive to improve their behavior. This can be interpreted as individuals having low salience of failure of the moral self when regarding their moral transgressions. Therefore, their moral schema is not activated or activated weakly, and consequently, the incentive to self-regulate might not exist.

Unsuccessful regulation leads to a sense of disengagement. By not recognizing the implications of unethical behavior on their moral selves, individuals are more prone to giving in to future immoral actions. Disengagement can shield the self from unfavorable self-evaluations; Bastian et al. (“Losing our humanity”) explain that perpetrators of immorality can employ ego-protective strategies – like rationalization – to avoid engaging in self-relevant consequences of their actions. Thus, it can be an effective mechanism to fuel one’s future transgressions. If individuals lack the capacity to empathize and recognize the faults of their actions, their moral inhibitions are weakened (Rai et al.).

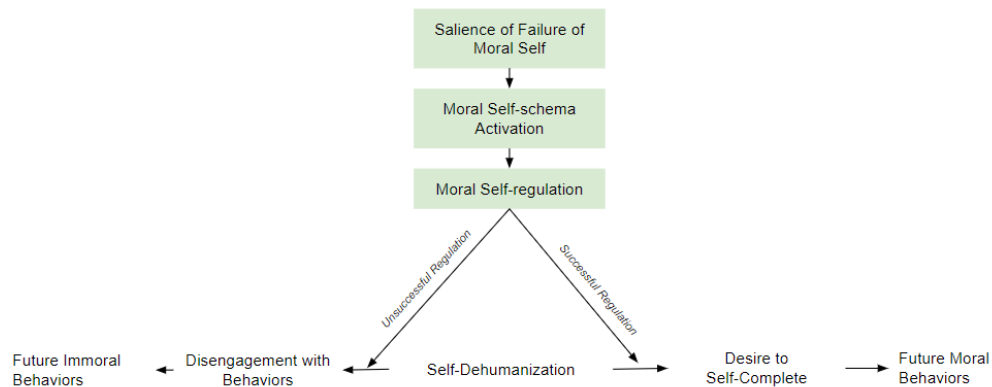


Figure 2: Moral Self-regulation and the Relationship between Self-dehumanization and Morality.

The Self-Reinforcing Cycle of Immorality

There is a feature in the relationship between self-dehumanization and immoral behavior that is important to discuss. While self-dehumanization can be a coping response to one's moral transgressions and immoral treatment towards others, it can also be a cause for future unethical acts (Bastian et al., "Losing our humanity"). This indicates that the relationship between self-dehumanization and immorality can form a cycle. In general, people who act immorally are not always prone to repeating such behavior frequently. For example, stealing someone's eraser when you were younger does not necessarily equate to the development of kleptomania in adulthood. Most individuals may eventually recognize the flaws of their actions and successfully regulate them in future instances. This could be attributed to the increased sense of self-control that we might develop over time. Self-control is defined as "the ability to override or change one's inner responses and interrupt undesired behavioral tendencies" (Gino et al. p. 192). It is essential to our daily decision-making, as it forces us to evaluate our desires and generate appropriate, acceptable – by the standards of self and interpersonal standards – responses.

When moral self-regulation fails often, immoral behavior can induce self-control depletion. Especially when unethical behavior is motivated by self-interested goals (Aquino et al.), the failure to self-regulate – control their actions – will allow dehumanized individuals to persist in their disengagement, and repeat their behavior as they can not override their immediate desires. It is also probable that self-control depletion leads to a depletion of the "will" to act morally in the future. This is in line with Tenbrunsel and Messick's hypothesis that people can perceive that if something is done in the past, it becomes "okay" to do in the future. Therefore, this paper argues that over subsequent repetition, perpetrators' engagement will decrease due to lowered self-control.

This lack of self-control traps individuals in a self-reinforcing cycle that is difficult to escape. In particular, more immoral behavior would lead individuals to self-dehumanize, perhaps to a point where this denial of humanity is advantageous to their moral disengagement (Jiang et al.; Sakalaki et al., "Self-dehumanizing"). As such, their ethical obligations might blur, or they might adjust their moral self-schema to become more in line with their new moral self-perception.

Proposition 5: The self-dehumanization and immoral behavior branch can become a self-sustaining cycle when self-control depletion occurs, enabling further immoral behavior.

To summarize the main processes of this branch, the effect of self-dehumanization on immoral behavior is mediated by disengagement from immoral actions. This effect is further exacerbated by unsuccessful moral self-regulation due to the low salience of moral self-implications. Thus, people come to accept their dehumanized status and feel unmotivated to repair unethical behavior; they could also view their behavior as acceptable or fail to comprehend its severity. Over time, when more failures of self-regulation occur, our sense of self-control can deplete, allowing individuals to purposefully act immorally for personal gain.

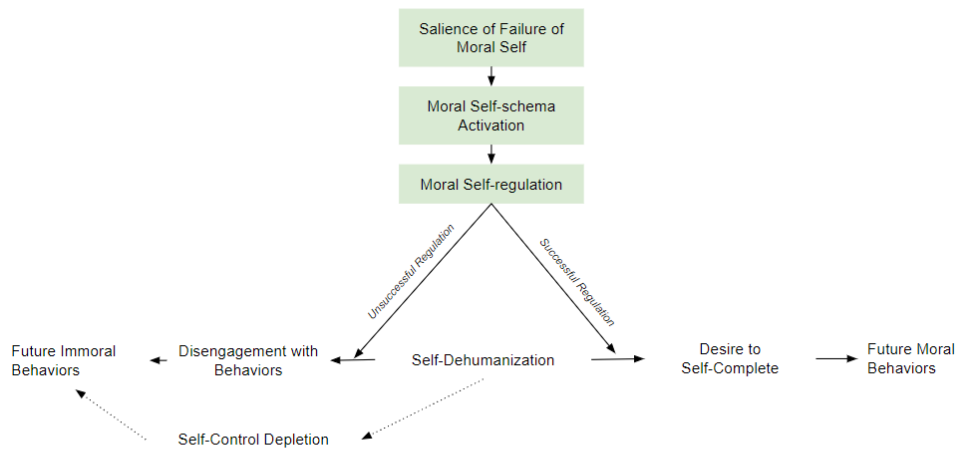


Figure 2: The Complete Dual Moderating Model of Moral Self-Regulation on Self-dehumanization and Morality

In *Figure 2*, the link between self-control depletion and self-dehumanization, and immoral behavior is depicted in dashed lines to indicate that this pathway is conditional. It will only be induced if failed moral self-regulation becomes a regular occurrence.

Discussion

In this paper, we discussed the relationship between self-dehumanization and morality to construct a model explaining the contrasting findings of Bastian et al. (“Losing our humanity”) and Kouchaki et al.. The model asserts that the moral path individuals take in response to

self-dehumanization is moderated by moral self-regulation, constructed by the salience of failure of moral self and schema activation. Self-dehumanization leads to moral behavior when regulation is successful by appealing to the desire to reinforce one's humanity, motivated by self-completion. On the other hand, self-dehumanization leads to immoral behavior when self-regulation is unsuccessful, leading to disengagement. As failures of self-regulation become frequent, one's ethical obligations blur, and their sense of self-control can deplete. This perpetuates a self-sustaining cycle of self-dehumanization and immoral behavior that is difficult to break.

Limitations & Further Considerations

The current literature on this topic is still divided on the causes of self-dehumanization. While immorality could lead to self-dehumanization (Bastian et al., "Losing our humanity"), other research has shown that it could be a consequence of other situations. For example, Poon et al. contrast Bastian et al. ("Losing our humanity") by arguing that feelings of entitlement are the mediators for ostracism and immoral behavior, not self-dehumanization. Additionally, what predicts individuals to have low salience of moral-identity failure remains largely speculative. Research on moral identity centrality found that it can moderate the activation potential of moral schema and affect one's moral intentions and behavior, thus shaping an individual's moral identity (Aquino et al.). In addition, secure attachment styles or dark personality traits can all affect our personal outlook toward altruism, prosociality, and morality (Capozza et al.; Jiang et al.). For example, Jiang et al. found that victims of extreme childhood abuse can develop dark personality traits such as Machiavellianism or psychopathy, which predisposes them to self-dehumanization. This indicates that upbringing can contribute heavily to one's moral identity. Therefore, more research should consolidate these findings.

However, there is one concept that stands out the most among these future considerations: Sachdeva et al.'s moral licensing. In their explanation of moral self-regulation, Sachdeva et al. proposed that this concept is complementary to moral cleansing. While moral cleansing is used to compensate when the moral self-concept is unfulfilled, when people exceed those standards, they lack sufficient incentive to engage in moral actions. As such, they have "credit" to dismiss future immoral actions – otherwise known as moral licensing. This can be seen through how physical cleansing – including baptism in a religious context – reduces the

psychological need to engage in compensatory behaviors (Zhong and Liljenquist; Lee and Schwarz). Lee and Schwarz suggest that moral cleansing can allow people to “wipe the slate clean” and completely remove unwanted residues of the past. Continuing this metaphor to explain human morality, moral licensing allows people to deem immoral actions are okay until their slate is dirty again – thus invoking compensatory behaviors. If moral licensing is a plausible phenomenon, this raises the question of how its negative feedback system can fit, and explain, the relationship between self-dehumanization and immoral behaviors. Future work should explore the mechanisms of moral licensing, and whether all individuals who re-humanize would engage in it.

Theoretical and Practical Implications

Dehumanization and self-dehumanization have important implications on human behavior. The experience of dehumanization is related to aversive self-awareness, manifesting through negative self-evaluations, linked with feelings of shame and guilt. In addition, denial of HN traits is uniquely associated with cognitive deconstructive states that transpire in contempt (Bastian and Haslam). It should be as damaging, then, to feel unworthy of being perceived as human by yourself. It is important to understand and study this phenomenon to prevent more extreme consequences that perpetuate hate, damaging stereotypes, and violence.

The most concerning finding from this model is that self-dehumanization and immorality can form a self-sustaining cycle. This could become detrimental for actions with more severe implications; incriminated individuals might be more likely to re-offend or people might tumble into a slippery slope of increasingly unethical behavior. Furthermore, this might have the greatest implications on impressionable, young children if they fail to develop self-regulation and correct early immoral behavior.

Investigating how to intervene in the chronic cycle of immorality is essential. In circumstances of self-dehumanization, acts of altruism or forgiveness are promising steps to re-establishing one's humanity. Victims who choose not to take revenge against transgressors found comfort in forgiveness, which not only rehumanizes them but also directly provides affective benefits. More surprisingly, revenge resulted in more mechanistic dehumanization of self (Schumann and Walton). In their research on the tethered nature of the victim-perpetrator relationship, Vaes and Bastian argue that in order to reclaim “full human status,” individuals

have to increase the perceived humanity of the opposing party. However, their model raises important arguments on the role of self and accountability in moral behavior. Refusal to cooperate in constructive solutions might impede the process of re-humanization (Vaes and Bastian). In addition, as self-regulation failures occur due to the low salience of the moral self, perhaps research into morality-centric education could encourage greater awareness of one's behavior. The salience of failures of the moral self, i.e. the recognition of one's flaws – thus activating the regulation pathway – can motivate self-dehumanized individuals to better themselves. Although further research is necessary to explore this, it is a promising sign that this phenomenon can encourage self-reflection and improvement.

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Disaster, Destruction, and Dictatorship: A Philosophical Assessment of President Recep Tayyip Erdoğan's Regime By Kylie Price

Introduction

On February 6th, 2023, a devastating 7.8 magnitude earthquake struck the Republic of Türkiye, unleashing destructive shock waves that shook the nation to its core. This catastrophic event led to the tragic loss of 45,968 Turkish civilians. Regrettably, this earthquake stands as the deadliest natural disaster in modern history.

The impact of the earthquake reverberated across ten provinces, leaving behind a trail of despair and anger among the victims. Their frustration grew exponentially as they witnessed the sluggish response from the government. It took hours for emergency workers to be dispatched to the affected areas, exacerbating the suffering of those in need. It was only after the death toll surpassed a staggering 20,000 that Turkish President Recep Tayyip Erdoğan finally visited the devastated sites.

It is essential to recognize that the occurrence of the earthquake unfolded against the backdrop of President Erdoğan's expanded presidential powers. The world witnessed President Erdoğan's responses to the widespread devastation, public outrage, and economic collapse that transpired during a period of consolidated power. The earthquake served as a catalyst for civilians to voice their grievances regarding political corruption, prioritization of profit over public welfare, and mistreatment of marginalized communities.

In the aftermath of the destruction, President Erdoğan's series of failed policies came to light, including the decision to lower interest rates amidst hyperinflation, the utilization of state security forces against protesters, and the unsuccessful military interventions in predominantly Kurdish regions of Syria. Consequently, these policy failures have led political scientists to question where the line should be drawn between democracy and dictatorship.

I aim to assess the "gray-zone regime" of the Republic of Türkiye, focusing primarily on its leader and figurehead, President Erdoğan. According to Stanford University political sociologist Larry Diamond, gray-zone regimes are "between full-fledged democracy and outright dictatorship... electoral democracies, however 'feckless' and poorly functioning" (Diamond 23). By examining the Republic of Türkiye's leadership, I hope to provide a philosophical lens into how moral character intersects with dictatorial governance. I will apply abstract concepts to a

concrete case study relevant to contemporary international politics. The following research will dive into disagreements amongst philosophers about how to define dictators.

Contemporary political scientists have primarily focused on institutional structures and government models to identify cases of democratic backsliding invoked by a leader with dictatorial character. However, I propose assessing gray-zone regimes that are not clearly democracies or dictatorships by using a holistic method that factors in internal virtue and governing structures. Thus, in this research paper I will bring virtue back into the discussion since modern definitions of dictatorship tend to focus only on a description of institutions. My purpose is to encourage a nuanced holistic approach to researching gray-zone regimes, especially encompassing internal characteristics such as virtue that are less emphasized in the assessment of dictatorship. Although Türkiye is a democratic republic in name, President Erdoğan's exertion of control over the nation and exploitative policies beg to differ, making it a particularly useful case study to exemplify my suggested approach of examining gray-zone regime leaders.

Ultimately, I will be arguing for the case that President Erdoğan's gray-zone regime is trending towards a dictatorship because he actively removes checks and balances on the executive branch, rules according to his private interest, and suppresses political dissent. Virtue plays a role in assessing each indicator to identify the character of dictators. First, I will examine the political philosophy tradition of describing "dictator" expressed in pivotal political philosophy texts to introduce my definition. Then, I will describe the key events in Erdoğan's presidency that define his style of electoral authoritarianism. Lastly, I will evaluate how Türkiye's current leadership meets my definition of "dictator" from a philosophical and moral perspective, while recognizing counterarguments against my claims.

Literature Review

Traditional theories in political philosophy that define "dictator" can be grouped into two categories. First, a swathe of philosophical texts regarding the nature of dictatorial rulers approach the subject from an institutional point of view. Classical philosophers such as Aristotle argue that there are three forms of government which have good and corrupt versions, including tyranny which institutionally has a single ruler and is morally corrupt (Aristotle). In *The Republic*, Socrates claims democracies give rise to tyrants, an inherent consequence of democratic political models (Plato 1172). In this paper, the term tyrant means an 'unvirtuous

dictator’ and will be used interchangeably with the term ‘dictator.’ Modern political theorists such as Hannah Arendt and Friedrich von Hayek clarify the consequences of economic and political structures on governance. For instance, Friedrich von Hayek’s *The Road to Serfdom* breaks down the downfalls of planned government and socialism, developing ripe circumstances for dictators to emerge where freedom is nonexistent (Hayek 56). However, Hayek also describes democratic forms of government by proposing the “Rule of Law,” a consistent approach to governance that draws parameters around what a leader is ethically allowed to do (Hayek 72).

Utilizing the institutional approach to define dictators alone leaves us with a gray-zone regime. Türkiye has features of both democracy and dictatorship. It is important to examine the governmental and economic models within which rulers operate, but those factors alone don’t paint the full picture of gray-zone regime rulers trending toward dictatorship. Instead, we disregard the leader’s character as an individual and how more abstract forces can play into how democratic a regime is.

The second prominent political philosophers have focused on researching the moral character of dictators, rather than the establishment in which they operate. Political philosophers including Aristotle, John Locke, and Yukichi Fukuzawa focus on defining a dictator based on ideals and expected behavior. Political scientist Jordan Jochim’s *Aristotle, Tyranny, and the Small-Souled Subject*, expands on Aristotle’s claim that dictators use fear tactics to shrink the souls of their subjects and undermine open communication to minimize risk of revolution, allowing the dictator to use less direct intimidation (Jochim 182).

This paper will utilize both approaches, defining dictators by their moral character and structure of their government. Institutional structures alone do not presuppose dictatorship. Therefore, we must look to the character of rulers backsliding into dictatorship who may still be operating in a pseudo-democracy to clarify how gray-zone regimes fit within the spectrum of governing styles. Ultimately, both governmental structures must be considered in tandem with virtuousness, which intertwine to produce a comprehensive assessment of democratic backsliding. The approach I am proposing to define a dictator closely resembles Aristotle's because it ensures the examination of both institutional and characteristic factors to develop insightful observations of gray-zone regime leaders.

President Recep Tayyip Erdoğan is an authoritarian dictator that established a party-dominated dictatorship. John Locke argues a tyrant is defined by a history of actions that

“exercise power beyond” what ought to be allowed for private interest (Locke). Drawing on Locke’s definition in his *Second Treatise of Government*, a dictator is a ruler that governs for self-interest and exerts unjust control over civilians. Because Locke finds the culmination of a ruler's actions to determine where a government falls on the spectrum of democracy to dictatorship, it is critical to examine President Erdoğan’s referendum that greatly expanded his control over government operations. According to Samuel P. Huntington and Clement H. Moore’s book *Authoritarian Politics and Modern Society: The Dynamics of Established One-Party Systems*, a one-party dictatorship occurs when one party overwhelmingly controls a government in a sovereign state, limiting political opposition (Ezrow and Frantz 2). One-party dictatorships have moderate charisma, advocate for pragmatic policy initiatives, and achieve goals by installing elites in positions of authority.

President Erdoğan’s Rise to Power

Erdoğan founded the Justice and Development Party (AKP Party) to amplify his call for democracy, progression, and infrastructural advancement. Quickly gaining electoral traction, AKP Party members overwhelmingly gained parliamentary seats, representing politically instrumental cities including Istanbul and Gaziantep. The AKP Party swept to power by massively winning the parliamentary elections in 2002, but because of Erdoğan’s prior criminal conviction of violating Türkiye’s commitment to secularism he was barred from running in elections. Once in power, the AKP Party lifted the ban on Erdoğan standing for election and in 2003 he was elected Türkiye's Prime Minister. Domestically, Erdoğan delivered economic and social transformation as his infrastructure projects provided schools, public transit, hospitals, and energy sources for Türkiye. Furthermore, his programs spurred industrial manufacturing and labor productivity, reducing runaway inflation that plagued the Turkish Lira.

Erdoğan’s “Silent Revolution” garnered global attention, emerging as a developed nation to Western leaders. He began negotiating European Union membership, effectively establishing Türkiye’s geopolitical presence and economic prowess. Consequently, Recep Tayyip Erdoğan was elected president of the Republic of Türkiye in 2014. President Erdoğan has remained the most powerful political figure in Türkiye for twenty years.

Yet, President Erdoğan has endured violent military and civilian uprisings concerning his regime. For example, in 2016 the Peace at Home Council of the Turkish Armed Forces killed

hundreds in an attempt to overthrow President Erdoğan for his religious affiliations and disregard for democracy. On the other hand, civilians hosted rallies to protest urban development programs that would demolish public centers such as the Taksim Gezi Park. These uprisings furthered Erdoğan's democratic backsliding, complicating philosophers task of assessing his gray-zone regime. This dilemma can be navigated by assessing President Erdoğan from both an institutional and internal character perspective. Although defining "unjust power" and determining whether President Erdoğan has increasingly governed according to self-interest is impossible, by examining President Erdoğan's actions I will provide indicators of both.

Assessing President Erdoğan's Constitutional Referendum

On April 16th, 2017 President Recep Tayyip Erdoğan's Justice and Development Party in collaboration with the Nationalist Movement Party introduced a constitutional referendum that would shift the balance of power in favor of his executive position. The referendum, altering eighteen articles of the Turkish constitution passed with a slim majority, 51.4% of the vote. Populations in urbanized regions, economic hubs, and Turkish diaspora communities in the United States, United Kingdom, and the Gulf did not support the referendum. However, interior regions of Türkiye overrode these opinions of dissent around the world.

Tensions within the Turkish parliament peaked over President Erdoğan's constitutional reform package which expanded the president's role to control aspects of the justice system, military, parliament, and prime ministry. The referendum sparked physical altercations on the floor, leaving lawmakers with injuries and broken noses. Now that I have provided context to this sweeping package that went into effect in 2019, I will distinguish why this legislation represents a turning point in Türkiye's democracy, how it supports the first two prongs of my initial claim, and foreshadows the natural disasters that would wreak havoc across the nation.

President Erdoğan's 2017 constitutional referendum was Türkiye's democratic tipping point, rapidly accelerating the emergence of a more authoritarian gray-zone regime. This proposal has been the most significant political move by President Erdoğan to restructure the foundation of Türkiye's political model. At the same time, by studying the amendments made to the Turkish constitution there is a clear theme of presidential consolidation of control over the judicial system, parliamentary system, military, and economic sector.

Does Removing Checks and Balances Define a Dictator?

First, I will assess how President Erdoğan's moral character influenced the degradation of Türkiye's checks and balances, exemplifying the intersection between structures and character in identifying democratic backsliding. Traditionally, philosophers' definition of an unjust ruler involves the exertion of unnatural amounts of power. How much power is too much? How does the removal of checks and balances provide insight into President Erdoğan's virtue?

In this case I am discussing checks and balances because President Erdoğan deliberately acted to remove checks and balances on the presidency by proposing the constitutional referendum. In other words, he inherited an institution that had checks and balances in place, and removed them because he was compelled to obtain more power. The referendum abolished the prime minister and replaced that role with the president, who also had an extended term limit and was able to appoint a majority of the judiciary. Furthermore, the Brookings Institute claims to initiate the presidential impeachment process "parliament could petition for an investigation into an alleged crime with an absolute majority; it would then need 3/5 backing to move forward with such a petition, instead of a simple majority" creating more barriers to regulate his position (Ekim and Kirişci). Austrian-British political philosopher and economist Friedrich von Hayek, expresses a similar argument in his book *The Road to Serfdom*, despite defining a dictator with an institutional angle. Hayek claims that adopting socialism and planned government leads to dictatorship because it violates the Rule of Law—a definition explored further in the private interest section—and deprives civilians of freedom (Hayek 72). Despite his argument primarily concerning planned government, Hayek offers insight into my definition of a dictator. For instance, he claims that democracy is an important device for "safeguarding internal peace and individual freedom," so the government ought to be limited and competition encouraged (Hayek 70). President Erdoğan's constitutional referendum expanded the scope of his dictatorship by eliminating the prime ministry, assuming judicial appointments, and controlling the national budget, limiting opposition.

My definition of a dictator refers to an unjust exertion of power by a single ruler. Although rulers can obtain power over civilians in a variety of ways, repealing checks and balances is the most relevant method to the Republic of Türkiye. By proposing the referendum package, which was geared to bolster the President's role in governing, Erdoğan revealed his true nature. The institutional changes made to the government are inseparable from President

Erdoğan's lack of virtue, sparking the process of democratic backsliding. The catalyst to alter the balances of power between the judiciary, parliamentary, and executive was an internal reflection of President Erdoğan's lack of virtue that characterizes his style of governance. Seeking to expand one's power is not inherently bad, but to better assess President Erdoğan's motivations we must discover more about his virtue.

Does Ruling in Private Interest Define a Dictator?

Second, I will clarify what it means to rule in private interest and its relation to dictatorship. In *Politics*, Aristotle distinguishes good government as one that rules according to common interest and a bad government as one that rules according to private interest, becoming despotic and perverted (Aristotle). He also argued that monarchies are a superior political model because it is easier for one man to achieve virtue than an entire population. However, Aristotle recognizes the possibility of tyranny by a singular ruler, suggesting a virtuous monarchy is not very probable. President Erdoğan is an individual who now has assumed the presidency and prime ministry but has not achieved virtue. Similarly, philosopher Hannah Arendt distinguished tyranny as rule influenced by one's will and personal interests from authoritarianism which is "bound by laws" to garner legitimacy (Arendt 4). Arendt frames these two definitions as distinctly different, but President Erdoğan's Republic of Türkiye is shrouded in ambiguity and counters itself. In Türkiye elections are still held, governing power is distributed to provincial mayors, and the parliament has a degree of influence in political affairs. Simultaneously, President Erdoğan passes legislation that directly benefits the salaries of Justice and Development Party members, erodes checks and balances through legislation such as the 2017 constitutional referendum, and silences electoral opposition. These contradictions are what make the Republic of Türkiye a gray-zone regime and require President Erdoğan's administration to be assessed using a nuanced approach that accounts for virtue.

Political philosophy theories traditionally attempt to categorize regimes into a set of labels that traverse the spectrum between democracy and dictatorship. Because Türkiye violates the parameters of these more rigid definitions, it can be considered what philosopher Larry Diamond coined a hybrid regime. Diamond describes a hybrid regime as a government that combines "democratic and authoritarian elements" (Diamond 23). Ultimately, traditional political philosophy shows that private interest plays a role in defining a dictator but becomes

more difficult to pinpoint when assessing politically ambiguous hybrid regimes in comparison to pure dictatorships. But what if President Erdoğan passes a policy that benefits both himself and the public? Is the government still acting morally? These concerns indicate there must be something more to ruling for personal gain. Thus, I propose modifying the way I will approach identifying President Erdoğan's actions, using the Rule of Law invented by economist and political philosopher Friedrich von Hayek.

The Rule of Law in political philosophy describes a system of laws that the government is bound by and cannot be violated based on a ruler's arbitrary will (Hayek 72). This theory allows us to set parameters for what constitutes lawful behavior and dictatorial rule. The Rule of Law is undermined when:

1. Laws target specific individuals and corporations.
2. One person's arbitrary laws undermine existing law.

Essentially, the government must obey laws set forth by its non-arbitrary government that is predictable, clear, and does not change due to the will of an individual ruler. Now layering the argument that dictators govern for their private interest (a characteristic of dictators) with the Rule of Law (the means of defining a dictator) we can apply these philosophical theories to President Erdoğan's governing style.

Although the 2017 constitutional referendum is a prominent illustration of President Erdoğan's political interests, the recent earthquakes that shattered southeast Türkiye provides a new perspective on his financial ambitions. In 2018, President Erdoğan approved a construction amnesty program that he believed would spur the economy, encourage urban renewal, and mitigate homelessness. In addition to privatizing inspections, the construction amnesties program would allow private contractors and construction companies to pay a fine for violating architectural safety codes. Urban renewal in itself is detrimental to communities in poverty who are displaced when higher value housing is constructed. President Erdoğan's economic platform often disadvantages the working poor whether that be taking an indifferent approach to hyperinflation or accumulating an astronomical national debt, the highest in four decades (The economist source goes here.) According to The Guardian correspondent Constanze Letsch's article, *An act of God caused the earthquake in Turkey—murderous corruption caused so many deaths*, the 2018 amnesty encompassed “almost 7.4m buildings and yielding 24.19bn TL (at the time about \$4.2bn) in government revenue” that would be invested in earthquake-proof measures

(Letsch). However, President Erdoğan has raised his monthly salary every year, despite mass poverty and corner-cutting construction companies looking to maximize profit. Critics claim that President Erdoğan neglected developing safe homes for civilians, residing in a nation criss-crossed with fault lines apart from the North Anatolian Fault Zone.

Despite the destruction caused by an uncontrollable earthquake and controllable solution to the impending natural disaster, President Erdoğan has not taken accountability for his actions. Rather than exterminate the amnesty program or recognize his hand in the death toll, TIMES magazine claims he was more “focused on censorship and political goals” (Burga). Journalist Solcyre Burga describes the primary failures of the president’s earthquake response:

1. Banning Twitter—Twitter was banned for twelve hours following a wave of backlash from the public. This action limited survivors from connecting and expressing anger at the government.
2. Carrying Out Arrests: Five people were arrested and eighteen were put into custody by Turkish authorities for “provocative posts” on Twitter regarding the earthquake. Silencing dissent against the government will be discussed in further detail as an indicator of democratic backsliding.
3. Negligent Infrastructure Practices: Construction codes were not enforced or applied to infrastructure projects during Erdoğan’s presidency, even though Türkiye is notorious for its seismic activity.

In comparison, when a 7.3 magnitude earthquake struck the coast of Fukushima, Japan triggering a tsunami the disaster killed four people. The reason 45,968 Turkish civilians are dead, and more are missing, is not the earthquake, but legislation that prioritized profit over the wellbeing of civilians that can be traced back to the president. This pattern of behavior is not unusual for President Erdoğan, as flammable gasses sparking fires in state-owned coal mines in Amasra, Soma, and Ermenek have left 360 dead. President Erdoğan addressed the tragedies by blaming “fate” for the poorly constructed mines susceptible to firedamp (Michaelson). If infrastructure is Erdoğan’s political platform, how could he allow such dangerous conditions, lax regulations, and unchecked civilian deaths?

President Erdoğan has benefited fiscally from the amnesty program from collecting contractor fees that went back into the government's budget for spending that has resulted in the death and emotional distress of his constituents. Yes, developing these facets of the economy and

structures to govern the people are inherently problematic, portraying Erdoğan's private interest approach to politics. The tangible outcomes of these dilemmas—death toll, buildings destroyed, and money collected by the government—are integral to analyzing President Erdoğan's democratic backsliding, but the intrinsic motivation is deeper than just the institution. A virtuous person would, by definition, never put others in harm's way or indulge in vices such as greed. Yet, President Erdoğan has repeatedly put the interests of himself and the local politicians that serve his needs over the health and stability of his nation.

President Erdoğan's amnesty program violated the Rule of Law by undermining the existing safety regulations established by the Union of Chambers of Turkish Engineers and Architects (TMMOB). As stated in Article 135 of the Turkish Constitution, the TMMOB is recognized as a corporate body and a public, professional organization comprising 24 chambers and 510,559 members based in Ankara, Turkey (“About”). The amnesty program targeted the influence of the TMMOB, thus weakening the union's ability to enforce safety regulations, particularly regarding earthquake-resistant construction. Consequently, the government benefited from collecting fees from construction companies that disregarded the TMMOB's guidelines, which were designed to protect the lives of homeowners. This legislative move by President Erdoğan to invalidate the TMMOB is not an isolated incident but rather a continuation of his actions aimed at silencing dissent.

One notable instance was during the 2013 Taksim Gezi Park protests, where the TMMOB expressed solidarity with activists who opposed urban development programs and the forceful eviction of peaceful demonstrators in Taksim Square. In response, the AKP (Justice and Development Party) passed a reactionary bill that stripped the TMMOB of their authority to participate in city planning processes and eliminated the visa application for projects, thereby impeding occupational supervision and reducing financial resources available to the chambers, as reported by Hürriyet Daily News (“Ruling AKP Approves”).

These consistent efforts to dismantle platforms of dissent and established organizations raise legitimate concerns regarding the characterization of President Erdoğan's leadership as backsliding to dictatorship. By suppressing and marginalizing voices of opposition, eroding the autonomy of professional bodies like the TMMOB, and curtailing their ability to shape policies and regulations, President Erdoğan's actions contribute to the perception that he is consolidating unjust power and undermining democratic principles.

Does Suppression of Political Dissent Define a Dictator?

On July 15th, 2016, the Turkish military attempted a coup d'état, killing 246 people. President Erdoğan blamed the uprising on the Gülen Movement, a relatively progressive Sunni Islamist group led by imam Fethullah Gülen emphasizing secular democracy and education. Gülen and Erdoğan had a cooperative political relationship until, as author Nedim Sener describes, “power and time caused these partners to disagree... Türkiye is not big enough for both of them” (Ramirez). The coup justified President Erdoğan’s purge of key institutions where suspected Gülenists took up posts to possibly exert influence on other civilians. According to VICE News, he ordered the imprisonment of “thousands in the judiciary and military, 21,000 teachers fired or suspended, and shut down 2,500 educational institutions” even though the United States has not arrested Fethullah Gülen due to lack of evidence (“The Rise & Fall”). The military faction that orchestrated the coup cited democratic backsliding and increasing intersection of church and state as factors that compelled them to overthrow President Erdoğan.

The uprisings were supported by the Members of the Union of Chambers of Turkish Architects and Engineers, whose outspoken members were imprisoned on conspiracy and espionage charges. TMMOB members have been targeted because of their support of the Gezi Park Protests, and more recently, dissent to the construction amnesty program that legalized unsafe building projects.

Political opponents representing other parties, often backed by civilians, have also been put on trial. Ekrem İmamoğlu, Istanbul’s mayor and member of the Republican People’s Party (CHP), was expected to be President Erdoğan’s biggest rival in the upcoming presidential election. However, İmamoğlu was imprisoned and banned from participating in politics for a press release published three years ago resurfaced. His criminal offense was calling the supreme election council “fools” (Michaelson). According to journalist Ruth Michaelson, İmamoğlu never attended “any trial hearings or the sentencing, and is expected to appeal the ruling” (Michaelson). The power confrontation reflected by the coup can be compared to President Erdoğan’s response to the 2023 earthquakes and imprisonment of his political competitor. Gülen, İmamoğlu, and TMMOB members in support of the Gezi Park protest were threats to President Erdoğan’s stronghold in the government, whether it be praising secularism, sparking a protest,

and swaying public opinion against President Erdoğan, they were all silenced for the same reason: political dissent and ideological influence overshadowing Erdoğan's popularity.

The aforementioned trials could not have been fair because they violate the Rule of Law, breaching the notion that all accused individuals are entitled to a fair trial and litigation. Furthermore, the indictments seem to be eliminating the figureheads of movements that criticize President Erdoğan to silence the voice of public opinion, an action motivated by private interest to stay in power. President Erdoğan's lack of virtue as a government leader is exemplified by his last-stitch efforts to halt critics' voices ahead of the 2023 elections, despite the traction his dissenters have garnered. Free elections with unrestricted competition and productive debates are necessary for a democratic institution, and President Erdoğan has deconstructed these aspects of Turkish politics to consolidate his own power and feed into the vices that lead one to dictatorship. Especially in a democracy, President Erdoğan ought to allow political opponents and organizations such as the TMMOB union to exercise their rights of dissent against government operations.

The suppression of voices against the government and political opposition by President Erdoğan poses a significant problem, as freedom of expressing dissent is vital for the well-being of democracies. In Yukichi Fukuzawa's work *An Encouragement of Learning*, he argues that the public must be willing to "sacrifice their lives to uphold the principle of justice" in order to effectively topple dictators (Fukuzawa 55). When a government denies its people this liberty, it exposes its lack of virtue. President Erdoğan has undertaken extensive changes to the judicial system and other institutions, exerting his influence and restricting crucial elements of democracy. What kind of leader would intentionally diminish the spirits of their citizens and strip away the freedoms that lie at the very core of democracy? Such actions reveal a profound lack of virtue in their hearts.

Counter Arguments

The characteristics I have identified to define a dictator: eroding checks and balances, ruling for private interest, and suppression of political dissent, may raise questions regarding the validity of my argument and virtue-centric approach. One criticism of my criteria to define a dictator and assessment of President Erdoğan's regime both concern misinterpretation of the

Republic of Türkiye's case study. What is the difference between bad government and dictatorship?

To address the counterargument, there are fundamental differences between a bad government and dictatorships, meaning that the two are not mutually exclusive. President Erdoğan's rule has at times benefited the nation, spurring infrastructure projects to encourage productivity and ended the military rule that dominated Turkish politics beforehand. Yet, fluctuating between "good" and "bad" governance does not change President Erdoğan's designation as a ruler of a gray-zone regime that is trending towards dictatorship. The key to defining a dictator lies in both institutional structures in which they operate and the virtuousness of the leader, a more nuanced approach that allows us to differentiate between bad government and dictatorship. By examining institutions, we may be able to identify a bad government, or one that does not serve to advance the needs and lives of the public. However, it is the virtue, intrinsic motivations, and moral integrity of a ruler that allows us to more clearly differentiate between bad government and dictatorship because it allows us to study individual rulers' character.

Conclusion

Ultimately, President Erdoğan's gray-zone regime is trending towards a dictatorship because by assessing his regime through a philosophical lens that clarified the definition of a dictator, we identified political actions that exemplified a lack of virtue. First, dictators actively use their platforms to eliminate checks and balances that keep each branch of the government from becoming more influential than the other. President Erdoğan expanded his role in the government by passing the 2017 constitutional referendum and diminishing checks and balances on the executive branch. The constitutional referendum allowed President Erdoğan to pass legislation that would put civilians living on fault lines in danger and the ability to appoint a majority of the supreme judiciary. Second, dictators prioritize their private interests and benefit, disregarding public opinion to indulge in self-serving political agendas. Virtuous rulers follow the Rule of Law indicating both institutions and virtue play a role in assessing more dictatorial leaders in gray-zone regimes. When its provisions are violated the government has begun to exert unjust amounts of control and power. The president breached the Rule of Law by undermining safety regulations to build earthquake-proof buildings and instead used amnesties to

justify the move, which benefited the government in the form of fees and quick construction to expedite his urban and residential development plans. Poorly constructed buildings exacerbated the death toll from a 7.8 magnitude earthquake that critics argue was preventable, especially if the president heeded warnings from the Union of Chambers of Turkish Engineers and Architects. Lastly, dictators suppress dissent because it actively hinders the cultivation of a democracy including political opposition and activists practicing civil disobedience to maximize their chances of remaining in positions of political power. Political competitors such as Sunni imam Fethullah Gülen who spearheaded the Gülen Movement and Istanbul's mayor and prospective presidential candidate Ekrem İmamoğlu were both either exiled or imprisoned based on insulting government officials. However, their offenses were nominal and nonviolent, which begs the question, did the crime warrant the punishment or did President Erdoğan want to ensure his presidential victory in 2023? Furthermore, members of the TMMOB who were supporting protesters at the Gezi Park protests were imprisoned on suspicious conspiracy charges that silenced their voices calling for an end to dangerous urban renewal projects.

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An Integrated Study on the Environmental Injustices of 20th Century America By Jaya Nadella

Abstract

It is no secret that for much of American history, marginalized communities have faced challenges in terms of environmental injustice, by living in areas containing heavy air pollution, substantial amounts of hazardous waste, etc. As a result, these demographics are placed at a societal disadvantage, with harm done to their overall welfare and health. This research aimed to investigate how this phenomenon has been reflected in American history, as well as identify specific implications environmental injustice has had on these communities, such as respiratory disease caused by atmospheric pollution from VOCs and the deterioration of living spaces as a result of high volumes of hazardous waste. Qualitative and quantitative data was gathered from a variety of environmental research experts and reputable environmental organizations. Overall, it was found that environmental disparities were largely present among the land tracts of low-income and racial minority residents within the studied regions in comparison to those of their white, affluent counterparts.

Introduction

This research investigated the ways in which marginalized groups have experienced environmental discrimination in America over time. For the purposes of this study, marginalized groups encompass low-income individuals and people of color, such as African Americans and Latinos. This generational problem has continued to develop especially due to growing urbanization and construction of corporate facilities across the United States in recent decades. In the 1960s, Latinos protested the use of harmful pesticides on the farmland in San Joaquin Valley, California upon which they worked. In the same decade, a group of African American activists in Harlem, New York City protested the construction of a large waste treatment facility in their community (Skeleton and Miller, 2016). Although these individuals have protested to get their perspectives heard, and have sometimes succeeded, they often do not have the financial means to hire legal representation and fight back against the power of these corporations. Ultimately, I was compelled to investigate this topic due to my passion for social justice, and my curiosity about the systemic ways in which racism and economic inequity are upheld within various facets.

Background Research

Instances of environmental injustice had been rampant prior to the 1980s, like the ones in San Joaquin and Harlem. However, an incident taking place in Warren County, North Carolina sparked a particular kind of social and community response, and garnered widespread attention for these environmental disparities. In 1982, the North Carolina state government sought to dump soil high in PCB concentrations into a landfill in the town of Afton, Warren County (Skeleton and Miller, 2016). PCBs, or polychlorinated biphenyls, are chemicals that have been known to cause adverse health effects in humans, such as intense skin rashes, liver failure as indicated by negative changes in blood and urine appearance, and various forms of cancer, among others. They have been formally classified by the U.S. Department of Health and Human Services as carcinogens, or cancer-causing substances.

Additionally, PCB concentrations indirectly harm newborns as a result of prenatal exposure to mothers. It has been reported that women who consume PCB-contaminated fish or encounter high levels of PCB concentration regularly, especially in industrial settings, give birth to children that weigh a few pounds less than other newborns (Washington State Department of Health, 2023). In a study published by the National Library of Medicine, a group of 418 infants were tracked until 6 years of age following prenatal PCB exposure, it was observed that at 42 months old, the infants experienced negative changes in their cognitive functions (Boersma, E R, and C I Lanting, 2000). It can be observed that generally, children encounter challenges concerning their developmental growth as a result of PCB exposure, which is detrimental to the sustainability of future generations.

It was known that Afton, Warren County was a predominantly black community, and therefore residents began to speculate that the government had discriminatory intentions. Residents went to great lengths to protest the impending soil displacement, some even lying down in the streets to block government trucks from reaching the landfill. Yet, even after these extensive measures, the government still went through with dumping the toxic soil in the landfill. African American locals were outraged that the government seemed to disregard the negative impacts PCBs could have on Warren County's drinking water supply, and subsequently the welfare of its residents. They also began to notice the pattern that factories with high emissions of atmospheric pollutants, like carbon dioxide and methane, were consistently placed in poor communities or communities with people of color. Activists became persistent in their efforts,

employing methods of nonviolent protest such as rallies and picketing outside corporations contributing to heavy pollution in their towns and cities. Hence, the Environmental Justice movement was formally established and rose to prominence.

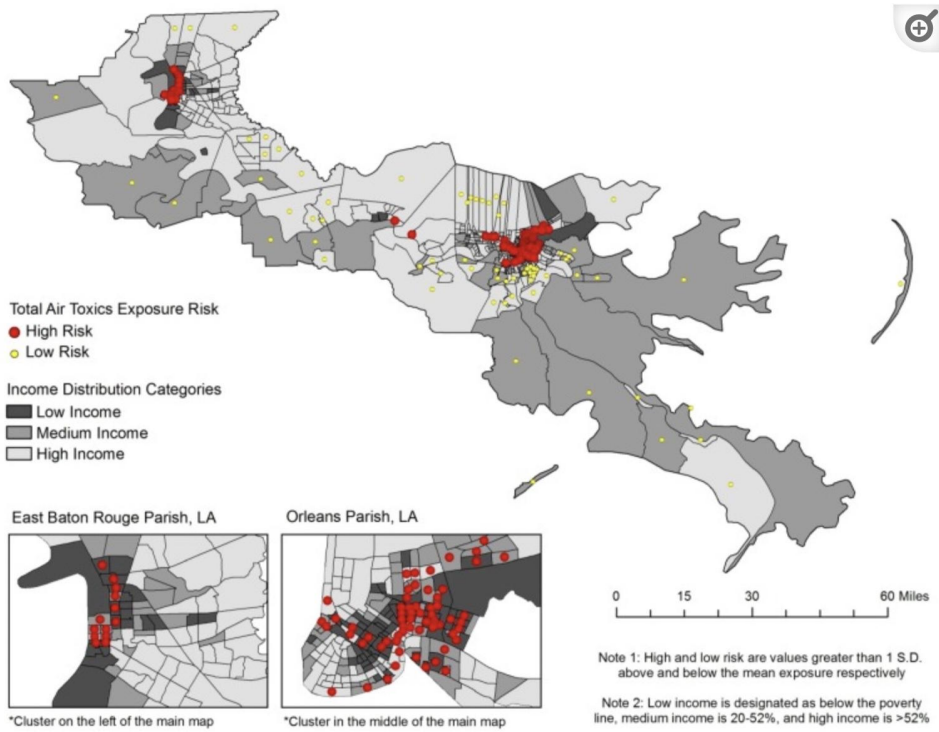
Methodology

The guiding question behind my research findings was, *“To what extent have the living spaces of marginalized populations in the U.S. been targeted by environmental inequity from 1990- the present?”* I predicted that the data found would support the conclusion that the areas in which marginalized groups live are largely targeted by environmental injustice, therefore resulting in the development of ailments and illnesses amongst said groups. To investigate this, I gathered information from scientific case studies and reports written on two instances of environmental discrimination in different cities within the United States. The two specific instances I delineated within this research took place in Cancer Alley, Louisiana and Los Angeles, California.

Data Collection

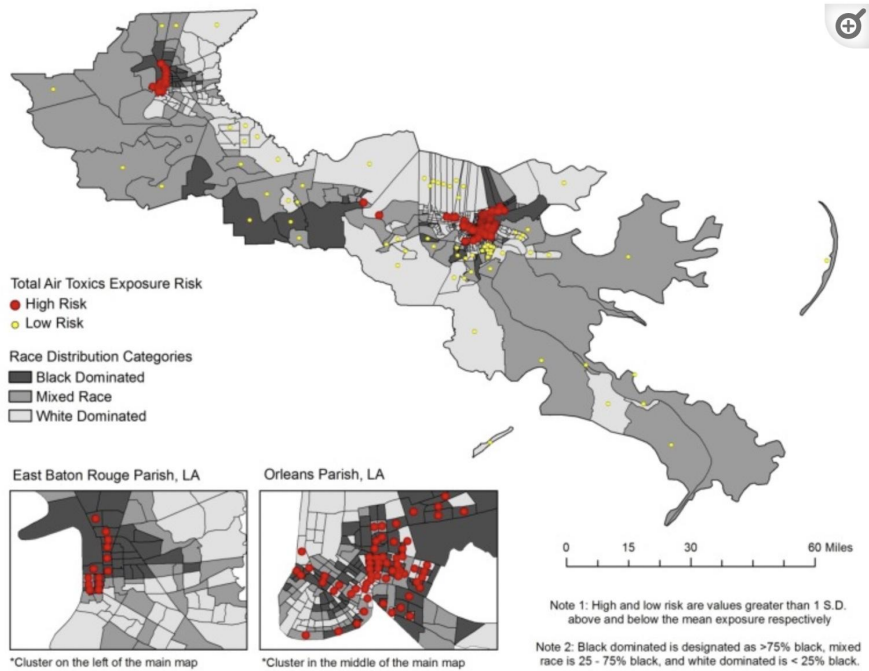
In the land that stretches between Baton Rouge and New Orleans, polluted air has become the norm. The area has been coined “Cancer Alley”, due to the prevalence of lung cancer and other respiratory diseases in the region. In a study published in the National Library of Medicine, it was found that land tracts with predominantly black or low-income neighborhoods in Louisiana experienced cancer at disproportionately higher rates than land tracts with white, affluent neighborhoods (James, Jia, and Kedia, 2012). Cancer risk was measured through the amount of exposure to VOCs, or volatile organic compounds, like formaldehyde and benzene, within each land tract. Data showed that households with income characterized as low (<\$25,400 annually) experienced a 12% increase in cancer risk in comparison to high income tracts (\geq \$41,600 annually). The graph shown below displays the correlation between household income levels and the level of cancer risk across all land tracts in Louisiana that were tracked during the study.

Figure 1- The cumulative risk from all VOC pollutants by income levels in Cancer Alley tracts.



It was also found that with every 10 percent increase in the black population within a specific land tract, there was an associated increase of 1.12 per million in the likelihood of getting cancer. There was a 16% increase in cancer risk for predominately black land tracts in comparison to ones with majority white residents. The graph below demonstrates this relationship, showing that high risk tracts were concentrated in the East Baton Rouge parish, where eleven out of the thirteen land tracts have a 75% black population or greater.

Figure 2- The cumulative risk from all VOC pollutants by race in Cancer Alley tracts.



Another study done by the EPA reveals more specific health implications caused by VOCs released by a specific power plant in the Cancer Alley region, the Denka Plant. It was found that nearly half of children that lived in households in Zone 1 (within 1.5 kilometers of the Denka Plant) encountered headaches, nosebleeds, or both symptoms. Approximately 40% of residents living in Zone 1 who responded to the study reported experiencing heart palpitations, severe chest pain, or both symptoms (University Network for Human Rights, 2019).

Traveling to the western region of the United States, environmental disparities pertaining to socioeconomic factors still stand. This is demonstrated through the distribution of TSDFs (hazardous waste treatment, storage, and disposal facilities) throughout the city of Los Angeles, as detailed by a research study published in *Social Science Quarterly* by the University of Texas. Qualitative data showed that TSDFs disposing of more than 50 tons of waste per year were mainly concentrated in areas with low-income residents. These low-income areas had a mean per capita income per land tract of less than \$11,000. Further data showed that TSDFs disposing of greater than 50 tons of waste per year were concentrated in areas in which 78% or more of the population was residents from racial minority backgrounds, specifically African Americans and Latinos (Boer JT, Pastor M, Sadd JL, Snyder LD).

Figure 1

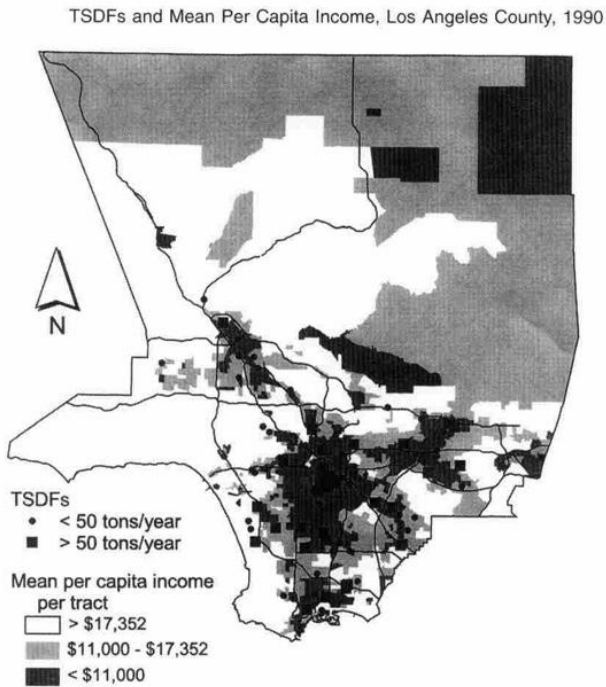
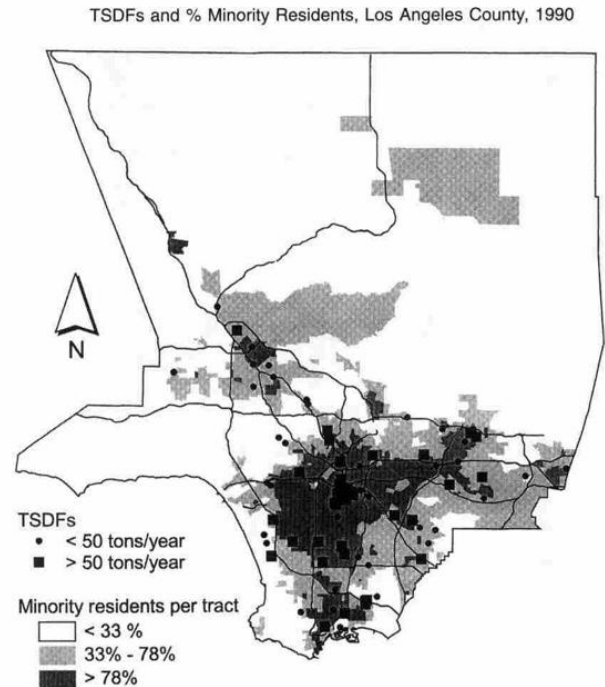


Figure 2



TSDF distribution in L.A. in relation to income

TSDF distribution in L.A. in relation to race

Analysis

The results gathered from studies within the environments of Cancer Alley and Los Angeles both supported the same overarching conclusion— Environmental disparities are *largely present* within the living spaces of marginalized populations in the United States. The land tracts in which low-income and racial minority residents live in both of these regions have experienced inequities at a disproportionate rate to high-earning, white residents. These findings are significant because they give a plausible explanation as to why various illnesses and diseases are prevalent amongst these marginalized groups. VOC inhalation and exposure to waste materials at high levels leads to respiratory diseases, nausea, and other conditions. These inequities are harming the overall welfare of marginalized populations.

Conclusion

This investigation ultimately supported my original claim, that being the areas in which marginalized groups live are largely targeted by environmental injustice, therefore resulting in the development of ailments and illness amongst said groups. Nonetheless, it is important to acknowledge that some factors were unaccounted for in these studies. For example, concerning the Cancer Alley study, the only cancer risks that were taken into account were outside, environmental sources. These include smokestacks, industrial facilities, chemical plants, etc. However, indoor sources of cancer risk were not factored in, such as VOCs from cleaning products, radon in the foundation of homes, etc. Additionally, lifestyle choices and behaviors were not factored in, such as frequency of smoking, alcohol consumption, diet composition, and exercise tendencies. These limitations could have slightly skewed or caused error in the data concerning disproportionate cancer rates among populations in the different land tracts.

The Environmental Justice movement expanded in the 21st century, and has been championed by organizations like the NRDC and the Sierra Club. Advocacy groups like the Louisiana Avatar project have made efforts to conduct research and further investigation on the pollution plants within Cancer Alley in order to prevent more VOCs from harming the health of residents in Baton Rouge and other neighboring areas. However, these research findings show us that environmental inequities still exist and are rampant within our country, despite the actions that have already been taken in attempts to solve them.

More research can advance our knowledge on instances of environmental discrimination across the nation by allowing us to pinpoint problem regions. Once these areas are identified, we must investigate the sources causing these issues, such as chemical plants, waste management sites, etc. and enforce local, state, and federal level regulations on their activities. This type of environmental policy change can be largely influenced by citizen involvement and grassroots campaigning. Policy is the most direct way to prevent these various sources from inflicting more harm on marginalized communities. If no policy change is made, these facilities will resume their practices without repercussion, and this generational cycle of harm will be perpetuated for years to come.

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Human Rights By Anika Ganesh

Throughout history, countless ethnic, gender, minority, and religious groups have been persecuted. While there are comparatively more rights for those groups in modern day society, human rights are starting to dwindle around the world once again. The rise of oppressive leaders and the passage of harmful laws are two of the major root causes of recurring oppression. There are possible solutions, however, such as voting and protesting. While these options may not be able to address every situation of repression, it is a major leap forward to counter governments taking a few steps back.

Democracy – rule by the people (Dahl) – is a word that has been thrown around to describe governments in the United States and Europe or to describe what governments are not in places like the Middle East and Latin America. However, when looking more closely at the leaders that have been recently appointed to power, it is clear that this word can no longer be used to support such governing regimes. In the United States, the true regression of democracy began in 2016, when former President Donald Trump ran for office. Trump can be described as an authoritarian populist, one who believes that they alone represent the people of a country (Mounk). This trend can not only be seen in the rhetoric he used during his campaign, but also through his actions while serving as president. First, he employed strategic rhetoric during his 2016 campaign. Instead of transforming anger to “love” like Obama, Trump manipulated the public’s frustrations with the government to rile up more anger among his crowds (Rowland). This led to the public believing that Trump could alleviate these frustrations and enabled him to form a cult-like following. He created eccentric beliefs, like systemic discrimination against white folk, and frequently influenced belief in racist ideology, particularly against Muslims and Mexicans. Further than this, he was able to create a distrust in reputable news sources which allowed his reach over voters to be more extensive. All of this rhetoric translated into a populist regime.

In addition to the Muslim Ban, border wall, and more racist policies, Donald Trump took racist rhetoric a step further– he enabled white extremist groups like the Ku Klux Klan and Proud Boys to be confident in asserting their agenda. His racist remarks about immigrants and people of color incited those groups to lead violent protests in southern states. In Florida, Black folk were threatened with physical violence while their attackers used Donald Trump to justify their

actions. In addition, Donald Trump has consistently defended proprietors of gun violence, especially at Black Lives Matter rallies as seen in 2020 (Cineas). Although these are two individual examples, it translates to a broader message – populist leaders incite hatred that has direct implications on human rights. With Donald Trump, it was his rhetoric leading to violence against target groups, mostly people of color. However, this repression looks different in Brazil. First, Bolsonaro’s regime can be characterized as a military dictatorship. He has frequently employed the military to pursue his agenda when it could not be realized the way he so desired (“Brazil: Bolsonaro Threatens Democratic Rule”). Likewise, he has pursued an anti-human rights agenda that has involved severely limiting women’s rights and disability rights. Limiting free speech of the press and lashing out against several reporters has also been a prevalent part of Bolsonaro’s regime (“Brazil: Institutions Stand up to Bolsonaro”). Free speech is a recognized human right, according to Article 19 of the United Nations Declaration of Human Rights (United Nations), meaning any restriction is antithetical to human rights and can lead to further repression. Using power and destructive rhetoric, leaders can ignite movements that undermine human rights.

Although these leaders being in power has led to the lessening of human rights, voting is a critical way to get them out of power. In fact, three key examples around the world exemplify the power voting has on leadership. First, voting in the election of 2020 in the United States was able to remove Donald Trump from presidency, preventing a consecutive second term. This election was monumental in a multitude of ways. To begin, it was the highest voter turnout ever seen in American history before (DeSilver). Because the American public had seen the detrimental rule Trump had over the country, they viewed the result of this election as imperative to decide the fate of this country. Thus, more were prompted to flock to the polls (Jarvis). Ultimately, this historic level turnout was enough to hand the seat of presidency over to President Joe Biden, who vowed to turn back the tides of Trump’s populist agenda. Going back to Latin America, voting has once again taken far-right leaders out of power. Luiz Inácio Lula da Silva, a former prisoner and left-wing politician, recently won the runoff election against Bolsonaro, the former president of Brazil. To many, Bolsonaro was seen as an authoritarian military dictator and his actions parallel those of Donald Trump’s. This was deeply troubling to voters, thus they turned to da Silva, who seemed to offer a much more promising future. When he was president in 2006, da Silva’s governance helped lift millions out of poverty which was not forgotten by

voters. Paired with his support of environmental protection, raising the minimum wage, and economic growth policies, he quickly gained traction among Brazil's population (Otis). Southwest of Brazil, a similar trend was seen in Chile, where the youngest president in the country's history was elected. Although this itself is monumental, it is worthwhile to recognize that it is another instance of voting removing ultra-right and dehumanizing leaders from power. José Antonio Kast, the far right candidate for the presidential election in Chile, has supported a minimization of human rights violations ranging from anti-immigration policies and blocking abortion access to militarizing indigenous lands (Mussa). To veer away from those policies, voters cast their ballots for Gabriel Boric, a left-wing former student protester. By appealing to younger voters, showing his determination to eliminate racial and LGBT discrimination left behind by former regimes, promises to lift the poor out of poverty, and his historic practices of protesting, Boric secured his seat as president (Castano). These three examples very clearly show the impact voting can have on the type of leaders that are in power – it is a matter of realizing that voting has an impact in order to achieve change.

As repressive leaders gain power, they pass policies that align with their interests but those often take rights away from more people than they help. Looking east, Hungary's government has passed some extremely controversial legislation. In 2018, the parliament signed a law into effect that would both make it illegal to help anyone seeking asylum and increased restrictions on who could be considered for asylum protection in the nation. However, this directly violates EU law to aid asylum seekers and allow entry to those who need it. Second, it violates international law. As a signatory of the UNHCR, Hungary has an obligation to accept asylum seekers and offer them protection, such as shelter and food, but they refuse to do so ("Access to Asylum Further at Stake in Hungary"). The UNHCR makes it clear that beyond legality, this is a question of human rights. As asylum seekers flee their countries to escape persecution and violence, they should be treated with dignity when attempting to find safety. Russia has followed a similar trend in the elapsing of human rights in recent years, as its government passed an extremely troubling bill – it decriminalized first time offenders of domestic violence. During the pandemic, Russia began to see an uptick in domestic violence, but rather than address the issue, they passed legislation that made it easier for abusers to escape punishment for their crimes. The statistics are troubling: every day, 22 women are killed and fifteen percent of patients in hospitals are victims of domestic abuse (Magnay). This is a clear

violation of human rights. When in a situation of abuse, victims should be able to easily receive justice instead of being forced to bear an impossible amount of evidence to incriminate their abuser. Women's rights are also faltering in Iran, where the government is cracking down on women who refuse to wear the hijab. Most women in Iran believe the hijab should not be made mandatory to wear as it is a cultural and religious symbol that carries different meanings for them. Making it mandatory takes away their bodily autonomy which is a very important right to them (Daley). Without bodily autonomy, people are dehumanized and are seen as objects that can be controlled. Because populist leaders strive to consistently gain more authority, they take away basic rights from their constituents to establish power relations.

When governments do not protect the rights of their people, citizens take it into their hands to make them listen by protesting. In Sri Lanka, President Gotabaya Rajapaksa grew highly unpopular after being seen as a threat to democracy. The Rajapaksa regime saw civilian deaths, religious persecution, and corruption which deeply angered the Sri Lankan people (Mogul). Thus, they began to protest. Thousands of protesters flooded the streets near the president's office, not backing down even after they were met with tear gas and police brutality (Zargar). This effort was worthwhile, as Rajapaksa resigned from his position as president. Going back to Iran, thousands of women are taking the streets to protest the strict hijab regulations. Following the death of Mahsa Amini, a young woman who died in custody of Iranian police for violating the hijab policy, the streets were filled with protestors. A new poll finds that 72% of Iranian women are becoming more secular and are in strong disapproval of the current regime (Maleki). What has shocked many is that a large number of men also oppose these rulings that harm women's rights (Arabi). These protests have caught international attention and have sparked prominent celebrities in the western hemisphere to speak out on these issues. Although these protests have not yet resulted in policy change, they are on track to produce a regime change as the dissent of the people is only gaining power – it has not subdued (Arabi). A regime change would be a huge win for women and any groups the ruling party is currently suppressing. A very similar event occurred in the United States in 2020 – the murder of George Floyd rekindled the Black Lives Matter movement protests *globally*. The Black Lives Matter movement has been an ongoing struggle of resisting police brutality against black folk and people of color. The systemic racism in the policing system has perpetuated decades of unequal treatment among its white and black counterparts. Protests took place not only in the

US, but also in the United Kingdom, New Zealand, France, and Columbia. These protests led to change: New Zealand's government stopped plans to arm police officers, Kentucky passed a law requiring police officers to wear body cameras, and more states began to increase restrictions on their officers (Silverstein). Protests are uniquely effective because they directly signal to governments that their citizens are dissatisfied with their policies that counter human rights and provide a path to enact change.

Although protesting and voting is largely effective, there are situations in which these methods are infeasible, such as when countries are under the rule of terrorist groups or are in a state of war. Countries that are under rule of terrorist groups face extreme repression, but lashout against these groups only incites more violence. The goal of terrorist rules is to undermine human rights completely, destabilize democracy, and instill fear in innocent bystanders (“Human Rights, Terrorism, and Counter Terrorism.”). Meanwhile, protests are nearly impossible when a country undergoes internal conflict. In such cases, alternate solutions are required to uphold human rights. Individual citizens can donate to organizations and their subcommittees, like the United Nations and their Office of Counter-Terrorism (“What We Do | Office of Counter-Terrorism.”). Such donations can help organizations scale up their technology and intelligence measures, which can be effective at combatting terrorism which is often the root cause of many refugee crises. Although the root causes of terrorism and civil wars may often be hard to solve, additional solutions can be provided for the victims of these issues. Because many people in these situations often need to flee their home country for safety, it is of utmost importance to provide a place of refuge for them. Established more than 70 years ago, the United Nations High Commissioner for Refugees is the world's largest organization that assists refugee seekers from all over the world. It helps refugees settle in new countries, provides them with food and shelter, but most importantly, it sets standards for countries who have signed onto the agreement (Crisp). As mentioned earlier, some countries like Hungary have blatantly violated UNHCR standards, which is why advocating for better refugee laws is extremely important. It is a human right for everyone to have access to safe living conditions, but it is also a basic human right for people to seek asylum that should be respected (“Human Rights, Human Lives”). However, the UNHCR may not have authority over certain governments, like China who has been oppressing the Uighur Muslims. In this case, it is up to governments to step up through measures like imposing sanctions and cutting of trade. In 2021, the US imposed sanctions and

import controls on China in response to the forced labor of the Uighur Muslims (Madhani). This measure should be replicated around the world by countries in the European Union, African Union, and those in Southeast Asia, as China heavily relies on those countries for both imports and exports. Sanctions are key to punish countries economically which forces them to address the issue behind the sanction in order to alleviate that economic stress. For countries like China that focus heavily on economic growth but target minority groups, sanctions can be extremely effective. Furthermore, sanctions on one country demonstrate to other governments that attacks on human rights will not be taken lightly but will be met with retribution.

From corrupt leaders to terrorist organizations to discriminatory laws, it is apparent that human rights are at stake all around the world. While the average citizen can do their part by voting for democratic leaders and protesting violent policies in many countries, they must also realize donating and supporting organizations that aid millions of displaced people around the world is imperative to the fight for human rights. The backsliding of human rights is not seen only in the countries aforementioned – it is a pattern that is becoming more prevalent around the world. Addressing human rights now is of utmost importance to preserve safety and prosperity for future generations.

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Reducing Recidivism: A Proactive Approach By Scarlet Shafie

Abstract

With 83% of released prisoners being rearrested within a decade, high recidivism rates plague the United States. This trend results from the ostracism and rejection that ex-offenders face as they reenter society. It is immensely challenging for them to secure employment and rebuild their lives because of these barriers. The consequences of this societal rejection have a profound impact, leading the ex-offenders to struggle with a diminished sense of self and navigate poor psychological well-being. To combat recidivism, it is imperative to implement proactive strategies grounded in criminological thinking. By prioritizing mental health support, increasing access to social services, and creating employment opportunities, recidivism rates will be reduced because ex-offenders will have access to the tools and support necessary for successful reintegration. An educational approach beginning at a young age to address crime prevention will also significantly contribute to breaking the cycle of recidivism by targeting it proactively. Although obstacles and opposition may arise, the potential benefits of this approach far outweigh the risks and the initial costs.

The Span of Recidivism

83% of released prisoners are rearrested within a decade (Kyprianides 1). This high rate of recidivism results from the rejection that ex-offenders face from society upon their release from prison. Ex-offenders are often unallowed to vote, struggle to find employment, and are regarded as "bad" and "dangerous" people by the public. This rejection, as well as degrading experiences in prison, make life after prison stressful and depressing, therefore motivating ex-offenders to re-offend (Kyprianides 1). This ostracism is especially harmful to ex-offenders attempting to rebuild their lives after their sentences since a person's social standing is a core determinant of their health and well-being. Ex-offenders often experience struggles with self-image, unstable and minimal social connections to others, and an overall demeaned psychological well-being. (Kyprianides 1). After leaving prison with a demeaned sense of self, ex-offenders are immensely vulnerable to the impending rejection that society will perpetrate against them. Ex-offenders' stigmatization limits their ability to obtain employment, establish romantic relationships, and even maintain platonic and familial ties. As a result, the mental

well-being of ex-offenders is often dire and leads to substance abuse, suicide attempts, and, most obviously, recidivism (Baffour 1).

The title "ex-convict" is a burden carried by 100 million adults in the U.S., the highest rate of incarceration in the world (Daly 1 & Scommegna 1). Of these 100 million, around 83 million have re-offended or are projected to. A solution must be found to not only reduce the concerning high rates of recidivism but also to stabilize the lives of ex-offenders, which would result in both a decrease in the costs associated with incarceration and a reduction in crime rates (Zuzek-Arden 1). The societal cost of incarceration extends far beyond the direct costs (policing communities and incarcerating individuals) as it also includes lost earnings, adverse health effects, and damage to the families of the incarcerated. Considering this, the total burden of the U.S. criminal justice system is estimated to be over \$1.2 trillion annually (Hayes 1). Therefore, the U.S. government must introduce an effective means of reducing recidivism and providing adequate resources to the ex-offender population, as this compounding debt and high level of recidivism will persist if they do not. Action needs to be taken to reduce the stigmatization and rejection that plagues the life of ex-offenders through the improvement of educational resources that will support prisoners and help to prevent the occurrence of crime.

The Mentally Damaging Prison Environment

Prison management practices are not grounded in criminological thinking and do not account for the interpersonal climate of prisons or the severity of their policies. As a result, ex-offenders often develop a poor self-image and an overall diminished psychological well-being (Kyprianides 1). They are constantly struggling under the ongoing stigma associated with ex-offenders while battling psychological obstacles that develop due to degrading experiences in prison. Nelson Mandela, the first Black president of South Africa and a Nobel Peace Prize winner, recalls his own experiences from the 27 years of incarceration that he faced for leading a movement against South Africa's policy of apartheid in one of the most highly acclaimed autobiographies of all time, *Long Walk to Freedom* (Kabir 1). Mandela recalls that "prison life is about routine," with each day, week, month, and year blending into the next. Time slows down in prison, making the days seem endless and eventual freedom seem unattainable. This monotonous routine breaks down the individuality of prisoners and, with it, their dignity. Mandela contends that "prison is designed to break one's spirit and to destroy one's resolve" (Mandela 13). The

authorities attempted "to exploit every weakness, demolish every initiative, and negate all signs of individuality" by extinguishing the spark that makes everyone individual and unique (Mandela 13). Prison and the practices executed within them conspire to rob offenders of their dignity and humanity, leaving them with a fraction of who they once were.

As Mandela recalls his time in prison, he states that he never truly considered that he would emerge from prison one day (Mandela 14). This depressed mindset is derived mainly from offenders' violent treatment by fellow prisoners and correctional staff. More than 20% of incarcerated inmates experience physical violence (Wolff 1). With such a high rate of violent treatment within prisons, it is unsurprising that more than half of all current inmates suffer from mental health issues, a number that has quadrupled since 1998 (Barrett 1). The current prison environment fosters a mental health epidemic, contributing to the U.S.'s immensely high recidivism rate. This epidemic is projected to expand exponentially, consuming a vast amount of the national budget and significantly increasing the recidivism rate. Educational resources must be improved and begin to emphasize mental health for the sake of offenders both in prison and post-sentence.

Reintegration into Society After Prison

Ex-offenders' well-being and the reduction in recidivism rates are heavily determined by ex-offenders' access to both public and non-profit social services. During the period immediately after release from prison, ex-offenders must establish a conventional lifestyle that will keep them from returning to crime, reducing recidivism rates. Over 600,000 people are released each year from state and federal prisons in the U.S. (ASPE 1). This large number of individuals re-entering society every year, coupled with the adverse psychological effects of incarceration, emphasizes the need for better educational resources.

When re-entering society, former prisoners are at high risk of experiencing economic insecurity due to their challenges in finding and sustaining employment. Dr. David J. Harding, a Professor of Sociology at the University of California, Berkeley, examined this by conducting a study to determine how economic security and general upward mobility are attainable for ex-offenders. Harding drew upon qualitative data from in-depth, unstructured interviews of ex-offenders that assessed the combination of employment, social support, and public benefits they drew upon to survive. His findings revealed an immense struggle among the ex-offender

population to meet even the most minimal needs of shelter and food (Harding 1). With a weakened mental state, a minimal support system, and the inability to make ends meet, many ex-offenders are motivated to re-offend to support themselves. This high risk of poverty is supported by the fact that most of the incarcerated population lived in poverty before their conviction. Ex-offenders struggle and often fail to break the cycle of recidivism due to the adversities stacked against them, preventing them from achieving stability and success.

The Struggle to Find and Sustain Employment

Due to stigmatization, ex-offenders experience immense discrimination when attempting to find and sustain employment. Dr. Adolfo Sachsida, a lawyer and economist, compiled data supporting this by surveying a population of convicts on probation. His findings show that ex-offenders earn 39% less than non-offenders (Sachsida 1). Ex-offenders face complex challenges in determining whether to re-offend or lead a responsible life. They face prevalent needs and challenges in mental health, substance abuse, housing and homelessness, education, providing for their children and families, and, undoubtedly, employment.

Employers are hesitant and even downright opposed to hiring ex-offenders due to the stigmatization that surrounds them. Mark Obbie, a freelance criminal-justice journalist, highlights the struggle to reintegrate former prisoners into society. Ex-offenders' failure to find employment contributes to a costly, negative cycle of both the social and economic systems of recidivism and crime. This negative cycle occurs at the expense of taxpayers and local communities (Obbie 1). Dr. Ora Starks, warden of the Mississippi Department of Corrections, discusses the "ripple effects" ex-offenders face due to their struggle to obtain employment. She states that this lack of employment leads ex-offenders to lack the ability to secure stable housing or contribute to their family's well-being. She contends that these "ripple effects" often lead them to engage in criminal activity merely to make ends meet. These findings align with the data Harding collected, demonstrating ex-offenders' struggle to meet even the most basic needs. Starks explores the beliefs and attitudes of employers on hiring ex-offenders by having business owners participate in semi-structured interviews that explore the factors influencing their hiring decisions. Unfortunately, due to the stigma of having a criminal record, she found that employers often will be hesitant or even opposed to hiring them. Employers' perspectives on this topic are valuable as they illuminate the barriers business owners may feel impeded when considering

employing ex-offenders (Starks 4). Many employers need to be made aware of their ability to reduce recidivism among minor ex-offenders by granting them employment opportunities, and therefore fail to exercise that ability (Smith 1). The unique perspectives of employers can inform policymakers, communities, organizations, and academia of the challenges that business owners face regarding hiring employees with criminal records (Starks 4).

The Solution: A Proactive Approach to Recidivism

While prison is a means of punishment, it is also intended to foster reformation and inspire offenders to refrain from re-offending. The loss of liberty that prison fosters should be sufficient punishment; prisoners should not be further punished by humiliation and violence. Current efforts are unsuccessful in reducing recidivism rates as they have a reactive approach. Anti-recidivism efforts need to be reconfigured and grounded in proactive thinking. With that approach, crime will be reduced from the source, eradicating the opportunity for recidivism. I suggest a two-pronged approach to target recidivism proactively.

The first part of the solution is to implement prison programs to teach "soft skills." Soft skills are personality traits and behaviors that will help candidates get hired and succeed across industries and in any profession (Herrity 1). Dr. Pat Nolan, the Director of the Center of Criminal Justice Reform at the American Conservative, presents a solution incorporating soft skills. Nolan offers a valuable perspective on this topic as he served a federal prison sentence, and therefore, his perspective is grounded in criminological thinking. He believes that prisoners need to be taught to think of themselves as employees, which would entail "getting up on time, cleaning up, showing up when you're supposed to, putting in a full day's work for a full day's pay, (and) not pilfering from the cash drawer or the supply room..." (Obbie 1). Nolan's perspective differs from the stereotypical approach of prison as a punishment. Nolan's perspective intends to work against the dehumanized approach that Mandela and many other ex-offenders have experienced. This program would treat the prisoners with respect and allow them to approach their time in prison as a rehabilitative experience. Teaching the incarcerated population soft skills will help them obtain employment after they are released and contribute to the economy rather than end up re-incarcerated.

The second part of the solution is to mandate education on crime starting at a young age. Adequate education can improve outcomes from one generation to the next, preventing crime

and therefore eradicating the opportunity for recidivism. Proper education on crime should begin far before the potentiality for incarceration does. Programs should be initiated and regulated within schools, especially in lower-income areas, to teach youth about criminal behavior and the harm it causes. These programs could also provide students with a well-informed and nonjudgmental adult to approach with questions, concerns, or personal problems that may motivate them to turn to substance abuse and violence (gateway behaviors that lead to criminality). Proper education on crime is a crucial aspect of this solution as it will reduce crime rates, eliminating the possibility of recidivism.

This two-pronged approach has the potential to prevent recidivism by reducing crime rates. Through its emphasis on education and prioritization of ascension, this solution will encourage ex-offenders to contribute positively to society by providing them with the resources they need to succeed and the motivation to veer away from criminality.

There is the potential of opposition toward this solution as it will require an initial expense that many communities may not have the means for or want to allot. For this reason, as well as others, some communities may be reluctant to implement these programs. Challenges will likely arise with implementing these programs, primarily due to the societal attitude towards ex-offenders. While changing societal attitudes may be difficult, it is not impossible. It is essential to weigh the potential benefits against these challenges and criticisms in order to gauge their applicability. Despite any trepidation, these solutions undeniably have a significant potential for success and effectiveness due to their deliberate grounding in criminological thinking. The prevention of crime that this solution will facilitate is well worth the initial expense and risk.

In conclusion, many potential actions could be taken to reduce recidivism; the overlapping theme is that the solution will be proactive and grounded in criminological thinking. The solution to recidivism will be complex and multifaceted, just as the problem is. Unfortunately, no clear-cut solution will immediately cause recidivism rates to drop, but there are ample opportunities for improving current policies and practices such as the ones proposed above. Regardless of which approaches are taken, the urgency and complexity of this issue need to be considered, and a proactive approach should be prioritized.

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Pressures and Harm Surrounding Social Media and Photo Editing: Influences of Gender and Age at First Use By Rishima Mathur

Abstract

Social Media is a significant part of many individuals' lives, specifically teenagers and young adults. It is a way to communicate and keep in contact with friends and family who may live in different parts of the world. However, there are also many detrimental effects that have been seen to increase with social media use. Adolescents depend on social media for validation, which can lead to insecurities, loneliness, and other mental health issues. The purpose of our study was to research the correlation between social media use in young social media users and their effect on mental health issues and negative feelings. We hypothesized that social media use would have negative impacts on mental health. We performed a mixed method study with a survey, asking both qualitative and quantitative questions regarding their social media use. The voluntary, anonymous survey was posted on instagram and snapchat stories, with data collected over the span of four weeks. Our study found that adolescents that use social media sometimes felt left out or lonely when not engaged in social media, as well as felt pressure to look their best selves at all times on social media using filters and editing tools, which was especially evident for those who identified as genders other than male and started using social media before age fourteen. This could lead to many detrimental issues in the future such as anxiety and depression, and thus, social media use should be monitored in adolescents and potentially be avoided until mid to late teenage years.

Keywords: Social media, filters, photo editing, loneliness, pressure

Introduction

With the increase of social media use in the last decade, there are both positive and negative effects seen in users. The launch of Facebook in 2004 initiated a significant rise in posting pictures and videos of people's daily lives showcased to the public. Since the advent of Facebook, numerous platforms have entered the social media scene such as Instagram, Youtube, TikTok, Pinterest, and many more. With several of these apps targeting younger users, social media platforms have become part of most teenager's and young adult's daily routines.

A review of the current literature surrounding social media use has shown that increased use can have some positive effects on users by enabling connection with and support of friends and family during tough times and times of loneliness (Anderson & Jiang, 2018; Rideout & Fox, 2018). This was substantially important throughout the COVID-19 pandemic, for example. However, there are many negative effects of social media as well (Berryman et al., 2017). Certain content may trigger PTSD symptoms in adolescents, playing a part in negative mental health outcomes such as suicidality, loneliness, and decreased empathy (McHugh et al., 2018). As social media has grown, so has the incidence of depression and anxiety in users (Strong et al., 2018; Cook et al., 2021). Social Media has also normalized the use of filters and photo editing. Oftentimes, social media users edit pictures to create the “perfect” image, and compare themselves with others, resulting in heightened insecurities and negative body image issues (Mun & Kim, 2021).

Although positives of social media use have been identified, the negative aspects tend to outweigh them when it comes to adolescent social media use. The consistent use of social media has been shown to cause a significant increase in mental health issues. A recent study in Hong Kong, found that social media use led to depressive symptoms such as feelings of loneliness in older adults (Yang et al., 2021). The current study investigates whether this is true for young adults who use social media in a primarily United States Asian American population. Although research has previously shown the effects of social media, as new social media platforms and technologies are developed, it is important to continue to monitor the situation. Thus, this study examines the current impact of social media use with the hypothesis that social media use will impose negative consequences on adolescents and young adults. More respondents reported feeling lonely when not engaged in social media and pressure to use photo editing and get likes if they started using social media before age fourteen and identified as genders other than male. The results highlight the dangers of social media use on adolescent mental health.

Methods

This research was conducted using a mixed-method design with quantitative and qualitative measures. All participation in the survey was voluntary and all participants consented to providing the information collected before responding to the survey. No personal information such as names were collected. The measures included an anonymous survey created through

Google forms with 1 scale-type multiple-choice question, 14 multiple choice selection questions, and 1 open-ended question. Participants were invited with an initial survey posted to an Instagram and Snapchat story and in an Instagram profile description. We used social media to advertise the study because we were looking to specifically study the population of young social media users.

As mentioned by Price et al. (2015), survey methods are effective because their data has helped collect and estimate the prevalence of many mental health disorders and identify statistical relationships between these disorders (Price et al., 2015). The survey also asked particulars about photo editing and filter use. Demographic questions in the survey asked for age, gender, ethnicity, and household income. The survey was open for four weeks, where 54 responses were collected, although two responses were removed from the data, one being left unanswered, and one was found to have non-serious answers. The other 52 responses were used for the data, converted into an excel sheet, and analyzed for percentages.

Results

A Google form survey was created and delivered to participants through Instagram and Snapchat. Based on the responses from stationary posts and stories, it appeared that participants were more likely to respond to the survey posted on stories probably because of their short duration over reading lengthy posts. Data was exported to excel and percentages were calculated for responses with demographics data presented in **Table 1**. Out of the 52 respondents, most were between the ages of 14-17 (94%), with only 6% being 18 or older. The respondents were mainly Asian American (70%), with other respondents being American Indian (7.8%), African American (3.8%), Caucasian American (3.8%), and Hispanic/Latino (3.8%). The sample population identified as 65% female, 25% male, 6% non-binary, and 2% transgender. The results group non-binary and transgender together as “other gender identity” in order to have a higher sample size for comparison. Most (52%) respondents came from families with a household income of over \$101,000.

A majority of respondents reported that they started using social media between the ages of 11-13 (63.5%). 15% started using it at an even younger age, age 10, and about 20% started using social media at older ages between 14-17. Most participants (41.5%) answered that they spend approximately 2-4 hours daily using social media, with 32% reporting they spend between

4 to 6 hours and 21% reporting they spend over 6 hours on social media daily. When asked how often respondents check their phones during class, 34% responded with 1-3 times, and about 32% said they check their phones more than 6 times during class. Next, participants were next asked about the social media platforms they use and their posting habits. When asked how many sites they belonged to, 47% of respondents stated they belonged to 3-5 social media sites. Surprisingly, over 30% of respondents said they belonged to over 5 social media sites. Almost all participants (95%) reported using Instagram, 74% used Snapchat and TikTok, and 80% used Youtube. Social media was primarily (92%) used to chat with friends, with around 65% reporting to use it for posting and browsing through pictures, 42% reporting to read news and find friends, and 29% reporting to use it to shop. Interestingly, when asked about their average number of posts daily, about 71% answered that they do not post daily, while others said they post 1-3 times a day.

The survey next asked about feelings relating to social media use and picture editing. When participants were asked whether they felt left out when they weren't engaged on social media, a majority (42%) reported that they sometimes felt left out, with 25% answering "yes" and 33% reporting "no." 62% of survey respondents reported that they do not use editing tools or filters on their pictures. When asked about the portion of pictures they think are edited on social media, Most respondents (44%) said that they think over 55% of pictures are edited, 34% said between 40-55%, and the remaining 20% said they believe up to 40% are edited. When asked about their feelings when seeing edited pictures, 71% of respondents answered neutrally, 14% reported it making them feel unattractive, 23% reported feeling insecure, and a minority responded feeling sad (6%) or angry (4%). When asked if they felt pressured to use filters on social media, 65% of respondents said that they did not, 33% said they felt somewhat pressured, and 2% felt very pressured. The last question of the survey asked "How important is getting "likes" to you?". Exactly 50% of respondents reported it as not important, 40% said somewhat important, and 10% said it was important.

To see if there were differences in gender, the data was analyzed for the percentage of answers from male, female, or other gender identities. It was found that 100% of males and other gender identities checked their phones during class compared to 91% of females. Almost half of males (46%) reported not feeling left out when not engaged in social media, while 70% of females and 80% of other genders reported at least sometimes feeling left out (**Figure 1**). It was

found that females were more likely than males or other genders to post daily (35% vs 15% and 20%). Females were also more likely than males to use editing tools (41% vs 23%), with other genders reporting the highest use (60%). The majority of all genders believed that over 40% of photos on social media are edited (82% of females, 77% of males, and 60% of other genders); however, females were more likely to believe that over half of the photos were edited (53% vs 23% of males). When looking at who was more likely to feel pressure by edited photos, females and other gender identities were more likely to report feeling pressured compared to males (38% of females, 8% of males, 80% of other genders, **Figure 2**). When asked about specific feelings toward seeing edited photos, 23% of people responded feeling insecure, but no male respondents reported feeling insecure or sad. When looking at whether there were gender differences in the importance of getting “likes,” over 50% of females responded that “likes” were somewhat or important to them, while only 37% of males and 40% of other genders responded that “likes” were at least somewhat important to them (**Figure 3**).

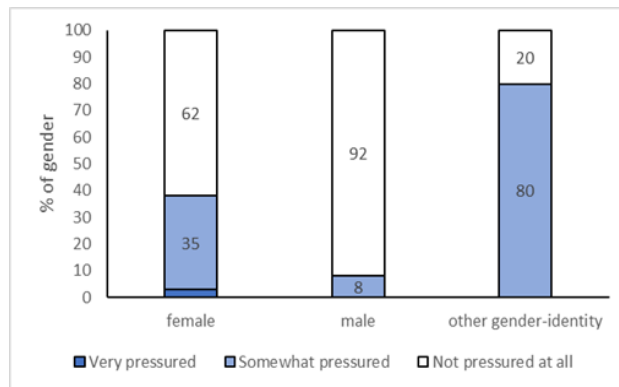


Figure 1. Females and other gender identities felt more pressure to use filters/editing tools to enhance their appearance. Participants were asked, “How pressured do you feel to use filtering and editing tools on photos to enhance physical appearance?” and were able to respond with “very pressured,” “somewhat pressured,” or “not pressured at all.” Percentages were calculated for each gender identity.

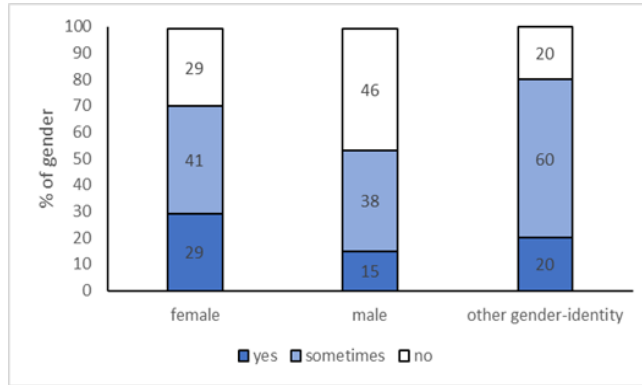


Figure 2. Females and other gender identities were more likely to feel at least somewhat lonely when not engaged in social media compared to males. Participants were asked, “Do you feel lonely, left out or out of touch when not engaged with social media?” and could answer “yes,” “sometimes,” or “no.” Percentages were calculated for each gender identity.

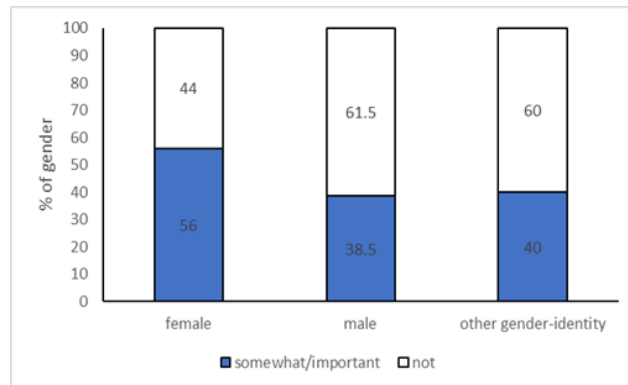


Figure 3. Females were more likely to say that getting “likes” were at least somewhat important. Participants were asked, “How important is getting "likes" to you?” and could answer “not important,” “somewhat important,” or “important.” Percentages were calculated for each gender identity.

Differences were found for the age that people started using social media; 75% of those who started using social media before the age of 14 said “yes” or “sometimes” to feeling lonely or left out when not using social media, versus only 42% of those who began social media use at

14 or older (**Figure 4**). When looking at the association between the age people started social media and negative feelings toward edited pictures, 35% of those who started before 14 had negative feelings compared to 8% of those who started at an older age. Almost half (43%) of those who started before fourteen felt somewhat or very pressured to use photo editing, whereas only 8% of those who started later felt this way (**Figure 5**). Similarly, those who started before 14 were more likely to place importance on “likes” with 58% thinking they are at least somewhat important versus 25% who started using social media at age 14 or later.

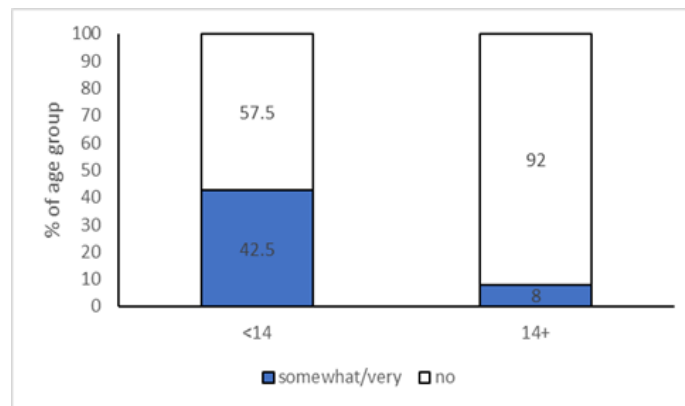


Figure 4. Those who started using social media at a younger age were more likely to feel lonely when not engaged in social media. Participants were asked, “Do you feel lonely, left out or out of touch when not engaged with social media?” and could answer “yes,” “sometimes,” or “no.” Percentages were calculated for those who started using social media before or after age 14.

When looking at other associations, it was surprising to find that people who didn’t post daily were more likely to feel pressure to use photo editing and filters (41%) compared to those who posted 1-3 times a day (20%). Those who posted daily were more likely to think “likes” were at least somewhat important (73%) compared to those who don’t post on a daily basis (41%). As was expected, over half of those who used photo editing and filters for pictures felt some pressure to edit photos (52%), while 78% of those who reported to not edit photos felt no pressure to do so. The most predictive factor for whether someone felt “likes” were important was feeling lonely when not engaged in social media. Out of those who did not feel lonely, 71% said they felt no pressure for getting “likes,” while 92% of those who felt lonely said they felt that “likes” were at least somewhat important. A similar trend was found when looking at

pressure to edit pictures. Out of those who do not feel lonely when not using social media, few (18%) reported feeling any pressure to edit photos, while out of those who did feel lonely, 54% reported feeling some pressure to edit their pictures. Those who felt lonely were also more likely to edit their pictures (69%) compared to those who did not feel lonely when not on social media (11%). The more social media sites a person used, the more likely they were to say “yes” to feeling lonely or left out when not using social media (1-3 sites: 17%; 3-5 sites: 24%; 5+ sites: 33%).

Discussion

Social media is a very large and significant part of the daily life for all teenagers and young adults, which is supported by our findings. We hypothesized that social media would have a negative effect on the mental health of teens and young adults. Seeing how young of an age respondents began using social media is interesting and concerning, as over 75% began use prior to the age of 14. Significant brain development occurs during this time, and when young teenagers or children are exposed to these posts and content, it may produce negative self-esteem and other mental health issues. This study aimed to shed light on these issues, and in particular, the effects of photo editing and filters being increasingly used throughout social media platforms. The current study findings fell in line with previous research reporting around 60% of young social media users use social media to post pictures (Plaisime et al., 2020). Social media is a place where people seek validation and reassurance (Diefenbach & Anders, 2022; Elhai et al., 2020; Nesi & Prinstein, 2015). Many users view social media as a platform to post their “favorite” or best pictures and videos which leads to a misperceived view of other people’s lives, potentially inducing detrimental effects on the human brain. Especially in young users, this can lead to constant comparison and validation-seeking in an attempt to look like the “picture perfect” person. Social media could also result in other detrimental patterns for mental health such as causing someone to rely on feeling secure and attractive only when they receive validation from social media through likes and comments. This could be seen in our study when we asked how important likes meant for the respondents. Half of the respondents said that likes were somewhat important to them, and social media users who started using social media before the age of 14 were more likely to answer yes to the question. This shows that if a child is

exposed to social media starting at a young age, it may result in unhealthy habits for seeking validation.

Additionally from our results, we found that the involvement of young users in social media correlates with the feelings of loneliness when not involved. When asked if they felt lonely when they were not engaged in social media, all users who answered “yes” reported using social media before the age of 14. This shows that for those who have been using social media since a young age, not posting or being active in social media may create a sense of disconnectedness from their peers and create a sense of isolation. One might say that social media allows individuals to communicate and connect with people who you may not see in person, increasing opportunities of building friends and a family, but it has been shown to actually make individuals feel lonelier (Berryman et al., 2017; Wirtz et al., 2020). Feelings of loneliness and isolation can lead to mental health disorders such as depression and anxiety (Mushtaq, 2014). Starting use of social media at a younger age also seemed to be associated with more pressure to edit pictures and more importance placed on likes, suggesting that social media may have more influence on people who started using it as a child or preteen rather than as a teenager. This effect may be mediated by the loneliness they feel when not using social media and the number of social media sites they use. Because more negative feelings were felt when viewing edited pictures by those who started using social media when younger, negative mental health outcomes by social media may be more potent for those who began use as a child or preteen.

In this study, more female users reported using editing tools on their social media posts, and believed that over half of the photos on social media used some kind of editing or enhancement tool. This is likely because using filters or enhancement tools is more normalized for women because of high “beauty standards” put on them to look a certain way (Buote et al., 2011). Many female users also reported feeling pressured when looking at edited photos compared to only a small percentage of males. This may be because these females may have compared themselves or felt less confident in their image after looking at a “perfect” or edited picture. Consequently, this could have led to the responses received from females more frequently reporting feeling “insecure” or “sad” when asked how they felt when they saw edited pictures. Less males reported that they felt left out when not using social media. Although this may be an accurate representation, especially in today’s society in the US, men are less likely to

feel comfortable sharing their feelings, which could cause bias or underrepresentation of their true feelings in their responses. Because of social norms, men often feel restricted from expressing emotions, specifically feelings of fear or sadness (Chatmon, 2020). Furthermore, men did not report negative feelings such as sadness or insecurities when viewing filtered or edited photos.

In all, most respondents began using social media as a child or preteen, which was associated with negative outcomes, including more negative feelings toward pictures being edited, more pressure to edit their own pictures, and more importance placed on “likes.” Also, gender seemed to have an influence on negative outcomes as well, particularly female social media users being more likely to report negative feelings such as sadness or insecurity when seeing edited pictures posted by others. Social media has a wide variety of content for many different interests; however, artificial intelligence, more commonly known as AI, can create a bias toward mainly negative content being displayed. These algorithms could prevent teens from seeing content that could boost mental health and self-esteem (Harriger et al., 2022). Additionally, most respondents seemed to use social media passively, with few posting only 1-3 times a day. Passive social media use has been shown to have more negative effects on individuals, while active use can have positive attributes (Escobar-Viera et al., 2018). Due to these findings, parents should be cautious of what age they allow their children to begin using social media and be aware that their female and non-binary identifying children may be more susceptible to negative self-esteem outcomes. Although, more studies should confirm these results in larger, more diverse populations as our population primarily consisted of Asian Americans and females. Another negative effect of social media that is more recently relevant and should be investigated is the selective algorithm.

Limitations

A limitation of our survey was the option for neutral answers. Oftentimes, when survey participants were asked about one’s feelings regarding edited pictures, we received neutral responses. This may be because the data was collected on a “self-report” basis and according to Brenner & DeLamater (2016) respondents try their best to give responses that are considered “socially desirable.” Thus, there could be some error arising from dishonesty in responses. Some may argue that survey methods may not always guarantee authentic and honest data. Although

this may be true, when data is obtained from a diverse participant population, it appears that most responses tend to be authentic (Escobar-Viera et al., 2018). Since this survey was anonymous, respondents may have been more open to giving honest and authentic answers. Another limitation involves the demographic and sample size. Our survey demographic was primarily Asian Americans, which may have resulted in the findings being biased towards that demographic group. Secondly, more females responded to the survey compared to all other gender identities which may have led to a more accurate analysis for females; however, we did receive an adequate sample of male participants. A larger sample size could have increased the diversity of our population and increased the generalizability of the findings

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How Can Mutations Affecting TGF- β 1's Interactions With Signaling Pathways Modify the Tumor-Microenvironment, to Promote or Suppress Cancer Cell Growth, Across Different Species? By Snigdha Arun

Abstract

Transforming Growth Factor-Beta1 (TGF- β 1), a growth factor protein, affects numerous cellular signaling pathways and responses². Through ligand binding, the activation of serine/threonine³ kinases, Smad proteins⁴, and VEGF proteins⁵ is vital in the tumor-microenvironment⁶. By regulating apoptosis and granulation⁷, and inhibiting cellular proliferation⁸ and tumor growth⁹; TGF- β 1 plays a significant role in the management of immunity¹⁰. However, with the dysregulation of this tumor suppressing cytokine¹¹, TGF- β 1 is no longer an anti-migratory and anti-proliferative protein. Instead, misregulation¹² causes TGF- β 1 to serve as an oncogenic factor, promoting metastasis¹³, angiogenesis¹⁴, and tumorigenesis¹⁵. Here, I explore the effects of mutations on TGF- β 1 by comparing amino acid sequences of mammal species¹⁶ with different lifespans¹⁷ to known effects of mutations on cancer signaling pathways to determine whether TGF- β 1 interactions have been modified in species with different lifespans. I use publicly available amino acid sequences for TGF- β 1 in different mammal species obtained through NCBI¹⁸, and create multiple sequence alignments across species¹⁹. I also collect a list of TGF- β 1 mutations known to affect signaling pathway interactions in cancer, and then compare mutations associated with species that are cancer resistant to those affecting cancer-related signaling. I also review the range of influence the TGF- β 1 cytokines have in the tumor-microenvironment²⁰.

Introduction

According to the World Health Organization²¹, almost 10 million people died from cancer in the year 2021. TGF- β 1 can play a critical role in catalyzing this uncontrolled cell proliferation. TGF- β 1 is not only observed helping the growth of malignant tumor cells, but it also plays a vital role in wound healing, immunoregulation²², and the overall maintenance of cell growth. TGF- β 1 normally plays a very important role in an organism's immunity²³, however mutations, including those involved in cancer, can cause TGF- β 1 to act differently.

The TGF- β superfamily consists of growth differentiation factors²⁴, the TGF- β family, bone morphogenetic proteins²⁵, and anti-Müllerian hormones²⁶. There are three forms of TGF- β : TGF- β 1, 2, 3. TGF- β is a ligand that regulates one's immunity by binding to TGF- β receptors²⁷. A ligand is a molecule that binds to a receptor, which then activates a cellular signaling pathway²⁸. During this process, SMAD Proteins act as the main transducer for the signals²⁹. SMAD proteins are a superfamily of transmitters for receptors.³⁰ In most cases TGF- β signaling pathways assist in cellular development and growth.

By looking at the evolution of TGF- β 1 mutations throughout different species, we can conclude that certain sites in TGF- β 1 have longevity associated mutations, which overlap with cancer mutations in human

Results

Since short living species have a higher tendency to get cancer³¹, I use short living species as a proxy to determine the evolutionary changes in TGF- β associated with cancer risk. In order to identify the mutations that cause the TGF- β 1 to help with tumor growth, I collect a list of species with TGF- β 1 through NCBI and order them from shortest to longest lifespan using AnAge database³². Then, I created two separate alignments: one for a shorter lifespan and one for a longer lifespan, and then I did a multiple sequence alignment with both groups, using benchling³³. However, this didn't work well because the Alignment Statistic map was showing a difference even if there was an outlier (only one species).

Therefore, I changed my approach and created an alignment with all species and then ordered them from shortest lifespan to longest. Then, I looked at specific positions on the map that were different in the short living species and the long living species. Mutations were found in Positions 16, 148, 162, 212, 238, and 239.

One of the most significant mutations, indicated in Figure(1), was in position 162, where short living species had a Serine, while the longer lifespan species had a Leucine. This is a non conservative mutation because Serine is polar while Leucine is nonpolar. This mutation from the nonpolar leucine to polar Serine could be significant to the dysregulation of TGF- β -1. Additionally, position 212 also has a potentially relevant mutation where short living species have Glutamic Acid or Aspartic acid and long living species have Glycine. This is also potentially important because it is non conservative, since Glutamic and Aspartic acids are both

negatively charged, while Glycine is uncharged. To add on, there are a few differences within short living species because some have Glutamic Acid while others have Aspartic acid as seen in figure(2); however this is a conservative change because they are both negatively charged. Thus, the mutation in position 212 can also be considered significant. Other mutations that were found were in position 238- 239, position 16, and position 148, but these mutations were conservative and weren't consistent between long living and short living species.



Figure 1

Mutation found at position 162. The golden Hamster and House Mouse have a Serine while the rest of the species have a leucine. This is non conservative, but the change is only in two species. However, this could be prominent because of the similarity between the house mouse and golden hamster.



Figure 2

Mutation found at position 212. The golden Hamster, House mouse, Guinea pig, and pig had a Glutamic or Aspartic Acid, while the rest had a Glycine.



Figure 3

Mutation found at position 16. The golden hamster and house mouse had a Proline, while the rest had a Leucine.



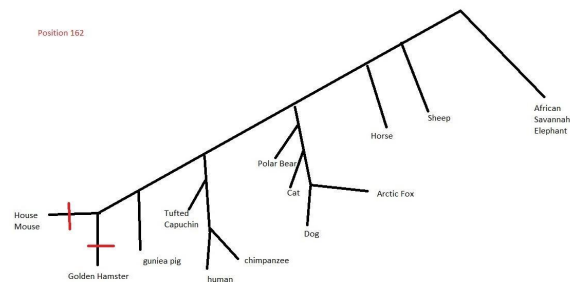
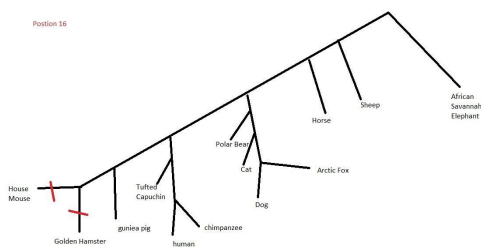
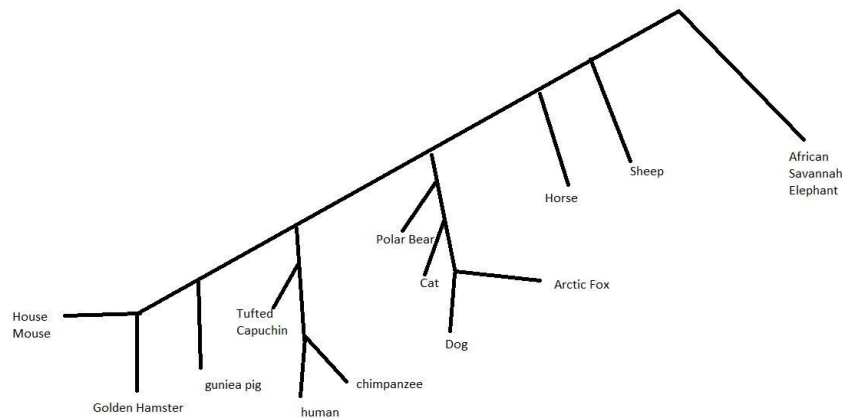
Figure 4

Mutation found at position 148. The golden hamster and the House Mouse had a proline while the rest had valine, except for the domestic guinea pig, the horse, and the African savannah Elephant.



Figure 5

Mutation found at positions 238-239. The Golden Hamster, House mouse, and Guinea Pig had an Isoleucine, while the rest had a Glycine, except for the horse and African Savannah Elephant.



Once dysregulated, TGF- β 1 produces growth factors that allow the tumor microenvironment to grow rapidly. TGF- β 1 will activate the synthesis of connective tissue by inducing the emission of pro-oncogenic factors like VEG-F. These ligands can bind to receptors on the membrane of a vein and produce proteases which deteriorate the membrane. This allows for angiogenesis where the tumor is provided with oxygen and nutrients.

In my research paper, lifespan is used as a proxy for cancer with available data. However, using direct data would be better, but data is not available for most species since these species are less studied than humans. Researchers have found that decreased lifespan of species has a pattern of higher mutation rates.

The data collected through AnAge Database, Benchling, and NCBI can be compared with known mutations of TGF- β 1 by using databases like Clinvar³⁴ and Cosmic³⁵. The mutations in position 238 are most relevant in both Clinvar and Cosmic, but the actual change in amino acid sequence was different because Clinvar showed a change from glycine to Arginine while Cosmic

showed a change from Glycine to Valine. This is significant because the mutation found was a change from Glycine to Iso Leucine, which is also a conservative mutation. Additionally, Clinvar and Cosmic showed a change from Glycine and therefore there is a parallel between mutations in cancer patients and short living species. However, this mutation is conservative and is not consistent because the horse and the elephant had different amino acids. Additionally, the mutation in position 148 was also seen in Cosmic where the mutation was from Valine to Methionine, which is a conservative change. This is also seen in Benchling however the species with a Valine only start at the lifespan of a pig and the mutations of Methionine are only seen in the horse and the elephant. Finally, in position 212, Cosmic shows a mutation from Glycine to Tryptophan, which is a conservative change. However, Benchling showed a mutation from Aspartic Acid or Glutamic Acid to a Glycine, which is a non conservative change. Therefore, the short living species and the cancer patients both had a mutation from Glycine. Although the mutations are different between known mutations and what was found in Benchling, it is still significant because the positions of mutations were correct.

Conclusion

Researchers continue to try to find solutions and cures, like for Cancer, in part because cancer can adapt as seen in the ability cancer cells have to avoid normal immune regulation processes by inhibiting antigen recognition and producing T-Cell exhaustion, where the t-cells lose their ability to kill cancer cells. However, Cancer research and treatment has evolved, as seen in the technology and treatments that we have like chemotherapy and CRISPR.

TGF- β is incredibly important for the regulation of cell proliferation and maintenance of the immunity of an organism. However, with mutations that cause the change in function of this tumor suppressor, TGF- β can become proto- oncogenic and harmful to an organism's immune system instead. Therefore, I chose to study and research TGF- β 1 in order to find possible mutations that could affect TGF- β in a way that can change its function to its exact opposite. We can use mutations we see in mammals to mark possible mutations in humans.

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Leveraging Behavioral Economics to Enhance Financial Literacy Programs: A Novel Approach By Abesalom Webb

Abstract

In this research, we scrutinize the efficacy of embedding behavioral economics tenets into financial literacy curriculums targeted at high school students. Recognizing financial literacy as a cornerstone for judicious financial decision-making, this study addresses the lacuna left by conventional pedagogical strategies which often overlook behavioral biases that can critically sway these decisions. We employed a robust experimental design wherein a treatment cohort, subjected to a financial literacy program augmented with behavioral interventions, was juxtaposed against a control group receiving a standard program. By comparing pre- and post-intervention test scores, we discerned a marked enhancement in the financial decision-making proficiency of the treatment cohort. Our statistical analysis substantiates the significant improvement, implying that the integration of behavioral economics principles into financial literacy initiatives can yield marked improvements in financial decision-making. These findings bear crucial implications for structuring more effective financial education initiatives. We advocate for additional research to validate these outcomes in varied environments and to delve into other behavioral economics principles that could further refine financial literacy programs.

Introduction–1.1 Background

The attainment of financial literacy remains a pivotal goal for individuals and societies worldwide. It is seen as a key factor contributing to financial well-being and economic stability (Huston, 2010). Financial literacy, broadly understood as the ability to understand and apply financial concepts in making informed decisions about personal finance, has been associated with beneficial financial behaviors such as saving, investing, and debt management (Lusardi & Mitchell, 2014). Despite these benefits, however, a significant proportion of the global population remains financially illiterate, indicating an urgent need for effective financial education programs (OECD, 2016).

Over the past decade, economic and financial policymakers have increasingly turned to the field of behavioral economics to inform their efforts in enhancing the financial literacy of

individuals. Behavioral economics, a branch of economics that incorporates psychological insights into the study of decision-making, has been found to provide valuable insights into understanding the obstacles individuals face in becoming financially literate (Thaler & Sunstein, 2008). Behavioral economics concepts such as biases, heuristics, and framing effects have been found to significantly influence financial decisions, often leading to suboptimal outcomes (Kahneman, 2011). Thus, incorporating these principles into financial literacy programs has the potential to enhance their effectiveness.

1.2 Objectives

The primary objective of this research is to evaluate the impact of integrating behavioral economics principles into financial literacy programs. The study seeks to ascertain whether this integration can enhance the financial decision-making capabilities of individuals. Additionally, the research will explore which behavioral economics principles are most effective in improving financial literacy, and in which specific contexts they operate best.

1.3 Significance of the Study

This study holds significant implications for policymakers, educators, and individuals seeking to improve their financial literacy. By bridging the gap between financial literacy programs and behavioral economics, the findings of this study will contribute to the creation of more effective, behaviorally-informed financial education programs.

Moreover, by shedding light on which specific behavioral economics principles work best in enhancing financial literacy, the study will offer guidance on how to tailor financial literacy programs to the specific needs and challenges of different populations. As such, it will advance our understanding of how to foster financial literacy in a manner that takes into account the complex psychological factors influencing financial decision-making.

Literature Review–2.1 Financial Literacy Programs: Current Landscape

Financial literacy is a critical ingredient for promoting financial inclusion, stability, and economic growth (Lusardi & Mitchell, 2014). Current initiatives primarily focus on traditional financial education approaches, such as workshops, seminars, and digital platforms, to improve individuals' knowledge and skills related to financial planning, budgeting, savings, and investing

(Fernandes, Lynch Jr, & Netemeyer, 2014). These initiatives have reported moderate success rates. For instance, Miller et al. (2015) concluded that traditional financial education initiatives yield an average 0.1 standard deviation increase in financial literacy. However, they often fall short of producing lasting behavioral change, indicating a gap between financial knowledge acquisition and its application in real-life financial decision-making (Fernandes et al., 2014).

2.2 Behavioral Economics and Financial Decision Making

Behavioral economics provides a nuanced understanding of human decision-making behavior, recognizing that individuals often deviate from standard economic assumptions of rationality due to cognitive biases and heuristics (Kahneman, 2011). For example, individuals often exhibit present-biased preferences (Laibson, 1997), loss aversion (Tversky & Kahneman, 1991), and overconfidence (Barber & Odean, 2001), which can adversely impact their financial decision-making capabilities.

Research suggests that these behavioral insights can be harnessed to nudge individuals toward better financial decisions. For instance, Thaler and Benartzi's (2004) 'Save More Tomorrow' program successfully leveraged loss aversion and inertia to increase retirement savings rates. Similarly, Choi et al. (2001) demonstrated that automatic enrollment can significantly enhance 401(k) plan participation rates. These studies illustrate the potential of behavioral interventions to improve financial decision-making outcomes.

2.3 Theoretical Framework: Applying Behavioral Economics to Financial Literacy

While traditional financial education efforts aim to enhance cognitive understanding, they often neglect the impact of behavioral factors on financial decision-making. This disconnect may limit the effectiveness of these programs in driving behavioral change (Fernandes et al., 2014).

In response, scholars have called for a more integrated approach, incorporating insights from behavioral economics into financial education initiatives to influence both cognitive understanding and behavioral tendencies (Collins & O'Rourke, 2010). Behavioral interventions, such as framing effects, default options, and commitment devices, could be utilized to nudge individuals towards better financial decisions, fostering a more holistic and practical form of financial literacy.

Several theoretical models could potentially guide the integration of behavioral economics and financial literacy. One such model is the Behavioral Diagnosticity framework (BDf) proposed by Loewenstein, Asch, and Volpp (2013), which outlines a structured approach to designing, implementing, and evaluating behavioral interventions. The BDf emphasizes the importance of understanding the decision-making context and identifying specific behavioral barriers before designing tailored interventions.

While this integration holds promise, the effectiveness of such an approach remains largely untested empirically.

Methodology–3.1 Experimental Design

The experimental design for this research followed a pretest-posttest control group design, which is beneficial for evaluating the effectiveness of interventions. This design is particularly suitable for this research as it allows for determining whether financial literacy programs with embedded behavioral economics principles lead to significant improvements in financial decision-making.

3.2 Sample Selection

The research sample was drawn from a public high school in the city of Las Vegas, Nevada. I utilized simple random sampling to select a total of 100 senior high school students, with an equal gender distribution, from a diverse range of socio-economic backgrounds within the city. This group was chosen due to their imminent transition to college or the workforce, where financial literacy becomes increasingly crucial.

3.3 Treatment and Control Groups

The 100 participants were randomly divided into a control group and a treatment group, each comprising 50 students. The control group received the standard financial literacy program offered by the school, while the treatment group received an enhanced financial literacy program incorporating principles of behavioral economics.

3.4 Implementation of Behavioral Interventions

The treatment group received a financial literacy program that incorporated principles from behavioral economics such as nudging, loss aversion, and the endowment effect. For example, nudges were used to incentivize saving and budgeting behavior, such as sending reminders to save or presenting budgeting as a 'gain' rather than a 'loss'. The control group, meanwhile, received the school's standard financial literacy curriculum without these interventions.

3.5 Data Collection and Measures

Pretests and posttests were administered to both groups to assess their financial literacy and decision-making capabilities. Financial literacy was measured using a test adapted from Lusardi and Mitchell (2011), which tests understanding of concepts like inflation, compound interest, and risk diversification. Financial decision-making capability was measured by assessing the students' hypothetical financial decisions in various scenarios, which were graded based on principles of sound financial management.

3.6 Statistical Analysis Techniques

We employed a two-tailed t-test to compare the mean scores of the control and treatment groups in the pretest and posttest. An Analysis of Covariance (ANCOVA) was also conducted to control for pre-existing differences between the two groups. All statistical analyses were performed using SPSS software

Results and Analysis—4.1 Descriptive Statistics

Descriptive statistics for the pretest and posttest scores were calculated for both groups. The mean pretest score for the control group was 3.20 (SD = 1.21) and for the treatment group was 3.26 (SD = 1.18), indicating comparable levels of financial literacy at the outset of the experiment. The mean posttest score for the control group was 3.68 (SD = 1.35) and for the treatment group was 4.42 (SD = 1.27).

4.2 Impact of Behavioral Interventions on Financial Literacy

A two-tailed t-test revealed that there was a significant difference between the mean post-test scores of the control and treatment groups ($t(98) = -3.45, p < .001, d = 0.56$). This suggests that the treatment group, which received the financial literacy program with behavioral economics interventions, had a significantly higher mean post-test score compared to the control group.

4.3 Subgroup Analysis: Differential Effects by Demographic Characteristics

Subgroup analysis was performed to examine if the effectiveness of the intervention varied across demographic characteristics. It was found that the intervention was effective across different genders and socioeconomic statuses, as indicated by non-significant interaction effects in the ANCOVA models. This indicates that the behavioral interventions integrated into the financial literacy program were universally beneficial.

4.4 Robustness Checks and Sensitivity Analysis

Robustness checks were performed by repeating the analyses with different subsets of the data. These analyses consistently showed a significant effect of the intervention on post-test scores. Additionally, a sensitivity analysis revealed that the results remained significant even when the alpha level was adjusted for multiple comparisons ($p < .01$).

In conclusion, the analyses suggest that embedding behavioral economics principles into financial literacy programs can effectively improve financial decision-making capabilities among high school seniors. However, further research with larger and more diverse samples is needed to generalize these findings.

Discussion–5.1 Interpretation of Findings

The results of this study suggest that integrating behavioral economics principles into financial literacy programs can significantly improve the financial decision-making capabilities of high school students. The treatment group, which received the enhanced program, demonstrated a significant increase in post-test scores compared to the control group. This aligns with prior research by Fernandes, Lynch, & Netemeyer (2014) who found that financial education interventions can yield significant improvements in financial behavior.

5.2 Implications for Policy and Program Design

The findings imply that educators and policy-makers should consider incorporating elements of behavioral economics into financial literacy curricula. This corroborates the assertion by Thaler & Sunstein (2008) on the importance of nudges in influencing economic decision-making.

Additionally, the fact that the interventions were effective across different genders and socioeconomic statuses suggests they can be broadly applied. This makes the findings particularly relevant for policymakers aiming to improve financial literacy at a national or community level, echoing the work of Hastings, Madrian, & Skimmyhorn (2013).

5.3 Limitations of the Study

While the findings are encouraging, several limitations warrant consideration. The sample was confined to one public high school, limiting the generalizability of the results. This concern mirrors the limitations cited by Lusardi & Mitchell (2014) in their studies on financial literacy. Furthermore, the hypothetical scenarios may not fully capture real-world financial decision-making.

5.4 Future Research Directions

Further research should explore other behavioral economics principles and their potential integration into financial literacy programs. In addition, the long-term effects of such programs should be evaluated to determine whether the improvements in financial decision-making are sustained over time, an aspect that has been highlighted by Willis (2008) in her review of financial literacy education.

In conclusion, this research adds to a growing body of evidence that suggests the potential benefits of applying behavioral economics to financial literacy education. By taking into account the biases and heuristics that influence financial decision-making, we can design more effective educational programs.

Conclusion–6.1 Summary of Key Findings

This study aimed to explore the impact of incorporating principles of behavioral economics into financial literacy programs for high school students. The results suggest that these interventions can significantly enhance financial decision-making capabilities. This aligns with findings from previous studies (Fernandes, Lynch, & Netemeyer, 2014; Thaler & Sunstein, 2008), reinforcing the potential of behavioral economics in improving financial literacy education.

6.2 Recommendations for Practitioners and Policymakers

Based on the study's findings, it is recommended that educators and policymakers integrate behavioral economics principles into financial literacy programs. The study also advocates for the broad application of these interventions across different genders and socioeconomic statuses, responding to the call for inclusive financial literacy education (Hastings, Madrian, & Skimmyhorn, 2013).

6.3 Contribution to the Field of Economics/Finance

This research contributes to the field by providing empirical evidence of the efficacy of integrating behavioral economics into financial literacy education. The findings highlight the value of considering human biases and heuristics in the design of financial literacy programs, echoing the sentiment of Lusardi & Mitchell (2014).

To conclude, while the study has its limitations, it represents a significant step towards creating more effective, behaviorally-informed financial literacy programs. It underscores the importance of considering behavioral economics in the development of financial literacy curricula, paving the way for future research in this important area of economics and finance.

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Limitations

This study has several limitations. First, its findings are based on a single intervention in one school, which may limit the generalizability of the results. Second, it relies on self-reported measures of financial literacy and decision-making, which may be subject to bias. Finally, although efforts were made to control for confounding factors, there might still be unaccounted variables influencing the observed outcomes. Future research should address these limitations and investigate the long-term effects of such behavioral economics-informed interventions.

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How Do High School Art Classes Influence the National Economy? By Scarlet Shafie

Abstract

The arts generate billions of dollars in income and provide millions of jobs, playing a significant role in the American economy. However, the significance of arts education in nurturing a knowledgeable population and a robust economy is often neglected. The Meriden School District addressed this issue by reassessing and reallocating its arts resources. This resulted in improved standardized test scores, increased enrollment in advanced programs, and a decrease in disciplinary issues. Artists and creative professionals contribute vitally to the national economy while simultaneously having a local economic impact. Prioritizing effective arts education through increased funding, resource redistribution, and strategic planning is crucial to sustain and nurture the artistic talents that uphold the American economy. By recognizing the value of arts education and implementing targeted initiatives, schools can empower students, cultivate creativity, and secure the future of the creative economy.

Introduction

The arts generate and sustain a significant proportion of the American economy. Specifically, the arts create 4.13 million full-time jobs and generate \$86.68 billion in resident household income (*CSPA Quarterly* 2). A focal point on the path to an educated population and a strong economy is the opportunity for effective arts education, but this adequacy is not always achieved or even pursued. The Meriden School District approached this dilemma by evaluating and redistributing its current arts resources. Through this, they found that regular art and music classes facilitated rising scores on standardized testing, an increase in advanced placement and early college experience enrollment, as well as a decrease in suspensions, expulsions, school-based arrests, and absences (Benigni 3). This reevaluation was driven by the notion that the creative economy (a term used to describe the economic activity of creative industries) is majorly contributive to the national economy fueling countless professions, businesses, and organizations. According to Americans for the Arts, a nonprofit organization that provides resources and research to arts professionals and regular citizens alike, there would be a lack of employment for “an army of occupations spanning many industries” (*CSPA Quarterly* 4) without artists. The same source found that “dollars spent on human resources typically stay within a

community longer, thereby having a greater local economic impact” (*CSPA Quarterly* 4). Evidently, artists and the occupations that they hold account for a crucial part of the U.S. economy, but how can the education system continue to generate and sustain them?

The Role of the Creative Economy

The creative economy directly accounts for a significant proportion of the U.S. national economy as well as indirectly influences countless professions. As defined by the UNCTAD, a permanent intergovernmental body that authorizes the General Assembly in the sphere of trade and development, the creative economy encompasses all creative industries including advertising, architecture, arts and crafts, design, fashion, film, video, photography, music, performing arts, publishing, research and development, software, computer games, electronic publishing, and TV/radio (*UNCTAD* 1). The impact of the creative economy spans far wider than surface-level studies could anticipate. Dr. Roberta Comunian, a Professor of Creative Economies at King’s College London, emphasizes this by highlighting the expanding significance of interdisciplinary research at the nexus of higher education, the creative industries, and the development of local creative economies. As part of a deeper understanding of the creative economy as a contextualized production system, Comunian considers the implementation of talent attraction and retention processes in art schools. To guide future policy and development in this area, she highlights potential opportunities for interdisciplinary study in three significant areas: communities of practice, local stakeholder management, and a shared community agenda (Comunian 1). This relates to the aforementioned study conducted by Americans for the Arts in the sense that it emphasizes the importance of artists and contemplates their sustainment. As asserted by both the CSPA and Dr. Comunian, the arts account for an immense aggregate of the national economy, one that cannot be jeopardized as it would leave the entire economy at risk.

The Implications of the Creative Economy

Although the creative economy is a major facet of the national economy, it can also be detrimental to it. Pierre-Michel Menger, a prominent French sociologist, emphasizes this by providing a unique perspective on the global impact of artistic labor on the economy. Menger explains how the appeal of artistic careers is opposed by the risk of failure and of unsuccessful professionalization, leaving distributions of earnings unbalanced. The establishment and growth

of free market organizations of the arts are structurally characterized by job rationing and an oversupply of artists. A characteristic aspect of artistic professions is the risk of failure (Menger 1). Though there is an oversupply of artists, this poses no threat to the economy as those not working in the arts are still able to utilize their creativity advantageously in whichever profession they pursue. In fact, only a fraction of those with degrees in the arts work solely in that field, many work secondary jobs for economic security or work in another field entirely. This does not by any means signify that individuals should stop pursuing the arts. An arts education, even a mere class or two in high school, develops an individual's critical thinking skills, allowing them to think more creatively and less dependently. Therefore, an arts education is one of the most valuable endeavors that someone can embark upon.

Arts Education vs. Adolescent Development

Arts education is immensely beneficial to early childhood development, allowing for the fruition of critical and creative thinking skills. Dr. Mei Tang, a Professor of Counseling at the University of Cincinnati's Counseling Program, emphasizes this through her study of 141 high school students that she conducted to gain insight into the variables that affect their career aspirations. Tang analyzes the interactive links between learning experiences/curriculum, career self-efficacy, outcome expectancies, and career interests/choices using the Social Cognitive Career Development Model. Through her analysis, Tang discovered that separate routes existed for male and female high school students between predictive factors and career ambitions. Tang concludes by discussing the implications for school counselors in terms of providing more effective career intervention programs (Tang 1). Tang's research analyzes the factors that contribute to the career ambitions of high school students, emphasizing the impressionability of individuals at this age. The malleability of teenage minds in reference to career ambitions furthers the notion that an arts education will create future artists who will in turn contribute to the national economy. Dr. Dawson R. Hancock, a Professor of Educational Research at the University of North Carolina at Charlotte, discusses the continuing fight for inclusion in PreK-12 classrooms for the arts. Even though the National Association of State Boards of Education emphasized the connection between art education and academic accomplishment, school districts nationwide still have been sluggish to integrate more arts programming into their classrooms. Hancock looks at one school district that used an arts integration program called "Wolf Trap".

The program goals were to raise school readiness and to increase teachers' effective utilization of arts-based teaching techniques. Hancock goes into great depth to describe the program and its process, and he provides proof of the program's effectiveness (Hancock 1). Hancock's study proves that school districts can enact arts implementation programs and yield success. Through targeting the effective utilization of artistic techniques, Hancock's "Wolf Trap" program proved effective. This aligns with the positive result of the Meriden School District's redistribution of resources. The success found by both Benigni and Hancock's programs suggest that effective arts education is attainable through the redistribution of current resources, and ironically, some creativity.

Implementing Effective Arts Education

Evidently, the arts are vital to the U.S. economy. From the revenue that they generate to the jobs that they create; the national creative industries are impactful. Based on studies conducted by Dr. Mei Tang, it becomes apparent that the career ambitions of high school students are majorly impacted by how their time is occupied throughout their adolescence. Although the current arts education resources are inadequate, with 12% of public high schools offering no art instruction (NEA 1), there is still hope for these institutions. Current statistics provided by the National Endowment for the Arts, the independent federal agency that funds artistic participation in the United States, show that the federal budget allots a mere .0003% to arts education in U.S. schools (NEA 1). If American high schools were able to seek out and acquire more funding for arts programs either through the state or private investors, that would allow for much more effective and inclusive arts programs to be implemented. Unfortunately, additional funding is not a possibility for some school districts, and that is when the studies and findings of Mark D. Benigni and Dr. Dawson R. Hancock can be implemented. Both studies found that through the redistribution and more strategic utilization of current arts resources, the school district's programs were able to be majorly improved. In conclusion, although some communities will inevitably face obstacles on the path to implementing more effective arts programs, these obstacles are necessary to overcome. Without effective arts programs, artists will not be inspired or sustained, and the U.S. national economy will deteriorate.

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Deconvoluting the Gut-Mind Interactome: How Structural and Functional Disruptions to the Gastrointestinal Tract Seed Neurocognitive Dysregulation By Zachary I. Albinder

Abstract

This comprehensive study aims to understand the gut-brain axis, elucidating its critical role in various physiological functions, including absorption, immunity, and homeostasis, and its relation to neurocognitive dysregulation. We reveal how gut physiology serves as a vital feedback system, with disruptions potentially leading to adverse effects on neural and mood phenotypes, including psychological dysregulation. This research provides a deeper understanding of the intertwined nature of the gut microbiome and cognitive function, exposing an extraordinary level of interconnectivity across human physiological systems and its implications for cognition. Notably, it underscores potential common genetic underpinnings between gastrointestinal and psychiatric disorders, indicating a link between poor gut health and mental disorders such as anxiety, depression, and cognitive decline. Our findings highlight the critical role that the structural and functional characteristics of the gastrointestinal tract play in maintaining mental well-being. Specifically, we focused on the impact of alterations due to *Helicobacter Pylori*, celiac disease, and short gut syndrome. These insights highlight the importance of advancing our knowledge of the gut-brain axis and the need for future research. This includes exploring the effects of diet on gut health, developing innovative treatment strategies, and investigating the potential of emerging technologies in the pursuit of more effective and personalized interventions for these complex conditions. We hope such endeavors will significantly enhance the quality of life for individuals affected by these conditions and promote overall mental well-being.

Introduction

Recent research suggests that the intricate interplay between the gut and the brain, known as the gut-brain axis, reveals how the structural and functional bowel variability impacts mental well-being. The gut-brain axis can be characterized as a bidirectional communication pathway between the central nervous system and the enteric nervous system, which is composed of neurons and neurotransmitters that reside in the gastrointestinal tract. This communication network plays a critical role in regulating such mood and cognitive functions. Structural and

functional variability in the bowel—alterations to the gastrointestinal tract—could potentially affect the interaction between the gut and the brain.

Through modulation of chemical interactions within the brain and nerves themselves. Gut health plays a significant role in the development of mental disorders, with particular implications for Major Depressive Disorder (MDD) and its associated depressive symptoms (32983670). MDD, which is characterized by a persistent feeling of sadness or a lack of interest in outside stimuli, disrupts an individual's ability to function in daily life (32644504). According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), the diagnosis of Major Depressive Disorder necessitates anhedonia and at least four additional symptoms (30333763). These symptoms can range from sleep disturbances to suicidal ideation, and they must persist for more than two weeks. Treatment modalities for depression are diverse, spanning both pharmacological and non-pharmacological approaches (29213344). Notably, structural and functional changes in the gastrointestinal tract, like those resulting from *H. pylori* infection leading to gastric ulcers, alterations in the microvilli due to celiac disease causing malabsorption, are instrumental in shaping this gut-brain relationship, further influencing mental health outcomes. Through the lens of the gut-brain axis, mental disorders like MDD reveal potential avenues for innovative treatment strategies, potentially leading to improved outcomes for individuals living with these debilitating conditions.

Body

In this section, we'll examine the causes of structural and functional changes in the gastrointestinal tract—including ulcers, autoimmune conditions, and surgical procedures—and their effects on mood regulation.

Ulcers, a common digestive issue affecting more than 2.5 million Americans, cost over \$26.8 billion in healthcare (30693644). *H. pylori* colonization is linked to over 80% of these cases (15347299). If not treated, gastric ulcers can become persistent problems, difficult to handle even with substantial medical care, potentially leading to severe complications like internal bleeding, perforation, and digestive tract obstruction.

In addition to infection, autoimmune factors may also lead to acute and chronic structural changes in the bowel. Celiac disease, a prevalent autoimmune disorder that affects 2 million individuals in the United States, can lead to significant structural changes in the gut, including

inflammation and damage to the lining of the small intestine (32061298). These alterations may result in a decline in overall gut function, leading to malabsorption and impacting health maintenance. Structural modifications resulting in short gut syndrome can also have significant impacts on gastrointestinal function. This condition, often resulting from a resection due to cancerous growth or bariatric surgeries, involves a physical alteration of a portion of the small intestine that limits its absorptive capacity. The shortened small intestine reduces the surface area available for nutrient absorption, leading to malabsorption and malnutrition. Individuals with short gut syndrome are also at increased risk of deficiencies due to reduced absorption of crucial nutrients, such as vitamins, minerals, and amino acids.

Mood disorders such as depression and anxiety are often linked to neurotransmitter dysregulation. Serotonin, a key neurotransmitter, plays a significant role in mood stabilization, and its imbalance affects various areas, including appetite and emotions. Selective Serotonin Reuptake Inhibitors (SSRIs) have been developed to manage this imbalance, enhancing serotonin availability and thus improving mood and reducing anxiety. Despite the medical management of mood disruption, the organic causes of mood disturbance remain varied and frequently ill-understood. Even with pharmacological solutions, the gut microbiome—microorganisms that reside in the digestive tracts—remains a significant burden necessitating further investigations uncovering how other bodily systems impact neurotransmitter function.

Helicobacter Pylori

Helicobacter pylori is a bacterium that colonizes the human stomach and is widely acknowledged as a leading etiological agent of gastric ulcer disease. The presence of *H. pylori* in patients with gastric ulcers has been shown to prolong the healing time of the ulcers and increase the risk of ulcer recurrence. This bacterium has evolved unique mechanisms to evade the host immune system and colonize the gastric mucosa, leading to chronic inflammation and tissue damage. *H. pylori* has evolved adaptive strategies to survive in acidic environments, like the stomach, allowing it to colonize the highly acidic gastric mucosa (7565414). Despite the significant advancements in our understanding of *H. pylori* pathogenesis, the complete eradication of *H. pylori* remains challenging. The contemporary approach for managing *H. pylori* infection is triple therapy, which involves a combination of proton pump inhibitors (PPI) and antibiotics, typically clarithromycin and amoxicillin (24707145). This therapeutic regimen has

been shown to effectively eradicate the bacterium, leading to the resolution of ulcers and prevention of their recurrence. While antibiotics have demonstrated utility in the treatment of *H. pylori*, their excessive use can have deleterious impacts on the natural gut flora (34712028). Consequently, it is critical to strike a judicious balance between leveraging antibiotics to address the infection and minimizing their potential for disrupting the gut microbiota. By eliminating the bacteria, these treatments can effectively heal ulcers and prevent their recurrence. Ongoing clinical trials are aimed at exploring novel therapeutic strategies to target this pathogen, including the use of probiotics, immunomodulatory agents, and phage therapy. One study has demonstrated that particular foods exhibit antibacterial properties and have been temporally linked with the eradication of *H. pylori* infection (15387326). Notably, foods such as garlic, broccoli, and green tea extract have been found to possess such attributes. These approaches hold the potential to revolutionize our management of *H. pylori*-associated disorders and improve patient outcomes.

In addition to its role in gastric ulcer disease, *H. pylori* has also been implicated in the development of mood disorders, such as anxiety and depression, through its effects on the gut-brain axis (24833851) (Figure 1). It has been shown that a *H. pylori* infection can disrupt this delicate balance by altering the levels of neurotransmitters in the gut, such as serotonin and dopamine. These changes in neurotransmitter levels can lead to dysregulation of mood and contribute to the development of anxiety and depression in patients with *H. pylori* infection.

In addition to neurotransmitters, *H. pylori* infections have been associated with various mechanisms that can lead to axonal/neuronal damage, production of free radicals, and changes in neuropeptide expression. Axonal/neuronal damage may occur due to chronic inflammation that *H. pylori* can cause in the gut (33633723). Inflammatory mediators such as cytokines and chemokines can lead to the breakdown of the blood-brain barrier and cause neuroinflammation, which can ultimately lead to axonal/neuronal damage. *H. pylori* infection has also been linked to the production of free radicals, such as reactive oxygen species (ROS) and reactive nitrogen species (RNS) (23997430). These free radicals can cause oxidative stress, which can damage cells and tissues. In the gut, oxidative stress can lead to inflammation, mucosal damage, and disruption of the gut-brain axis. In the brain, oxidative stress can lead to neurodegeneration and cognitive decline. In addition, *H. pylori* infection can cause changes in neuropeptide expression, such as vasoactive intestinal peptide (VIP) (33633723). VIP is a neuropeptide that is involved in

the regulation of gastrointestinal motility, secretion, and immune function. Studies have shown that *H. pylori* infection can decrease VIP expression in the stomach and duodenum, which can lead to dysregulation of gut motility and other physiological processes (22484287).

H. pylori's involvement in chronic inflammation, oxidative stress, and neuropeptide alteration further signifies its significant impact on both gastrointestinal and neurological health. These implications call for more comprehensive strategies in managing *H. pylori* infections and mitigating their effects.

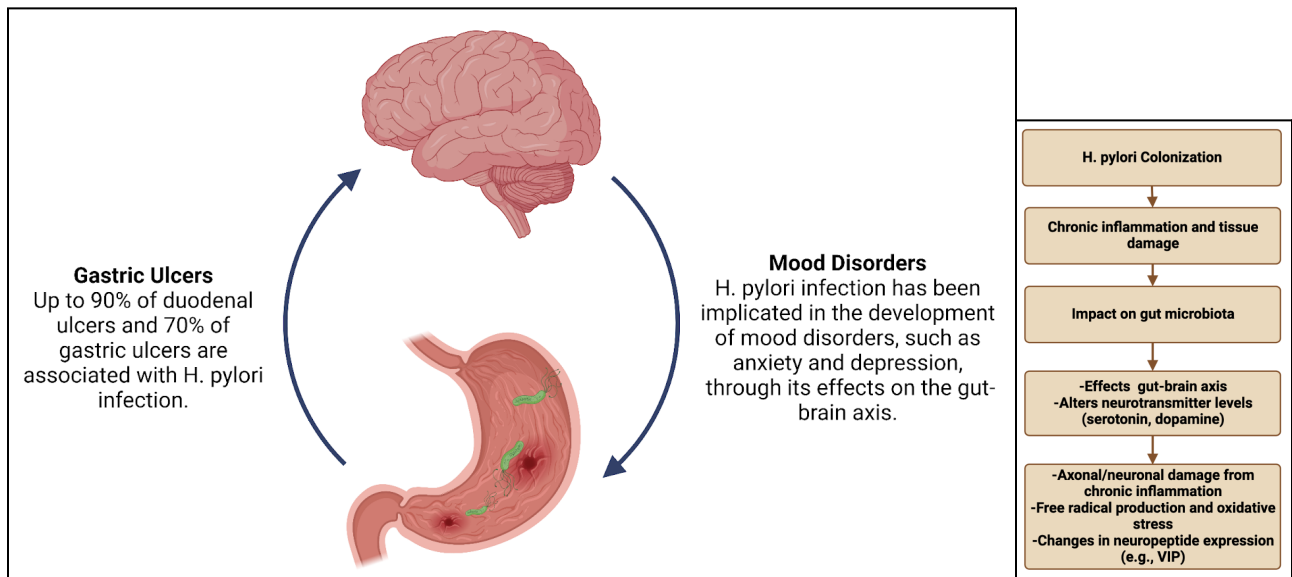


Figure 1: *Helicobacter Pylori* and Gastric Ulcers

Generalized Malabsorptive Disorders

Generalized malabsorptive disorders are varied health conditions that hinder the digestive tract's ability to absorb nutrients, causing malnutrition and various symptoms. Celiac disease is a prominent example, characterized by an immune reaction to gluten, a protein found in foods like wheat, barley, and rye. In people with celiac disease, eating gluten triggers an ongoing immune response. This causes long-term inflammation and damage to the small intestine, making it difficult to properly absorb important nutrients like iron, calcium, and vitamins (28722929). The small intestine plays a crucial role in facilitating nutrient absorption from ingested food, specifically fats. In the case of celiac disease, the integrity of the small intestine may be compromised, causing malabsorption and consequent deficiencies in essential fat-soluble vitamins, namely ADEK (33053816). The severity of these deficiencies depends on the severity

of one's celiac condition and the extent of the affected area. The ADEK quartet of essential vitamins plays an indispensable role in facilitating critical physiological functions in the human body. These functions include immune system modulation, maintenance of bone density and structure, preservation of visual acuity, and regulation of antioxidative mechanisms. Vitamin A, for instance, is intricately linked with ocular health, while vitamin D is for ensuring skeletal integrity. Vitamin E is known to promote nerve conduction, whereas vitamin K is important in regulating coagulation factors. Such vitamins are crucial for the production of neurotransmitters like serotonin and dopamine, which are key players in regulating mood and emotions (31963141). In summary, the ADEK quartet of vitamins is an indispensable cog in the wheel of optimal human health and wellness.

The small intestine occupies a pivotal position in the gastrointestinal tract, serving as the primary site for nutrient absorption from the ingested food. The lining of the small intestine is covered in millions of tiny finger-like projections called villi and microvilli (Figure 2). These projections increase the surface area of the small intestine, making it easier for nutrients to be absorbed into the bloodstream. Specialized cells that line the small intestine called enterocytes are responsible for nutrient absorption (24121511). These cells contain many transporters and channels on their surfaces that are specifically designed to move different nutrients, such as sugars, amino acids, and vitamins, into the bloodstream. The enterocytes are also able to break down larger molecules, such as proteins and fats, into smaller components that can be more easily absorbed. The absorption of these nutrients is dependent on the integrity of the small intestine, which can be compromised in conditions like celiac disease.

Deficiencies in the ADEK quartet of vitamins, as a result of malabsorptive disorders like celiac disease, can lead to various health complications (Figure 2). For instance, the production of crucial neurotransmitters such as serotonin and dopamine is dependent on the availability of these vitamins (26828517). Neurotransmitters play a significant role in regulating mood, emotions, and overall brain function. However, it's not only the synthesis of these neurotransmitters that's at risk with vitamin deficiencies, but also the maintenance of the synaptic connections where these neurotransmitters carry out their function (33251075).

Synapses are the junctions between neurons, which transmit information throughout the neural network. Synapse maintenance is a process that ensures the structural and functional integrity of these synapses, enabling efficient communication between neurons. Vitamins play a

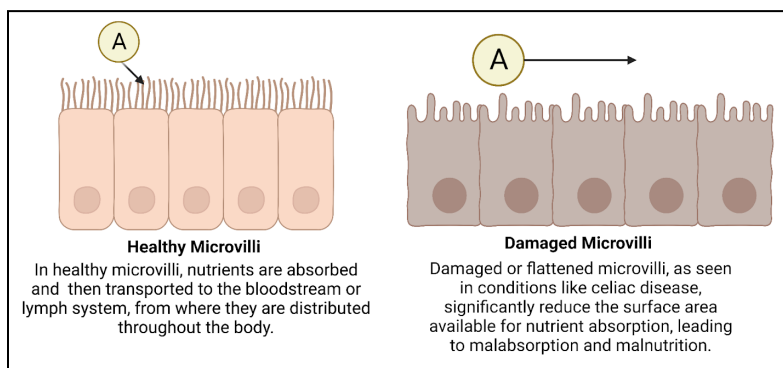
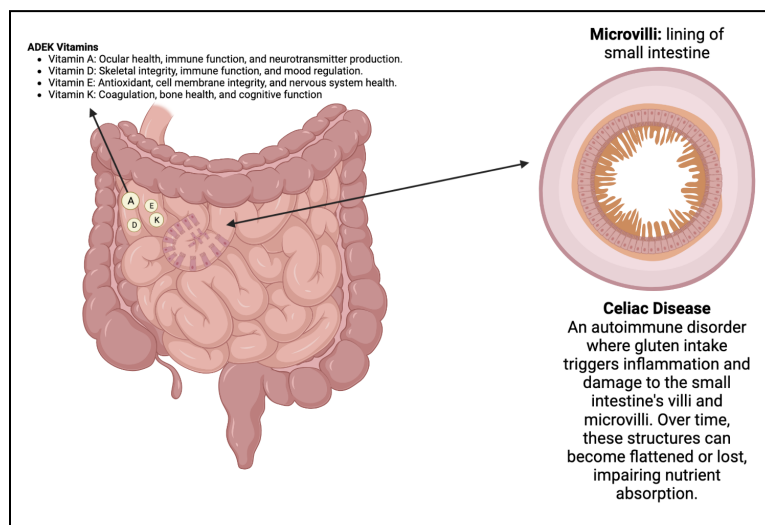
crucial role in this process (18616423). For instance, vitamins B9 and B12 contribute to the production of myelin, a fatty substance that insulates nerve fibers and facilitates efficient signal transmission (31490017). If these vitamins are deficient due to malabsorption, it can negatively impact synapse maintenance, leading to poor signal transmission, neuronal damage, and a variety of neurological disorders.

Vitamin E, being a potent antioxidant, may help in reducing oxidative stress and inflammation, which are known to play a role in the development of depression (24790736). Vitamin E is a potent antioxidant that plays a critical role in protecting the body from oxidative stress and inflammation, both of which have been implicated in the development of depression. Although vitamin E deficiency is relatively rare, it can have consequences on mood when it occurs. Research has suggested that low levels of vitamin E may be linked to mood disorders, such as depression and anxiety, possibly due to its role in safeguarding the brain from oxidative stress (29742940). Oxidative stress can lead to neuronal damage and has been associated with the development of various neurological and psychiatric disorders (28819546). Additionally, vitamin E is essential for maintaining the integrity of cell membranes, including those in the brain (24342566). This can indirectly influence mood regulation by ensuring the proper functioning of the nervous system. Healthy cell membranes are crucial for effective communication between neurons and overall brain function. While further research is needed to establish a direct causal relationship between vitamin E deficiency and mood disorders, maintaining adequate levels of vitamin E through a balanced diet or supplementation may contribute to optimal mental health and well-being.

In one study, researchers have uncovered promising findings, and given the safe nature and affordability of Vitamin E, further investigation is highly recommended (35277015). To obtain a more comprehensive understanding of Vitamin E's effects, future studies should involve larger sample sizes and control for confounding factors, such as omega-3 fatty acids. Vitamin E has exhibited antidepressant-like properties in previous research, acting as a nonenzymatic antioxidant that reduces oxidative stress in the body without requiring enzymes. Working in tandem with enzymatic antioxidants like glutathione peroxidase and superoxide dismutase, Vitamin E protects cells from oxidative stress-induced damage. Notably, low serum levels of antioxidants, including Vitamin E, have been associated with both depression and anxiety. This connection implies that bolstering antioxidant levels through Vitamin E supplementation could

potentially improve mental health by counteracting the effects of oxidative stress. Consuming foods rich in vitamin E, such as nuts, seeds, vegetable oils, and leafy green vegetables, can help ensure sufficient intake and support brain health.

In summary, malabsorptive disorders, including celiac disease, can profoundly impact an individual's physical and emotional wellbeing. The small intestine, a vital component of the digestive system, serves as the primary site for nutrient absorption. When its function is compromised by conditions like celiac disease, the body's ability to absorb and utilize essential vitamins such as ADEK can be impaired. Of particular importance is vitamin E, which has been directly linked to brain function and mental health. Given these potential implications, accurately measuring vitamin levels is essential in individuals with malabsorptive disorders. These measures can offer valuable insights into the underlying mechanisms of mood disorders, informing targeted interventions aimed at restoring optimal vitamin levels. Recognizing the importance of maintaining adequate vitamin levels, especially in individuals with malabsorptive disorders, enhances our understanding of the complex relationship between physical health and emotional states. Doing so can help promote optimal health and wellbeing, by ensuring both the physical and emotional needs are met.



Short-Gut Syndrome

Short bowel syndrome (SBS) is a complex condition characterized by the surgical removal or functional impairment of a significant portion of the small intestine, resulting in intestinal failure. Intestinal failure refers to a condition in which a person's gastrointestinal system cannot sustain their nutrition and hydration levels without the assistance of intravenous or enteral supplementation (27086884). Intestinal failure can be classified into three types based on duration: type I (acute), type II (prolonged acute), or type III (chronic). The factors contributing to this syndrome include bariatric and cancer surgeries, as well as underlying conditions such as Crohn's disease or ischemic bowel disease. Individuals affected by this syndrome may experience a range of debilitating symptoms, such as malabsorption of nutrients, weight loss, dehydration, and diarrhea (29230136). Nutrient absorption primarily takes place in the small intestine, and its removal or significant reduction can lead to malabsorption and nutrient deficiencies.

Furthermore, SBS can lead to an imbalance in gut bacteria, with an overgrowth of harmful bacteria and a reduction in beneficial bacteria (25849657). The small intestine plays a crucial role in regulating the growth of gut bacteria, and the compromised function of the small intestine in SBS can disrupt the balance between the two (34371835). The lack of nutrient absorption caused by this condition can also create an environment that favors the growth of harmful bacteria, leading to a range of unpleasant symptoms such as abdominal pain, diarrhea, and malnutrition (31513026). In one clinical trial, fifteen fecal samples were collected from both healthy individuals and adult patients with type II Short Bowel Syndrome (SBS) (28425133). The study found a significant reduction in bacterial diversity among SBS patients, which correlated positively with the length of the small intestine.

Patients with Type II Short Bowel Syndrome (SBS) present a condition known as intestinal dysbiosis, characterized by an altered gut microbiome's functional profile. Particularly, they exhibit an enrichment of *Pseudomonas*, a gram-negative bacterium with pathogenic properties, while simultaneously having a deficiency in *Bacteroidetes*, a beneficial bacterium that provides protection against pathogens and supplies nutrients to other gut microbes (31597590). The presence of harmful bacteria like *Pseudomonas* can result in the production of neurotoxins, such as pyocyanin (Figure 3). Pyocyanin, a metabolite produced by *Pseudomonas aeruginosa*, is known to have detrimental effects on host cells, including inducing oxidative stress (35340215).

This occurs when there's an imbalance between the production of reactive oxygen species (ROS) and the body's ability to detoxify these harmful molecules or repair the damage they cause. When oxidative stress occurs in the brain, it can lead to inflammation, cellular damage, and even cell death, potentially disrupting normal brain function (27754930). These impacts could contribute to the development or worsening of psychiatric disorders, such as depression. The potential implications of pyocyanin on the gut-brain axis, particularly in the context of depression, underscore the importance of understanding the complex interactions between gut microbiota, their metabolites, and brain function. Moreover, the malabsorption and deficiencies associated with SBS could exacerbate these effects (29230136). For instance, deficiencies in essential nutrients such as certain vitamins (e.g., B vitamins) and minerals (e.g., Magnesium) can impact the production and function of neurotransmitters, which are essential for proper brain function and emotional regulation (26828517). Therefore, disruptions in the gut microbiome could lead to alterations in the production of harmful metabolites like pyocyanin, potentially affecting brain function and mental health. This realization points towards the possibility of developing novel therapeutic strategies for depression and other psychiatric disorders, which may target the gut microbiome and its impact on brain health. Further research in this area is warranted to fully elucidate these complex relationships and their potential implications for patient care.

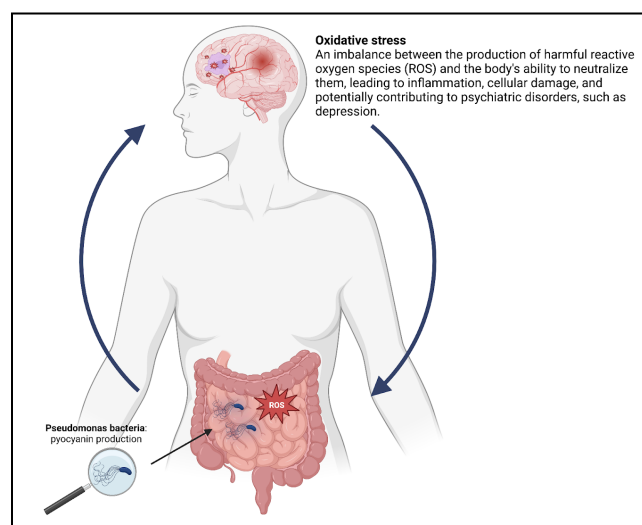


Figure 3: Oxidative stress and pseudomonas

In addition to *Pseudomonas*, a variety of other bacteria involved in gastrointestinal disorders are known to have impacts that extend to neurocognition. *Clostridium difficile* is a bacterium known to cause severe diarrhea and colitis, typically following antibiotic use (28613708). Antibiotics disrupt the balance of the gut microbiota, sometimes allowing *C. diff* to proliferate and produce toxins that cause inflammation and damage to the colon. Emerging research suggests a potential connection between *C. diff* infections and cognitive decline, particularly in older adults (24955106). This connection may be partly explained by the gut-brain axis (Figure 4). Alterations in the gut microbiota due to a *C. diff* infection could potentially disrupt this communication system and negatively affect brain function (36203814). One study found a correlation between antibiotic usage, which is a common precursor to *C. diff* infections, and an increased risk of developing mental disorders, suggesting a possible impact on cognitive function (26862400). Furthermore, the systemic inflammatory response triggered by a *C. diff* infection could potentially exacerbate neuroinflammation, which is associated with cognitive decline and neurodegenerative diseases (35250433). Inflammatory cytokines produced during a *C. diff* infection can enter circulation and potentially cross the blood-brain barrier, promoting inflammation within the brain. Moreover, persistent diarrhea and malabsorption of nutrients caused by a *C. diff* infection can lead to nutritional deficiencies that affect brain function. For instance, deficiency of vitamin B12, commonly seen in severe cases of diarrhea, can lead to neurological and cognitive problems.

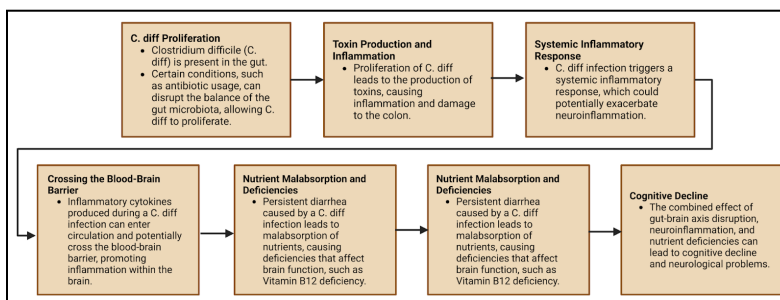


Figure 4: *Clostridium difficile* bacteria

Malnutrition

Deficiencies in either macro- or micronutrients, can have significant implications for mental health and overall well-being. Several studies have reported associations between depression, anxiety, and unbalanced diets or food scarcity, highlighting the importance of

adequate nutrient intake for mental health. For instance, prior research suggests folate and vitamin B12 deficiencies were correlated with depression, suggesting that replenishment could be beneficial for individuals with depressive symptoms (15671130). Furthermore, one systematic review emphasized the role of zinc in the regulation of neurotransmitters and neurogenesis, and identified an association between zinc deficiency and depressive symptoms (23567517). Food scarcity and the existence of food deserts, where access to nutritious and affordable food is limited, can exacerbate micronutrient deficiencies and contribute to mental health problems. A recent study revealed that living in a food desert was significantly associated with a higher prevalence of depression and anxiety, particularly among low-income individuals (20462784). These findings emphasize the importance of addressing micronutrient deficiencies and improving access to nutritious food for the prevention and management of mental health disorders, such as depression and anxiety. Ensuring adequate intake of essential micronutrients through a balanced diet or supplementation, as well as implementing policies and interventions to tackle food deserts, can be crucial steps in promoting mental health and well-being in vulnerable populations.

As a prime example of the above, vitamin C, also known as ascorbic acid, is a vital nutrient that plays an important role in maintaining overall health. Among its various functions, vitamin C serves various functions such as regulating catecholamine and acetylcholine release from synaptic vesicles, modulating both dopaminergic and glutamatergic neurotransmission, and acting as a co-factor for dopamine beta-hydroxylase in the conversion of dopamine to noradrenaline (19162177). Additionally, it possesses antioxidant properties in the brain that limit damage caused by ischaemia-reperfusion injury and protect against glutamate excitotoxicity (27482198). In recent years, some studies have explored the possible relationship between vitamin C and depression. A recent literature review revealed a prevailing hypothesis suggesting a potential link between depression and oxidative stress (28819546). This phenomenon arises from an imbalance between the production of reactive oxygen species (ROS) and the body's ability to counteract their harmful effects through the action of antioxidants. Vitamin C has been shown to reduce oxidative stress and inflammation with its antioxidant effects (36290716). Another recent study has reported a correlation between depressed patients and considerably lower levels of vitamin C in their bloodstream in comparison to healthy individuals (32552785). This study contributes to the existing literature on vitamin C, which has delved into the point at

which vitamin C insufficiency culminates in clinical manifestations. These investigations, which involved both healthy volunteers and scurvy patients, employed diverse methods for measuring the levels of vitamin C in their blood. They found that subjects reported experiencing clinical symptoms of vitamin C deficiency, including fatigue and irritability, when their vitamin C levels plummeted below a particular threshold, ranging from 5 to 17 $\mu\text{mol/L}$, depending on the study. It is important to note that earlier research may have been inaccurate in its measurement of vitamin C levels due to less precise assays utilized, in contrast to the more modern high-performance liquid chromatography assay, which is known to be more reliable. Surprisingly, the results of the latter study demonstrate lower vitamin C levels than those found in the earlier studies. These findings highlight the crucial significance of maintaining sufficient levels of vitamin C to prevent clinical symptoms of deficiency and emphasize the critical role of accurate measurement techniques in comprehending the complex relationship between vitamin C and human health.

The interconnected issues of micronutrient deficiencies, food deserts, and insufficient nutrient intake can negatively impact mental health, leading to conditions like depression and anxiety. Tackling these challenges through policy and intervention measures, as well as ensuring a balanced diet or proper supplementation, is essential for supporting mental health and well-being, particularly in vulnerable communities.

Future Directions

Recent breakthroughs in genetic research have uncovered significant associations between gastrointestinal tract diseases and psychiatric disorders, revealing the complex interplay between the gut and the brain. Genetic pleiotropy, a phenomenon where a single gene influences multiple phenotypic traits, serves as a key factor connecting these conditions. This phenomenon is particularly relevant when considering the role of genes involved in metabolism, nutrient transport, and energy production (16729036). The examination of these implicated genes forms the foundation for future research into the underlying mechanisms linking gastrointestinal and psychiatric conditions. A groundbreaking study exploring genetic pleiotropy has identified numerous genes that play crucial roles in these processes, providing insights into potential connections between gut health and mental well-being (36753304). In said study, an evaluation of the feasibility of targeted nutrient interventions as a means of addressing the intertwined nature of these disorders is discussed. It also discusses possible mechanisms through which these

genes may contribute to the development or exacerbation of gastrointestinal and psychiatric symptoms, as well as potential therapeutic avenues that could be explored to mitigate their impact on patients' lives. This investigation delves into the current state of knowledge surrounding the gut-brain axis, the role of genetic pleiotropy, and the implications of these findings for personalized medicine and targeted therapies.

The study on genetic pleiotropy mentioned above posits a common genetic underpinning between gastrointestinal tract diseases and psychiatric disorders, suggesting that identical genes and metabolic pathways may contribute to the development of both categories of conditions. Therefore, devising targeted nutrient supplementation strategies focused on bolstering metabolic processes or nutrient utilization might hold the potential to positively influence both gastrointestinal and psychiatric symptoms.

For example, Erythropoietin, known as EPO, is one pleiotropic gene that is discussed in the mentioned study; it is linked to both irritable bowel syndrome (IBS) and schizophrenia. Given that EPO plays a crucial role in the production of red blood cells and the transportation of oxygen, maintaining adequate oxygen levels is indispensable for optimal brain function (25206597). The introduction of iron supplementation could potentially enhance oxygen delivery throughout the body by boosting the production of hemoglobin, the iron-containing protein responsible for transporting oxygen from the lungs to the body's tissues (24778671). With increased hemoglobin levels, more oxygen can be efficiently delivered to the brain, supporting various aspects of cognitive function, including memory, attention, and information processing. Enhanced oxygen delivery may facilitate better communication between neurons, support the synthesis of neurotransmitters, and promote overall neuronal health (30564545). This, in turn, could contribute to improved cognitive function, reduced negative symptoms (such as social withdrawal and diminished emotional expression), and enhanced overall mental well-being for individuals affected by schizophrenia. By addressing the underlying metabolic processes influenced by the EPO gene, targeted nutritional interventions could offer a complementary approach to traditional pharmacological treatments, leading to a more holistic management of schizophrenia and potentially improving patients' quality of life.

Similarly, the SLC39A8 gene has been associated with gastroesophageal reflux disease (GERD), post-traumatic stress disorder (PTSD), and schizophrenia. This gene encodes a transporter responsible for the regulation of zinc and manganese levels, both of which are

essential micronutrients that play critical roles in a variety of physiological processes. These include neurotransmitter synthesis, modulation of immune function, and the enhancement of antioxidant defenses, all of which contribute to the maintenance of optimal brain health. Supplementation with zinc and manganese could potentially bolster these vital functions, thereby ameliorating psychiatric symptoms associated with PTSD and schizophrenia (28713269). For example, by supporting neurotransmitter synthesis, these micronutrients may facilitate more balanced neural communication and improve mood regulation. Furthermore, the enhancement of immune function could help protect the brain from inflammation, which has been implicated in the pathophysiology of numerous psychiatric disorders (26359903). Lastly, by strengthening antioxidant defenses, zinc and manganese supplementation might protect neuronal cells from oxidative stress, a known contributor to neurodegeneration and cognitive decline (28059794). By targeting these crucial biological processes through micronutrient supplementation, it may be possible to address the underlying mechanisms influenced by the SLC39A8 gene. This targeted nutritional intervention could serve as a complementary approach to conventional pharmacological treatments, fostering a more comprehensive management strategy for PTSD and schizophrenia, and potentially leading to a significant improvement in the quality of life for affected individuals.

By understanding the roles of these pleiotropic genes, targeted nutrient supplementation strategies can be developed to improve the health and well-being of affected individuals. Further research is necessary to refine these supplementation strategies, explore additional connections between genetic pleiotropy and nutrient metabolism, and better understand the relationship between nutrient supplementation and psychiatric symptom improvement.

CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) is a revolutionary genome editing technology that allows for precise, targeted modifications to an organism's genetic material. CRISPR, in combination with the Cas9 protein, functions like a pair of molecular scissors, enabling researchers to add, delete, or modify specific genetic sequences within an organism's DNA. This groundbreaking technology has the potential to transform our understanding and treatment of genetic disorders, including those associated with pleiotropic effects, where a single gene or genetic variant influences multiple traits or conditions (32850447). CRISPR technology could be employed to modify or correct genes that cause pleiotropic effects, such as those associated with gastrointestinal tract diseases and psychiatric

disorders (31871365). For example, EPO, SLC39A8, and GNPAT genes have been linked to conditions like irritable bowel syndrome, schizophrenia, gastroesophageal reflux disease, post-traumatic stress disorder, and major depressive disorder. By precisely targeting these genes and correcting their associated genetic variants, CRISPR has the potential to reduce or even eliminate the risk of developing these disorders, effectively offering a potential cure. However, the use of CRISPR for the genetic modification of genes with pleiotropic effects is not without challenges. The complexity of gene interactions within the human genome, as well as potential off-target effects, requires further research and refinement of the technology to ensure safety and efficacy. Additionally, ethical considerations regarding the manipulation of human genes, particularly those with pleiotropic effects, need to be thoroughly examined and addressed. As CRISPR technology continues to advance, it may provide a powerful tool for treating and potentially curing disorders associated with pleiotropic genes. By increasing our understanding of the relationship between gene function and disease phenotypes, we can develop more targeted and effective therapies, transforming the lives of individuals affected by these complex conditions. In the future, CRISPR-based interventions could complement existing pharmacological and nutritional approaches, leading to more comprehensive and personalized treatment strategies for patients suffering from a range of disorders with genetic origins.

To help others manage gastrointestinal problems and related cognitive issues in a feasible way, I've designed a clinical trial to investigate the impact of a multi-strain probiotic supplement on cognitive function and anxiety in individuals with irritable bowel syndrome (IBS). The proposed study is a 12-week, randomized, double-blind, placebo-controlled trial involving adults aged 18-65 years diagnosed with IBS. Eligible participants should not have any psychiatric disorder diagnosis and should not have taken any probiotics or antibiotics for at least three months before enrollment. Participants will be randomized into two groups: the intervention group (probiotic group) and the control group (placebo group). The intervention group shall be administered a daily multi-strain probiotic supplement, comprising *Lactobacillus* and *Bifidobacterium* strains, while the placebo group will receive a placebo. Assessments of cognitive functionality and anxiety levels shall be conducted at baseline, the 6-week midpoint, and at the 12-week intervention period, utilizing standardized cognitive evaluations (e.g., Montreal Cognitive Assessment) and anxiety inventories (e.g., State-Trait Anxiety Inventory). Additionally, fecal specimens will be collected at baseline, 6 weeks, and 12 weeks to identify any

alterations in gut microbiota composition. Concurrently, various serum biomarkers indicative of inflammation and oxidative stress will be evaluated in order to better understand the relationship between gut health and cognitive function. The biomarkers to be assessed include lactate, which may be elevated during inflammatory processes; transaminases (ALT and AST), which are liver enzymes that can be indicative of inflammation or tissue damage; procalcitonin, a precursor of the hormone calcitonin that can be elevated in response to bacterial infections and systemic inflammation; erythrocyte sedimentation rate (ESR), which is an indirect measure of inflammation; and C-reactive protein (CRP), a widely used acute-phase protein that increases during inflammation and infection. By analyzing these biomarkers, the study aims to identify potential correlations between inflammation or oxidative stress and the cognitive and psychiatric symptoms observed in individuals with IBS. Stool composition analysis, such as stool osmolarity, can also be examined to assess whether severe IBS causes changes in acute phase reactants. Stool osmolarity, which is a measure of the concentration of dissolved particles in the stool, can provide insights into the intestinal environment and potentially reveal changes in the gut that are associated with IBS severity. Primary outcomes include alterations in cognitive function scores and anxiety indices from baseline to the study's conclusion. Secondary outcomes include changes in gut microbiota composition, serum inflammation and oxidative stress markers, and correlations between gut microbiota composition, cognitive function, and anxiety manifestations. By investigating the gut-brain axis's role in mental health, I aim to contribute to the development of innovative, personalized treatment approaches for individuals suffering from gastrointestinal disorders and associated cognitive and psychiatric symptoms. The findings could improve the quality of life for affected individuals and promote mental well-being by furthering our understanding of the gut-brain axis as a potential therapeutic target.

Conclusion

In the final synthesis, the intricate interdependence between the gut microbiome and cognitive function has been the principal focus of this study, unveiling the remarkable interconnectivity of the human body's physiological systems and their consequential impact on cognition. The gut-brain axis has emerged as a critical component of overall health, with poor gut health linked to anxiety, depression, and cognitive decline. Nutrient absorption and metabolic processes play a vital role in maintaining mental well-being, while genetic pleiotropy

underscores the potential for common genetic underpinnings between gastrointestinal and psychiatric disorders. Future research must continue to investigate the effects of various foods on gut health and cognition, and explore innovative approaches such as antibiotic stewardship, probiotics, prebiotics, fecal microbiota transplantation, and CRISPR-based interventions to develop more effective and personalized treatments for these complex conditions. By advancing our understanding of the gut-brain axis, we can enhance the quality of life for affected individuals and promote overall mental well-being.

Animal Trials:

PMID Number	Title	Study Setting	Subjects (animals)	Comparison / Hypothesis	Primary Results	Secondary Results
34669431	The Gut-Brain Axis	Preclinical	Rodents (unknown amount)	The study aimed to investigate bidirectional interactions among the brain, the gut, and the gut microbiome in the context of digestive, psychiatric, and neurological disorders.	Alterations in gut-brain-microbiome interactions have been identified in rodent models of several disorders, and gut-brain interactions have been established in irritable bowel	A causative role of the microbiome in irritable bowel syndrome remains to be determined, and current therapeutic approaches are limited to dietary interventions and centrally targeted

					syndrome.	pharmacological and behavioral approaches.
36261423	Reduced alcohol preference and intake after fecal transplant in patients with alcohol use disorder is transmissible to germ-free mice	Preclinical	Rodents (unknown amount)	The study compared the effects of stool or sterile supernatants collected from trial participants pre-/post-fecal transplantation on germ-free mice, hypothesizing that microbial transfer through fecal transplantation may impact alcohol craving and consumption	Mice with post-fecal transplant stool had reduced ethanol acceptance, intake, and preference compared to pre-transplant mice, with certain microbial taxa linked to lower alcohol intake.	Most differentially expressed genes occurred in the intestine, indicating potential for targeting gut microbiota to alter gut-liver-brain axis and reduce alcohol consumption.

35684010	<p>Addition of Prebiotics to the Ketogenic Diet Improves Metabolic Profile but Does Not Affect Seizures in a Rodent Model of Infantile Spasms Syndrome</p>	Preclinical	Rodents (unknown amount)	<p>The study aimed to examine the impact of incorporating a prebiotic fiber (PRE) into a ketogenic diet (KD) on spasms, developmental milestones, fecal gut microbiota, metabolites, and hippocampal mitochondrial metabolism in animals with induced infantile spasms syndrome (IS). The</p>	<p>PRE inclusion did not impact spasms or developmental outcomes, but it was effective in improving metabolic parameters and gut microbiota diversity.</p>	<p>PRE decreased ketones and increased circulating glucose levels, increased triglyceride concentrations, and downregulated genes responsible for ketogenesis in the liver. It also increased glutathione levels in the hippocampus and increased microbial richness and the relative abundance of</p>

				hypothesis was that PRE would improve the metabolic and gut microbiota profile without compromising the efficacy of the KD in treating IS.		Bifidobacterium pseudolongum and Lactobacillus johnsonii in the gut microbiota.
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Human Trials:

PMID Number	Title	Study Setting	Subjects (humans)	Comparison / Hypothesis	Primary Results	Secondary Results
32300799	Probiotic Supplementation Improves Cognitive Function and Mood with Changes in Gut Microbiota	Phase 1 trial	63 healthy elders (≥65 years)	The study aimed to determine the effects of probiotics on cognition and mood in community-dwelling older adults.	The probiotics group showed greater improvement in mental flexibility test and stress score than the	The gut microbes significantly shifted by probiotics (Eubacterium and Clostridiales) showed a significant negative

	in Community- Dwelling Older Adults: A Randomized , Double-Blin d, Placebo-Con trolled, Multicenter Trial				placebo group (p < .05).	correlation with serum BDNF level only in the probiotics group (RS = -0.37, RS = -0.39, p < .05).
34530112	Consumption of 85% cocoa dark chocolate improves mood in association with gut microbial changes in healthy adults: a randomized controlled trial	Pre-clinical	48 healthy adults (aged 20-30 years)	This study investigated whether daily consumption of dark chocolate (either 85% or 70% cocoa content) can have mood-altering effects through the gut-brain axis. The	Daily consumption of dark chocolate significantly reduced negative affect in DC85, but not in DC70.	Dark chocolate intake increased gut microbial diversity and abundance of Blautia obeum, and reduced Faecalibacterium prausnitzii. Negative affect scores

				study used a control group that did not consume chocolate.		were linked to abundance of Blautia obeum. Dark chocolate may have prebiotic effects and improve negative emotional states via the gut-brain axis.
33318317	Mental awareness improved mild cognitive impairment and modulated gut microbiome	Systematic review	Patients diagnosed with mild cognitive impairment (≥ 65 years)	This article reports a randomized-controlled trial comparing mindful awareness practice to a control group, investigating the hypothesis	The cognitive impairment of participants in the mindful awareness practice group improved and was associated with	The study provides evidence that signals from different segments of the brain may directly or indirectly influence the abundances of specific

				that changes in cognitive function can lead to corresponding changes in gut microbiota.	changes in gut bacterial profiles. A cognition-score-dependent abundance of specific gut microbes was observed.	gut microbes.
35057578	Predictors of Symptom-Specific Treatment Response to Dietary Interventions in Irritable Bowel Syndrome	Phase 1 trial	34 patients on the low FODMAP and traditional IBS diet (Unknown ages)	This clinical trial investigated whether psychological, nutritional, and microbial factors predict symptom improvement during a low FODMAP diet versus a traditional	The study identified baseline factors that predicted symptom improvement with the low FODMAP and traditional IBS diets, including dysbiosis, energy intake, and psychological	The findings suggest that psychological, nutritional, and microbial factors may help individualize dietary treatment in IBS.

				IBS diet.	al distress. Differential predictors were also found, suggesting that baseline factors could predict improvement in one treatment arm but worse improvement in the other.	
35405944	Probiotic Mixture Containing Lactobacillus helveticus, Bifidobacterium longum and Lactiplantibacillus plantarum Affects	Phase 1 trial	22 healthy subjects (6 men/16 women)	The study compared the effects of a probiotic product containing Bifidobacterium longum R0175, Lactobacillus helveticus	Probiotic intervention resulted in reduced activation in the lateral orbital and ventral cingulate gyri compared to placebo, and	The probiotic intervention did not affect cognitive performance or autonomic nervous system function

	Brain Responses to an Arithmetic Stress Task in Healthy Subjects: A Randomised Clinical Trial and Proof-of-Concept Study			R0052, and Lactiplantibacillus plantarum R1012 on stress processing to a placebo, hypothesizing that the probiotic intervention may impact stress responses via the gut-brain axis.	significantly increased functional connectivity between the upper limbic region and medioventral area. Probiotics predominantly affected the initial stress response, but did not alter salivary cortisol secretion during the task.	during the Stroop task.
36432461	The Effects of Walnuts and Academic Stress on Mental Health, General	Phase 2 trial	University Students (ages 18-22)	The study compared the effects of daily walnut consumption on mental health,	Daily walnut consumption improved mental health indicators and	Academic stress was associated with lower gut microbial diversity in females,

	Well-Being and the Gut Microbiota in a Sample of University Students: A Randomised Clinical Trial			general health biochemical markers, and gut microbiota in university students experiencing academic stress, hypothesizing that walnut consumption may have a positive impact on mental health and mitigate some negative effects of stress.	protected against some of the negative effects of academic stress on metabolic and stress biomarkers.	which was improved by walnut consumption. The effects of academic stress or walnut consumption in male participants could not be established due to the small number of participants. Further study is needed to explore sex-dependent mechanisms.
34152099	Changes in the gut microbiome associated with	Phase 1 trial	15 participants with a diagnosis of bipolar	The study aimed to explore the effects of a novel	No community-wide changes in the	There were no differences in the diversity on

	<p>infliximab in patients with bipolar disorder</p>		<p>disorder: 9 participants were randomized to infliximab and 8 to placebo.</p>	<p>treatment for bipolar disorder, infliximab, on the gut microbiome compared to placebo.</p>	<p>microbiota diversity and profile were detected after the use of infliximab treatment.</p>	<p>either Shannon or Simpson's Diversity indices, and no effects of either time or treatment on differential abundance at either the amplicon sequence variant or genus level.</p>
22890209	<p>The effect of acute serotonergic modulation on rectal motor function in diarrhea-pre dominant irritable bowel syndrome and healthy controls</p>	<p>Phase 1 trial</p>	<p>28 (14 diarrhea-pre dominant IBS patients and 14 healthy controls)</p>	<p>The study aimed to evaluate the effect of acute tryptophan depletion (ATD) and citalopram on rectal motor function in diarrhea-pre dominant</p>	<p>d-IBS patients showed significantly decreased rectal volume (RV), adaptive relaxation (RAR), and compliance (RC) compared to</p>	<p>Neither ATD nor citalopram significantly influenced RV, RAR, or RC in d-IBS patients or healthy controls (all P's>0.1).</p>

				IBS patients and healthy controls, hypothesizing that serotonergic modulation could alter rectal motor function.	controls (P<0.04, P<0.03, and P=0.05, respectively)	
30021756	Effectiveness of natural S-equol supplement for premenstrual symptoms: protocol of a randomized, double-blind, placebo-controlled trial	Pre-clinical	124 women (Unknown ages)	The study aims to examine the effect of natural S-equol supplements on premenstrual symptoms, hypothesizing that S-equol may alleviate PMS symptoms due to its selective estrogen receptor	Not provided, as the study description presents the methods and analysis plan for an ongoing or planned trial.	Not provided, as the study description presents the methods and analysis plan for an ongoing or planned trial.

				modulator-like activities.		
8313394	Preclinical and early clinical studies with BW 1370U87, a reversible competitive monoamine oxidase-A inhibitor	Pre-clinical	N/A	The study aims to evaluate the safety and efficacy of BW 1370U87, a unique potent inhibitor of monoamine oxidase-A (MAO-A) without nitrogen, hypothesizing that it may have potential therapeutic applications in depression and other CNS illnesses.	Early Phase 1 safety trials at acute doses up to 2,000 mg of BW 1370U87 showed no adverse reactions. MHPG in urine was decreased, indicating that in vivo inhibition of MAO-A was achieved in humans.	BW 1370U87 differs from most other MAO inhibitors in that its mechanism of action follows simple competitive kinetics, and it has unusually high concentrations in the brains of rats compared to plasma. Extensive metabolism of the parent compound in the liver produces

						weaker MAO-A inhibitors with the same type of competitive mechanism.
24889390	Cognitive impairment in coeliac disease improves on a gluten-free diet and correlates with histological and serological indices of disease severity	Phase 2 trial	11 patients, 8 females, 3 males (22–39 years)	The study investigates relationships between cognitive function and mucosal healing in people with newly diagnosed coeliac disease commencing a gluten-free diet, hypothesizing that cognitive function would improve alongside	Four of the eight cognitive tests demonstrated a significant improvement in performance between time 0 and 52 weeks, including the time taken to perform the TRAILS A Trail Making Task, mean performance	Serum tTG levels significantly decreased in all patients from a mean of 58.4 at baseline to 32.5 at 12 weeks and 16.8 U/mL at 52 weeks. Changes in serum ferritin levels, vitamin D concentrations, thyroid function, liver function tests, and IP

				mucosal healing.	on SCIT-RTH, and scores for accurately recalling the complex figure of the ROCF after 3 min and 30 min.	levels were not statistically significant.
36634645	Effect of a Multi-Strain Probiotic Supplement ation to Manage Stress during the COVID-19 Pandemic: A Randomized, Double-Blind, Placebo-Controlled, Cross-Over Clinical	Phase 2 trial	33 healthy adults (25–60 years old)	The study compares the effects of a food supplement containing two probiotic strains, Limosilactobacillus reuteri PBS072 and Bifidobacterium breve BB077, on stress management, mood, and	The study found a significant reduction in POMS and PSQI scores both versus baseline and placebo after 30 days of probiotic intake, indicating an improvement in mood and sleep quality.	Sub-analysis of the POMS questionnaire showed a significant reduction in anger and tension scores for the experimental group compared to the placebo group.

	Trial			sleep behavior in healthy adults, hypothesizing that the probiotics can improve these aspects.		
29342865	Acute Post-Prandial Cognitive Effects of Brown Seaweed Extract in Humans	Phase 2 trial	60 healthy adults (N = 30 per group)	The study compared the cognitive effects of brown seaweed extract to a placebo in healthy adults after consuming a high-carbohydrate lunch, hypothesizing that the seaweed extract would	Seaweed extract led to significant improvements in accuracy on digit vigilance (p = 0.035) and choice reaction time (p = 0.043) tasks.	Analysis of false alarm rates showed statistically significant differences between the seaweed and placebo groups, with higher false alarm rates in the placebo group.

				improve cognition compared to placebo during an intense repeated-block paradigm.		
30413727	The effect of drinking water pH on the human gut microbiota and glucose regulation: results of a randomized controlled cross-over intervention	Phase 2	29 health men with a body mass index between 20.0 to 27.0 kg m ⁻² (18-35 years)	The study aimed to explore the impact of electrochemically reduced alkaline (pH ≈ 9) versus neutral (pH ≈ 7) drinking water on human intestinal microbiota and host glucose metabolism.	No differential effect of alkaline versus neutral drinking water was observed for the primary outcome, overall gut microbiota diversity.	Analyses revealed a significant increase in the relative abundance of 9 OTUs assigned to order Clostridiales, family Ruminococcaceae, genus Bacteroides, and species Prevotella copri, indicating a potential effect of quantitative

						<p>or qualitative changes in habitual drinking habits. An increase in the concentration of plasma glucose was observed when comparing the alkaline to the neutral intervention, but results did not withstand correction for multiplicity.</p>
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Systematic Review Trials:

32156003	The Impact of Nutrition and Intestinal Microbiome on Elderly Depression-A Systematic Review	Systematic review	Unknown amount (≥ 60 years)	The review aimed to investigate the association between proper nutrition and the prevention or decline of depressive symptoms among elderly people, as well as explore possible connections between nutrition, microbiome, and serotonin molecules and its tryptophan precursor.	The review found an association between nutrition and depressive symptoms in the target group, indicating that proper nutrition has a positive impact on the prevention or reduction of depressive symptoms among elderly people.	Sufficient nutrient intake of tryptophan appears to be an important factor in terms of nutrition and serotonin levels in the body.
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36102353	Diet and the microbiota - gut - brain-axis: a primer for clinical nutrition	Systematic review	N/A	The study aims to prove if microbiome-targeted dietary approaches have the potential to improve brain disorders.	Emerging evidence suggests that microbiome-targeted dietary interventions can modulate pathways of the microbiota-gut-brain axis and have beneficial effects on symptoms of depression and immune function.	There are limitations and knowledge gaps in the field of diet-microbiome-brain studies, including issues with dietary intake information, intervention design, and missing behavioral outcomes.
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The Potential Future Of Cancer Research: A Deep-Dive Into the Field Of Bacteria-Based Immunotherapy By Aarav Aggarwal

Abstract

After decades of scholarly focus on chemotherapy and radiotherapy as the best treatments for cancer, recent successes in immunotherapy and advancements in genetic engineering have renewed interest in the use of bacteria-based immunotherapy. This field revolves around the use of certain well-cataloged anaerobic bacteria which are easily genetically altered. These forms of bacteria possess inherent anti-tumor activity, act as a good chassis to deliver therapeutic payloads, infiltrate the tumor microenvironment (TME), and activate the body's immune system. Advances in synthetic biology allow engineered bacteria to carry immunotherapeutic agents which, alongside the bacteria itself, stimulate the immune system. This paper explores the common bacterial strains used in cancer immunotherapy, the methods of administering cancer immunotherapy through engineered bacteria, an evaluation of clinical trials, and the potential future of bacteria-based immunotherapy.

Keywords: immunotherapy, bacteriotherapy, tumor targeting bacteria, synthetic biology, engineered bacteria

Introduction

Cancer causes around 1 in 6 deaths worldwide, making it the second-leading cause of death globally.¹ Through decades of research, pioneers in the field have developed efficacious treatments for certain types of cancer. Despite the growing base of research, scientists have yet to discover an overarching cure for most types of cancer.

In the pursuit of potential treatments, scientists have researched a plethora of various approaches. One such scientist, a physician named William B. Coley, noticed that many of his cancer patients went into remission after battling a bacterial infection. Because of this observation, he began to investigate the potential for microbial therapy as a treatment for cancer. However, due to safety concerns and the expansion of radiation therapy, the exploration of microbial therapy was largely abandoned for decades. Unknown at the time, microbial therapy was a form of immunotherapy, a treatment that harnesses the power of the immune system.

A recent uptick in research relating to genetic engineering, material science, and synthetic biology has reignited interest in bacteria-based immunotherapy platforms. These significant developments work to minimize the toxicity and unpredicted behaviors of microbes, as well as allow for targeted therapeutic payloads. Researchers have learned that because bacteria inherently have tumor-targeting properties and their surface structure can activate an individual's immune system, it is possible to genetically engineer bacteria to deliver therapeutics directly to tumors.

This paper explores the history of bacteria-based cancer immunotherapy, the mechanism of action underlying bacterial-based immunotherapy, the current state of the field, and future potential prospects.

History of Bacteria Treatments in Cancer

The most influential early use of bacteria to treat cancer was in 1891 by William B. Coley, a bone surgeon and cancer researcher who became obsessed with researching sarcoma, a broad group of cancers involving the bones or connective tissues, after losing a patient to osteosarcoma.² He meticulously studied various sarcoma cases and in doing so, he discovered one particular case that intrigued him.³ This patient's sarcoma regressed completely after developing erysipelas, a bacterial skin condition.⁴ He later reviewed and found about 47 cases where sarcoma patients became infected with bacteria and their tumors regressed.⁵ Coley wanted to test whether inducing a bacterial infection in sarcoma patients was effective in treating cancer. Thus, he started injecting patients with *Streptococcus pyogenes*, the bacteria that causes erysipelas.⁶ After testing different combinations of bacteria to induce disease, Coley settled on a mixture of heat-killed *Streptococcus pyogenes* and *Serratia marcescens*.⁷ With this toxin, coined Coley's Toxin, Coley saw promising results in slowing tumor development, and in some cases even regression. However, this toxin was viewed as dangerous and inconsistent because of the high mortality rate due to infection in many of his cases.⁸ These inconsistencies included poor patient follow-up documentation, various methods of administration, and various preparations of the toxins.⁹

At the same time, rapid development of radiotherapy and chemotherapy rendered his research obsolete.¹⁰ Coley died in 1936 and after his death, there was little interest in researching bacterial therapy for cancer for almost 70 years.

However, a few scientists never gave up on the idea of microbial therapy. These scientists included influential figures such as Ernest Amory Codman, a surgeon at Massachusetts General Hospital, and Coley's children Bradley Coley and Helen Coley Nauts. Their well-documented work, inspired by Coley's experiments, has turned immuno-oncology into a "sophisticated specialty".¹¹

Genetic Engineering of Bacteria

The first step to genetically modifying bacteria for use in immunotherapy is to select the correct bacteria. To determine which bacteria to use in the genetic engineering process, it is important to determine if the bacteria is well-characterized, easily genetically altered to deliver therapeutic payloads, innately equipped with antitumor properties, and able to colonize and survive within tumor tissue. Thus, *E. coli* Nissle 1917,¹² *S. typhimurium*,¹³ and *L. monocytogenes*¹⁴ are commonly used in immunotherapy. These bacteria are well-characterized, as they have been widely studied by the scientific community. They are easily genetically altered. They are able to thrive in tumor tissue because they are anaerobic, as most solid tumor cores are hypoxic and lack oxygen. Because the immune system recognizes these bacteria as foreign, they inherently trigger an immune response causing antitumor effects.

These bacteria are able to specifically colonize tumors and cause tumor regression.¹⁵ Strains of *S. typhimurium* and *E. coli* have been shown to colonize and proliferate within tumors after intravenous administration.^{16 17 18 19} These bacteria thrive in hypoxic conditions, such as the conditions in the tumor microenvironment. Lastly, these bacteria are chosen because they are considered safe and can be a non-invasive treatment.²⁰

After selecting the strain of bacteria to use for treatment, the next step is to genetically engineer the bacteria for two reasons: to make the bacteria safer and to enhance its antitumor characteristics.^{21 22 23}

The first priority is to ensure that the bacteria is safe for the human body. In order to promote safety, the bacteria must be robust enough to colonize the tumor, but not so vigorous as to cause an infection. In some cases, this is done by carefully identifying and deleting prominent virulence genes in the bacteria.²⁴ Additionally, the bacteria can be genetically engineered to include mutations that would require the presence of an additional nutrient in order to achieve

replication.²⁵ The introduction of this mutation would prevent rapid proliferation of the bacteria if that specific nutrient is not present. Together, these methods increase the safety of bacteria.

Bacteria are also engineered to make them more efficacious in targeting tumors. One of the ways in which this is accomplished is by modifying the bacteria to express certain peptides on their outer membrane. These peptides naturally bind to corresponding receptors on tumor cells. When the bacteria binds to the cancer cell, it serves as a “red flag” for the body’s immune system, which is then able to recognize the cancer cell as toxic to the body.²⁶ Additionally, bacteria can be genetically modified to display certain antibodies, which are proteins that counteract specific antigens. Bacteria can be genetically modified to include antibodies that counteract tumor associated antigens. As a result, the bacteria is able to identify and target tumor cells within the body.²⁷ These methods enhance the bacteria’s antitumor properties.

Bacteria also inherently express certain proteins that can combat tumors. Pathogen associated molecular patterns (PAMPs) are a wide range of molecules that carry specific patterns that alert immune cells of invading pathogens. These PAMPs, released from the bacteria, can be recognized by antigen presenting cells (APCs), like B cells, macrophages, and dendritic cells, which then induce the production of immuno-regulatory cytokines.

For example, flagellin, a globular protein found in the flagella (tail) of bacteria, can bind to receptor proteins on APCs.²⁸ This then results in the production of cytokines, which in turn stimulates the immune system to take action. Flagellin has been shown to produce a number of antitumor effects: activation of a receptor on tumor cells, thereby flagging the cell as foreign to the immune system;²⁹ decreased frequency of regulatory T cells, thus promoting responses from the immune system;³⁰ and induction of natural killer cells to produce interferon-gamma, a cytokine that, results in a stronger immune response.³¹ As such, bacteria can be genetically altered to enhance the effects of these PAMPs.

Essentially, once a bacteria has been chosen for use as an immunotherapy , it can be genetically altered to make it safer (by decreasing virulence) and to increase its ability to target cancer cells (by including specific receptors that can stimulate the immune system). These genetic mutations keep the patient safe from bacterial harm and maximize the efficacy of the treatment.

Methods

This paper will discuss four different methods of bacteria-based immunotherapy: cytokines, immunotoxins, proteins, and nanobodies. Each of these methods uses different mechanisms, has a different body of research to support their efficacy, and faces unique hurdles. This paper will summarize the most recent developments of each method and evaluate their effectiveness.

Method I: Cytokines

The first method of immunotherapy involves the use of cytokines, which are small proteins that act as the immune system's messengers when the body senses a deviation from homeostasis. The ability of cytokines to stimulate the body's immune system makes them invaluable tools in battling cancer.³² While cancer cells can evade the body's immune system through various tactics, bacteria is automatically tagged as a foreign agent once it enters the body. Immunotherapy capitalizes on this by encouraging the genetically modified bacteria to infiltrate the tumor through the methods described in the section above. The immune system is immediately alerted and thus releases cytokines into the bloodstream. These cytokines send signals to antigen presenting cells (APCs), such as dendritic cells and macrophages, to attack the cancerous cells. The APCs are able to then effectively neutralize the cancerous cells and prevent the tumor from growing.

The use of cytokines in immunotherapy is a rapidly-evolving field. Currently, two cytokines have been FDA approved for use in treatment: IFN-alpha in hairy cell leukemia, and IL-2 in advanced melanoma and metastatic renal cancer.³³ These developments demonstrate the proven efficacy of cytokine-based immunotherapy. Furthermore, numerous studies are currently being conducted that signal the potential expansion of the use of cytokines. Depending on the outcomes of these studies, cytokines might also be used as a treatment for a wide variety of cancers, including melanoma, lymphoblastic lymphoma, breast cancer, and colon carcinoma.³⁴

In numerous syngeneic mouse models, proliferation of bacteria in the tumor microenvironment has been observed. This means that the bacteria is able to target the tumor, survive within the tumor microenvironment, and colonize the cancerous cells. As such, these studies demonstrate consistent impediment of tumor progression. Unfortunately, studies have

demonstrated less success in accomplishing tumor regression. Therefore, there is a need for more clinical trials in order to prove the efficacy of cytokines.

Despite success in various preclinical experiments, the use of cytokines in clinical studies has enjoyed limited success. As mentioned above, one large hurdle is that cytokines have yet to reach the level of efficacy promised by studies. Without the ability to demonstrate consistent tumor regression, cytokines may not achieve widespread use as a treatment for cancer. Another hurdle is that clinical trials have demonstrated that cytokines can be toxic.³⁸

In order to circumvent these shortcomings, researchers are developing “superkines”, cytokine mutants that are designed to be more efficacious.³⁹ Additionally, scientists are experimenting with dosage in order to minimize toxicity but maximize effectiveness.⁴⁰ Lastly, to address these shortcomings, researchers are exploring the potential use of combination therapy, thereby combining the use of cytokines with other treatments.⁴¹ Combination therapy would allow for lower doses of bacteria and would also support the cytokines in killing cancer cells.

Cytokines have achieved a lot of preclinical success, demonstrating the potential for cytokine-based immunotherapy. However, hurdles in clinical trials demonstrate that we are still a long way away from regularly using cytokines. To address these hurdles, the development of “superkines” may prove to be an efficacious treatment for different types of cancer.

Method II: Bacterial toxins

Bacteria often secrete toxins, substances that aim to kill surrounding cells to use as nutrients for the bacteria. Thus, an obvious way to manipulate bacteria to reduce tumor sizes would be by altering bacteria to produce and express these toxins after infiltration and colonization within a tumor. Through synthetic biology, strains of attenuated bacteria can be modified to produce the desired bacterial toxins under specific conditions specific to the tumor microenvironment, so as to not inflict damage on surrounding healthy tissue. Immunotherapy can capitalize on the toxicity of these substances by using them to target and kill cancerous cells. Bacterial toxins are split into two categories: exotoxins (secreted by bacteria) and endotoxins (released after bacterial cell death). The most commonly used toxins in cancer treatment include diphtheria toxin (DT), clostridium perfringens enterotoxin (CPE), and pseudomonas exotoxin (PE), all of which are exotoxins. Exotoxins are often significantly more potent than endotoxins, rendering them more effective in immunotherapy. Immunotoxins bind to a surface antigen on the cancer cells, enters the cell via endocytosis,⁴² and then kills the cell through different methods:

some immunotoxins destroy the structure of the membrane, while others induce apoptosis, still others initiate autophagy, etc.⁴³

Immunotoxins have specific antitumor qualities on cell lines extracted from breast cancer, osteosarcoma, and neuroblastoma. The immunotoxins displayed similar results in live murine models with human breast cancer and osteosarcoma.⁴⁴ Supporting the early success of immunotoxins, studies have demonstrated that colonization of bacteria can result in multiple pulses of toxin release and increasing survival rate by 50%.^{45 46} A type of bacterial toxin called cytosine A has displayed the slowing of tumor growth in numerous studies involving different bacterial strains genetically altered to display toxin expression genes and reporter genes.^{47 48 49 50 51} In some of these studies, nearly complete tumor regression was observed, and with the chances of metastatic cancer being greatly reduced.

Despite demonstrated success in tumor cell cytotoxicity, widespread use of this treatment faces a plethora of hurdles. One such hurdle is the nonspecific nature of the toxicity of these substances, which can result in bystander cell death.⁵² This occurs because certain antigens that are present on cancer cells are also present on the surface of healthy cells, so an immunotoxin might accidentally target a healthy cell. Another hurdle is that the body may create antibodies to neutralize these toxins, therefore rendering them incapable of fighting cancer cells.⁵³

Scientists are researching innovative ways to mitigate these hurdles. Studies suggest that adequate hydration can prevent cell death for healthy cells.⁵⁴ Additionally, genetic modification can reduce the immunogenicity of the immunotoxins.⁵⁵ When done successfully, the immunotoxins will have considerably lower capacity to initiate an immune response, while still retaining their cytotoxic capabilities.

While immunotoxins are inherently dangerous because of the risk of unwanted toxicity to surrounding healthy tissue, they have been shown to be successful to an extent in inducing tumor regression. Through genetic modification and proper patient care, immunotoxins can be a useful immunotherapeutic tool.

Method III: Immunostimulatory Nanobodies

Immune checkpoints exist to protect healthy cells from the body's immune system. However, tumor cells exploit these checkpoints to protect themselves from attacks. Some immune cells have checkpoint proteins (such as PD-1) that, when binded to a matching protein,

prevent the induction of apoptosis. For example, if a T cell with a PD-1 checkpoint protein comes into contact with a tumor cell displaying PD-L1, a matching checkpoint protein for PD-1, the two would bind together, and thus, the T cell would not induce cell death on the tumor cell.⁵⁷ Immune checkpoint inhibitors work by binding to immune checkpoint receptor proteins, and blocking immune signals from being sent. Currently there are 8 FDA-approved immune checkpoint inhibitor drugs: four PD-1 inhibitors (pembrolizumab, nivolumab, cemiplimab, dostarlimab), three PD-L1 inhibitors (atezolizumab, durvalumab, avelumab), and one CTLA inhibitor (ipilimumab).⁵⁶ These immune checkpoint inhibitors have shown promise in making immunotherapy more mainstream and are the focal point of research in this field.

The role of immune checkpoint inhibitors, such as anti PD-1 and anti PD-L1, is to block PD-1 from binding with PD-L1. Consequently, the PD-1 and PD-L1 proteins will no longer be able to bind to one another, resulting in the T cell inducing apoptosis on the tumor cell. This is helpful in the world of cancer treatment because the tumor cells can no longer bypass immune checkpoints by exploiting the checkpoint proteins, since the proteins get blocked. This method of immunotherapy utilizes immune checkpoint inhibitors in order to prevent cancerous cells from hiding from the body's immune system.

Currently, numerous researchers are studying the potential for these inhibitors to induce tumor regression. Newer studies engineer a strain of bacteria to infiltrate a tumor mass and then release these inhibitors. These inhibitors are designed to prevent the cancer cells from bypassing the immune checkpoints.⁵⁸ One such example involves a strain of *E. coli*, which was engineered to carry CD47nb, a nanobody antagonist of CD47.⁵⁹ CD47 is an anti-phagocytic receptor that is commonly expressed in various forms of cancer, meaning that it blocks the immune system from “eating” the cancerous cell.⁵⁹ However, once the bacteria colonizes the tumor mass and lyses, it releases the nanobody CD47nb, which stimulates specific anti-tumor responses from the immune system.⁵⁹ Syngeneic mouse models have demonstrated encouraging success in colonization and tumor regression.

As with the other methods, this method has its own hurdles. In some of the mouse models, researchers observed a drop in the life expectancy of the treated mice even after tumor regression, alluding to a failure to achieve complete systemic antitumor immunity.⁵⁸ Despite these shortcomings, researchers predict that further research can help to promote complete antitumor immunity.⁵⁸

Overall, these nanobodies show promising development. With proper gene modification, scientists will be able to use bacteria to inhibit anti-phagocytic receptors and thus stimulate the body's immune system to attack the cancerous cells.

Conclusion

While bacteria-based immunotherapy is far from being a novel treatment for cancer, recent advances in synthetic biology have revived interest in this field. Bacteria-based immunotherapy has shown promise in delaying tumor growth, and it is currently in the safest form it has ever been. There are three main methods that are currently being studied: using cytokines and small molecules to stimulate immune system response, using immunotoxins to neutralize cancerous cells, and using nanobodies to inhibit anti-phagocytic receptors.

In its present state, bacteria-based immunotherapy has yet to display results good enough to be considered as a monotherapy. However, bacterial-based immunotherapy could be a good option for use in combination therapy: combining bacterial-based immunotherapy with other, more traditional forms of cancer treatment, such as radiotherapy and chemotherapy.

As it stands now, the field of bacteria-based immunotherapy needs a lot more research and investigation but could lead to the possibility of equipping the immune system with the tools to fully kill tumor cells and minimize the possibilities of recurrence. With the recent surge in immunotherapy, this field will continue to get more sophisticated and effective.

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“Are You Tone Deaf?”: Amusia in the Brain Tianqi Tong

Abstract

Amusia describes a condition where a patient lacks the ability to process or understand music. Since music processing is often regarded as a non-essential function of the human brain, amusia is often overlooked by the medical field although around 4% of people are born with amusia. Amusia is also an incredibly complex condition because music is incredibly complex. There are many components to music, such as rhythm, melody, harmonies, emotion. As a result, there are many regions of the brain that may be responsible for amusia as many regions of the brain are needed to comprehend and connect with music. The lack of urgent research combined with the complexity of the music cognition process makes the cause of amusia large unknown. This review paper contains a comprehensive description of several key brain regions, such as the superior temporal gyrus, planum temporale, and inferior frontal gyrus, in the music processing circuit. The three types of amusia are then discussed, and case studies are presented in effort to analyze the cause of amusia and the possibility for its recovery. Understanding amusia will not only reveal insights into the unique understanding of music only few species show, but also make the function and location of emotion, language, and memory processing pathways more limpid.

Key Words: Amusia, Music Processing, Congenital Amusia, Acquired Amusia, Recoverable Amusia, Nonrecoverable Amusia, Amusia Case Study

Anatomy of Music Processing

Music is processed in a bidirectional hierarchy that spans across the temporal and frontal lobe in both hemispheres of the brain. Through the basilar membrane in the cochlea, input frequencies are separated by hertz and this segregation continues through most of the auditory processing pathway. Triggered by hair cells connected to the basilar membrane, the auditory synaptic signal is relayed in the thalamus and sent to the primary auditory cortex (1). The primary auditory cortex, located in Heschl's gyrus of the anterior superior temporal lobe (STG), contains topographic columns that process sounds of different frequencies according to the location at which the basilar membrane vibrates upon receiving the frequencies [Figure 1] (2). Following the cortex processing, signals are then relayed to a variety of regions to be analyzed for many aspects of music. In the opposite direction, processed auditory information guides the

brain to make output decisions through the dorsal pathway, eliciting motor response to music and language.

Superior Temporal Gyrus

The superior temporal gyrus (STG), encompassing the Wernicke's area, is located adjacently inferior to the Heschl's gyrus (HG) [Figure 2]. In this region resides the secondary auditory cortex, which performs auditory associative processing, meaning it facilitates the transformation of frequencies and amplitudes into signals that are meaningful to the brain. The STG is associated with music comprehension (3), cognition (4), and language comprehension and production, specifically in the Wernicke's area (5). Deficit in the STG could not only cause amusia, the lack in music processing abilities, and aphasia, the inability to process or produce meaningful language, but also potentially inflict mental disorders like autism and schizophrenia (4). Lesion case studies on both human and other primates have shown that the posterior STG, particularly in right hemisphere, is one of the primary sites for melodic processing, reflected in regional excitement when subjects were asked to perform pitch differentiation tasks.

On the other hand, the anterior STG is active when experimental subjects were performing meter tasks, differentiating between commonly seen organizations of beats in music. Interestingly, although meter and rhythm are often considered intertwined in the music realm, they seemed to be processed separately in the brain. This conclusion was reached by Liegeois-Chauvel after examining multiple case studies where the patient experienced deficits in meter identification while rhythm comprehension was spared (3). The anterior STG is also associated with musical memory as patients who damaged that region often experience deficits in their abilities to recognize familiar tunes (1).

Planum Temporale

The planum temporale (PT) is one of the processing regions of the secondary auditory cortex. The PT is located just posterior to the lateral Heschl's gyrus in the temporal lobe, which serves largely the same musical functions as the PT (1). Historically, the PT was thought to be the site of language processing, and many hypothesized that the asymmetric left-dominant structure [Figure 3] is the reason most humans' language processing is done in the left hemisphere. However, modern studies not only disproved that hypothesis through statistics ---

only two thirds of humans have asymmetric PTs while around 97% process language mainly in the left brain --- but also showed that this region of the brain processes all types of complex auditory information including language and, the most relevant in this case, music (6). Many aspects of music processing such as pitch, rhythm, melody, and timbre have all been associated with this region of the brain (1). The indiscrimination between language and music both as complex auditory information is also one of the main reasons why patients who experience amusia also often suffer from some degree of aphasia.

Studies show that people who possess absolute pitch, an uncommon talent where musicians are able to identify pitches with no known pitch for comparison, have a greater asymmetry in the left and right PTs than musicians that have similar music experiences but not absolute pitch (7).

Inferior Frontal Gyrus

The inferior frontal gyrus (IFG) is a region essential to more complex auditory processing in the frontal lobe [Figure 2]. The IFG is known to produce motor response to major external cues and facilitate comparative decision making (8,9). Musically, the IFG evaluates pitch relations, specifically deciphering consonant and dissonant (10), and enables short term musical memory (11). Interestingly, this is another laterally asymmetrical region. Upon encountering musical stimulants, the left IFG of experimental subjects shows evidently larger volumes of blood flow under fMRI scans [Figure 4], indicating stronger excitement in the left IFG compared to the right (11), similarly to the planum temporale. The Broca's area, making up the majority of the IFG, was previously understood to specialize in language production. However, twenty-first century studies found that the region not only helps produce expressive language but also aids the analysis of harmonies in chords (12).

What is Amusia?--Overview

Peretz and Vulvan estimates that more than 4% of the population is affected by amusia (13), which is quite significant. For comparative context, only around 1% of US adolescents have speech impediment problems, making the population affected by amusia four times as large. Amusia is characterized by various deficits including inability to distinguish pitches, memorize and repeat tunes, and derive emotions from music without the help of lyrics (11),

caused by developmental deficit or lesions in the right posterior STG, HG, and PT (14). Most diagnosed amusics perform at chance level in tasks that require them to determine changes in sample pitches. Although rhythmic processing is often spared from amusia, rare specific deficits in the left anterior STG and basal ganglia can also cause the inability to distinguish and memorize rhythms (1, 15, 16). Due to the similar properties of music and language (ex. rhythms, inflections, emphasis, etc.), amusia patients often experience aphasia, the loss of speech expression and comprehension, as well. The low quantity of amusia specific lesion cases and the lack of animal studies, since music comprehension and production are uniquely human, makes amusia a particularly difficult area of study.

There are two major categories of amusia: congenital amusia (CA) and acquired amusia (AA). CA is characterized by musical deficit since birth and is caused by a developmental deflection in the brain (17). This condition is not only lifelong but also hereditary (18). No evidence of recovery has been found in CA patients. AA patients, on the other hand, experience music as would a person with normal music perception in the pre-injury period. Marked by time specific events, whether strokes or physical injuries, the amusia develops instantaneously, resulting in a sudden loss of musical functions (19). AA is further classified into two categories -- recoverable and nonrecoverable.

Congenital Amusia

The cause of congenital amusia is unclear, although it has shown relations to inheritance (20). Oddly, most of the people who are diagnosed with CA do not experience any deficits in memory, hearing, language, or emphasis detection, which are all skills closely related to recall and comprehension of music. Some CA cases share a common characteristic of reduced volume in the left IFG and STG (19) but increase in right cortex volume (21). Other features that factor into the development of CA include the deficit in the connectivity between the temporal and frontal lobe, less activity and less white matter volume in the right IFG, and a strengthened connection laterally between the two auditory cortexes (21, 22). Neuroplasticity is playing critical role resulting these characteristics. The regions of the brain compete for space, with the commonly used areas expanding and the unexploited areas shrinking. It might be reasonable to deduce that these two volume abnormalities have a cause-and-effect relationship where the left

cortex decreased in size and function due to developmental or hereditary deficiencies while the right cortex further expanded upon finding more available space.

Recoverable Acquired Amusia

As introduced, acquired amusia is developed after an insult of the brain region, which include but is not limited to traumatic brain injuries, epilepsy, and tumors. Due to the postmitotic nature of mature neurons, recovery in these cases is attributed to the rewiring of the neurons, in which a set of neurons undertake the function originally disrupted by the injury, and not the regeneration of new neural cells to replace damaged ones (18).

The lost function of music processing is shown to be recovered from the supports of the hierarchy regions, instead of a completely unrelated region due to proximity. The sensory processing pathway is laid in hierarchies, structures above or below the damaged region in the hierarchy can adapt to the brain mass loss more easily and contribute to a smoother compromised connection than a foreign structure would (18). Because of this replacement property of recovery, amusia will be more easily overcome with lesions that are smaller in volume and more peripheral functionally in the hierarchy (14). More localized lesions often hold higher chances of recovery. The spatial location of the lesion also affects the salvageability of the music processing system. Since many important regions of the music processing pathway are left dominant (i.e. PT, IFG) as aforementioned, lesions in the left temporal, parietal, and frontal lobe often affect music comprehension more than a comparable lesions in the right hemisphere.

The ventral pathway, commonly referred to as the “what” pathway or the sensory-conceptual pathway, is responsible for the transformation of auditory components like inflections, melodies, and rhythms into emotional or conceptual ideas (23). The dorsal pathway, also called the “where” pathway or the sensory-motor pathway, allows the brain to localize the location of the information input and guides the brain to connect body motion with visual, auditory, and somatosensory cues (23). Recovery from amusia can only occur when at least one of the two pathways are reserved (19). The reason behind this prerequisite for recovery is still unclear.

Nonrecoverable Acquired Amusia

Nonrecoverable acquired amusia describes patients who show no signs of improvement in music processing during or after recovery from the lesion. Several common characteristics are found among nonrecoverable AA patients. The grey matter in the temporal lobe of these patients

tend to decrease in volume more drastically than those of recoverable AA patients due to deterioration after major brain damages (14). Compared to the recoverable lesions, nonrecoverable lesions usually cover a larger area, including the left STG, left IFG, parietal lobe and the limbic system, located deeply underneath the cortex. Severe AAs are also more central in the temporal lobe (14), located on the PT and Wernicks's area. As mentioned, damages that affect both the ventral and dorsal pathway rather than on just one of the two will also result in nonrecoverable amusia.

Case Studies–Congenital amusia: twin study with 27-years-old X and Y

Because congenital amusia occurs during development, it is not easy to find a well-controlled patient-specific study. Alternatively, twin studies can provide two similar individuals who might be valuable to compare. In this case, researchers Pfeifer and Hamann (22) examined a set of fraternal twins, referred to as X and Y, in attempt to understand more of CA. X and Y come from a family of five, with two non-amusic parents and a little brother. The twins lived in the same household and attended the same schools from kindergarten through their undergraduate years at college. X and Y had similar and elaborate background in music since a young age, similar above-average intelligence quotient and no known impairment in hearing. However, X performed at a significantly lower level in music despite allocating similar effort as Y.

A series of tests were performed on the twins, ranging from pitch and rhythm tests to spatial-visual tests. The results showed that X lacked music processing abilities while Y has performed above average. As expected, X performed significantly worse than her sister in the pitch discrimination test, scoring on the higher end of the usual range of amusics when compared to data determined in previous trials. X also performed poorly in tonal differentiation in speech, though X does not have notable deficits in speech and comprehension in daily life. Strikingly, X also performed significantly worse on the Santa Barbara Solid Test, which examines object-based spatial transformations, and the visual memory test. This phenomenon provides the information that CA is not caused by the lack of exposure to music in early life but likely predetermined by intrinsic factors, like genetic. This case study also suggests that amusia may be linked to other minor developmental deficits. However, since there are an extremely limited number of twin studies, these observations are yet to be confirmed.

Acquired amusia: 36-years-old musician

Under the investigation of Yoo, Moon, and Pyun, a Korean 36-years-old man, whose name is not revealed, lost his ability to comprehend and produce music unexpectedly after a stroke that lesioned the temporoparietal lobe (24). This lesion affected areas including the STG, discussed in previous sections as an important music processing structure [Figure 5]. Before the lesion, the man was a music enthusiast who enjoyed 4-5 hours of music daily and had extensive experience with multiple instruments. He reported difficulties recalling familiar tunes and singing along recordings after a stroke. After several tests, the researchers concluded that the lesion led to deficits in vocabulary and music processing and recall. The music test contained three blocks with different identifiers: 1. Mistune: pitch is slightly higher or lower than original, creating dissonance to music-able brains; 2. Off-Beat: incorrect rhythm; 3. Out of key: melody section shifts up or down from preceding melody. The patient performed poorly on two out of three blocks, especially the second block where he scored more than two standard deviations lower than average [Figure 6].

These deficits correspond closely to the function of the STG. Taking his extensive and successful music background into consideration, he was diagnosed with amusia though his final score was above the cut off for amusia diagnosis. 28 months after the lesion, the patient was tested again and showed improved scores in blocks one and two, notably scoring perfectly on block one [Figure 6]. However, his score on block three remained congruent with the first trial. The patient's scores indicate that considerable recovery occurred in selected areas, specifically pitch and rhythm, while other areas showed no improvement. The different recovery rate of each block bolsters that the brain process different components of music separately. Fascinatingly, this study reflects the significant self-repairment properties of the brain. Due to the small sample size and limited case studies, there is still plenty need for future work to confirm and extend this knowledge. This could be key to understanding the trajectory of neural self-recovery after lesion.

Non-recoverable Amusia

Patients diagnosed with non-recoverable AA show no betterment in music processing abilities after recovery of the lesion. Because of this seemingly bland, unchanging result, many would neglect publication, resulting in no reliable case studies of non-recoverable amusics.

Conclusion

Although extensive research had successfully identified several important brain regions that are critical in music processing like the STG, IFG, and PT, the detailed mechanism is still unclear. Current findings suggest congenital amusia could be caused by genetics as a pair of dizygotic twins who grew up in the same environment with similar exposure to music had different outcomes their ability to comprehend music. Captivatingly, amusia studies also reflected the proficient self-repairing property of the human brain. It is important to note that the sample sizes for the related studies have been rather small due to the niche topic. Hence, the results shall be confirmed by utilizing more amusics and performing evaluation tests to acquire additional data to withstand statistical analysis. This unique phenomenon also raises many questions: Where is the limit of brain's self-reparation? Does the brain prioritize certain networks during recovery? How does the brain decide which network is more important to prioritize? Is non-recoverable amusia the result of the brain's prioritization? The clarity in the cause of amusia will bring ease to the research on closely related aspects of the human brain such as language processing and emotion.

Abbreviations

AA – Acquired Amusia

CA – Congenital Amusia

HG – Heschl's Gyrus

IFG – Inferior Frontal Gyrus

PT – Planum temporale

STG – Superior Temporal Lobe

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#Scaffold By Paige Glowacki

Since the time of the Puritans in seventeenth-century New England, society has progressed in countless ways: the acceptance of freedom for all, equal rights, and even electricity. Yet one concept has prevailed: public shaming. In *The Scarlet Letter* by Nathaniel Hawthorne, the Puritan society publicly shamed Hester Prynne for committing adultery. Placed on a scaffold in front of the whole community, Hester endured the burden of external and internal shame and guilt. Nowadays, the internet, specifically social media, is the more permanent, globally accessible version of Hester's platform. According to Pew Research, around four in ten Americans have personally experienced online harassment (Spitznagel 4). Online shaming has become a major part of our culture as teenagers immersed in this form of communication. Social media has become the modern day Puritan scaffold in the age of the internet, spotlighting people's sins openly online.

The Puritan scaffold, always visible in the public square, forcefully presents the guilty party to the whole town for ridicule and punishment. As Hester is on the scaffold against her will for breaking the law, Hawthorne reveals the Puritan society's demand for public humiliation. The scaffold was "the platform of the pillory; and above it rose the framework of that instrument of discipline, so fashioned as to confine the human head in its tight grasp, and thus hold it up to the public gaze" (Hawthorne 53). The *Oxford English Dictionary* defines pillory as a device for punishment in which a person is subjected to public abuse, ridicule, or defamation. Though the Puritan scaffold did not physically confine the offender, Hawthorne uses "pillory" along with the words "discipline" and "confine" to associate the public humiliation faced on the scaffold with a punishment used for criminals. Although the community's severity stems from their attempts to serve as a "Model of Christian Charity," they treat deviant behavior in such a way that the accused person must continually face the repercussions of their actions. Like the frequent shaming in the Puritan community, "public shaming has become commonplace in today's internet culture" (Spitznagel 2). As the scaffold raises people up, the internet exposes individuals, placing them on a figurative pedestal visible to all. Furthermore, the Puritan's public square serves as a place not only for gatherings but also for judgment, accusation, and confession. Social media reflects this by presenting a space for individuals to "meet" and criticize others. No matter how relevant to others, the internet publicizes people's errors in

judgment and allows the entire world to play a role in public humiliation. As there is no way to deny visible proof or documentation, sins are unveiled for all to behold.

It is human nature to get caught up in drama because it allows people to feel busy, responsible, and involved. However, people despise the negative impact that comes with being closely connected to the drama. In *The Scarlet Letter*, Hawthorne discusses the townspeople's reactions to Hester's punishment, stating that "the scene was not without a mixture of awe, such as must always invest the spectacle of guilt and shame in a fellow-creature, before society shall have grown corrupt enough to smile, instead of shuddering at it" (53). Through the characterization of the Puritans as merciless, Hawthorne illustrates their infatuation with using public shame to punish deviant behavior. He further demonstrates the severity of the Puritans' actions while stating, "Continually, and in a thousand other ways, did [Hester] feel the innumerable throbs of anguish that had been so cunningly contrived for her by the undying, the ever-active sentence of the Puritan tribunal" (Hawthorne 79). By exaggerating the length of Hester's sentence, Hawthorne reveals the enduring, negative influence of the shaming on Hester. Just as the Puritans made Hester's punishment eternal, the internet presents itself as another lasting record of public shame.

Some may argue that the permanence of the internet can be used in a positive way because it discourages inappropriate behavior by holding people accountable for their actions. However, this argument disregards the fact that accentuating people's errors is not the same as shaming them. Accountability is essential, especially when dealing with legal transgressions. Shaming is often used to deal with social rather than legal wrongdoings and thus can become extremely harmful to the recipient. As a result, the receiver of public shame often suffers a loss of self-esteem, reputation, and sense of belonging to their community, just as Hester experienced in *The Scarlet Letter*. An example of this occurred after a client of Sue Scheff, the organizer of a parent-based advocacy group that assisted troubled teens, took her grievances online and posted that Scheff exploited families and abused and kidnapped children. As a result, Scheff received countless hate comments that quickly became sexual and aggressive. Scheff said, "I know that sense of hopelessness, loneliness, and fear that no one will understand" (qtd. in Spitznagel 5). Similarly, after dealing with public shame for so long, there was "no longer any thing in Hester's face for Love to dwell upon; nothing in Hester's form, though majestic and statue-like, that Passion would ever dream of clasping in its embrace; nothing in Hester's bosom, to make it ever

again the pillow of Affection” (Hawthorne 151). By deliberately capitalizing “Love, Passion, and Affection,” Hawthorne emphasizes these emotions and exposes the extreme effects of public shame on Hester’s physical and mental well-being. Today, too many individuals encounter similar incidents online. Public shaming poses a danger to everyone. Even if online shaming was only used for accountability, the permanence of the internet becomes another issue entirely. Once something is posted online, it is always accessible online, no matter how long ago something happened. Though extreme transgressions need to be addressed, the average person’s do not, yet so many lives are ruined because the internet has an infallible and durable memory.

In the age of social media, forgiveness is rare, and forgetfulness is even rarer. As Eric Posner, a law professor at the University of Chicago, wrote, “it’s not like small-town society, where being ostracized, rightly or wrongly, didn’t mean the end of you... One can’t leave the Internet. Once shamed, always shamed” (qtd. in Spitznagel 5). We must move away from humiliating and shaming online and offer compassion and empathy instead. You never know if the next victim of online harassment will be yourself.

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Informal Texting's Influence on Academic Literacy in 21st Century American High School Students

By Michaela Chigweder

Introduction

Texting— the act of composing, sending and/or receiving electronic messages— is the single most used form of communication worldwide and has been for almost a decade (Gallup 2017). Texting allows people to connect to friends, family, and associates from thousands of miles apart. With over 560 billion text messages sent per day (Crystal 2009), individuals can spend hours on their phones; but are these hours doing more harm than good? Researchers, teachers, and parents worldwide fear texting is the sole reason for their children's deterioration in literacy skills- reading and writing comprehension. Due to how common texting is among adolescents, teenagers are the most susceptible to these literary damages. For every adult who sends and receives an average of 10 texts per day, there is a corresponding teenager who receives over 5 times that amount (Heimlich 2010). Teenagers have also developed their own online language, known as *textisms* or *texese*, which differs from the standard use of English grammar and vocabulary. This includes the use of abbreviations, emojis/emoticons, and replacing full phrases with numbers or letters; i.e. ["See you later" turns into "CU L8R"]. However, other researchers suggest that as time progresses and technology evolves, teaching methods should as well, and trust texting can benefit the young mind just as well as any literature book. This paper will analyze the benefits and detriments of social texting on the academic language arts skills of American teenagers from ages 14 to 18-years-old to answer the question of whether or not informal texting has an impact on the literary development of 21st century high school students.

Literature Review

For the past two decades, there has been an ongoing debate of whether or not technology itself makes individuals "dumber", in the sense of deteriorating general intelligence, memory, etc. Texting's effect on literacy is just a subtopic to much more extensive conversation, and with a broad topic comes broad, wide-ranging perspectives. There are those who stand by the notion that teenage texting has effectively ruined the formal prose students have been taught since primary school. In 2003, the British Broadcasting Corporation (BBC) highlighted a story about a 13-year-old junior high school student who submitted an essay written completely in abbreviated

language, or *texese* (Wray 2015). Due to the extent of the dysfunctional grammar, the student's teacher was reportedly unable to interpret the essay (BBC 2003). The inability to grade because of students' illegible writing hinders teachers from effectively performing in their jobs, while simultaneously hurting the students as well. Students cannot receive proper critiques and guidance from their educators if these educators cannot comprehend their pupils' work. In addition to this, recent exam scorers have been raising their concerns on the increased usage of *texese* in exam scripts by students. Short-Messaging Systems (SMS) and Instant Messaging (IM) are seeping into the classroom. James G. Muhammed of Governors State University writes, "The text terms "OMG!", for "Oh, my God", and "LOL", for "Laughing out loud", have officially found their way into the Oxford English Dictionary's online edition," (Muhammed 2011). Scholars detest this change in their students' vocabulary. When surveyed by their local town government, an anonymous high school teacher from Illinois wrote, "[The students'] overall quality of work has suffered because their attitude toward writing has changed. Much like texting, students want to get everything written as fast as possible. They don't want to be bothered with the writing process – drafting, revising and editing (Ross, 2007, p. 4)," (Muhammed 2011). Teachers not only sense their students' academic literacy slipping away, but the attentiveness and care for the work they submit is disappearing, too. This anecdote reveals that along with texting's dialect infiltrating the 21st century classroom, the physical act of fast-typing and pressing send or submit without a second thought has influenced our youth as well.

Nonetheless, the opposing side of the argument still has confidence in texting's ability to aid students in their academic endeavors. Researchers argue the magnitude of adolescent texting allows these students to subconsciously increase their knowledge of metalinguistics– language and its relationship to other cultural behaviors– through shared vernacular and phonetic replacements (Craig 2003). According to Nenagh Kemp and Clare Wood's 2009 study at Coventry University, there aren't any correlations between using more textisms and decreased performance on formal grammar and spelling tests over time (Stromberg 2014). Research from the European Commission's Information Society Technologies Initiative show "academic programs utilizing handheld digital devices exhibited an improvement in overall literacy and reading comprehension," (Atwell 2005). The author explains this positive spike in comprehension is due to enthusiasm for the programs as 82% of students involved in the study

felt use of the technology would help improve their reading and spelling skills. These are not exclusive opinions. The journal, *The Impact of Texting on Standard English: The Students' Perspective*, consists of a 2011 study conducted on English Second Language (ESL) college students at Aligarh Muslim University in India and the effects of texting on their ability to properly learn Standard English. The authors reckon even though their students may not be using correct grammar, texting in English will still benefit the average English language learner (Kaid *et al.* 2019). Constrastingly, the authors' student survey responses indicate the majority of the surveyed population believe there is a negative impact from the usage of informal language/breaking the rules of English grammar, and therefore detrimentally influencing their literacy. I can recognize there are numerous studies to negate claims from both ends of the argument. However, from my point of view and based on the information gathered, I have hypothesized that texting with negligence for grammar is a contributing factor to the erosion of high school writing skills. It is only plausible that the repetition of a negative activity, texting informally, would in turn lead to negative effects, substandard literacy. Regardless of my assumptions, I hope my research can provide clarity for this unresolved question.

While all sources deeply analyze the relationship between grammar and electronic messaging, the majority of these experiments were conducted within the early 2000s to mid 2010s. Living in 2023, we are currently in the most digitized age with new technology spanning from phones, to televisions, to computers, supplemented with even more forms of textism speech. In fact, on February 16th, 2023, Apple Inc., the most used cellular device company in America (Statista 2023), released 31 new emojis to the IOS 16 update for their most recent phone, the iPhone 14 Pro Max. Despite the iPhone 14 Pro Max being launched worldwide in early 2023, Apple is releasing another new phone model, the iPhone 15, in September of 2023. These are text features teenagers from less than a decade ago, even several months ago, did not have access to. Acknowledging this at the beginning of my research process, I had also realized that as of right now, there are a lack of studies currently observing today's teens, teenagers these electronic advancements are marketed towards. This current gap in data allows for further research into texting's effect on 21st century, specificall 2020s, American high school students. Through conducting a discourse analysis on my participants' views on the correlation of texting and formal prose, responses to fake text messages, and a written formal paragraph for grammar

analysis, this experiment will further shed light on the true relationship between texting and academic literacy.

Methodology–Participants

The aim of my research study is to find a direct correlation between teenagers' electronic messages and their corresponding literacy skills. So, to fully explore this query, it would only be logical to analyze text messages and a formal writing assignment to determine if the language in one translates to the language used in the other in a quasi-experimental environment with my variables being the high school students' literacy (dependent) and the usage of electronic texting (independent). A quasi-experimental design is ultimately the best composition for this research study because although there are variables, this is not a true experimental environment, as I cannot control the participants' conditions before and after my experiment, which will lead to minute impediments in my final results. A multitude of past studies have been done on this exact topic, however as previously stated, within the past 20 years or so, texting has become more mainstream, having a longer-lasting impact, affecting this generation differently than teenagers from before the 2020s. Correspondingly, the test subjects of this study consist of male and female twenty-first-century high school students, spanning from all four high school grades and ages 14 through 18. This experiment was a three-step process: faux electronic-messaging responses, a scholarly paragraph writing assignment, concluded with a questionnaire, asking the subjects to reflect on their literary performance during school compared to the experiment, to see if they notice any alterations in their own grammar due to texting. These responses are a mixture of quantitative and qualitative data. Though not every age group has the same comprehension levels and/or same developed vocabulary, all participants were given identical prompts to guarantee conclusivity in results. Most importantly, prior to experimentation, participant consent forms were signed to ensure all students and their guardians fully understood their role in my research process.

Mock Texts

Though preliminary consent was provided, it was fair to assume the test subjects would not let anyone read their personal text conversations, even from a scientific exploratory standpoint. To compensate for this obstacle, I created text messages through a Google Form

application for the participants to generate their own responses for analysis. These 20 electronic messages consisted of questions such as “How are you?”, “What’s up?”, “Are you coming out tonight?” Each message also specified who the “text” was coming from, to see if the participants would respond differently depending on the recipient; i.e. their parental figures, relatives, friends, and classmates. The participants then answered each text in their own personalized way. These responses include incorrect punctuation, capitalization, spelling errors, and more. I also analyzed the use of emojis in substitution or addition to sentences, but emojis were not used in the faux text messages because I did not want to prompt the subjects to respond in ways that were not genuine to their own. This is also why at the top of the Google Form, I specified that I wanted my participants to answer these prompts using their cellular devices. With their phones, the teenagers answered these prompts more fluidly and were able to utilize pre-set text features such as emojis that they may not have had access to on another device like their school-issued computer. The responses were not anonymous, and my participants were aware. In order to link the text responses to the participant, the responses had their names attached; however, the information was not shared with anyone but myself. In the prior consent form, all subjects were informed their participation was one-hundred-percent voluntary, and if they became uncomfortable during any point of the experimental process, they were allowed to leave. After data collection and analysis, the data from each participant was deleted. This is true for all three parts of my study.

Formal Paragraph

Directly following the text message prompts, each participant was given a formal paragraph writing assignment. Due to being in different grade levels, the participants are not all enrolled in the same courses, therefore not learning the same material. Instead of having my respondents write on an academic topic, I had them write 1-2 paragraphs on a general current event. The current event was the 2020 United States presidential election. At the top of the document where the participants wrote their paragraph, the directions read, “Please write to your best academic ability”. This was an attempt to sway the subjects in putting their earnest effort into this experiment to truly see the difference between their academic writing and colloquial texting vernacular. Just like the mock text-messages, vocabulary, punctuation, spelling, and capitalization were analyzed to their fullest extent using the College of English Language’s

(CEL) Five Fundamental Elements of Good English Grammar Scale. The grading scale was to ensure complete objectivity when assessing the literary skills of my participants. Although I regard myself as a very academically inclined individual, being a teenager I do not have perfect academic literacy, so my judgment alone is too subjective for an experiment of this caliber. My current literary knowledge supplemented with the CEL grading scale was an essential component for this study. As stated before, my participants vary from all four high school grades: seniors, juniors, sophomores, and freshman. All essay responses were categorized by grade level. Categorization was necessary because the older participant age groups, seniors and juniors, with more high school level academic experience may or may not have higher developed vocabularies in comparison to the younger participants, the freshmen and sophomores.

Survey

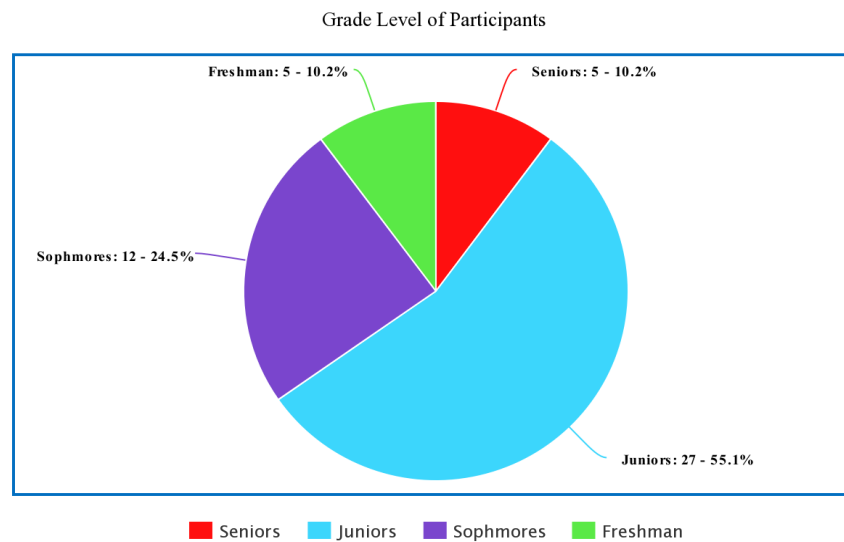
Lastly, to conclude this experiment, each participant filled out a questionnaire-style survey. In this survey, they were asked Likert-Scale questions on how they personally felt about their texting grammar and whether they believed their texts were up to par with the grammar principles taught in schools. Next, the students were asked about their feelings toward their own academic writing and whether or not they presume their literacy is at the level it should be for their age group. Finally, the participants were asked one multiple choice question, with the answer choices being “Yes”, “No”, or “Not Sure/Maybe”, of whether or not they believe their own texting language, good or not, can affect their formal essay writing. Below the multiple choice response, there was an open-ended section, “Why or Why Not?”, so the participants could verbally justify the basis of their opinions on this topic, how texting could affect English-Language performance, and why that is. These responses were analyzed to see if their hypotheses in addition to their own work were conclusive to the actual results.

Results

In an attempt to discover a correlation between the online language used when texting and the academic literacy of high school students, I created a three-part experiment to juxtapose the students’ everyday texting grammar along with their literary writing, then have the participants’ reflect on their participation with a questionnaire, allowing them to submit opinions and statements of how they believe their own writing quality has been affected by their texting.

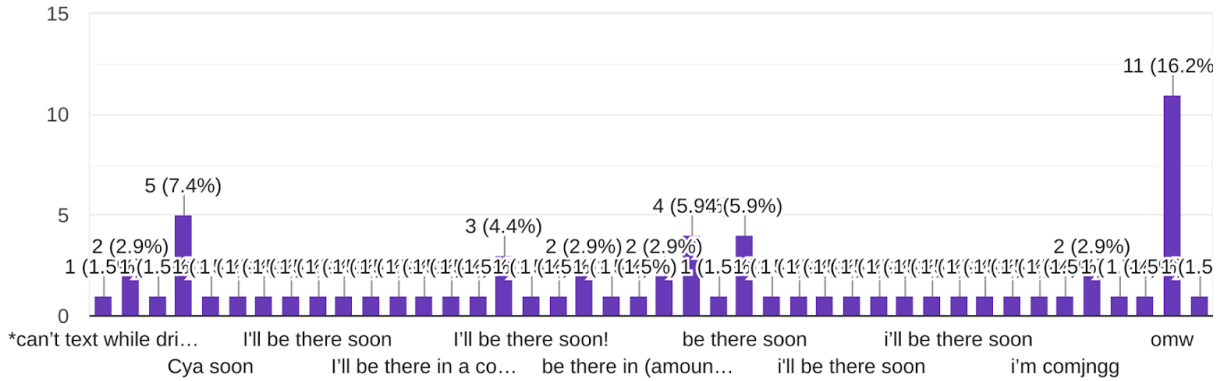
My surveys were sent in a mass email to the entire student population. I had over 150 students answer different parts of my methodology, but only 27% of those responses participated in all three parts of my study. The final sample size for my study was a total of 49 students, both male (n=18, 27%) and female (n=31, 63%) from all four high school grade levels: seniors (n=5), juniors (n=27), sophomores (n=12), and freshman (n=5).

Figure 1



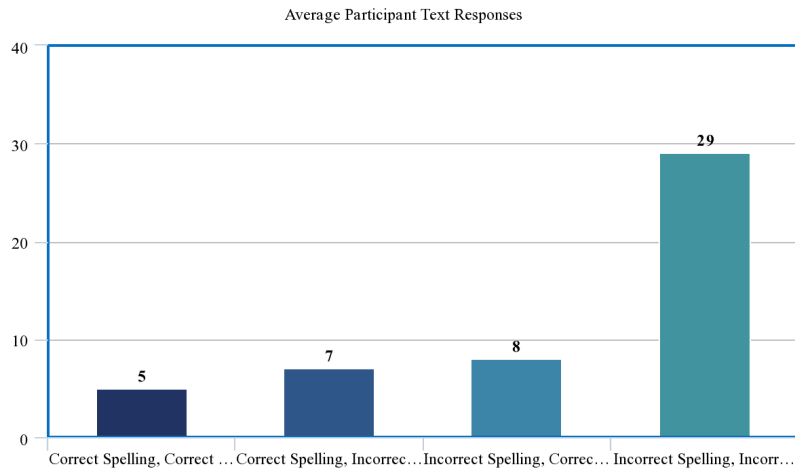
In the first section of my methodology, the mock text messages, the participants were given text prompts and requested to answer as they normally would when texting on a regular basis. With the prompts and Google Form application, the participants answered these questions on their phones allowing access to emojis, voice-typing, etc. Each participant answered a total of twenty questions. An example question is *How would you say - "I'll be there soon."* The mass responses included variations of "coming soon", "cya soon", "imma be there soon", and the most common response was "Omw", an abbreviated textism term that translates to the full sentence "On my way".

Figure 2



The use of textisms was unsurprisingly a common trend among all responses. When examining the average responses across all 20 text prompts, only 10%, 5 out of 49, contained proper grammar, correct spelling, and correct end-of-sentence punctuation. The text responses were organized into four distinct categories, as seen on the chart below. The subheadings of the graph are as follows: Correct Spelling and Correct Grammar, Correct Spelling and Incorrect Grammar, Incorrect Spelling and Correct Grammar, Incorrect Spelling and Incorrect Grammar. The 29 out of 49 responses with both incorrect spelling and grammar consisted of texts with little to no punctuation and absolutely no capitalization. To supplement this data, over 80% of all participants answered the text message prompts with emojis.

Figure 3



With teenagers being the age group to text the most frequently for more prolonged durations compared to middle-aged adults, elders, and adolescents younger than 13-years-old (Wray 2015), one would imagine their academic literacy would exponentially decrease as their colloquial texting increases. To my surprise, even though significantly more than half of my respondents answered all 20 prompt texts with incorrect grammar, spelling errors, punctuation mistakes, and emoticons, the majority of the academic writing paragraphs displayed almost no sign of textism vernacular. In an effort to ensure grading consistency, all paragraphs were assessed with the College of English Language's (CEL) basis for good grammar. For an essay to have good grammar, the CEL states these five elements must be present: Word Order- the determinant of the relationship between different words, Punctuation- meant to signify and stress words went used correctly, Tense/Aspect- staying in one consistent tense (past, present, or future), Determiners- phrases used to give prior context to a topic or statement, such as "which", "how many", "what", "my", Transitional Phrases- phrases connecting ideas to one another (CEL 2011). The writing prompt read as follows, *To your best academic ability, please write 5-8 sentences reciting the events of the 2020 outbreak of coronavirus, otherwise known as COVID-19. Include any and all valid information: statistics, countries, the cause/effect, impact, etc.*

When assessing each subject's writing portion of the survey, the respondents abided by an average of at least three out of the five elements, the most being tense, punctuation, and transitional phrases. The writing was not lack-luster or informal, in fact several essays were very academic. As expected, there were a few responses that failed to meet the CEL standard. Nevertheless, there were no stark trends of colloquial grammar or textisms present within the paragraphs. A lower scoring paragraph example is,

“I think that this was all stupid. There was no need for a lockdown (**missing comma before and**) and it ruined teenagers (**missing apostrophe for the possessive noun teenagers'**) social skills and ruined mental health. They never shut us down for the flu, rsv (**RSV needs capitalization**), and etc (**missing comma**) when they are just as bad, if not even worse. The president is stupid (**missing comma**) and we need a new person in office. He is ruining the country and the well-being of everyone around us.” - *Female, Class of '23*

Not only does this student have several missed capitalization and punctuation errors, which are bolded, she uses heavily opinionated language, which is underlined. This language

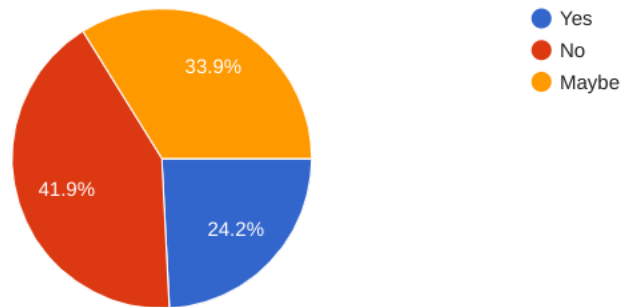
differs from the academic tone teachers look for when grading, especially at the high school level. Though spelling is correct, this paragraph reads like a text message, fails the CEL scale, and would not be acceptable to submit in an academic setting. However, this response,

“In December of 2019, the first case of COVID-19 was discovered in Wuhan China. Controversy [surrounds] the origins of the virus, but there is no debating the tragic outcome. **Within months**, this virus went from nothing to a worldwide pandemic, shutting down schools and large gatherings. **Over this period**, millions of people died and public turmoil ensued due to unreliable information and fear. **Luckily**, it only took about two years for life to get back to the way it was prior to the virus.” - *Male, Class of ‘25*

These two responses are polar opposites on the CEL scale. The paragraph from the sophomore male student is a high-scoring response. The writer frequently uses transitional phrases, highlighted in bold lettering; and the underlined words in this instance show proof of staying in one consistent tense, the past tense. The student also refrains from using subjective language, which again differs from a true academic tone. However, the senior female student has numerous grammatical errors and lacks scholastic diction. The first student’s paragraph was informal, but that response and others like it were a part of a very small minority. This data adds clarity to my final conclusion while disproving my initial hypothesis of the older students having better grammar than their underclassmen counterparts. There was actually a very common trend showing the classes of ‘25 and ‘24, sophomores and juniors, scoring higher on the CEL scale compared to the oldest grade, the class of ‘23 or the seniors.

The most shocking information was the student responses in the third and final part to my methodology, the reflection section. Each student was asked five reflection questions. An example from the survey is *On a scale of 1-10 (1 being the lowest, 10 being the highest), how good do you think your grammar is when you text your friends or family?*, with over 52% answering 1-2 or 3-4. The first four questions were multiple choice questions, and the last required a supplementary open-ended response, *Do you personally believe your texting can influence your academic literacy? Why or Why Not?* To my amazement, less than 25% answered YES, over 40% answered NO, and the remaining 35% approximation said MAYBE.

Figure 4



When answering the second-half of the question, “Why or Why not?”, the written responses were eye-opening. The same class of ‘25 male student who wrote the high scoring CEL paragraph responded, “I think while texting and academic performance use the same form of communication, they are written for distinct purposes. When texting the objective is to convey the most amount of information as fast and [efficiently] as possible, while in essays, grammar, spelling, and grading are all considered. Not to mention hours to look over and analyze your work. In my opinion there probably are correlations between the two, but I think in average cases the direct grammar and spelling characteristics are negligible.” Adding to this participant’s point, a senior female student, different from the low CEL scoring student, wrote, “Texting and writing essays are two different ways of communicating for me. I do not view them the same, for when I text I rush and write things quickly. I am unbothered by grammar or spelling issues. However, when I write essays I make sure to take my time, attempt to sound sophisticated, and ponder the best way to demonstrate my thoughts. Therefore, the two ways of communicating are completely different to me and do not become tangled with the other.” Though contrasting my initial theory, these responses were essential in feeding my understanding. With the first two sections of my study, I was able to provide a simple yes/no answer to my research question, but the reflection answers, especially the open-ended section, gave some insight on why, which can be further expanded on with more research.

Now, based on the data presented, it can be determined that texting has no true affect on academic literacy. Almost one-hundred percent of all participants were texting with incorrect grammar, abbreviations, emojis, misspelled words, incorrect punctuation, etc. However, this vernacular language did not carry over into their written academic paragraphs. From the small

minority of the sample size, there were minute grammatical errors. Despite this, the errors were not severe enough to show any substantial correlation between informal texting and/or any deterioration of academic literacy or even the improvement of academic literacy. Along with this discovery, there was also no data present to show how texting affects literacy across grade levels, especially considering the majority of my responses were from the class of 2024.

Limitations

As previously affirmed, my study consisted of three parts, the texting portion, the academic paragraph, and the reflection questions. The results show there was no true connection between grammar in texting and grammar in school. However, there were multiple outside factors that impede the results of my study. One main limiting factor was not knowing the initial reading and writing levels of my participants. Although my surveys were sent to my entire school, the majority of responding participants were my fellow classmates and peers who, along with me, are currently enrolled in honors and advanced placement (AP) courses, which are more academically rigorous compared to the lower-level college preparation (CP) classes. Due to the participants actively being in the higher level classes, including English, the students' reading and writing capabilities are already at a sophisticated level. This means regardless of texting habits, nothing can cause a detrimental effect to the intricate language arts skills they've already developed and use on a daily basis. This was a common theme among the participants, and in the reflection portion of the surveys, the students wrote about how they text everyday and have never noticed a severe change in literacy, positive or negative. When designing and executing my methodology, I failed to create a preliminary test to assess the initial grammar skills of my participants. Implementing a grammar pre-test analysis would have aided my results, giving me a deeper understanding as to why my hypothesis was incorrect. I, however, am not the only researcher who has neglected this important fact before exploring the topic of deteriorating literacy. Within the sources of my literature review, most mention how there is a rapid decrease of accuracy in English test scores while there is an increase of technology being produced and used among teenagers. Though both events occur almost simultaneously, it has been proven multiple times that correlation does not equate to causation; and as researchers, it is not acceptable to assume and theorize without significant evidentiary backing.

Conclusion and New Directions

My own experiment and analysis has shown that notwithstanding negative assumptions from parents and teachers, informal texting has not influenced a downfall of academic literacy. This conclusion coincides with researchers Nengah Kemp and Clare Woods collaborative study, as they both concluded texting had no positive nor negative impact on their students tested. Though my sample size is limited to my school's student population, this theme is possibly widespread throughout the country. However, taking into account the striking limitations of my experiment and others, the data from these studies, including mine, is skewed to a degree. The children's initial grammar levels are the most important preliminary information needed to properly conduct a meritable study of this stature. One cannot discover a change in behavior if they do not know the standard, because without the standard, there is nothing to deviate from. Moving forward, I believe it is important to not only find the starting point of children's literacy, but also create additional research into how texting impacts children with lower-level language arts skills, along with investigating at what point grammar is ingrained in higher-level course taking students to not have daily habits such as informal texting impact their school writing. This was a very shocking discovery for my study, and perhaps if my experiment contained a more even mixture of CP students versus AP students, then my hypothesis of texting having a negative impact on academic literacy would have been correct.

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Unpacking the Baggage: A Content Analysis of Asian/Asian-American Immigrant Stereotypes in ABC's Fresh Off the Boat By Ellia Hamabuchi, Daniel Olivo, Hilary Kim

Abstract

This study examines the representation of Asian/Asian-American and immigrant stereotypes in the ABC (American Broadcasting Company)'s sitcom "Fresh Off the Boat." With a conventional content analysis, I analyzed a randomly selected sample size of 30 episodes across all 6 seasons to identify and log all stereotypes that were related to the culture, heritage, or qualities about Asians/Asian-Americans and immigrants. My findings suggest that while the show serves as a groundbreaking landmark for Asian representation on mainstream US television, it also contains certain harmful stereotypes, such as the perpetual foreigner stereotype, tiger mom stereotype, and the generalization of the emotional disconnect between immigrants and their American-born children. While this show is effective in using stereotypes in a self-critical manner to denormalize them, a more nuanced and critical portrayal of Asian and immigrant experiences is required in order to properly represent and promote these stories for a more inclusive and accurate representation of diverse communities in the film industry.

Introduction—Underrepresentation and Misrepresentation of Minorities and Asians

Research and studies on racial representation of different ethnicities in the film and media industry all point towards an underrepresentation of Asians in American media. Up till 2019, Asian-American and Pacific Islander (AAPI) actors and actresses made up less than 5% of lead roles in film projects in the US (Wolf, 2019). This statistic matches a study by Michelle Sugihara, who found that of the top 10 grossing films from 2010-2019 in the US, only 4.5% of leads or co-leads are AAPI characters, compared to 5.6% for supporting characters (Sugihara, 2021). This is all while people with people with AAPI ethnic backgrounds make up about 7.4% of the US population in the 2020 US Census, showing a disparity in how these minorities are being represented in the mainstream media (U.S. Census Bureau, 2020).

This small percentage of representation can be a result of what Hollywood believes to be the most profitable, as evidenced by Carl Octavo, who concluded that Hollywood neglected Asian-American actors within film to focus on showing white actors (Octavo, 2020). He came to this understanding since it was expected that AAPI actors would have less profitability than

White actors due to disparities in popularity compared to White actors (Octavo, 2020). As Asians are considered “low demand” by Hollywood executives and producers, a lack of popularity can be attributed to the lack of opportunity to raise demand in the first place, which is not an issue for White actors. Similarly, a study by Joann Lee interviewed aspiring Asian-Americans actors about their perception of the current state of racial representation in the media, finding that the profitability of which minorities were on screen played a big factor in how they were represented (Lee, 2001). As she interviewed aspiring Asian-American actors, she quoted, "Asians' superstar status is not a reality in America at this time" (Lee, 2001). Max Landis commented similarly, pointing that there are no A-list Asian actors or actresses who are famous enough on an international level, causing hesitance towards casting AAPI unlike a famous, white actor or actress who may already have a guaranteed level of popularity that they can bring with them to the film (Landis, 2016). While this may make sense for filmmakers whose priority is to make money while making art, this leads to a cycle, as while AAPI actors struggle to find roles, producers do not want to risk losing attention for their movie, forcing them to instead cast a white actor for an originally AAPI character, building more popularity for the more well-known white actor while Asian actors and actresses are not able to receive the same recognition. This causes a domino effect, as despite a story being originally made up of AAPI characters, the casting of a white actor for an AAPI role causes a disconnect between the culture behind the story for the sake of profitability.

Effects of Misrepresentation and the Usage of Stereotypes

Defined by Merriam-Webster Dictionary, a stereotype is “a standardized mental picture that is held in common by members of a group and that represents an oversimplified opinion, prejudiced attitude, or uncritical judgment” (Merriam-Webster, n.d.). The effect of this underinvestment can be seen in a recent survey with more than 5,000 US residents by Leading Asian Americans to Unite for Change (LAAUNCH), who found that more than 58% of Americans were not able to name a prominent Asian-American figure (LAAUNCH, 2022). Jennifer Liu found that of the small number of respondents who were able to name an Asian-American public figure, the most prominent were Jackie Chan, who is not Asian-American, and Bruce Lee, who passed away in 1973 (Liu, 2022). This points towards the lack of Asian representation in popular media, as it can be seen that Americans are basing off

their knowledge around Asian figures based on outdated films and pop culture. This is supported by the same survey from LAAUNCH, where almost a third of respondents answered with “Kung Fu, Martial Arts, Expert” when asked the question “In TV or the movies, Asian American men are often portrayed in the following type(s) of character roles?” (LAAUNCH, 2022).

Demonstrating that the public’s vision and knowledge around AAPI figures and culture are extremely outdated and misrepresented as people stick with ideologies and generalizations from decades before the present.

A study by Nancy Yuen recorded that the average U.S. resident consumes digital media for approximately 15.5 hours each day which is equivalent to 64.5% of the 24-hour day (Yuen, 2019). This suggests that since the average American spends such a large amount of time exposed to media, the influence of media on their personal opinions is something that can exist. When it comes to media sources such as the news, the issue of proper representation is a serious topic to be considered. A study by the Harvard Law Review details the murder of Vincent Chin in Detroit in 1982, who was attacked by both a father and recently laid-off stepson for the unemployment issues in the auto industry at that time, which was blamed on Japanese car imports (Harvard Law Review, 1993). Despite being Chinese, Chin was assumed to be part of the unemployment issues in the area because of racial stereotyping and prejudice from the media (Harvard Law Review, 1993). While published almost 30 years ago, this issue is still one to be taken seriously, as the misrepresentation of minorities in media serves as a huge influence on the portrayal of them to the general public. A pattern of media-influenced hate crimes can be seen today, as the US Department of Justice reported a 77% rise in anti-Asian incidents from 2019 to 2020, which reflect different media outlets pinning AAPI as the cause for the COVID-19 pandemic (U.S. Department of Justice, 2023). While the contexts and the time periods are separate and distinct, it can be inferred that the impact the media has on its viewers is one that impacts personal opinions towards minorities, which have the potential to be violent.

In an article by Adeel Hassan, top ivy-league schools including Harvard University have been accused of automatically giving lower personality ratings to applicants that are Asian-American, suggesting that schools and opportunities that are normally available to everyone are actively being affected and in these cases, blocked off due to their race or ethnicity (Hassan, 2018). This obstacle to getting into college can heavily affect one’s life, as the university that one is able to attend can have a direct impact on the jobs and salaries that are

acquireable after graduation. As a result, an impact on getting into college becomes a domino effect, leaving a mark on many other aspects of life all because of one uncontrollable factor in the beginning.

Past education and into the corporate world, Buck Gee and colleague Janet Wong did a study that found that Asian-Americans and immigrants had a much harder time breaking the glass ceiling when it came to getting higher positions at corporate jobs, as many supervisors, managers, and those in power in workplaces believed and assumed that Asians and immigrants were always satisfied with where they were (Gee & Wong, 2016). This led to the lack of promotions towards these minority groups, from which similar results can be seen by an earlier study by Gee and Denise Peck finding that Asian-Americans are the least likely racial group to be promoted into management due to the common belief that they don't have any motive to move up the corporate ladder (Gee & Peck, 2015). Despite this low chance of being able to move up the corporate ladder due to pre-existing stereotypes, the model minority myth generalizes Asian-Americans as being successful despite being a minority, enforcing a division among marginalized communities to enforce the American dream of "pulling yourself up by the bootstraps." As these assumptions can be traced back to the messages that are placed within the media as AAPI characters are almost never played as high positions within professional or economic environments, the correlation between stereotype representation against Asians and immigrants and the suppression of these minorities with societal barriers can be identified.

Background of *Fresh Off the Boat*

ABC (American Broadcasting Company)'s *Fresh Off the Boat* debuted in February 4, 2015, and was the first show in more than twenty years that focused on an Asian-American immigrant family living in the United States, starting a domino effect on the media industry and catalyzing the start of more Asian-American representation in mainstream media, stated by Kimmy Yam (Yam, 2020). The show was based on Eddie Huang, a professional chef and food personality who wrote an autobiography of his life as an Asian-American child in a majority-white town where he faced many issues due to his ethnicity, a factor that created his struggle with his identity. In the show, the family moves from Taiwan to Washington D.C., later moving to Orlando, Florida, into a majority-white community with little-to-no Asian population. Representing the experiences of many other immigrants and Asian-Americans across the country, this show served as a very important piece of media in history that created the potential

to change how the general public viewed Asians/Asian-Americans and immigrants. However, despite its role in catapulting Asian-American representation in modern American media, limited research surrounding its actual ability to represent minorities and immigrants has been found. Of the sources that do focus on the show, their primary focus is on a small quantity of stereotypes such as Model Minority Myth or the Perpetual Foreigner stereotype. This proves to be a limited scope around the presence of stereotypes, as there are a wider variety of generalizations that are present throughout many different types of media, restricting the ability to gauge the state of minority representation.

Public Opinion

ABC's *Fresh Off the Boat* was a show that was met with controversy immediately from its announcement by ABC for a number of different reasons, which are important to mention as it reflects the atmosphere that the general public established surrounding the show's debut. As Alex Abad-Santos, a writer from Vox with vast experience writing on film and diversity issues, suggests, being the first show in twenty years to focus on an underrepresented minority in television, this show was an important aspect and already faced controversy because of the title it was given, "fresh off the boat" (Abad-Santos, 2015). This saying refers to a slur and is offensive towards not only Asians/Asian-Americans, but also immigrants that immigrate from other countries to the United States (Abad-Santos, 2015). This article ultimately suggests how groundbreaking the show truly was, as it had already made a huge impact on the general public's opinion on the show. Jiayang Fan, describes how Eddie Huang really wanted to use the term "fresh off the boat" because of how offended the general public would be, representing the show's objective of crossing lines into unventured territory in attempts to start the reclaiming process of the slur (Fan, 2015). With inspiration from ABC's *All-American Girl*'s Margaret Cho, the lead character of America's first all-Asian cast television show, Abad-Santos reveals that Huang's motive for the show is to create a groundbreaking effect on the television industry (Abad-Santos, 2015). According to an article written by Tony Maglio, while Eddie Huang did not like the outcome of the show itself, claiming that it was white-washed and inaccurate to his actual experiences, Huang defended the show's title, remarking that the show is meant to reclaim the slur and educate the weight behind the term (Maglio, 2015).

Past Studies in the Field

When it comes to previous studies on Asian-American and immigrant stereotypes in media, there is little work surrounding the topic. However the majority of existing literature pointed to the fact that representation of Asian-Americans and Immigrants is something that was much needed in American media. While there exists research, many studies do not reflect contemporary representation of Asian-Americans. Studies by Joann Lee, Elaine Aoki, and Brooke Hoffman on this topic range in age from 20 to 40 years old, and although conclusions of these studies serve as useful sources of information, Asian-American representation issues continue to evolve throughout the industry. As a result, it's crucial that new research be conducted to form a better surrounding of this topic in order to discover and mitigate the problems present in the industry for the better of the future. While there exist sources that date back less than ten years prior to 2022, there still is a lack of research when it comes to modern family shows such as *Fresh Off the Boat*, despite serving as a huge moment in Asian representation in American film. Instead, there is more research surrounding ABC's *All-American Girl* in 1994, the first show to have an all-Asian cast on U.S. television, according to E. Alex Jung (Jung, 2014). As a result, research is needed to examine *Fresh Off the Boat*, which is the first show since *All-American Girl* to have an all-Asian cast on network television broadcasted across the world, breaking barriers of minority representation (Abad-Santos, 2015).

Present Study

Stereotypes against Asian-Americans and immigrants that can be found in media can have an influential effect on the general audience of normalization that is absorbed from books, television, and other media forms. Due to a lack of proper Asian and immigrant representation in the media industry, generalizations have gone unkempt in the public mindset and increased representation of Asian-Americans and immigrants is needed to educate the public on the implications that these stereotypes have, whether it be hate crimes or social assumptions and prejudices that people have based solely on looks. As a result, the proper representation of minorities in modern shows like *Fresh Off the Boat* can be beneficial towards educating the public on Asian-American and immigrant struggles. Stereotype presence in shows are not always negative when it comes to representation, but instead can also be utilized positively to denormalize stereotypes. This study uses *Fresh Off the Boat* to analyze its usage of stereotypes

and generalizations regarding Asian-Americans and immigrants to go against pre-conceived notions of prejudice in efforts of educating the general public.

Methods–Show Context and Selection

Fresh Off the Boat aired for 116 episodes across 6 seasons until the final two-part episode on February 21, 2020 (IMDb). The Asian-American family the show revolves around is composed of two parents – Jessica and Louis who immigrated from Taiwan; Louis’ grandmother – Jenny Huang; and three children – Eddie, Emery, and Evan (IMDb). This show was chosen to examine its ability of representing Asian and Immigrant families, making headlines in film critic articles for being the first show to air on U.S. national television with an all-Asian cast in over twenty years (Blum, 2014). In addition to making hundreds of headlines for its cast, Michelle Yang comments that this monumental show catalyzed the release of other Asian-family focused shows such as *Crazy Rich Asians* (2018), *Always Be My Maybe* (2019), and *The Farewell* (2019) (Yang, 2020). As media often incorporates Asian-Americans and immigrants into jokes and humor by referencing harmful stereotypes and generalizations, shows that focus on Asian-American immigrant families like *Fresh Off the Boat* are expected to be able to accurately represent Asians, immigrants, their cultures, and the stereotypes that they often are forced to fight with. As a result, the representation of stereotypes in *Fresh Off the Boat* are of great importance to educate and raise awareness towards the challenges that many Asian-Americans and immigrants in the United States are faced with everyday.

Sample Size

The total watch time of all episodes of *Fresh Off the Boat* amounts to 58 hours without accounting for time spent on coding (IMDb, n.d.). As a result, a sample size has been decided to be a randomly selected 30 episodes to represent the series as a whole, which would be determined by assigning each episode a number based on chronological order (Episode 1 = 1, Episode 2 = 2, Episode 3 = 3 ... Episode 114 = 114, Episode 115 = 115, Episode 116 = 116). Using a random number generator that could pick a number from 1 to 116, 30 numbers were then randomly generated and ran again when a duplicate was presented. While random, the finalized sample size included at least three episodes from every season of the show. The distribution of these episodes was decided as 30 episodes across all 6 seasons due to the difference in quantity

of episodes in each season, such as Season 1 having 13 episodes while Season 2 consists of 24. Had five episodes been chosen from each season (5 times 6 equals 30) instead of 30 episodes across all 6 seasons, 38.46% (5 out of 13 episodes) of Season 1 would be a representative of the rest of the season compared to 20.83% (5 out of 24 episodes) of Season 2, leading to clusters of episodes across the seasons and a smaller representation in seasons with more episodes. As a result, an equal number of episodes from each season to ensure equal chance among all episodes for the measurement of stereotype representation in the show itself. With these 30 random numbers selected, episodes were organized into chronological order in a spreadsheet to follow during analysis.

Conventional Content Analysis - Coding

Stereotypes were chosen for analysis due to their influence on the general public when portrayed in media through the different characters in different shows. In a study by Nancy Yuen, there was a correlation between a decrease in self-esteem for young girls and young Black males when watching representation patterns in Hollywood (Yuen, 2019). As stereotypes often were present throughout the shows, audiences would witness them and start to believe that they were true, inducing a possibly negative impact onto these minorities by forming generalizations and general prejudice around them.

While watching the selected sample size episodes, I will determine and collect codes in a conventional content analysis style by judging whether or not a scene, character interaction, or dialogue is stereotypical between characters or of the character, such as a character's characteristic. Since both positive and negative representations of stereotypes exist, codes are recorded and tagged with their effect, with [Positive] meaning that it goes *against* the stereotype (counter stereotype), thus breaking it and enforcing denormalization, and [Negative] which would go *with* the stereotype (stereotype), thus reinforcing it and promoting normalization. Despite this, in a study by Kerry Kawakami, stereotypes can be utilized in shows with minority representation positively by self-critically using stereotypes in a way that makes it obvious to the audience that it is not a true representation of the minority. While *Fresh Off the Boat* uses this strategy often throughout the show while also using counter stereotypes, these instances that followed stereotypes in a sarcastic manner were still tagged as [Negative] impact, as the

self-critical effect was established by the repetition of all the stereotypes in the episode, not just one.

Categorization and Organization

Codes that are categorized and defined in a similar manner will be developed and recorded using Google Sheets and Google Docs, chosen for their organization features and ease of access. Along with the record of codes, the episode number, timestamp (MM:SS), frequency, context, and impact will also be logged. The record of this data will allow revision of certain episode timestamps and comparison of frequencies in each code, playing a role in a more in-depth analysis of the sample size to add elements for measuring the representation of the show in its entirety. After one thorough watchthrough and analysis of the sample size's 30 episodes, the codes will be reviewed for consistency by rewatching the 30 episodes to double check the data and add or remove missed/mistaken stereotypical behaviors from the data set. To minimize the effect of personal bias, the rewatch of the sample size was coded without referring to the first set of codes in order to reduce bias while improving consistency. Doing this second watchthrough will ensure higher-quality coding and eliminate inconsistencies that may be present in the data set which would skew the results.

In the event that a situation could not be determined on whether or not it contained a stereotypical quality or instance, the season, episode number, and timestamp will be recorded as [Undetermined]. Timestamps that were tagged as [Undetermined] were then revisited at the end of the watch for continued analysis and classification after watching and analyzing other parts of the show, to which it was then able to be determined how it would be recorded. This layer of coding aims to prevent mistaken coding that may occur throughout the research process. Without this layer of security, the behavior's miscategorization and coding could negatively affect the credibility of the data by skewing corresponding conclusions.

Results–Total Codes

Throughout the thirty randomly selected episodes of *Fresh Off the Boat*, there were a total 322 recorded instances of stereotypical behavior.

Figure 1 - Frequency of Codes

Code	Frequency	Frequency	Frequency
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	[Positive] ¹	[Negative] ²	[Total] ³
Affection Issues	25	18	43
All Asians Look Alike	0	4	4
Asians are Bad at Driving	0	1	1
Conservative	6	5	11
Cuisine Assumptions	0	2	2
Model Minority	1	3	4
Nerd	10	23	33
Tiger Mom	8	35	43
Over Competitive	0	9	9
Penny Pincher	3	46	49
Perpetual Foreigner	1	20	21
Prejudice	1	30	31
Strict or Violent	5	41	46
Superstitious	1	22	23
Undocumented Immigrant	0	2	2
Total	61	261	322

¹[Positive] refers to going *against* the given stereotype – a *counter stereotype*.

²[Negative] refers to going *with* the given stereotype.

³[Total] refers to the *sum* of frequencies.

Figure 2 - Definitions of All Codes that were Discovered in 30 Episode Sample Size

Stereotype	Definition (Stereotype that Assumes...)	Example
Affection Issues	Asians have difficulty showing emotion and affection to others or family	S2, E25: Jessica and Louis struggle to have a romantic kiss in front of Emery when he asks
All Asians Look Alike	Asians all look similar to each other to the point where they are the same people	S4, E71: Eddie believed someone's three (Asian) exes were all the same person
Asians Can't Drive	Asians are not good at driving	S6, E115: Jessica cuts across three empty lanes to turn right
Conservative	Asians or Immigrants possess conservative thought processes	S2, E28: Jessica is upset Louis is friends with a woman
Cuisine Assumptions	Asians or Immigrants have "weird", "exotic", or "disgusting" food	S1, E3: Jessica brings Chinese food to a neighborhood party, which gets avoided
Frugal	Asians or Immigrants are obsessed with saving money	S1, E2: Jessica clogs holes of the pepper shakers in their restaurant to prevent money loss?
Model Minority	Asians all have a high level of educational professional success	S5, E101: Jessica was falsely reported for "yelling at a student" because she gave the student an F; she apologized but got fired

Nerd	Asians or Immigrants are always obsessed with knowledge while being antisocial and introverted	S1, E10: Evan builds a machine that "breaks down Dr. Pepper into its 23 individual flavors" in elementary school
Tiger Mom	Asians or Immigrant parents always force children towards high achievement or success in music, education, etc.	S1, E2: Jessica is discontent with how easy their new school is and enrolls them in "Chinese Learning Center" – a cram school
Over Competitive	Asians or Immigrants are obsessed with winning or being superior	S4, E66: Jessica becomes coach of the a softball team just to beat Louis' team
Perpetual Foreigner	Asians or Immigrants are foreign solely because they are a minority ethnicity	S1, E10: Jessica regularly goes to bars, not knowing that they are women's bars
Prejudice	A quality about someone or something based off race or ethnicity	S1, E2: Teacher puts her hands together and bows at Jessica
Strict or Violent	Asians or Immigrants are strict, violent, or brutal to others or family	S6, E110: Jessica says she will try acting because she heard it's like manipulation
Superstitious	Asians or Immigrants are always following spiritual or religious motives	S4, E71: Jessica tells Honey that painting her nursery red will bring Satan to the neighborhood
Undocumented Immigrant	Immigrants are in the country illegally	S3, E41: Jessica calls INS (ICE) on Hector and a peaceful protest outside Cattleman's Ranch

Stereotype Prevalence

Out of the thirty episodes, the presence of stereotypes went as high as 25 instances in *Season 1, Episode 2: Home Sweet Home-School*, compared to as low as 3 occurrences in *Season 5, Episode 3: Workin' the 'Ween*. The top three most prevalent stereotypes in the analyzed sample size from greatest to least were *Penny Pincher*, *Strict or Violent*, and *Tiger Mom* and *Affection Issues* tied at 43 instances. At the other end of the spectrum, the least prevalent stereotypes throughout the show from greatest to least were *Model Minority*; *Undocumented Immigrant* and *Cuisine Assumptions* tied at 2; and *Asians are Bad at Driving*. All definitions and examples of stereotype codes that were recorded can be found in Figure 2.

Episodes with Most Stereotypes

Season 1, Episode 2: Home Sweet Home-School was an episode that focused on Eddie dealing with Jessica's obsession with his grades, as she makes him enroll in a cram school because she believes that school was "too easy" since he got straight A's. At the same time, the sub plot of the episode contains Jessica trying to control Louis' restaurant by micro-managing everything and trying to lessen economic losses down to small details such as how many napkins are given out, how much garnish is on each dish, and how much pepper comes out of each shaker. Out of the 25 recorded instances where there was stereotypical behavior, only one occurrence was logged as [Positive], when Louis went against the *Penny Pincher* stereotype. In addition to having one of the highest presences of stereotypes, the same three stereotypes – *Penny Pincher*, *Tiger Mom*, and *Prejudice* – repeat, showing a cluster of occurrences.

Episodes with Least Stereotypes

Season 5, Episode 3: Workin' the 'Ween focused on Eddie's experience working at a new job in a mattress store on Halloween night. At the same time, Jessica and Louis take on a new challenge of taking care of Marvin and Honey's baby Maria as her godparents. With three recorded timestamps for stereotypes, none of them are [Positive], meaning that all three went along *with* the stereotype. With three codes, each timestamp went under a different stereotype – *All Asians Look Alike*, *Strict or Violent*, and *Prejudice* – with no other recorded instances throughout the entirety of the episode.

Discussion

This study found 322 instances in which stereotypical behavior occurred across a randomly selected 30 episode sample size to answer the question "How are

Asian/Asian-American & Immigrant Stereotypes represented in ABC's *Fresh Off the Boat*?" Of the episodes in the sample size where stereotypes were detected during analysis, episodes within the first half of the sample contained 2-4 stereotypes that repeated multiple times as the main issue/obstacle to overcome for the main characters. This result supports what was said by Eddie Huang, the person whose memoir the show is based off of, who claimed that the episodes were white-washed and inaccurate to his actual experiences in his house, as they all had issues that were important to him and Asian-Americans across the country but all also ended in a neat happy ending that made all of the challenges resolve by themselves (Abad-Santos, 2015).

Until the ending seasons of the show, most stereotypes were clustered among the episodes, while the latter seasons had more dispersed stereotypes. While more spread out, the second half of the show had less overall stereotypical presence, with 147 instances of stereotypical behavior being found in the second half of the show while 179 instances in the first half. This is equivalent to a -9.82% difference between the first and second halves of the show, suggesting that the latter half of the show had character qualities that depended less on stereotypes and instead more on regular character development that did not rely on ethnicity.

Some episodes had a considerably less amount of stereotypes, as they either had focused more on correcting the stereotype faster than others, a pattern that is found commonly throughout the show. As each episode occurs, a character(s) is set with an obstacle that is a stereotype or stigma to which they must overcome to achieve their "happily ever after" at the end of the episode. Towards the beginning of the show's debut, Huang tweeted saying that he's happy that people of color can see themselves in the *Fresh Off the Boat*, but he adds that he himself cannot recognize his life in it (Huang, 2015). This aligns with other comments by Eddie Huang, including his statement on why he stopped narrating for *Fresh Off the Boat* after Season 1, complaining that he realized the show was not going to replicate his memoir, but instead act as a gauge to see how the public would react to Asian-American media (Goodwillie, 2022).

Limitations

Personal Bias

As an Asian-American child of immigrant parents, possible bias against Asian-American and immigrant stereotypes that might have been able to affect final data collection and analysis serve as a limitation to this study's credibility. In response to this possible corruption of data, the

sample size was watched twice to confirm codes, along with adding or removing instances that were missed or accidental in order to increase data's validity and accuracy.

Time Restraints

Due to the window of time that was provided to complete this project, the watch through and analysis of all 116 episodes in *Fresh Off the Boat* was not feasible for this study. As a result, the usage of a sample size of 30 episodes out of 116 episodes can serve as a limitation to the credibility of my research. In addition, my identity as an Asian-American and child of Asian immigrant parents can serve as possible bias that could affect my data set. As a result, in order to minimize the effect of personal bias on my results, a second run through of my 30 episode sample size was conducted to ensure my codes were accurate and clean. The time restraint that was on my project caused me to cut my episodes down to 30 out of the original 116, as the watch time of the full show would take too long to be able to finish the results.

Conventional Content Analysis

This study was coded by only one person, and so the underlying biases that could be present within the researcher could cause an effect on the data's overall credibility. As a result, for future studies, it may be beneficial to have multiple coders involved in the methods process, as they can peer-review each other along with achieving a higher efficiency and have the ability to code more episodes in a shorter time frame.

Conclusion and Future Application

To recap, this study utilized a conventional content analysis that examined and recorded Asian/Asian-American and Immigrant stereotypes throughout a randomly-selected 30 out of the show's 116 episodes. The final goal of this paper was to examine and measure the state of representation for these minority groups, along with possibly establishing a method that can be applied to other shows that have been released. For example, since the release of *Fresh Off the Boat* in 2015, there has been a rise in Asian-American shows in US media, opening up possibilities to analyze these new shows and compare them back to this study, measuring the progress that the representation has come from. When looking specifically at Asian-American shows, Yang notes that there have been releases such as *Crazy Rich Asians* (2018), *Always Be My Maybe* (2019), and *The Farewell* (2019) (Yang, 2020). In addition to Asian-American shows, the method used in this study can also be used when measuring representation for other minority groups that are present in different types of media. The proper research towards lack of

representation of minorities in the media is important, as it can cause an impact on societal attitudes towards these minorities, such as Asians/Asian-Americans & Immigrants (Hoffman, 2012). With the addition of future research towards this topic of representation of minorities, these new sources of research on the American media can be used towards making differences in the industry and promote change for all minorities across the nation for a more equitable future of entertainment.

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The Benefits, Neural Mechanisms, and Best Teaching Practices for Second Language Learning

By Allison Reich

Abstract

Previous research has investigated the brain's fundamental mechanisms in attaining language proficiency, and how those mechanisms and their relative success differ based on age, circumstance, and environment; however, little is known about how these underlying mechanisms can be applied to formal instruction of language across different age groups. Filling this gap in knowledge, the following article aims to enhance readers' understandings of the neuroscientific mechanisms occurring below the surface during second language acquisition to inform compelling teaching approaches. Through the exploration of several vital mechanisms underlying language acquisition, including synaptic pruning, critical periods, brain plasticity, and myelination, this article will illuminate the cognitive and neurological processes that are crucial in acquiring proficiency in a second language. In doing so, this paper will examine the roles and effects of age and environment on individual linguistic development. Ultimately, through the compilation of previous studies conducted on the subject of second language acquisition and the mechanisms imperative to successful linguistic advancement, the article employs neuroscience to discover the most effective and efficient strategies for auspiciously teaching a second language. Previous research demonstrates numerous benefits to bilingualism; it enhances the executive control system and delays symptoms of both Alzheimer's Disease and dementia. With this information in mind, this article will benefit future language learners by enhancing their brain function and health through the optimization of second language teaching strategies.

Introduction

Language is a window into the world: a door for open communication, expression, and cultural understanding. It defines human capability and existence and allows us to form crucial relationships, articulate individual needs and desires, and reveal the human thoughts and perspectives that are pivotal in effecting change and growth in society. In a world that has become increasingly interconnected, it is now more important than ever to expand the scope of our linguistic abilities and to do so by challenging ourselves to obtain proficiency in several languages. In the United States, about 20 percent of individuals speak multiple languages; in

European nations, over 50 percent of citizens have obtained proficiency in more than one language.¹ Bilingualism is a gateway to both understanding and experiencing the distinct cultures emerging, developing, and progressing around the world; however, in order to open this gateway, it is vital to first advance our understanding of the mechanisms and factors that play critical roles in acquiring aptitude in a second language.

The brain contains 85 billion neurons; these nerve cells take on the imperative task of sending and receiving messages between the body and the brain.² Neurons consist of a cell body called the soma, dendrites that typically receive electrical signals from other neurons, and axons that carry these electrical signals away from the soma to connect with other neurons.² Neurons' dendrites receive information from other neurons in the form of chemical signals called neurotransmitters.² These chemical signals bind to receptors on the dendrites, and they then transform from chemical signals to electrical ones.² If the electrical activity is strong enough upon traveling to the soma, an action potential is produced that is sent across the neuron to eventually reach the axon terminal and release more neurotransmitters that will communicate with another cell.² This process characterizes human action and reaction, inevitably playing an essential role in language acquisition.

While neurological connections and synapses, the junctions between two neurons, are formed and reinforced throughout human life, during the early embryonic period infants extensively absorb external information.³ They cultivate many synaptic connections rapidly, as they learn to adapt to their environments and develop as individuals.⁴ At around 2 to 4 years old, toddlers' brains hold approximately double the amount of neurological connections seen in an adult brain; at this point, they have reached the climax of synaptic growth.⁴ In order to enhance and solidify the connections that appear to be most important— those that are used consistently in the individual's early years— the brain must undergo the process of synaptic pruning.³ During this transformation, approximately half of an adolescent's synapses are removed.⁴ The process intends to dispose of connections that are deemed insignificant in the individual's development: the synapses that are not used or reinforced frequently. Ultimately, synaptic pruning differentiates between strong signals that are utilized and taken advantage of by the individual and signals that are often overlooked, neglected, and unemployed. By disposing of weak synapses, the brain is then able to concentrate on the enhancement of

stronger signals, sequentially increasing neurological efficiency and effectiveness and invigorating stable, useful connections.³

With a more enriched understanding of the basic neurological processes that are applicable in each action we partake in as humans, it is easier to discern the brain's specific ability to obtain proficiency in a second language. The human brain's mastery in receiving and passing on messages, strengthening and eliminating specific connections, and maintaining neurological efficiency paves the way for human aptitude and natural capability in linguistic development; however, in order to maximize this potential, it is essential to intertwine scientific understandings of neurological mechanisms with language-teaching procedures that can be applied in everyday life. Utilizing neurological research to devise the most effective methodologies for teaching a second language will allow us to make the gateway to bilingualism more accessible with the goal of expanding human relations and knowledge of the vast linguistic and cultural identities that occupy the earth.

With these goals in mind, this article will investigate the neurological processes that occur during second language acquisition, including synaptic pruning, myelination, and critical periods. In examining these mechanisms, I will also differentiate between the language-learning processes of children and adults. Through exposing these cognitive processes and distinctions, I will ultimately formulate the most effective, scientifically-based methodologies for teaching a foreign language.

Benefits of Bilingualism

While bilingualism promotes unity among distinct, otherwise isolated cultures, it also administers benefits for the individual. Studies have demonstrated that those proficient in more than one language have not only more robust, adept executive control systems, but they also experience symptoms of diseases such as Alzheimer's and dementia later in life than monolinguals.

The executive control system, located in the prefrontal cortex of the brain, plays a crucial role in determining the human ability to perform cognitive functions. It dictates our capability in planning, problem-solving, and concentrating; it allows us to comprehend and remember instructions or commands and juggle multiple tasks simultaneously.⁵ Essentially, the executive control system oversees and regulates everyday activity, regulating how humans

function in society. With this in mind, however, it is crucial to note that the skills associated with executive function and the scope of its control system are developed and strengthened throughout life, not predetermined at birth.⁶ As bilinguals are faced with the task of managing multiple languages at once, they must decide which language to apply given their specific environment, atmosphere, and situation. In doing so, they frequently employ their executive control systems to distinguish between distinct settings and moments, as they pivot from one language to the next. This task requires active awareness and adaptability, ultimately heightening their ability to perform all cognitive tasks, not just those related to language or expression. In fact, a study conducted at the University Jaume I of Castelló de la Plana tested 40 students, both bilinguals and monolinguals, on their reaction times and accuracy when responding to stimuli.⁷ Bilinguals outperformed monolinguals on this task-switching activity, suggesting that they have more capable executive control systems than monolinguals, which ultimately enhances bilinguals' flexibility and skill in executive functions.⁷ As the individuals were participating in the study, their brains were simultaneously being scanned with functional magnetic response imaging (fMRI), a neuroimaging tool used to measure and compare blood flow in the brain during neurological activity. The fMRI scans demonstrated that bilingual individuals recruited larger proportions of the left hemisphere brain than the monolinguals did during the examination.⁸ In other words, the students who had obtained proficiency in more than one language were more in touch with the left hemisphere of their brains: the area recruited in linguistic activity.

The functional advantages that are linked to bilingualism foster further benefits for the individual. With a more adept executive control system in possession, a stronger cognitive reserve is established, allowing bilinguals to have more resilient, protected brains in the face of neurological impairment.⁹ In switching between languages in everyday circumstances, individuals who speak more than one language cultivate many advanced, neurological connections and are ultimately able to resist symptoms of neurological decline in their later years. With this information in mind, studies have established that bilinguals who are susceptible to diseases like Alzheimer's and dementia experience the symptoms of cognitive deterioration 4 to 5 years later than monolinguals.⁸ These results do not disfavor those who learned their second language in early childhood nor those who took on second language acquisition later in life; in fact, the conclusions demonstrate that proficiency in two languages,

regardless of the age of acquisition, results in neurological durability and defense against these diseases, sequentially prolonging the period of time before the bilingual's symptoms become apparent.⁹ It is important to note that bilingualism does not make the brain immune to these diseases, but rather delays the age of onset by perpetuating a more flexible, aware, and active brain.

These previous studies reveal the benefits and advantages of bilingualism, demonstrating that linguistic enrichment goes beyond cultural awareness and communication; it strengthens the neurological mechanisms essential in everyday life. The ability to proficiently speak and comprehend a foreign language stimulates the brain, paving the way for a stronger executive control system— one that will maximize the human ability to problem-solve, retain self-control, and complete important tasks. This bilingual advantage builds tenacity in the brain, ultimately delaying symptoms of cognitive impairment.

Language-Learning Process Overview

Linguistic functions are generally centralized in the left hemisphere of the brain; Broca's area, the region responsible for speech production, and Wernicke's area, the zone recruited in language comprehension and processing, collaborate in analyzing word meanings and, in turn, formulating relevant responses.¹⁰ According to the Wernicke-Geschwind Model, a basic, simplified explanation of the neurological processes that occur during human communication, when a human listens to another human speak, their words are internalized and converted into signals in the brain.¹⁰ First, these signals are sent to the primary auditory cortex and then to Wernicke's area, where the words' meanings are decoded by the individual.¹⁰ Once the message is comprehended, an unpolished, potential reply is generated and sent to Broca's area.¹⁰ Finally, after the response is fully curated, it is transferred to the primary motor cortex, the region that controls the muscles in human mouths, allowing us to articulate and verbalize these signals and ideas.¹⁰

While these steps characterize communication among developed individuals, the process of linguistic progression actually commences before birth. In fact, studies have demonstrated that upon birth, babies are already familiar with the general melody, sound, and pattern of their mother language.¹¹ Although newborns are not able to articulate their needs in the form of words, the sounds and rhythms generated as they cry resemble those of their native tongue.¹¹ Comparing

the distinct cries of German and French babies, scientists discovered that the sounds were different; upon investigation, they detected that French babies' cries began at low intensity and slowly increased.¹¹ German babies, on the other hand, were seen to have the opposite crying patterns: their noises began at high intensity and slowly decreased.¹¹ The patterns of their respective cries coincide with the rhythmic patterns of the two languages: in the French language, words located towards the end of the sentences are generally the ones stressed, but in German, individuals often stress the words at the beginning of their sentences.¹¹ Thus, these discoveries suggest that even before birth, babies begin the process of linguistic development.

When learning a second language, however, individuals usually undergo 5 stages of acquisition and development. These stages and their timeframes are specific to the varying abilities of different language-learners. Generally, learners begin in a silent, receptive stage— one defined by the introduction of limited vocabulary and comprehension.¹² During this stage, individuals focus on attaining accurate pronunciation and learning new words, but they are unable to speak the language with true understanding and awareness.¹² With continued practice and exposure, learners are able to advance to the the early production period. This stage is characterized by learners' understanding of about 1,000 words, so they are able to form short phrases, although often not grammatically correct.¹² The third stage of second language acquisition is speech emergence; during this period, learners have a vocabulary of about 3,000 words and are able to form sentences and begin reading and writing in the new language.¹² Intermediate fluency, the fourth stage, is reached when individuals are able to communicate more comfortably, making use of complex sentences and phrases.¹² During this stage, individuals often begin to think in their second language, allowing them to have a greater understanding of the idiom.¹² Finally, second language learners reach the advanced fluency stage and have the ability to read, write, understand, and speak their language with full proficiency.¹²

While these stages trace the general process of foreign language acquisition, it is important to note that circumstance and environment play crucial roles in the human ability to gain proficiency in a second language. For example, the distinction between successive and simultaneous second language learning affects language development significantly. With simultaneous language acquisition, one acquires proficiency in their first and second language at the same time. The individual utilizes the two languages interchangeably throughout their childhood to satisfy their communication needs.¹³ Successive language learning, on the other

hand, is characterized by a time gap between the acquisition of the individual's first and second language.¹³ In other words, after obtaining full proficiency in their first language, or their mother tongue, the successive language learner then begins to learn their second language.¹³

When comparing the two circumstances and relative timeframes of procurement, simultaneous language learners are at a clear advantage: they are able to obtain a higher level of proficiency, as they learn in a natural, immediate environment.¹⁴ They use the languages independently in order to get their specific necessities met.¹⁴ By contrast, successive learners may favor one language.¹⁴ Instead of learning the new language independently, individuals may cross-reference meanings and definitions between the two languages.¹⁴ They resort to translation and comparison, ultimately limiting their ability to procure true fluency in the second language.¹⁴ Additionally, successive language acquisition often implies that the individual will be learning their non-native language in a forced, classroom environment, which hinders true growth, exposure, and practice. Individuals often do not have a reason to use the language outside of the classroom, so they are not consistently employing the new language as a means of necessity, but instead as a tool of translation and cross-reference. This notion frequently diminishes the individual's drive and persistence in using the language long-term, which can result in a lower level of proficiency.

A study conducted on the comparison of simultaneous and successive language learning posed a clear distinction in brain activity between learners of different circumstances.¹⁴ Using brain imaging, the researchers discovered that the brains of simultaneous language learners had centralized both languages in Wernicke's area, the region that develops at a young age.¹⁴ In these bilinguals, the brain was able to accommodate both languages in the same neurological area.¹⁴ When examining successive language learners, however, the researchers found that brain activity was not centralized in Wernicke's area; in other words, the second language had been misplaced and relocated in the brain, forcing the learner to adapt to the improper placement of the new language.¹⁴

It is also important to consider the distinction between second language acquisition in natural environments versus in school settings. When learning in a natural setting—often in the home or a comfortable, immediate environment—the learner is able to actively and consistently experience exposure to native speakers, practice conversing in real time, and employ the language as a means of achieving or receiving something. Generally, this setting of learning

entails a more consistent, applicable usage of the language. In a school setting, however, learners are engaged in less organic practice. They receive less exposure, as they are limited to a few classes per week. When compared with a natural environment, the school setting is not ideal for learners, and will often result in a lower level of proficiency.¹⁴ Despite the general disadvantage of a classroom setting on linguistic development, adults have been seen to thrive when learning their second languages in instructed settings.¹⁵ With greater maturity than minors and lower requirements for exposure to new languages, adults are able to reap the benefits of school settings; they do not need the same levels of consistent practice and natural conversation as children do to obtain second language proficiency.¹⁵ Children, however, outperform adult learners when in a natural setting with constant exposure and speaking opportunities; they require more input to thrive, but as their learning-needs are met outside of the classroom, they are ultimately able to retain more linguistic information and skill than adults.¹⁵

Adults Vs. Children

In order to better understand the distinction between adults and children in their foreign language acquisition abilities, it is important to consider the neurological mechanisms occurring among different age groups.

Synaptic pruning is crucial in shaping the neurological efficiency and capacity of an individual. As previously discussed, during infancy children obtain many synaptic connections in the brain— about twice as many as the average adult.⁴ During adolescence, however, the synaptic connections that are deemed insignificant are disposed of, making room for the important connections to grow stronger, more efficient, and more effective.³ The connections that remain prevalent in the brain are those that are consistently employed throughout infancy.⁴ Thus, if the child is frequently exposed to a second language and utilizes it to fulfill their daily needs, those linguistic signals will be neurologically strengthened and reinforced throughout adolescence and adulthood, paving the way for an ease and natural proficiency in their second language.

The Critical Period Hypothesis also explores further reasoning for the benefits of learning a second language earlier in life.¹⁵ Critical periods are terms where the brain obtains heightened awareness and sensitivity.¹⁵ From the ages of 0 to 3, infants reach the peak of neuroplasticity, implying that they are better able to adapt or make changes in response to stimuli.¹⁶ This ability coincides with linguistic development as it shapes infants' capacities in modifying language as a

result of repeated exposure to speech and audio.¹⁶ The high levels of neurological plasticity present during critical periods signify the brain's lack of solidified and stabilized neurological connections.¹⁷ During infancy, as the brain is still working to crystalize its important connections, it is very plastic; over the course of the human lifespan, however, connections are solidified and strengthened, decreasing neurological plasticity.¹⁷ In other words, as the brain matures and connections become more fixed, it becomes more challenging for humans to make successful changes, transitions, and adaptations, as these stable neurological connections are hard to revise once they are enforced.¹⁷ Critical periods begin and end suddenly, and are essential in establishing developmental milestones in linguistic functions.¹⁵ Upon the end of these periods, human ability to acquire certain skills, including language learning, decreases significantly.¹⁵ This provides an explanation for adults' lower capacity in adapting to the intricacies of new languages. Adults' decreased brain plasticity makes it harder for them to auspiciously retain the information of a new language.¹⁷ While adults may have success in temporarily acquiring language proficiency, their hardwired, re-enforced neurological connections are difficult to alter, leaving little room for them to maintain long-term linguistic skill in a foreign language.¹⁷ Finally, because critical periods only occur during the first few years of human life, adults no longer experience these cycles of extreme responsiveness, and are thus at a disadvantage when taking on the task of second language acquisition.¹⁵

To illustrate the concept of critical periods, researchers studied humans in their first few years of life, examining their abilities to differentiate between distinct phonemes, the sounds and syllables that comprise spoken language.¹⁸ In doing so, they discovered that babies were able to distinguish between the phonemes of all languages, not showing any preference for a specific tongue.¹⁸ Upon investigation, the researchers found that Japanese babies of about 4 months of age were able to discriminate between the "r" and "l" sounds commonly used in the English language; in fact, they were just as equipped in this ability as babies who were raised in English-speaking households.¹⁸ Japanese adults, however, had lost this skill and were no longer able to perceive this distinction.¹⁸ The study demonstrates that upon birth, when the brain is obtaining high levels of neuroplasticity and has not yet formed and solidified specific connections, individuals do not favor a particular language. Rather, their unfixed connections allow them to possess the capability to understand and accept the specificities of any given language. Through further linguistic exposure and interaction, however, this ability declines.

After 6 months of age, humans begin to favor their native language due to the presence of stronger synaptic connections that limit brain plasticity. After one year of life, humans completely lose the ability to distinguish between the phonemes of non-native languages.¹⁸

In understanding potential mechanisms that stimulate these periods of heightened sensitivity, it is crucial to consider myelination. Myelination is the process by which oligodendrocytes, specific glial cells that provide support to neurons in the central nervous system, form a myelin sheath around the axons of neurons.¹⁴ This sheath facilitates rapid communication between neurons throughout the nervous system, which ultimately increases the brain's ability to quickly send and receive information through signals.¹⁴ This process facilitates coordination of language development and ability.¹⁴ By late infancy, the brain obtains almost complete myelination.¹⁴ Thus, before the age of six, children have neurons that are densely wired, which allows them to efficiently internalize and maintain information. After children reach six years of age, however, their ability to absorb and retain information declines.¹⁴

Second Language Teaching Methodologies

From birth, humans have the capacity to learn more than one language, and in today's interconnected society, it is more important than ever to exercise this potential; however, in order to achieve bilingual success, determining the most effective and efficient ways to teach foreign languages is crucial. Given the information throughout this article, it is evident that learning a second language earlier in life provides a natural ease in acquiring proficiency. Synaptic pruning, brain plasticity, critical periods, and myelination support a high capacity for language-learning and adaptability in young children. Thus, it is most beneficial to begin learning a second language before puberty to avoid the brain's inevitable decrease in neuroplasticity.

When familiarizing a child with a second language, it is crucial to provide consistent exposure to the idiom. Children are able to constantly absorb the information at hand; however, this also indicates that a satisfactory amount of information and exhibition must be presented to the young language learner in order for them to process and obtain the necessary skills associated with language acquisition. Considering synaptic pruning, if a child is not frequently employing specific signals throughout their childhood, those connections will be disposed of by the brain. The mechanism of synaptic pruning goes hand in hand with language acquisition: a child must use the language to maintain proficiency, or they will lose their linguistic ability. In terms of

teaching mechanisms, this means that those responsible for children's language growth must encourage consistent use of the language outside of the classroom; they should provide their young students with opportunities to employ their foreign language skills in native-speaking settings to reinforce the children's abilities and comfort in the desired language. Moreover, teachers should maximize their students' exposure to the language. This can be through simple conversations, involvement in play groups or daycare centers with children or adults who speak the target language, activities or games conducted in the idiom of choice, or movies, shows, and songs in the given language. In fact, a study conducted by Yan Lui at the School of Foreign Languages and Literatures of Beijing Normal University in China determined that when Chinese students watched movies where actors spoke in English, the students' English comprehension, confidence in speaking, cultural awareness, and English-presentation skills increased.²⁰ This type of exposure, whether through movies or other forms of language-based activity, will play a key role in the student's ultimate development as a bilingual. It is also important to involve several of the child's senses in different activities. Because humans employ multiple senses in most activities and interactions we partake in, incorporating multi-sensory lessons into classes mimics a natural environment, and therefore allows students to process the information at hand at a higher rate.²¹ A study conducted by researchers in 2002 demonstrated that when pictures are shown with the simultaneous use of reciprocal sounds, phrases, or words, humans' reaction times and accuracy in identifying the subject matter increases.²² An additional study directed by Dr. Aaron Seitz in 2006 at Boston University examined participants as they underwent training in motion-detection.²³ One group was trained through audiovisual motion-detecting tasks, while the second group was trained with only visual motion-detecting activities.²³ The group that was offered both visual and auditory stimuli displayed significantly higher levels of learning during and after the experiment than did the participants who were only offered sources of visual stimuli.²³ With these studies in mind, it is clear that using pictures associated with specific words, captivating colors, specific toys or physical objects accredited to distinct target vocabulary, or engaging songs or videos will increase learning results and maximize the child's engagement. Incorporating fun activities or lessons that include recipes, games, or instructions will also peak the child's attention and captivation with the language. Physical activities, hand gestures, or specific movements that can be associated with particular phrases or words may also help. Given the activities and ideas above, it is evident that linguistic-related activities must be playful and

lighthearted to keep the child engaged and involved; this will also aid in making words or ideas more memorable, and allowing the child to associate the second language with moments of fun, rather than as a chore to avoid. Finally, it is vital to make the language-learning environment a place of comfort and safety. Children must feel that they are able to try, make mistakes, and escape their comfort zones; otherwise, they will not fully engage in the activities and instead fear embarrassment or punishment. In fostering a safe learning environment, children are more comfortable speaking out and exercising their language skills, which will maximize the time periods that they practice and employ the language, and ultimately curate stronger linguistic ability.

Although it is ideal to begin the introduction of a second language during early childhood, for many, this is not possible. While learning a second language during adulthood may come with more obstacles and difficulties, proficiency is still achievable. In fact, adults are better suited to a classroom environment than kids are.¹⁵ With higher levels of maturity, older individuals are able to thrive in an instructed environment, and they require less exposure to the language to reach proficiency.¹⁵ When teaching adults, it is important to instill within them the value of their work; the teacher must remind their adult learners of their goals and the learner's specific need for acquiring proficiency in the language. This will foster higher levels of motivation, pushing the learner to dedicate themselves to their linguistic journeys and maintain interest in gaining aptitude in the desired language. It is also important to provide students with consistent encouragement and applause for their work. In other words, teachers should compliment the students' progress in the language and maintain a sense of optimism. As far as teaching methodologies, repetition is key when instructing an adult. Due to lower levels of brain plasticity, it is challenging to alter the hard-wired synaptic connections that adults have reinforced throughout their lives. Thus, in order to teach older individuals new topics, repetition must be consistently employed throughout instructed lessons. Similar to younger learners, adults have also been seen to benefit from exposure to captivating forms of entertainment, such as television offerings, the radio, or songs performed in the target language. A recent study conducted at the University of Kebangsaan Malaysia surveyed adults on what they personally found to be the most helpful strategies for second language learning.²⁴ 100% of the individuals participating in the study identified that listening to talk shows, watching TV, or seeing movies in their second language improved their language speaking and listening skills.²⁴ With this

information in mind, teachers should consider incorporating entertainment sources conducted in their students' specific target language into their language-teaching lessons. The same study also demonstrated that 80% of the adult learners accounted for in the survey determined that using new vocabulary in different ways and in distinct sentences allowed them to gain further understanding of new words, expanding and enhancing their vocabulary.²⁴ This signifies that, when teaching adults, promoting repeated use of specific words in separate contexts allows learners to gauge the true meanings of vocabulary, and thus allows them to more efficiently commit words to memory. Teachers should therefore utilize activities that encourage the use of the same word several times while alternating the context or meaning of the word. Finally, it is important to foster a routine within lessons: this may include scheduling days or specific hours dedicated to linguistic instruction or particular activities that are consistent throughout all classes. This allows adults to better adapt to the new information at hand.

Immersion is also an impactful resource that aids individuals in fostering a stronger ability in second language learning. Immersing students, both adults and children, within the culture of the target language provides ultimate access to exposure. Immersion also creates an environment where learners use the language out of basic necessity. Rather than being restricted to the use of the second language within the confined boundaries of a classroom or during occasional conversations, students participating in immersion are forced to use the given language in daily interactions to get by; in other words, in order for participants to get their necessities met in their respective locations, they must employ the second language consistently. In an instructed setting, on the other hand, this is often not the case, as learners have the option to resort to their first language in moments of necessity. Thus, with more practice, exposure, and need-based use of the idiom, students of all ages have a higher potential to reach foreign language proficiency through immersion opportunities.

To recap, when teaching a child a second language, it is critical that they receive consistent exposure to the idiom, engage in light-hearted activities that recruit multiple senses, and therefore employ multiple regions of the brain, and learn in a nurturing, accepting environment. When teaching adults a second language, it is more important to focus on utilizing repetition and routine in order to allow students to better adapt and compensate for their lower levels of brain plasticity.

Conclusion

In conclusion, bilingualism promotes many unique benefits and aids humans in thriving both socially and neurologically. Learning multiple languages provides clear benefits: it unites people of distinct cultures, strengthens speakers' executive control system, and delays symptoms of disease such as Alzheimer's and dementia. In fact, about 70% of monolinguals regret not learning a second language, and 21% of these citizens recalled missing a career opportunity due to their linguistic limitations.¹⁹ In order to reap these benefits of bilingualism, we first examined the intricacies of the brain that play vital roles in second language acquisition in both children and adults. In doing so, we are able to discern that, due to mechanisms such as synaptic pruning, critical periods, myelination, and heightened brain plasticity and adaptability, children maintain an advantage when attempting to gain foreign language skills. With this information in mind, it is clear that language-teaching requires consideration for the distinct age groups at hand. When teaching kids, exposure and consistency prove to be essential for success; when teaching adults, however, repetition plays a more important role.

In discussing these concepts, we can spread awareness for the neurological processes associated with linguistic development to promote a global society where different cultures can meet and remain interconnected.

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The Effects of Alcohol Consumption on Gut Microbiota: Implications for Liver and Brain

By Ryan A. Chien

Abstract

Alcohol consumption is a major public health concern worldwide with numerous deleterious effects on health with one significant outcome being alcoholic liver disease. In recent years, research has shown that alcohol consumption can significantly impact gut microbiota and this in turn has been implicated in the pathogenesis of alcohol-related diseases. The human gut is a complex organ containing trillions of microorganisms that are collectively known as the microbiome. The population of microorganisms called microbiota are diverse and dynamic, responsible for regulating the homeostasis of the intestinal barrier. They can exert a significant impact on the host during both homeostasis and disease. Alcohol consumption can disrupt the microbiome and proper functioning of the gut, leading to mucosal hyper-permeability and disruption of the intestinal barrier integrity. This in turn can trigger inflammation in end organs such as the liver and brain leading to alcoholic liver disease and effects on mood, emotions and behavior. There have been attempts to treat this dysbiosis, or imbalance of microflora, using various means to modulate the gut microbiome, and some interventions show promise. This review will explore the current state of knowledge with regards to how gut microbiota is affected by alcohol consumption and the implications for liver and brain health.

Introduction

Excessive alcohol consumption has been a global problem leading to numerous adverse health effects and a considerable financial health care burden. The chronic use of alcohol represents one of the most common mortality causes worldwide (1). According to the World Health Organization (WHO), 2.3 billion people in the world consume alcohol and about 75 million are listed as having alcohol disorders. In 2016, the harmful use of alcohol led to some 3 million deaths (5.3% of all deaths) in the world and 132.6 million disability-adjusted life years. The mortality rate resulting from alcohol consumption is greater than that caused by diseases such as diabetes, HIV/AIDS and tuberculosis (2). Alcohol abuse causes damage to multiple end organs, primarily to the liver, the gut, and the brain, thus triggering a multi-system problem. The liver and to a smaller extent the gastrointestinal tract (GIT) are mainly involved in the

metabolism of alcohol, sustaining the greatest degree of tissue injury by heavy drinking. In patients with alcohol use disorders (AUD), alcoholic liver disease (ALD) and cirrhosis (chronic liver disease marked by inflammation and scarring) are the leading causes of death (3). There is therefore an urgent need to develop new therapeutic interventions for patients affected by severe alcoholic liver disease.

In addition, recent studies have suggested that alcohol consumption affecting the gut microbiome may also lead to structural and functional neurological abnormalities as well as affect mood and behavior (4, 5, 6, 7). This review aimed to explore the existing research on the relationship between alcohol consumption and gut microbiota, the proposed effects that the gut microbiome can have on the liver and brain, and how interventions aimed at correcting alcohol-induced dysbiosis may reduce some of the adverse effects of alcohol.

Gut Barrier

The flux that moves bidirectionally between the gut and the liver plays a major role in liver pathology and involves the biliary tract, portal vein and systemic circulation. The liver controls the gut microbiota composition by modulating multiple functions such as production of bile acid and interacting with the enterohepatic circulation. This is the reason for the responsiveness to end products from gut bacteria and nutrients received via the portal vein. The barrier that separates the gut-liver axis is the intestinal barrier which is comprised of numerous layers that line the intestine and defend the hosts from invasion by microorganisms. This border is a physical barrier which is selectively permeable and made up of juxtaposed epithelial intestinal cells connected by tight junctions, adherens junctions and desmosomes. There is also an intestinal mucus layer which is composed of mucin secreted by goblet cells and it acts as a physical, chemical and immunological barrier, which also helps to protect mucosal cells against exogenous organisms.

Microbiota

The microbiota of the intestine is defined as the total collection of microbial organisms within the gastrointestinal tract (GIT). It contains over 1,000 different species of known bacteria and tens of trillions of microorganisms overall including bacteria, archaea, fungi, yeast, and viruses which is approximately ten-times the number of somatic cells in the human body. Most

belong to the phyla *Firmicutes* and *Bacteroidetes* followed by *Actinobacteria* and *Verrucomicrobia* (8). The GIT microbiome houses more than 3 million unique genes, far outnumbering the amount of human genes 150 to 1 (9). Once a child reaches 3 years of age, the composition of bacterial gut microbiota remains stable and is unique to each individual depending on various factors such as diet, genetics, and different environmental factors. There is a symbiotic relationship between the GIT and the intestinal microbiota. Though the exact role of microbiota remains largely unexplored, the microbiota helps with the synthesis of amino acids and food, contributes to the extraction of energy from food, macromolecule catabolism, drug and toxin metabolism and helps to form barriers against pathogens (10). The gut is the largest reservoir of microorganisms in the body.

Pre-clinical Dysbiosis

Any imbalances in intestinal flora composition or function are generally indicated as “dysbiosis” (8). In fact, alterations of microbiota homeostasis have an effect not only on alcohol-induced liver disease, but they have also been associated with other disorders including but not limited to obesity (9), type II diabetes (11), celiac disease (12), irritable bowel syndrome (13), inflammatory bowel disease (14), and cancer (15).

Heavy alcohol consumption has been reported by most studies to directly alter the biodiversity of gut microbes and produce significant change in the relative abundance of some particular microbes, causing inflammation and dysbiosis in the gut (16,17). Alcohol abuse facilitates bacterial over-growth predominantly in the upper small bowel, both in preclinical and human models (16). Mice that were fed alcohol for 3 weeks developed ALD and had qualitative changes in the microflora due to small intestinal bacterial overgrowth, and dysbiosis in the cecum. Also, anti-microbial molecules against Gram-positive bacteria contribute to gut dysbiosis, observed after alcohol consumption (16). These mice demonstrated an imbalance of families of bacteria, showing an increased abundance of *Bacteroidetes* and *Verrucomicrobia* reduction and a reduction of bacteria from the phylum *Firmicutes*. In another study, rats fed alcohol daily for ten weeks displayed an altered colonic bacterial composition leading to dysbiosis in the ileum and colon (18). Following alcohol consumption, there is a trend for depletion of bacteria with anti-inflammatory activity such as *Firmicutes* and *Bacteroidetes* phyla, and an increase in bacteria with pro-inflammatory activity such as *Proteobacteria*. These changes

appear to be specific to the species studied (rodents or humans) and the protocol for alcohol ingestion. (16,17).

ALD patients have a specific microbiota pattern which is associated with the severity of alcohol-induced liver injury. The degree of susceptibility to alcohol-related liver injury is transmissible from patients to mice through fecal microbiota transplantation (FMT). When transplanted with the gut microbiota isolated from patients with severe alcoholic liver disease compared to those that received microbiota from alcoholic subjects without alcoholic liver disease, mice that were fed alcohol develop severe liver inflammation, greater intestinal permeability, and organ cell death (19). This suggests that the transfer of intestinal flora from alcoholic subjects without alcoholic hepatitis ameliorates alcohol-induced liver disease, demonstrating that intestinal bacteria play a causative role in the disease development. The species of bacteria that were mainly involved in the deleterious effect of severe ALD transmission included altered *Butyricimonas*, *Bacteroides*, *Alistipes*, *Bilophila wadsworthia*, *Proteus*, *Clostridium*, and *Escherichia Coli*. Also, intestinal microbiota isolated from patients with advanced alcoholic hepatitis display a disrupted concentration of *Faecalibacterium prausnitzii*, a microbial species with mucosal protective properties and anti-inflammatory and producing butyric acid (20).

Human Dysbiosis, Intestinal Hyper-Permeability and ALD

Most of the alcohol metabolism in humans occurs in the liver. Ingested alcohol is typically processed through oxidative conversion, during which the enzyme alcohol dehydrogenase (ADH) converts alcohol into the acetaldehyde which is a toxin. Acetaldehyde is then converted to acetate by Acetaldehyde dehydrogenase (ALDH).

Unhealthy alcohol use causing changes in gut microbiota has been suggested as a key factor in ALD development and alcohol-related morbidity.(17, 21, 22, 23, 25)(Fig 1). Bjorkhaug et al showed that chronic alcohol overconsumption generates small intestinal malabsorption and alteration of colonic bacteria balance, also affecting gut microbiota metabolism (24). In a more recent study Bjorkhaug and et al analyzed the intestinal bacterial composition variability in patients with chronic alcohol overconsumption compared to those with minimal to no history of alcohol intake (22). These patients had microbiota that had more potential to be inflammatory along with an over-representation of Proteobacteria (Gram-negative, more blood endotoxins) in

the gut, and an increase in *Clostridium*, *Sutterella* (Proteobacteria), and *Holdemania* (Firmicutes). They also showed a lower amount of *Faecalibacterium*, as previously demonstrated in preclinical studies, that is generally thought to be protective against gastrointestinal conditions. For the proteobacteria of the class Gammaproteobacteria and Firmicute of the class of Bacilli, the degree of the over-growth in alcoholics and cirrhotic patients correlates with the severity of the liver damage (25). Moreover, the authors found a lower concentration of butyric acid, which is thought to be beneficial for maintenance of the intestinal barrier integrity, in the feces of alcohol over users.

All of these findings are consistent with previous studies in which reduced amounts of *Lactobacillus* and *Bacteroidetes* species and a higher abundance of Proteobacteria and Fusobacteria in alcoholics have been found (17, 23). The reason for the bacterial overgrowth remains unknown. Since alcohol can reduce gastrointestinal motility, this has been proposed as a possible mechanism for fecal stasis and intra-luminal bacterial proliferation. There are also gut non-bacterial communities including fungi, viruses, and archaea, which may also participate in the disease process (33) and a decrease in fungal diversity and an over-representation of *Candida* species in patients with alcohol use disorder has been observed (26).

All these alterations are also accompanied by increasing concentrations of secondary bile acids, further worsening the liver damage (19). By mechanisms which are incompletely understood, alcohol abuse prompts a disruption of the intestinal barrier integrity which with the mucosal injury caused by alcohol, increases the permeability of the mucosa (27). Experimental and clinical studies have demonstrated that alcohol exposure affects the function of the gut barrier,

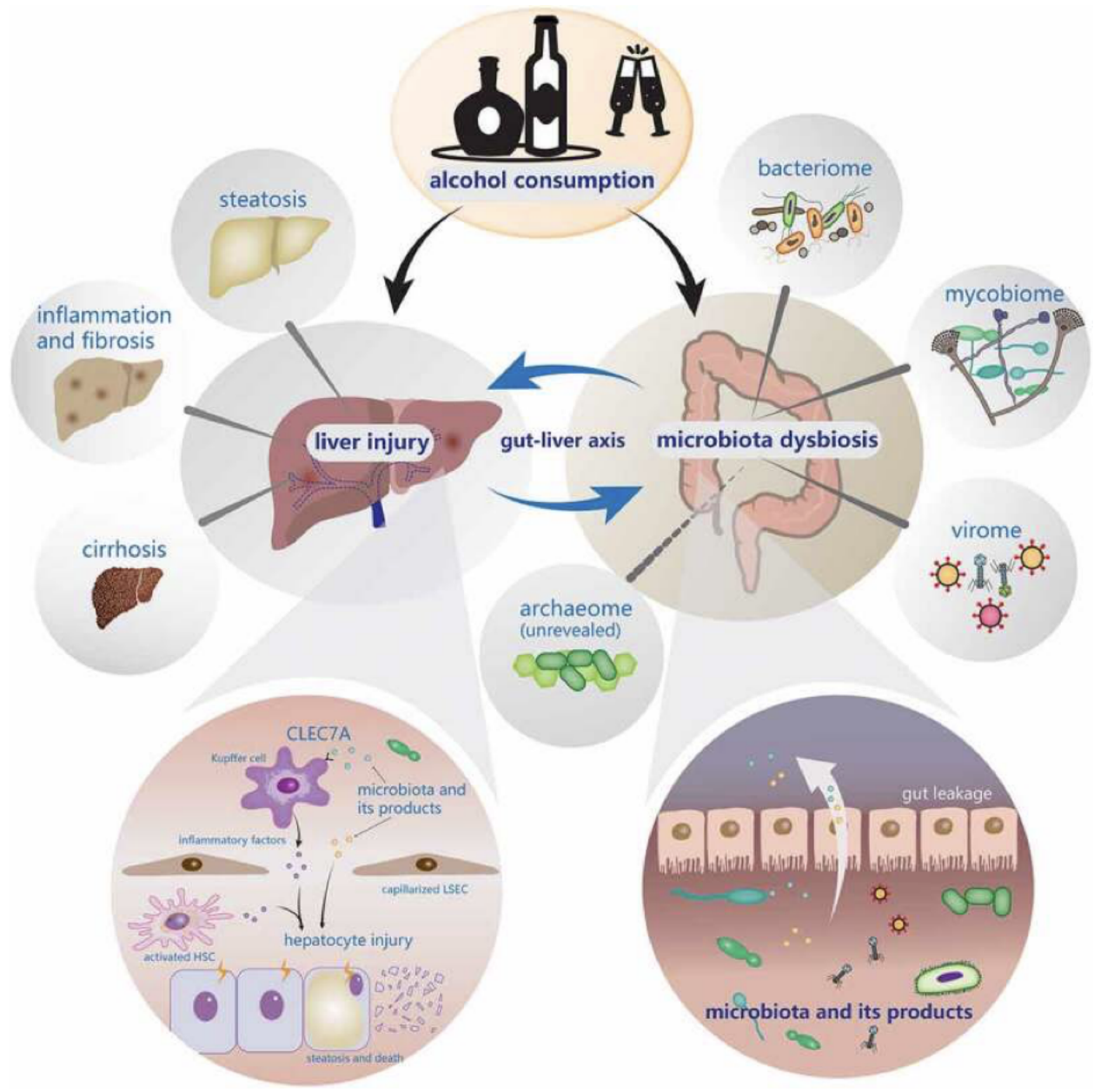


Figure 1: Illustration of alcohol consumption, dysbiosis and liver injury (Gao et al, Gut Microbes. 2021 Jan-Dec;13)

Resulting in increased intestinal permeability and movement of luminal antigens into the portal circulation of mainly bacterial endotoxins such as lipopolysaccharides (LPS). The enhanced intestinal permeability facilitates the translocation of pathogenic bacteria from the intestinal lumen to extra-intestinal space. Also gram-negative microbial products and pro-inflammatory luminal metabolites are moved into the blood circulation, contributing to liver damage (18, 28). Gut-derived toxins such as Lipoteichoic acid, flagellin, bacterial

hypo-methylated DNA, and others are released in the blood circulation and are implicated in the development of ALD, especially endotoxins (LPS) and peptidoglycan. These pathogenic antigens reach the liver via the portal vein, and are enabled to activate the inflammatory processes (29). Exacerbating the inflammation are secreted pro-inflammatory mediators such as chemokines and cytokines (TNF α and IL1 β), free radicals, and leukotrienes.

Though alcohol causes gut-derived inflammation, not all people with AUD develop alcohol-related diseases, and those who do have varying degrees of disease severity. Although the extent of disease depends in part on the extent of alcohol use and may involve inherent individual characteristics, including genetics, race, and age, there are some other factors that may affect alcohol-induced intestinal inflammation and subsequent alcohol-related disease. Circadian rhythm, which refers to an internal cycling of various biological processes, can be disrupted with chronic alcohol use. The evidence on circadian rhythm suggests a circular cycle where circadian disruption promotes alcohol-induced intestinal inflammation and alcohol disturbs circadian rhythm, which may further propagate intestinal hyper-permeability and inflammation (53).

Alcoholic liver disease (ALD) encompasses a broad spectrum of hepatic processes including asymptomatic steatosis, alcoholic steato-hepatitis, fibrosis, cirrhosis, and hepato-cellular carcinoma (30). The association between alcohol consumption and liver disease is now widely recognized and the majority of individuals (90%) who regularly intake more than 40–60 g/day of alcohol develop steatosis. Steatosis is reversible with cessation of drinking, however, in 20–40% of regular drinkers, it may be complicated by inflammation and fibrosis with cirrhosis developing in about 10–20% (31). As a result, there is an urgency to develop novel therapeutic interventions for patients with severe alcoholic hepatitis.

In one study, they showed that although isotope-labeled ethanol contributes to fatty acid collections in the liver, plasma, and cecum contents of mice, there is no evidence of ethanol metabolism by gut microbiota. They observed that the gut microbiota responded to ethanol-feeding not by metabolizing ethanol directly, but by activating acetate dissimilation leading to elevated blood acetate concentrations during ethanol consumption. They concluded that ethanol is not directly metabolized by the gut microbiota, and changes in the gut microbiota linked to ethanol are a side effect of elevated acetate levels (32).

Brain

Not only does the brain help to control the gut, research has suggested that the gut can actually affect brain function and behavioral aspects through the gut-brain axis with adjustments in the composition of gut microbiota and associated metabolites (5)(Fig 2). Alterations of the gut barrier function, leakage of bacterial products through the leaky gut, and development of an inflammation at the gut and liver level may all contribute to the development of a peripheral inflammation that may also lead to the development of a brain inflammation. Alcohol-induced increased intestinal permeability and endotoxemia may affect psychological condition and cognitive capability, reinforcing the tendency to drink. In patients hospitalized for alcohol detoxification, the enhanced intestinal permeability and LPS blood levels were significantly correlated with higher scores of depression, anxiety, diminished social interactions, and alcohol cravings, even after alcohol withdrawal (6). Chronic alcohol use also can impact alcohol craving by allowing microbial metabolites to enter the peripheral and central circulation (37). The degree of intestinal permeability was differentially associated with certain behaviors, with recovery in depression, anxiety, and craving levels noted in individuals with low intestinal permeability, but not in those with high intestinal permeability. (37). Alcohol craving as well as anxiety and depression were also linked to gut microbial and peripheral metabolite level alterations (38). The gut microbiome may also be able to affect emotions and emotion regulation. In a recent publication, 206 patients recorded measures of emotion-related factors and had analyses of their stool. Negative emotions were directly correlated with the relative abundance of Firmicutes bacterium CAG 94 and Ruminococcaceae bacterium D16 and positive emotions were inversely associated with these same species. Negative emotions were inversely related to the biosynthesis of pantothenate, coenzyme A, and adenosine (57). Systemic inflammation produces a negative direct effect on neurons and facilitates the disruption of the blood-brain barrier and the passage

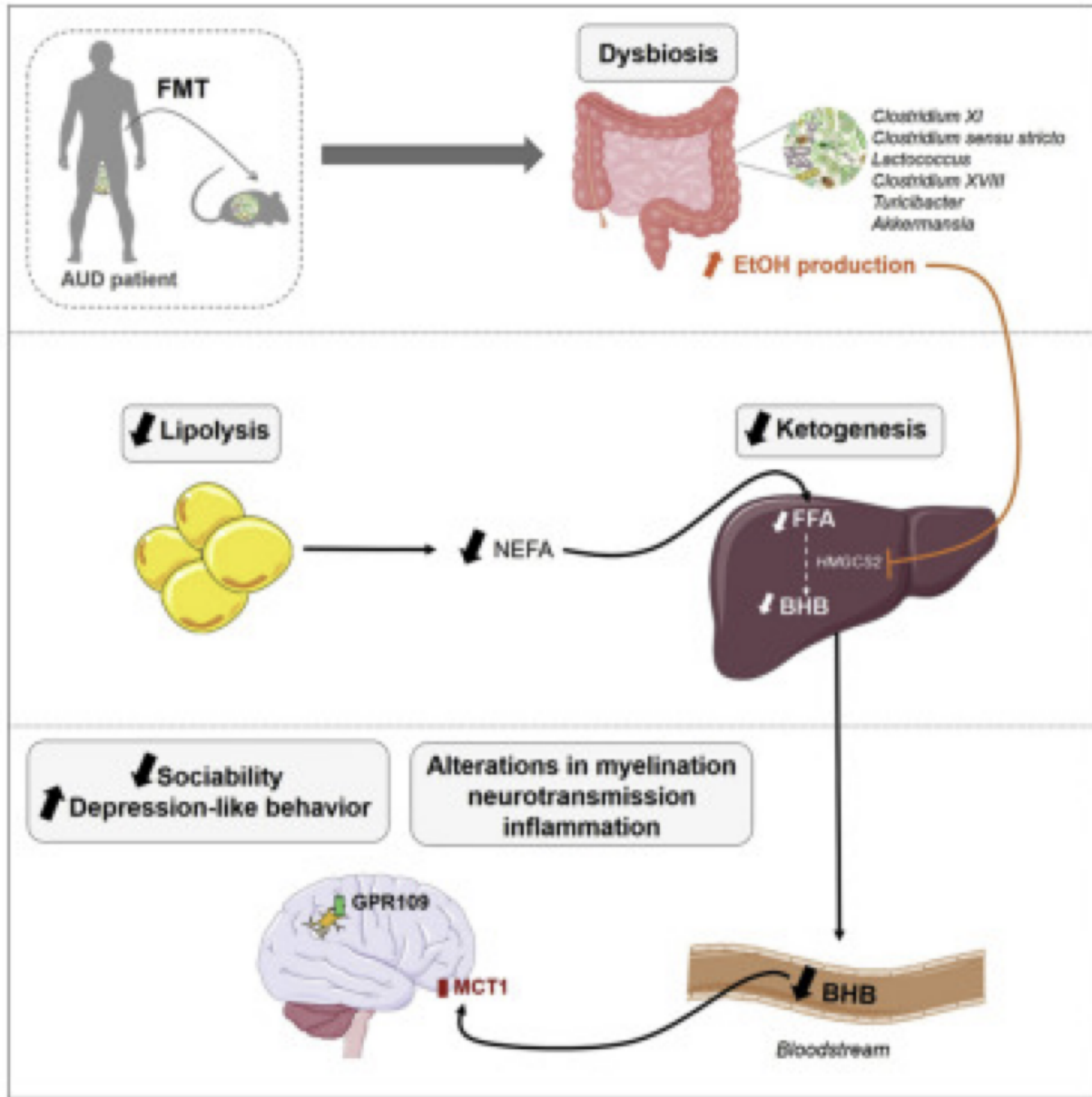


Figure 2: Illustration of dysbiosis and behavior (Leclercq et al, Cell Rep. 2020 Oct 13) of activated peripheral immune cells (7). The systemic inflammation resulting from alcohol-induced gut inflammation leads to elevated cytokines which may be able to disrupt the blood-brain barrier and enter the brain, initiating a vicious cycle that perpetuates alcohol's effects on the central nervous system (35). Transplanting gut microbiota from AUD patients to mice showed effects on behavioral (depression, sociability) and neurobiological (myelination, neurotransmission, inflammation) processes and demonstrated that gut dysbiosis is associated with metabolic modifications involved in alcohol addiction (34). There is accumulating evidence

that alcohol-induced dysbiosis and gut microbiome may contribute to alterations in the vagal nerve response and inflammation in the central nervous system, influencing areas implicated in AUD including the thalamus, hippocampus, amygdala and prefrontal cortex (36).

Treatment

Alcoholic cirrhosis and liver failure account for most deaths. Liver transplantation represents a potential lifesaving treatment for the end-stage of liver disease in ALD patients. Current management of ALD patients aims to prevent the onset of liver damage and/or progression by encouraging alcohol abstinence, however, treatment efficacy is highly dependent on disease severity and the ability to tolerate alcohol withdrawal using both psychological and pharmacological means. Remission success has rates between 20–40% (39, 40). There is therefore an urgent need to establish novel therapeutic interventions.

Efforts have been made to modulate intestinal bacteria composition including the use of diet, probiotics, prebiotics, antibiotics and fecal microbiota transplant. Animal model research and clinical studies have broadly demonstrated that gut microflora composition may be affected by genetics, lifestyle, and environmental factors, including dietary habits. Dietary changes, both long and short-term, can quickly normalize intestinal microflora, thus suggesting a simple and effective approach to restore eubiosis. The major contrasts in microflora composition have been witnessed between people consuming Western diet and vs. high-fiber diet. Many natural extracts have been discovered to have a protective effect on ALD. Dietary polyphenols in coffee, green tea, and chocolate have shown beneficial effects by directly interacting with gut microbial communities. Flaxseed oil improves inflammatory responses and stimulates Firmicutes and Parabacteroides overgrowth in mice with ALD (41). Phenol extracts bolster eubiosis, repair intestinal barrier dysfunction, and protect from liver inflammation in animal models of binge drinking (42, 43).

The first probiotic tested, *Lactobacillus rhamnosus*GG (LGG), was in a rodent model of ALD and it was effective to recover ‘leaky gut’ and hepatic inflammation either alone or enriched with oat fibers (44). LGG administration also showed protective effects on ethanol-induced liver injury, circulating liver enzymes, and endotoxemia in rats (45). Similarly, short-term oral treatment with *Bifidobacterium bifidum* and *Lactobacillus plantarum* 8PA3 in a randomized study comprised of 66 alcoholic patients was associated with microflora recovery

and significantly lowered liver enzyme levels compared to the standard therapy (46). Mice fed Lieber-DeCarli diet supplemented with *Akkermansia muciniphila* were protected against acute and chronic ALD as proven by reduced pro-inflammatory cytokines, systemic endotoxins, and recovery of ethanol-induced intestinal barrier dysfunction (47). An 8 probiotic strain mix Probiotic VSL#3 (mainly *Lactobacillus* and *Bifidobacterium*), prevented changes in tight junction protein expression thus conserving the intestinal barrier function and reduced endotoxins translocation from the gut lumen to the portal circulation in a rat model of acute ALD (48). In another study utilizing probiotic VSL#3 in patients affected by different chronic liver diseases including 20 ALD patients, improvement in circulating cytokines and oxidative stress parameters and even more in liver pathology (49).

Prebiotics have also been shown to attenuate hepatic lesions in both animal models and humans. Prebiotics are indigestible fibers that serve as substrates for species such as *Lactobacillus* and *Bifidobacteria* proliferation. There have been a few studies investigating the efficacy of prebiotics in alcoholic models. The prebiotics predominantly studied include fructo-o-oligosaccharides (FOS), galacto-oligosaccharides (GOS), arabinoxylan-oligosaccharides, inulin, and prebiotics from natural sources (chicory and yacon roots, etc). Inulin, FOS, fructan and GOS consumption and their effects on *Bifidobacterium adolescentis*, *Bifidobacterium catenulatum*, *Lactobacillus* spp, *Faecalibacterium prausnitzii*, *Bacteroides* spp and *Clostridium* spp have been studied in the non-ALD setting with some promising results (50).

Finally, synbiotics are evolving as a new therapeutic intervention to manage gastrointestinal, metabolic and liver disorders. The term “synbiotic” refers to a synergistic combination of probiotic with prebiotic compounds, which selectively trigger probiotic bacteria survival augmenting their beneficial effects. FloraGuard®, a synbiotic mix enriched in prebiotics and *Lactobacillus acidophilus*, *Lactobacillus bulgaricus*, *Bifidobacterium bifidum*, *Bifidobacterium longum*, and *Streptococcus thermophilus*, added to an ethanol diet mitigated hepatic steatosis and inflammation and improved gut permeability in rats (51). In another pre-clinical study, C57BL/6 mice given chronic binge ethanol feedings were protected against hepatic steatosis and liver injury when they were supplemented with *Faecalibacterium prausnitzii* and potato starch (52).

Fecal microbiota transplantation (FMT) is the transfer of stool matter from a healthy donor into the intestinal tract of a recipient. It has been used in inflammatory bowel disease and pseudomembranous colitis. The mechanisms by which it may provide health benefits include changing bacterial species and supporting overgrowth of nonpathogenic microbes which produce antimicrobial agents (54). In one study, alcohol-sensitive mice were noted to have diminished Bacteroidetes and increased Firmicutes and Actinobacteria populations relative to alcohol-resistant mice obtained from the same laboratory. FMT from the alcohol-resistant mice to the alcohol-sensitive mice reversed the Bacteroidetes depletion and protected the mice from alcohol injury (55). In another translational study using germ-free humanized mice and completed FMT from patients with and without severe alcoholic hepatitis (SAH), with consequent alcohol feeding, the mice with FMT from SAH patients showed more significant liver inflammation, greater hepatic necrosis, increased intestinal permeability, and translocation of bacteria when compared with the mice which received FMT from non-SAH alcoholic patients (19). Analyses revealed that the microbiome composition was distinctly different between the SAH and non-SAH alcoholic hepatitis patients. Subsequently, a second FMT from patients without SAH into the mice who had earlier received FMT from SAH patients showed improvements in liver lesions, confirming the principal role of the gut microbiome in severe alcoholic hepatitis. A recent phase 1 trial showed that FMT was safe and associated with short-term reduction in alcohol craving and consumption with favorable microbial changes compared to placebo in patients with alcohol misuse and alcohol-associated cirrhosis (56).

Conclusion

For the future, more controlled trials addressing the restoration of gut microbial composition and the modulation of bacterial metabolites in preventing or reversing alcohol effects, are needed. There is a need for more prebiotic studies in ALD. Also current human data on FMT for alcohol-associated liver disease are sparse so an urgency exists for larger and long-term clinical trials with FMT from healthy individuals.

The search for new treatment options is also always in demand. Currently the use of rifaximin as a possible antifibrotic drug modulating human gut microbiota is being studied in hepatic encephalopathy and may hold promise in other alcohol-induced disorders. Unlike the non-targeted therapies such as the use of antibiotics, probiotics, or fecal transplants, precision

medicine may be considered where therapies are more targeted, such as with the use of more precise microbial communities, engineered individual bacterial strains, or drugs that inhibit or mimic specific bacterial enzymes. Microbiota composition testing could even become an appealing option for diagnosis and staging of liver disease.

Alcohol is among the most used drugs and its misuse greatly impacts health worldwide, calling on the need for novel therapeutic options for alcohol-induced diseases. The gut microbiome has recently been a focus of research and treatment as it has been linked to various disease processes. With alcohol consumption now being recognized as having various detrimental effects on the gut microbiota, studies have revealed links between this dysbiosis and alcohol-induced disorder primarily of the liver and brain. ALD, cirrhosis, mood and behavioral changes including further alcohol craving are all consequences of altered gut microbiomes secondary to alcohol misuse. Dysbiosis in the intestinal microbiota may alter intestinal barrier function leading to gut leakiness, the production of proinflammatory/pathogenic microbial products, and/or affect liver metabolic pathways. Current management of ALD involves alcohol abstinence, corticosteroids or pentoxifylline, or surgical interventions therefore the need to identify novel therapeutic strategies is paramount. Intestinal microflora modulation with the use of probiotics, prebiotics, synbiotics, or FMT are being studied and show promise. Thus, a better understanding of the mechanisms involving the effects of alcohol on intestinal microbiota composition may help with finding effective means to restore intestinal microbiota homeostasis.

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Gun Violence in the Schools of United States: Understanding the Complexities and Seeking Solutions Through Social Science Perspective By Yeondoo Lee

Abstract

Gun violence in the US is a complicated, multifaceted problem with serious social and public health repercussions. The United States has a substantially higher gun death rate than most other countries, especially wealthy countries. According to a 2018 analysis of 195 countries and territories conducted by experts at the Institute for Health Metrics and Evaluation at the University of Washington, it is still far lower than the rates in numerous Latin American nations. In 2016, the most recent year for which data were available, and which also happened to be the study's most recent year, the U.S. gun death rate was 10.6 per 100,000 persons. That was significantly higher than the same figures in Canada (2.1 per 100,000), Australia (1.0), and other European countries, including France (2.7), Germany (0.9), and Spain (0.6) (Pew Research Center, 2023).

This paper gives a general overview of the subject of gun violence in the US, with a focus on school shootings, and examines the numerous elements that contribute to it, such as gun accessibility, mental health problems, racial disparities, and socioeconomic considerations. The following section of the paper looks at possible remedies to this issue, such as tightening gun control laws and regulations, addressing mental health problems, and addressing racial and socioeconomic disparities. The study emphasizes the significance of using a social science perspective to comprehend the complexity and breadth of the discussion over gun restrictions in the US, analyze the connection between firearms, and also state stats for the recent shootings. The paper concludes by discussing these tactics' success and the current controversy about them. In general, the essay highlights the significance of a thorough and research-based strategy to combat gun violence in the United States.

Background

In the United States, the topic of gun regulation has long been divisive. As of 2021, there were an estimated 393 million firearms in civilian hands, making it the nation with the greatest rate of gun ownership in the whole globe (Small Arms Survey, 2021). Unfortunately, a high

incidence of gun violence, particularly mass shootings in public settings like schools, is also linked to this high percentage of gun ownership.

Data from the last five years, from 2017 to 2022, were used in the study (Katsiyannis, Antonis, et al., 2023) to investigate rates of deliberate firearm deaths, mass shootings, and school mass shootings in the USA. In all age groups, the number of deliberate gun deaths and crude death rates increased between 2017 and 2020; the crude death rate climbed from 4.47 to 5.88. Given the COVID-19 pandemic's onset and the ensuing government- or locally-mandated school closures, it was understandable that school shootings significantly decreased in 2020, but they sharply increased once more in 2021. According to recent research, school shootings, school mass shootings, and related deaths have been increasing over the past five years. Notably, boys, especially Black boys, are disproportionately affected by gun violence, with this group experiencing far more gun deaths per capita than any other group of young people. There are presented implications for practice and policy. The United States has seen 57 times more school shootings than all other major industrialized nations combined (Katsiyannis, Antonis, et al., 2023). In the USA, firearms are the main cause of mortality for children and teenagers, with children ages 5 to 14 having a 21-fold increased risk of gun death and adolescents and young adults ages 15 to 24 having a 23-fold increased risk compared to other high-income nations. Furthermore, the likelihood of a Black child or teen dying from a gunshot is 14 times higher than the likelihood of a Latin child or teen dying from a gunshot.

Handguns were used in 59% of the 13,620 gun murders and nonnegligent manslaughters in the United States in 2020, the most recent year for which the FBI has made data public. In 3% of firearm homicides, rifles—a category of weapons that includes some firearms referred to as “assault weapons”—were used. 1% of cases involved shotguns. The remaining 36% of gun homicides and nonnegligent manslaughters involved different firearm types or were labeled as “type not stated” (Pew Research Center, 2023).

Overview of the Problem of School Shootings in the US

Children who experience violence, crime, and abuse are at risk for a variety of negative outcomes, such as drug and alcohol abuse, post-traumatic stress disorder, depression, anxiety, failure in school, and criminal behavior.

The Gun Violence Archive estimates that there were 614 mass shootings in the US in 2021, leading to 291 fatalities and 1,206 injuries. A number of high-profile school shootings have also occurred recently, including the Parkland massacre in Florida in 2018 that left 17 people dead and 17 injured.

About 39,000 gun-related deaths, including suicides, homicides, and unintentional shootings, occurred in the United States in 2019, according to the Centers for Disease Control and Prevention (CDC) (Centers for Disease Control and Prevention, 2023). This translates to nearly one death every 14 minutes, or more than 100 deaths each day on average.

In the United States, there have been a number of high-profile gun violence episodes in recent years, including large-scale shootings in public locations, workplaces, schools, and other public venues. For instance, a shooting at Marjory Stoneman Douglas High School in Parkland, Florida, in February 2018 left 17 people dead and 17 others injured (Mazzei et al., 2022). Similar to this, a shooting at a Walmart in El Paso, Texas, in August 2019 left 22 people dead and 24 others injured (Gun Violence Archive, 2021). Numerous variables, such as demographic traits, geographic location, and the kind of gun used, affect the prevalence and patterns of gun violence in the United States.

Studies have revealed, for instance, that African Americans are disproportionately affected by gun violence when compared to other racial and ethnic groups and that men are more likely than women to be victims of gun violence (Everytown Research, 2021). In a similar vein, handguns are the most often used type of firearm in gun-related crimes, and metropolitan areas see higher rates of gun violence than rural ones (Bureau of Alcohol, Tobacco, Firearms and Explosives, 2019). I will conclude by saying that the problem of gun violence in the United States is a serious one in terms of social and public health, and it affects people individually as well as in families and communities. A thorough and evidence-based approach to prevention and intervention is necessary because the frequency and patterns of gun violence vary depending on a variety of circumstances.

To make communities safer and more resilient, there are many different people and organizations that can help. According to Meloy et al., there are some behavioral patterns and models that are frequently imitated in acts of mass violence, such as the “radicalization model” and the “copycat effect” (Meloy et al. 269). Therefore, cooperation between law enforcement

and community organizations is essential if they are to break these patterns and stop further incidents.

Fig 1 discussion: Mass shootings on the premises of public schools, in particular, continue to be a serious social and public health concern in the USA. Recent statistics point to sustained increased trends in school shootings, school mass shootings, and deaths related thereto over the previous five years—patterns that unsettlingly reflect overall gun violence and deliberate shooting deaths in the USA during the same time period. The effects on the youth of our country are significant. Notably, boys, especially Black boys, are disproportionately affected by gun violence, with this group experiencing far more gun deaths per capita than any other group of young people. The impact on Black girls is also greater than it is on girls from other ethnic or racial groupings. Furthermore, although the COVID-19 epidemic and school closings reduced gun violence in schools—including school shootings and school mass shootings—during the 2020 school year, trend data indicate that the rate of gun violence is still rising. In fact, the number of gun deaths related to school shootings is at an all-time high (Katsiyannis, Antonis, et al., 2023).

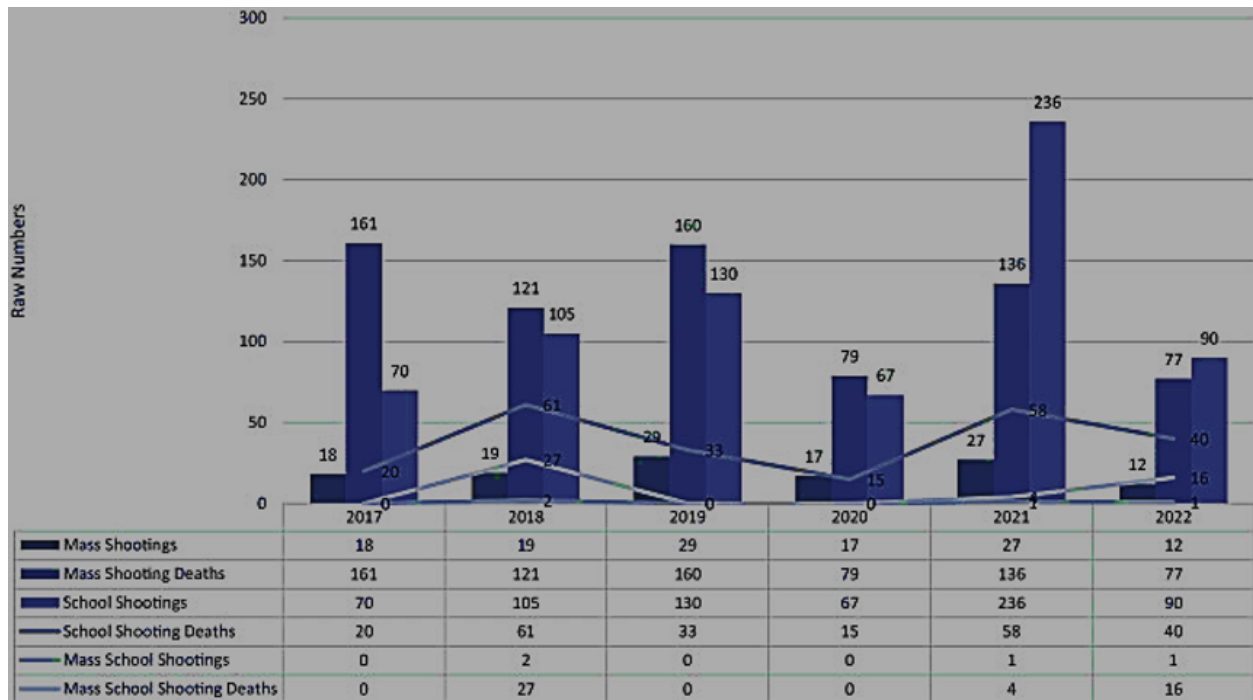


Fig 1: Mass shootings, school shootings, and mass school shootings across the USA (2017–2022). Data obtained from Everytown Research and Policy.

Factors to the Problem

The issue of gun violence in the US is complicated and multidimensional. The accessibility of getting a gun is one reason that makes this problem more prevalent. In contrast to many other nations, the United States maintains few limits on who can own and acquire firearms. Additionally, “stand your ground” laws, which permit people to use lethal force in self-defense without fleeing, have been adopted by many states.

The prevalence of mental health problems is another element that leads to gun violence in the United States. According to research, those who struggle with mental health issues are more likely to be both victims and perpetrators of gun violence (Swanson et al., 2013). But the vast majority of those who have mental health issues do not pose a threat to themselves or others.

Bullying (87% of school shootings are caused by it), as well as noncompliance with medication regimens and adverse effects from psychiatric medicines (both 12% of them). The majority of school shooters said or left behind proof that they were bullied severely and continuously for a long time. The majority of bullied individuals felt humiliated, which led them to consider suicide or retaliation. Furthermore, 10% of the school shooters who were given mental prescriptions for treatment showed medication non-compliance (failed to take prescribed pills). Before committing a violent act, many school shooters who were on psychiatric medications for their disorder encountered negative effects from the medications (Paolini, Allison C., 2015).

Information becoming more easily accessible online, as well as violence in media such as movies and video games, are other factors that have been linked to an increase in gun violence in schools. Media exposure. Violence can make people more aggressive, and after seeing gun violence in movies, young people will be more interested in buying and using firearms. The majority of violent gun crimes perpetrated in schools (60%) are carried out by people with pistols.

According to research, traumatic incidents like school shootings can and can have an impact on the mental health of victims and residents of affected communities, increasing the likelihood that they will experience post-traumatic stress disorder, depression, and other psychological problems. Even if they did not attend the school where the shooting took place, kids’ sentiments of fear, anxiety, and vulnerability are nonetheless exposed and amplified by the

intense media coverage of such tragedies. Students of all ages may struggle with adjustment and display avoidance behaviors (Katsiyannis, Antonis, et al., 2023).

And last, racial and socioeconomic factors are intertwined with the problem of gun violence. According to repeated studies (Fowler et al., 2017), low-income communities of color are disproportionately affected by gun violence. This is caused in part by structural injustices and the accessibility of firearms in these areas.

Solutions

The issue of gun violence in the US cannot be solved in a single way. Instead, a multifaceted strategy is required to address the various causes of this problem. Strengthening gun laws and restrictions is an important action that can be made. This might entail actions like requiring background checks for every gun transaction, banning assault rifles, and placing limitations on high-capacity magazines.

Addressing mental health issues is a crucial additional step. This can entail improving access to care for those who require it as well as raising money for mental health services. The stigma associated with mental health issues must also be addressed since it discourages people from getting the treatment they require when they do. The final step in reducing gun violence is to address racial and socioeconomic factors. This can entail funding neighborhood-based programs to prevent violence, addressing structural injustices that fuel both poverty and violence and giving marginalized populations access to education and employment opportunities. School staff may overestimate a student's resilience while underestimating their distress following a shooting. A student's feeling of well-being may also be threatened by an adult's problems adjusting after trauma since they may feel that their teachers are unable to give them the security they need to stay safe at school.

Recommendations for Teachers

Teachers should set aside time to talk with their kids about the incident, reassure them that they are safe, and acknowledge and validate their fears, feelings, and worries. It's crucial to acknowledge and emphasize to kids that all emotions are acceptable when a tragedy occurs. It's vital to remember that some pupils choose not to verbally communicate their emotions. You can also use other developmentally appropriate activities like writing, reading, and imaginative play.

Throughout their discussions, educators should also give explanations of the problem and the events that are appropriate for children's developmental stages. Students need succinct, straightforward responses that are paired with assurances that schools are secure and that adults are there to look out for them at the primary school level. In the secondary grades, students could query more outspokenly if they are actually safe and what security measures are in place at school. Educators can answer these queries by supplying information on the safety measures taken by school and community leaders. Teachers should go over safety measures with kids and assist them in identifying at least one adult in the building who they can approach in case of emergency. Limiting media and social media use is essential because exposure to information that is not age-appropriate might make people feel anxious or confused (Katsiyannis, Antonis et al., 2023).

Recommendations for School Leaders

School administrators should greet kids and visit classrooms to be a visible, welcoming presence. Clear behavioral standards, positive behavior interventions and supports, and crisis planning readiness are just a few of the ways that school leaders should keep their campuses safe and caring for everyone who attends, including parents and students. The creation of press releases for widespread distribution within the school community can fall under this category. In addition, school administrators should offer staff members crisis training and professional development that is based on needs analyses and targeted towards knowledge or skill shortfalls that have been found. Additionally, they should oversee the implementation of curricula and programs that prevent violence in schools, as well as examine school safety policies and procedures to make sure that all safety concerns are effectively addressed in the school's current crisis plans and emergency response protocols.

Recommendations for Counselors

The Preparation, Action, Recovery (PAR) model and the Prevent and prepare; reaffirm; evaluate; give interventions and respond (PREPaRE) models are two methods that stand out in the literature used by counselors in the wake of violent incidents. The only comprehensive, nationally accessible training program designed by educators for educators is called PREPaRE. Despite being helpful, neither the PAR nor PREPaRE model specifically addresses the reactions

of school counselors to shootings when their school is directly impacted. The School Counselor's Response to School Shootings-Framework of Recommendations (SCRSS-FR) model was created as a result, and it consists of six stages with associated elements for school counselors who have experienced a school mass shooting. Each of these options gives school-employed mental health workers the training they require to counsel the students.

The following inquiries can be used by school counselors and other stakeholders to assess a student's risk of committing a violent act in order to be more prepared for any prospective school shooting: What did the youngster say? Has the child voiced any complaints? Do their pals know anything? Do they possess any weapons? Do they feel down? Additionally, as 81% of attackers had a grievance at the time of their attack, educators must be aware of students who have complaints against faculty or other students and perform behavioral observations of these students. Counselors, educators, parents, and students can help to spot a potential school shooting by gathering information and asking specific questions (Paolini, Allison C, 2015).

Recommendation for the Federal Government

While a federal ban on assault weapons would be ideal, it is unlikely (especially in light of recent Congressional action). Similar restrictions have been placed on state activity following the US Supreme Court's ruling on New York state law. However, statistics on gun deaths and injuries, the relationship between gun violence and access laws in different countries and states, and the failure of security measures such as armed guards stationed in schools (such as Robb Elementary School) must always be emphasized. Additionally, just like with tobacco companies and narcotic drugs, the common perception of immunity for gun manufacturers should be put to the test (Katsiyannis, Antonis, et al., 2023).

Social Science Perspective

The technique taken by social scientists to Investigate people's behavior, societies, and cultures is referred to as the "social science perspective." This viewpoint places a strong emphasis on the use of scientific methods to investigate social issues, including experimentation, observation, and statistical analysis. This viewpoint is used by social scientists from a range of disciplines, including sociology, psychology, anthropology, economics, political science, and communication, to study societal topics and problems. Giddens (2021) asserts that the goal of the

social science approach is to comprehend social phenomena in terms of the fundamental mechanisms and causes that underlie them. Through the analysis of data and the testing of hypotheses, it aims to identify the regularities and patterns of social behavior and human behavior. This method makes the assumption that a range of elements, such as culture, social structures, institutions, and individual activity, influence social phenomena. The social science viewpoint, Weiner et al. (2013) offers a thorough framework for comprehending complex social issues, including poverty, inequality, and globalization. This is from an interdisciplinary perspective. It enables academics to combine knowledge from several disciplines and to look at social issues from various angles. The social science perspective also emphasizes the significance of context, history, and culture in influencing social outcomes and human behavior.

Role of Social Science

Understanding the underlying causes of gun violence in schools and coming up with prevention measures depend heavily on social science. Hahn et al. (2019) claim that social science research can be used to pinpoint risk factors for school shootings, such as mental health conditions, firearm accessibility, social isolation, and exposure to violence. Policymakers, educators, and communities may create preventative and intervention initiatives that tackle the root causes of gun violence by comprehending these risk variables. The creation of threat assessment procedures is one instance of how social science research has helped to lower gun violence in schools. Threat assessment is locating and evaluating people who could be violent risks in order to take preventative action before an act of violence takes place. This strategy has been proven to be successful in avoiding violent crimes such as school shootings (Fein et al., 2019). In addition, programs and policies focused on reducing gun violence in schools have benefited from the findings of social science research. For instance, the Everytown Research Centre has performed studies that have aided in the development of policies and programs aimed at preventing gun violence in schools, such as the implementation of regulations requiring background checks for all gun transactions (Everytown Research Centre, 2019).

Significance of Evaluating the Problem Through Social Science Perspective

It is important for a number of reasons to approach the debate over gun restriction in the US from a social science perspective. First of all, it is beneficial to comprehend the complexity and range of the issue.

Gun violence is a social issue that results from the interaction of individual, community, and societal variables, as stated by Frattaroli et al. (2013). It is possible to gain a more thorough understanding of the problem and find potential remedies by looking at these elements from a social science perspective. Second, a social science viewpoint enables a more complex examination of the connection between weapons and violence. According to Fox and DeLateur (2014), there is a complicated relationship between gun ownership and violence that can change depending on a number of variables, such as the type of gun used, the situation in which it is used, and the personalities of those involved. Social scientists can shed light on ways to avoid or lessen gun violence by carefully researching these aspects. Thirdly, a social scientific viewpoint emphasizes the significance of practice and policy that is grounded in fact. According to Webster and Vernick (2013), social science research may give decision-makers the facts and information they need to make sensible choices regarding gun control laws. Social scientists can aid in the identification of successful interventions and the assessment of their effects by employing rigorous methodologies and examining data from numerous sources.

Social scientists may help develop practical solutions that advance public safety and well-being by exploring the complex and diverse nature of the problem, analyzing the link between guns and violence, and emphasizing evidence-based policy and practice.

Considering the topic of gun control from a social science perspective is significant because it aids in developing a thorough understanding of the complex and multifaceted nature of the issue, offers insights into how gun violence can be prevented or reduced, and highlights the significance of the issue.

Social scientists can aid in the identification of successful interventions and the evaluation of their effects by looking at how individual, community, and societal factors interact and by analyzing data from many sources. In order to create effective gun control laws and practices in the United States, a social science approach is essential. Public health academics have grown more influential in expressing their conceptualization of the prevention of gun violence and the corresponding research goals. With approximately 40,000 fatalities from gun violence each year (almost as many as from auto accidents), it is obvious that this is a public

health issue. The public health approach broadens the conversation to include victimization of all kinds, including suicide and accidents, as opposed to the normal focus of talks on gun control and the criminal justice system, which emphasize criminal assault and homicide. (In actuality, only around 37% of gun deaths are caused by criminal activity (SSRC)).

Case Study

The second-deadliest school shooting tragedy in US history took place at Sandy Hook Elementary School in Newtown, Connecticut, on December 14, 2012. In the course of 12 minutes, 20 first-graders and six members of the school staff were shot and killed. The shooter, Adam Lanza, was forced to drop his assault weapon and commit himself with a handgun upon the swift arrival of law enforcement officers, who ended the massacre.

The Sandy Hook school shooting demanded top-level attention. The highest-ranking official in the town of Newtown, First Selectman E. Patricia Llodra, stood in front of the media only hours after the shooting. Connecticut Governor Dannel Malloy then arrived shortly after. Obama, however, was the one who gave the Sandy Hook tragedy national priority status. The direct and personal involvement of a sitting President was, in fact, a defining aspect of the Sandy Hook massacre. The President appointed a group of national experts to the Gun Violence Task Force, and they were given a four-week deadline to come up with a comprehensive list of potential solutions to the country's public health epidemic of gun violence. The Task Force's wide-ranging recommendations were presented in the President's speech to the nation on January 16, 2013, during which he also publicly signed executive actions aimed at reducing gun violence. The White House website simultaneously debuted a page of resources titled "Now is the Time: The President's Plan to Protect Our Children and Our Communities by Reducing Gun Violence."

School shootings not only result in death and injury, but also psychological damage. This event's singular feature is the wide-ranging "psychological footprint" it left across the country following Newtown. At Virginia Tech in 2007, the bloodiest school shooting in the US took place. Norris studied the literature on the psychological effects of mass shootings on survivors, families, and communities in the immediate aftermath.

From a fair stance, it is hoped that the momentum generated by the shooting at Sandy Hook Elementary School will be applied moving forward to an honest search and committed

research to find a set of workable solutions to lessen the burden and individual horror of gun violence in America (Shultz et al., 2013).

Social Science Perspective of Case Study

According to the social science analysis of the case study on the Sandy Hook Elementary School massacre, the incident had a profound psychological effect on both the local community and the general populace. The shooting sparked action at the highest levels of government and brought the issue of gun violence to the attention of the nation. A key feature of the tragedy was the participation of a President who was in office at the time in the reaction to the disaster, underscoring the significance of political leadership in tackling issues of public health related to gun violence.

The lesson learned here is that in order to alleviate the weight and personal tragedy of gun violence in America, more study must be done, and practical solutions must be put into practice. The President's speech's recommendations from the Gun Violence Task Force serve as the foundation for this endeavor. However, since access to weapons, mental health, and societal and cultural norms about gun ownership must all be taken into account, the problem of gun violence in the US is complicated and necessitates a multifaceted response.

Assessment of Hidden Factors

The assessment of unacknowledged factors, including access to firearms, emotional well-being, and cultural norms, that contribute to weapon viciousness and acts of mass murder is a complicated problem that has received much research. As stated by Kalesan et al., "access to firearms is a known risk factor for violent behavior and suicide" (309). A further observation made by the authors is that "individuals with poor emotional well-being are at an increased risk of perpetrating violence" (Kalesan et al. 308).

Cultural norms may also encourage violent behavior, such as glorifying violence in the media (Kalesan et al. 310).

In addition, Swanson et al.'s analysis concluded that "restrictions on firearms sales to individuals with a history of mental illness and increased funding for mental health services could potentially decrease the risk of mass shootings" (Swanson et al., 2013).

A holistic strategy that considers access to weapons, emotional health, and cultural norms is needed to examine the underlying factors influencing weapon viciousness and acts of mass murder. Strategies like limiting the sale of firearms and expanding access to mental health care may be able to assist in lowering the likelihood of such violent crimes.

Previous Approaches to the Problem

The essay “Gun Control: An Overview of Major Laws and Policies” by Michael A. Foster and William J. Krouse, specialists in domestic security, is one source that analyzes current gun control strategies in the US. They claim that the National Firearms Act, the Gun Control Act, and the Brady Handgun Violence Prevention Act are the three main federal gun control legislation in the US. In addition to these federal rules, each state has its own laws governing the possession and use of firearms. While other states have more lax regulations, some states have stricter laws in place, such as background checks and waiting periods (Foster & Krouse 2018).

Numerous steps have been taken to ensure school safety and prevent such incidents in response to acts of mass violence. These initiatives include recommendations for tougher gun control laws, crisis response methods, and school safety measures. There is a continuous discussion regarding these policies’ efficacy in decreasing gun violence and preventing acts of mass violence.

Positive behavioral interventions and supports (PBIS), Response to Intervention (RTI), and other Multi-Tier Systems and Supports (MTSS) have been used in recent years to improve academic and behavioral outcomes as well as school climate and student engagement. These strategies may also have an impact on lowering school violence. Through the implementation of research-based instructional and behavioral interventions, informed by data-based decision-making and the distribution of students across three tiers, PBIS uses a tiered framework to improve the behavioral and academic outcomes of students. High-quality classroom instruction, screening, and group interventions are implemented in Tier 1 schools; focused interventions are implemented in Tier 2 schools; intense interventions and thorough evaluation are implemented in Tier 3 schools. Implementing RTI has improved academic outcomes (such as reading and writing) as well as school atmosphere and student behavior.

Recent events at Robb Elementary School in Uvalde, Texas, prompted the US Congress to pass historic legislation aimed at reducing gun violence. This legislation improves background

checks for potential gun buyers who are under 21 and permits examination of juvenile records starting at age 16, including health records pertaining to potential gun buyers' mental health. Additionally, by providing financing, this act will enable states to implement "red flag laws" and other intervention programs while also bolstering regulations governing the sale and trafficking of firearms (Katsiyannis, Antonis et al., 2023).

The Federal Assault Weapons Ban of 1994 is one instance of successful gun control legislation. Timothy Welbeck, an assistant professor of Africology and African American studies, claims that the ban led to a decrease in fatalities caused by assault weapons. After it expired in 2004, the number of assault weapon-related deaths rose once more. The Lewis Katz School of Medicine at Temple University has adopted the Cure Violence strategy to lessen gun violence through a number of programs that have been running since 2011. The method is named after a Chicago-based effort that, in the first year of its implementation in West Garfield Park, a neighborhood with a high rate of gun violence, witnessed a 67% decrease in shootings. Programs run by the Centre for Urban Bioethics focus on outreach workers to pinpoint those who are most prone to commit acts of gun violence. Programs are then targeted at these people in an effort to assist them in altering their perspectives and actions (Rosenthal, Cindy, 2022).

Reaction to Mass Violence

To avoid and respond to acts of mass violence, many schools have developed security protocols, including active shooter drills and heightened security measures (Musu et al.). To react swiftly to acts of mass violence, crisis response mechanisms have been put in place, such as those created by the Federal Emergency Management Agency (FEMA).

To avoid gun violence, recommendations for tougher gun control laws have been made (Cook et al.). Examples include mandated background checks and restrictions on assault weapons.

However, it's not entirely clear how well these actions will work to stop mass shootings and lower gun violence. While some studies imply that school safety measures can increase school safety, others (Musu et al.) doubt their efficacy in stopping shootings. Similarly, while crisis response procedures can lessen the effects of a shooting, they cannot always ensure that such tragedies never happen (FEMA).

Stricter gun control laws' effectiveness is also up for question; some studies believe they can reduce gun violence, while others contest this idea (Cook et al.).

Overall, despite the fact that a number of strategies and responses have been put into place to address acts of mass violence and lessen firearm violence, their efficacy in achieving these goals is still being investigated and debated.

A useful viewpoint on gun regulation and acts of mass violence is provided by sociology. Awareness of how cultural attitudes towards weapons can affect gun ownership and use requires an awareness of “accepted practices” (Anderson, 2001).

In addition, behavioral economics can shed light on aspects like availability bias and risk perception that influence people’s decisions to purchase and use firearms (Mullainathan & Shafir, 2014).

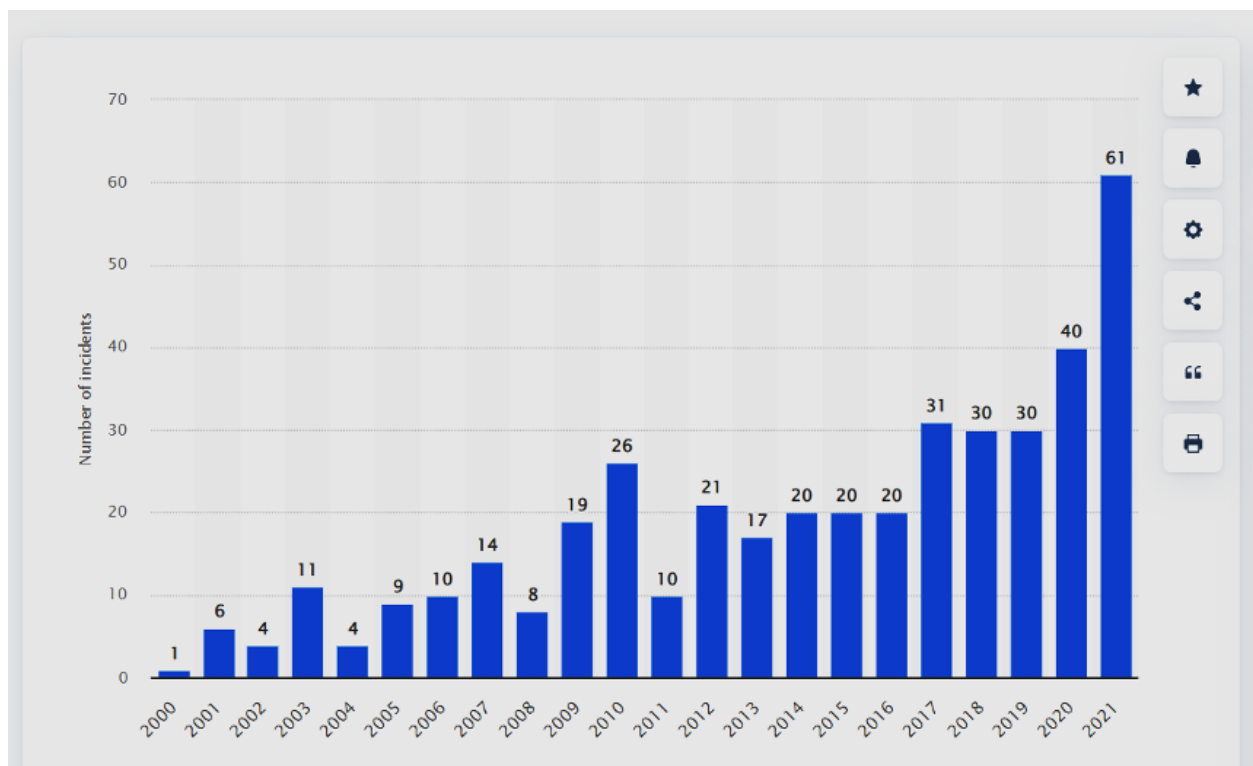


Fig 2: Number of active shooter incidents in the United States from 2000 to 2021 Active shooter incidents in the U.S. 2000-2021.

The FBI gathers information on “active shooter incidents,” which are those in which “one or more individuals actively engaged in killing or attempting to kill people in a populated area.”

According to the FBI's definition, 103 persons died in such situations in 2021, excluding the shooters.

Mass shootings are occurrences in which four or more individuals are shot, even if no one is killed (again excluding the shooters), according to the Gun Violence Archive, an online database of gun violence incidents in the United States. In 2021, 706 persons perished in these occurrences according to this criterion.

Regardless of the criterion chosen, deaths from mass shootings in the United States only represent a small portion of all gun homicides that take place nationwide each year (Pew research center, 2023).

Evaluating the Approaches

To comprehend the problem of gun violence and mass shootings in the US, sociological insights have been used. According to some academics, societal and cultural issues like poverty, social inequality, and the lack of proper mental health treatment systems are the primary causes of gun violence (Lopez, 2017). According to Jennifer Carlson (2018), the sociological perspective on gun violence emphasizes the importance of structural factors like race, gender, and class in influencing how people interact with firearms and engage in gun violence. The creation of community-based programs to reduce gun violence, the implementation of laws and policies to limit gun ownership, and initiatives to increase access to mental health care are a few interventions based on sociological insights (Cook, 2017).

Implementing sociology-based approaches to reducing gun violence, however, raises moral and practical questions. For instance, some gun control laws may violate people's rights to keep and bear arms or adversely affect particular groups more than others, such as communities of color. Additionally, funding for community-based interventions might face competition from more urgent social issues like health care and education. In order to combat gun violence and mass shootings, it is necessary to take both the moral and practical ramifications of sociological interventions into account (Carlson, 2018).

A comprehensive strategy is needed to address the complex and varied problem of gun violence and acts of mass violence in the US. A few significant conclusions and suggestions are drawn by looking at the situation of gun control laws now, mental health interventions, and sociological perspectives.

First off, it has been demonstrated that tougher gun control laws can reduce gun violence and stop mass shootings. Gun-related fatalities and injuries have been shown to be decreased by measures including universal background checks, waiting periods, and limits on assault weapons and high-capacity magazines (Giffords Law Centre, 2021). Mass shootings can also be avoided by treating mental health issues and granting access to mental health care (Swanson et al., 2013). To increase student safety and avoid school shootings, schools can implement a variety of measures, including active shooter drills, emergency response procedures, and counseling services (National Association of School Psychologists, 2020).

According to sociological theories, social norms and views on gun ownership and violence have a big impact on how people behave. As a result, interventions ought to concentrate on modifying cultural perceptions of violence and firearms (Bushman et al., 2016). This can be accomplished through media campaigns, community outreach projects, and educational programs that support responsible gun ownership and non-violent conflict resolution.

However, each suggested solution may have some disadvantages. Gun rights activists who feel that stricter gun control laws infringe on their Second Amendment rights may oppose such measures.

Reaching and identifying persons who may be in danger of perpetrating mass violence may be difficult for mental health therapies. It might take time and effort to change societal perceptions about violence and guns.

Despite these difficulties, it is imperative to address the problem of gun violence and acts of mass violence in the US through a combination of legislative changes, sociological reforms, and mental health treatments. Among the many advantages of minimizing gun violence include fewer fatalities and injuries, increased public safety, and a decrease in the financial costs of gun violence.

Future Plan

In the United States, reducing gun violence in schools continues to be a key goal for policymakers, educators, and communities. Various ideas and techniques that try to both prevent gun violence before it happens and lessen its effects in the case of the shooting have been put forth to address this issue. Implementing evidence-based prevention programs is one of the potential strategies for lowering gun violence in schools. Effective prevention programs,

according to the National Institute of Justice (NIJ), include actions like social-emotional learning, conflict resolution, and a better school climate (NIJ, 2021). These initiatives can aid in lowering the risk factors for gun violence and fostering a secure and encouraging learning environment in schools. Guns can be diverted from law-abiding citizens less frequently if handgun buyers are required to have licenses, all gun purchases are subject to background checks, and retail gun dealers are closely regulated. Interventions across several systems, including legal, public health, public safety, community, and health, will be necessary to reduce the prevalence of gun violence. Increasing the amount of data and funds available will aid in informing and assessing gun violence reduction programs (Kleck, G., & Gertz, M., 2020). Additionally, strengthening physical security measures in schools is a crucial component of any future initiatives to lower gun violence. Installation of metal detectors, security cameras, and panic buttons and training personnel in emergency response protocols are a few examples of these measures (NIJ, 2018). But it is essential to ensure that these policies are carried out in a way that does not stigmatize pupils or foster an atmosphere akin to a prison.

Future Suggestions for Social Science

According to the social science viewpoint, minimizing gun violence in schools necessitates an all-encompassing strategy that takes into account the various elements that influence this problem. This strategy entails understanding the underlying causes of gun violence using scientific methodologies, creating evidence-based preventive and intervention programs, and monitoring the success of these initiatives over time. According to the social disorganization theory, a higher frequency of violence may result from the dissolution of social institutions like the family, schools, and communities (Kelling & Coles, 1997). According to this perspective, combating gun violence in schools necessitates fortifying these social structures and fostering a sense of belonging.

According to psychological theories, individual characteristics, including mental health conditions, can contribute to gun violence in schools. According to social science studies, opening up mental health services to students in schools may be able to address these problems and stop school shootings (Everytown studies Centre, 2019).

The social science viewpoint also emphasizes how crucial it is to take into account the social and cultural context of school shootings. For instance, the culture of gun ownership and

the accessibility of firearms in the United States may be factors in the occurrence of gun violence (Hahn et al., 2019). As a result, reducing gun violence in schools necessitates both broader policy changes that address the root causes of gun violence as well as school-based initiatives.

The expansion of mental health services schools is another strategy. Access to mental health services can assist in detecting and addressing these issues prior to their escalation because they are a substantial risk factor for school shootings (Everytown Research Centre, 2019). The lack of mental health specialists in schools can also be addressed by increasing financing for school-based mental health programs.

Although it's crucial to understand that the majority of people who have mental illnesses are not dangerous, mental health therapy can frequently stop gun violence in those who are at risk for it due to mental illness, suicidal thoughts, or feelings of desperation. A national priority should be making policies and programs that identify and treat everyone suffering from a mental illness. The current state of mental health services access in the United States has to be urgently addressed; access is terribly inadequate. Additionally, it should be mentioned that behavioral threat assessment is evolving into a norm of care for stopping violence against the government and other public authorities, as well as in workplaces, institutions, and schools.

In order to address the prevention of gun violence, the mental health community must take the lead in promoting community-based collaborative problem-solving strategies. To combat the propensity for many community service systems to function in silos, such models ought to combine preventative tactics. There has been some success with community-based initiatives that train local residents in mental health first aid and police in crisis intervention. For these initiatives to be appropriately expanded to more communities, more research and piloting are required (Kleck, G., & Gertz, M., 2020).

Conclusion

In conclusion, it is crucial to have a thorough grasp of the issue from a social science perspective in order to reduce gun violence in the US, especially school shootings. Gun violence is caused by a variety of factors, including drug use and mental illness, and addressing these root causes is essential to averting further events. Sociological insights, which emphasize the impact of structural variables like poverty, social inequality, and a lack of mental health treatment systems, have been used to analyze the issue of gun violence and mass shootings in the US.

Applying sociology-based methods necessitates considering both the ethical and practical repercussions, such as potential violations of the right to bear arms and conflicting financing priorities. Implementing stricter gun control laws, enhancing mental health interventions, and changing cultural conceptions of violence and firearms through media campaigns and educational initiatives are all strategies to minimize gun violence. Each suggestion, though, could run into opposition and difficulties. Despite these challenges, it is imperative to address the issue of gun violence through a holistic approach since doing so can lead to a reduction in fatalities and injuries, an increase in public safety, and a reduction in crime. Effective measures must combine more stringent gun laws, more resources and assistance for mental health, and neighborhood-based preventative initiatives. Even though there isn't a single, effective way to stop gun violence, the US must continue to give it a top priority and seek to make everyone's future safer. The study goes on earlier efforts at gun control in the US, including federal laws and state-level regulations. Numerous programs, including crisis response techniques and school safety measures, have been implemented to guarantee school safety and stop acts of mass violence. Schools have employed PBIS (Positive Behavioral Interventions and Supports) and RTI (Response to Intervention) to improve academic and behavioral outcomes. The US Congress passed legislation enhancing background checks and empowering states to enact red flag laws and other intervention programs in response to recent events at Robb Elementary School. Mass shootings involving firearms have terrible effects on communities, so it is up to us all to do something to stop them.

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Which Strategies Best Minimize Choking Under Pressure By Aayesha Jain

Abstract

This paper evaluates strategies that help minimize choking under pressure using a literature review. Choking is a common phenomenon where individuals perform worse when put under pressure. The paper focuses on choking in sports and exam contexts, examining self-focus, distraction, and motive disposition theories for why the phenomenon occurs in individuals. Differences in choking in different contexts, such as individual and team sports, and experts and novices are also explored. While these theories have been explored in detail in the choking literature, effective strategies have not been compared with each other. This paper, thus, details various methods to minimise the negative impacts of choking in high-anxiety individuals, making an appraisal of their strengths and limitations.

Introduction

Choking under pressure is a common phenomenon. For example, consider the scenario of playing in a pro golf tournament. Imagine being the highest-scoring player in the world at the time and having thousands of eyes watching your every move as you reach the final round of the game. Imagine, then, being overcome by the pressure and losing the game.

Indeed, multiple news outlets have covered this exact example. Pro golfer Greg Norman experienced this in the 1996 U.S. Masters. When entering the game's final round, Norman had a six-stroke lead over Nick Faldo, yet lost the tournament by five shots (Howard, 2016). Widely regarded as one of the greatest chokes in sports history, Norman's loss has been examined by neuroscientists and sports psychologists for years. Choking is a mental, emotional, and physical phenomenon, and in the top golfer's case could have been caused by an intense focus on failing or overthinking.

A similar scenario occurred in basketball in the 1995 NBA Finals, with the Houston Rockets defeating the Orlando Magic 4 games to 0. A career 70% free throw shooter, Nick Anderson was sent to take four free throws, which would have benefited the Orlando Magic if he had made at least one of the four. However, having choked under pressure, Anderson missed all four free throws, contributing to his team's loss.

As these examples illustrate, choking greatly affects performance. Choking under pressure describes instances where the execution of a well-learned, procedural skill fails under high levels of pressure or stress, leading to substandard performance. Valuable goals, the pressure of performance before an audience, or fear of failure may lead to substandard performance in high-stakes situations. Often, the cause for choking is pinpointed as anxiety, whether it is an intense focus upon internal thoughts of failure or external pressures such as audiences.

Choking also may occur in different contexts, though primarily in sports or exam conditions. As presented, in sports, choking occurs in high-pressure situations due to distractions, high levels of self-focus, or irrational beliefs. Similarly, choking can frequently occur in an academic setting, such as in a high-stakes exam. Students often feel overwhelmed by pressure and tend to forget information they have learned when in the exam. This can have serious consequences for students, as standardized testing or entrance exams are often held periodically, and failure to perform well could derail a student's plans. Choking can negatively affect people in different contexts, but examining its causes can help to minimise choking.

Within the literature, there are multiple cognitive theories for choking under pressure. First, *distraction* theories describe how pressure causes an athlete or performer to allocate greater attentional resources to worrying about performance outcomes and focusing less on the task at hand (Wine, 1971). Second, *self-focus* theories claim that pressure leads an athlete to consciously process the motor skill execution (Baumeister, 1984, 611). In the second theory, thus, the proposed cause for failure is too much attention on the task. Among the approaches that specifically look at individual differences are studies that look at the role of anxiety and motive disposition. Different motives, such as achievement, power, and affiliation can impact an individual's performance in a stressful setting. For achievement, an individual would hope for a standard of excellence, for power, exerting impact on others, and for affiliation, engaging in positive social interactions (Müller et al., 2021). Such individual differences can either lead to choking, as discussed, or clutching, wherein a player performs well in an unfavourable situation.

As much research suggests, humans can be trained to prevent or minimise choking in stressful situations. When finding strategies to help individuals reduce choking, it is important to examine the causes of these failures. In the following sections, I will describe each of these

theories in more detail. Furthermore, I will present the commonly used strategies for minimising choking in sports and academic settings.

Causes for Choking Under Pressure

Research on choking under pressure has led to various theoretical explanations for the phenomenon. Distraction theories and self-focus theories are two competing schools of thought in the literature on choking. Largely, researchers tend to agree that self-focus is a more plausible explanation (Beilock & Gray, 2007; Gucciardi & Dimmock, 2008), although distraction and several other mechanisms could also contribute to choking. Another possible mechanism is differing motives in a sports or exam scenario, which could determine the anxiety levels of a person, causing choking. These three main approaches will be explored in this section.

Distraction Theory

Primarily, distraction theories attribute choking to cognitive performance. The theory, largely formulated by Wine (1971), is supported by evidence from choking literature suggesting that highly anxious people are generally more self-preoccupied than people low in anxiety and that high levels of anxiety cause the greatest differences in performance. Wine concludes that highly anxious people divide their attention between the task and their self-preoccupation. This pressure leaves insufficient attention to the task at hand, causing substandard performance (Beilock et al., 2004).

Recent, qualitative data supports the theory of distraction (Hill et al., 2011; Oudejans et al., 2011; Hill & Shaw, 2013). Findings support that distraction due to external worries diverts attention from careful monitoring of the task, causing choking. For example, Oudejans et al. (2011) conducted a study to find out which focus of attention occurs most often when expert athletes perform under pressure and found that attention to performance worries generally explains choking. In the study, 70 athletes were asked to state their focus of attention in a high-stakes competition, out of which 4% focused on movement execution while 26% were related to worries. The results thus showed that athletes were hardly ever focused on their own movement compared to external factors, lending more support to distraction theories. Evidence for distraction theories also comes from studies of visual attention. Wilson, Wine and Wood (2009) found that soccer players held greater fixations on the goalkeeper during penalty shots,

resulting in more goals within reach of the keeper. In this case, the keeper acted as a distraction, with greater attention being attributed to the keeper as compared to the task of scoring a goal.

While distraction theories explain choking in the context of sports to some extent, the theory does not elaborate on how distraction may impair a motor skill (Roberts et al., 2017). Furthermore, evidence for distraction theories is largely self-reported, as a primary method of data collection is surveys or interviews. When reporting reasons for choking, athletes may try to rationalise their choking instances by attributing a failure to a distraction, hence inferential bias may be a risk (Ericsson, 2006). To its merit, this theory can be generalized to both sports and exam contexts, as the fear of failure may be prevalent in both contexts, acting as a distraction and causing an individual to choke. Nevertheless, further, and more diverse research into distraction theories is required to help determine how distractions can be reduced.

Self-Focus Theory

While distraction leaves too little attention on the task, self-focus emphasizes too much task-focused attention (Baumeister, 1984; Wine, 1971). In general, many researchers have concluded that self-focus theories are more plausible than distraction theories, as motor actions are affected when a person's attention is directed towards skill execution (self-focus), but are preserved even when their attention is diverted (distraction).

Self-focus theories largely consider skill learning theories, which claim that motor skill execution moves from controlled processing to automatic processing over time (Anderson, 1982; Logan, 1988). While controlled processing is slow and requires focus, automatic processing is the opposite. Essentially, self-focus claims that choking occurs when automatic processing is replaced with control processing due to excessive attention to the task.

A study by Mesagno et al. (2009) aimed to examine if people with greater self-consciousness display a greater propensity to choke. The study asked 41 experienced basketball players to complete 240 free throws in low-pressure and high-pressure scenarios, with music intervention to act as a distractor. The results showed that the music intervention decreased self-awareness in participants and enabled them to minimise explicit monitoring of the execution of the task, lending support to self-focus theories. Choking can thus occur when greater attention is given to the explicit action of the task, causing high levels of pressure to trigger conscious motor processing.

However, there are challenges to the self-focus theory as well. While excess attention given to motor processes may cause choking in sports, the theory does not generalise to an exam context. In an exam, other than the act of writing, no other motor skills are involved, thus other factors must be responsible for choking. Moreover, self-focus assumes that controlled processing is detrimental, but does not consider that it may also be helpful in some cases. For example, Maurer and Munzert (2013) found that 18 out of 23 skilled basketball players concentrated on body movements when carrying out free throws. Self-focus is also a very simplified explanation, and more complex internal mechanisms such as irrational beliefs or individual motives may explain choking more accurately in different contexts.

Motive Disposition Theory

Motive Disposition Theory is another promising approach to why people choke under pressure. Unlike distraction and self-focus theories, MDT focuses more on how individuals differ in the kind of incentives they find rewarding (McClelland et al., 1989). The theory largely addresses three motives - achievement, power, and affiliation - which can determine what would be rewarding for an individual. Since individuals are motivated by different factors when competing in exams and taking exams, this theory is also applicable in both scenarios and can explain choking.

Specifically, in sports, different situations represent incentives for people with different motives. For example, participating in a team sport would be a strong incentive for those with an affiliation motive, as they would gain an opportunity to engage in positive social interactions. On the other hand, engaging in a high-competition sport would be of value to someone with a strong power motive, as winning such a competition would help them gain respect. Research has shown that if an individual's motives match the incentives in a situation, performance increases (Sorrentino & Sheppard, 1978). MDT thus shows how choking reduces when an athlete's motives match the incentives of the task (Müller et al., 2021).

Müller et al. (2021) experimented to examine the relationship between participants' affiliation and power motives and choking under pressure in a golf-putting task. The participants were first assessed on their motives and then divided into conditions where their performance was measured per different types of pressure situations. The results of the study showed that a participant's affiliation and achievement motives were directly related to performance in pressure

situations. The study has real-world implications, as an athlete's motives can be used to maximise their performance in a sporting event (Müller & Rothermund, 2018). For example, putting a high affiliation motive athlete in a swimming team relay race could lead to better performance and minimise choking. Research around MDT is thus important to determine which strategies can minimise choking under pressure, as different strategies may benefit different people due to individual differences.

How Choking Differs in Different Contexts

Certain individuals in certain situations are more likely to choke under pressure than others. As previously explored, one such reason may be differences in motives in individuals. Similarly, countless other factors can influence the propensity to choke. In such varying contexts, strategies to reduce choking will also differ. In the following section, the multiple causes for choking will be explored in sports and exam contexts, individual and team sports, experts and novices in sports, and individual differences in people in

Choking in Sports and Exam Scenarios

Entrance examinations and tournament finals are both high-stakes events, although in different contexts. Researchers studying choking under pressure largely look at these two contexts - sports and exams. The motives for choking as well as the strategies to minimise choking, however, differ in the two situations.

Firstly, choking in exams is largely caused by test anxiety (Wine, 1971). As suggested by Marlett and Watson (1968), highly test-anxious people spend more time doing things which are not task-oriented, such as worrying about outcomes and performance. This intense focus on failure thus often leads to choking, or 'blackouts' during an exam, wherein a person may forget exam material they have learnt. In sports as well, some highly anxious people may choke due to fear of failure. On the other hand, however, choking in sports may occur due to intense self-focus on motor actions, as discussed previously. In most sports, athletes are involved in some form of motor actions which may be disrupted due to excessive worrying, however, in exams, no motor movements are involved. In examination conditions, therefore, choking occurs to a large extent due to anxiety about negative consequences.

Secondly, strategies to minimise choking under pressure differ in sports and exam contexts. Recent research has shown that writing about worries and anxiety improves test performance in an exam condition, especially for highly test-anxious people (Yu & Zhang, 2023; Ramirez & Beilock, 2011). A study carried out by Ramirez and Beilock (2011) showed how when students wrote down their thoughts about an upcoming test for 10 minutes, their test scores increased by at least one grade point. Since choking in exams is largely caused by high anxiety and distraction from the task, channelling anxiety before an exam through expressive writing is thus one effective strategy.

Conversely, one key strategy to minimise choking in sports includes training under anxiety, as this could help reduce higher levels of anxiety during a high-stakes sporting event (Oudejans & Pijpers, 2010). Several other strategies such as Cognitive Behavioural Therapy and Panic Focused Psychodynamic Psychotherapy have also been explored by researchers, which will be detailed in subsequent sections. Overall, though, as causes for choking differ in sports and exam conditions, strategies to reduce choking also differ.

Choking in Individual and Team Sports

Choking in individual sports or performances has been discussed extensively, for example through previously described cases of golfer Greg Norman or free-throw shooter Nick Anderson choking in high-stakes games. However, choking occurs in team sports as well. A well-known example is the huge 1-7 loss of Brazil to Germany in the FIFA World Cup Semi-final in 2014 (Filho, 2021) which showed a sudden collapse in the performance of the Brazilian team, described by researchers as “team collapse” (Wergin et al., 2018). While choking in individual and team sports have similar consequences, the mechanisms due to which choking occurs and the strategies that can be used to reduce choking differ.

Similar to choking under pressure, “team collapse” occurs when the perceived pressure on a team is high, leading to extreme underperformance within a competition (Apitzsch, 2006; Wergin et al., 2018). Contrary to individual choking, team choking compounds during a critical event after a specific starting point, for example, points scored by the opponent team, game interruptions, or referee decisions against a team. These events can discourage members of the team, causing a collapse in performance. Many different factors can also spark this collapse in a tournament, Cognitive factors such as insecurity about the game could cause players to worry

about failing and reduce overall performance. Emotional changes especially an increase in anger and anxiety can also affect the entire team. During a difficult game, communications between players can also be harmed due to these factors, causing a sports team to collapse.

Anxiety, negative emotions and cognitions can cause players to choke both in individual sports and team sports. Some strategies to reduce possible team collapse include educating a team about the likelihood of choking (Wergin et al., 2018) and helping them work on regulating emotions. Working on improving communication between team members is also an important step to preventing and reducing choking in team sports (Wergin et al., 2022).

Choking in Experts and Novices

As previously described in the self-focus theory section, skill learning initially relies on controlled processing, which changes to automatic processing with time and practice. While novices rely on controlled actions in a sport, experts largely act automatically. Choking occurs in athletes when their motor processes are interrupted, which differs between experts and novices.

According to Beilock et al. (2002), well-learned skills in experts do not always require constant attention, as they have been rehearsed countless times and are “automated”. In this case, excessive attention to the task can cause disruption, resulting in choking. The researchers carried out an experiment under a skill-focused condition wherein golfers were instructed to focus on their motor actions, or a dual-task condition, where music was played as a distraction. The results showed that experienced golfers performed significantly better in the dual-task condition as compared to the self-focus condition. This also supports the idea that the self-focus theory is more applicable for pinpointing choking in experts.

Much research on choking under pressure (Roberts et al., 2017; Beilock & Gray, 2007) shows that experts are more likely to choke when their attention is directed inwards, affecting their automatic processing, while novices are more likely to choke due to external distractions. This research shows that it can be beneficial for novices to direct their attention towards individual motor actions in the early stages of skill acquisition, and for experts to direct their attention to other aspects of their performance so as to not deter automatic processes. These implications for skill learning and performance can thus benefit both experts and novices.

Choking Due to Individual Differences

Whether or not a person will choke under pressure can depend on external circumstances and contexts, yet one key differentiating factor for whether one person will choke more or another is their individual differences. While some choke under pressure, some athletes perform better under pressure. A few significant individual differences that contribute to choking are working memory capacity and self-consciousness.

Working memory is the cognitive system responsible for the active maintenance of task-relevant information (Jonides, 1995). High working memory people usually have higher abilities to score on a test or exam as compared to low working memory people. However, much research has concluded that individuals with high working memory are more likely to choke when under pressure than those with low working memory (Beilock & Carr, 2005;). In a well-known study by Beilock and Carr (2005), only individuals high in working memory capacity showed decrements in mathematical problem-solving when placed under pressure because their attentional capacity was compromised. Since high working memory people are more likely to succeed in an academic context, their stakes are higher and are more likely to choke as well. This research highlights the importance of finding appropriate strategies to combat choking for high-achieving test takers.

Self-consciousness is another factor influencing choking under pressure, as self-conscious people are more likely to choke under pressure (Baumeister, 1984). In accordance with this, it can be hypothesized that people of a certain gender are more likely to choke than others due to the threat of stereotypes. This could also be due to increased self-consciousness because of gender stereotypes. For example, in a competitive exam setting, a female test-taker surrounded by male test-takers may feel isolated or unfit, leading to increased self-consciousness and hence choking under pressure. Although research on gender and socioeconomic differences relating to choking under pressure is limited, self-consciousness is certainly another crucial factor in causing choking.

Overall, it is apparent that choking is a common phenomenon that can affect people in countless different contexts. Moreover, choking can be detrimental for individuals in high-stakes situations such as a tournament or exam. It is, therefore, essential to find strategies that can minimise choking. More importantly, not every strategy can be applied to every context, thus the following sections will aim to evaluate which strategy best applies to which context.

Strategies to Minimize Choking Under Pressure

Using the several theories and explanations for choking described previously, researchers have devised strategies and techniques to minimize the phenomenon. Mesagno et al. (2015), for example, argued that strategies should be developed specifically for the self-focus and distraction theories. After conducting tests to determine what caused an individual to choke, appropriate strategies can be administered to help reduce choking. While some techniques to minimize choking are simple and efficient, others require sustained effort and time. The benefits of a certain strategy vary from person to person. Pre-task strategies include cognitive distressors, biological mechanisms to focus, and pre-performance routines. On the other hand, long-term solutions could include different kinds of therapies and training under pressure. This section will explore the effectiveness of each strategy.

An effective pre-exam strategy to reduce choking is writing about testing worries. Ramirez and Beilock (2011) tested whether having students write down their thoughts about an upcoming test could improve their test performance, especially for students who were perpetually anxious about tests. By expressing their worries about failure and negative consequences for ten minutes before starting an exam, students focused less on such worries during the exam. The researchers divided participants into two conditions, where half the participants engaged in expressive writing and detailed their worries, while the other half wrote about a miscellaneous topic unrelated to the exam. The results showed that the expressive writing condition produced higher results and fewer reports of choking. Expressive writing before a test can also help members of stigmatized groups to improve their performance if they reaffirm their values and beliefs in writing before a test. Research has shown the strategy to be beneficial for women in science classes due to the gender gap, and African American students in school settings (Cohen et al., 2006; Miyake et al. 2010). Generally, in an exam context, writing out fears can thus be an efficient technique to increase focus and minimise choking.

Another pre-task strategy that may help athletes improve their performance is simply squeezing a ball in their left hand before a competition to activate certain parts of the brain. Beckmann et al. (2013) conducted three experiments with experienced soccer players, judo experts, and badminton players to test this biological strategy. The strategy is rooted in the fact that the right hemisphere of the brain controls movements on the left side of the body and vice versa (Baumann et al., 2005). The self-focus theory suggests that excessive attention to motor

processes in a sport can cause choking. Thus for right-handed players, squeezing a ball with their left hand can help activate the right side of their brain, and help reduce excessive self-focus on motor actions with the right hand. Beckmann found that this strategy is effective in sports wherein the focus is placed on body movements and specific motor actions. However, the same would not work for athletes whose performance is based on strength or stamina, such as runners. This strategy hence has limited applicability.

A third intervention that is used to improve task concentration is a pre-performance routine (PPR). Mesagno et al. (2015) researched whether a PPR could reduce choking by minimising distraction during a sporting event. The researchers tested whether PPRs containing extensive features such as cognitive and behavioural preparation, deep breathing, and cue words helped athletes improve performance under pressure. They found that creating personalised PPRs for individual athletes produced task-focused attention. PPRs helped athletes reduce excessive negative self-talk and distracting thoughts, helping to improve performance. This intervention, similar to squeezing a ball and writing down fears, allows an individual to destress and gain focus prior to an important task. These three efficient methods can thus help people reduce choking in a short span of time.

Choking under pressure is most often caused by excessive anxiety in high-stakes situations. Cognitive Behavioural Therapy (CBT) is one successful therapy to help those with anxiety disorders and can be applied to choking as well. A well-known approach for anxiety treatment, CBT is a type of psychotherapy that helps individuals learn coping skills for various problems. However, CBT may not always be effective as a standalone treatment for anxiety as many patients terminate prematurely and not all respond to these treatments (Barlow et al., 2000). An alternative therapy is Panic Focused Psychodynamic Psychotherapy (PFPP), which is rooted in psychoanalytic theory and empirically supported to aid anxiety disorders (Busch et al., 2012).

Merced (2018) published a recent paper on how psychoanalytic theory applies to choking under pressure. The core idea is that there may be “psychodynamic” factors - conflicts between needs and wants, and moral values (Rapaport & Gill, 1959) - influencing choking, along with neurological and physical factors. For this reason, PFPP, a psychoanalytically oriented treatment for anxiety, is an alternate therapy to help minimise choking, especially if CBT was not helpful for an individual. PFPP is a time-limited (24 sessions) treatment that helps patients learn how

their conscious behaviours may be influenced by unconscious factors. While in treatment, patients can increase their own self-awareness and self-understanding through insight. Insight is an important tool for choking-prone individuals in PFPP and can help them understand their inner conflicts (Castonguay & Hill, 2007). Since CBT and other cognitive-behavioural strategies are not helpful for some individuals, PFPP can be another option.

Moving on from therapies, a more practical and accessible strategy is training under pressure. In an exam scenario, this can mean taking mock or practice exams under similar conditions to the final one. Training with mild levels of anxiety also improves performance and reduces choking in sports (Oudejans & Pijpers, 2009; 2010). This process is called acclimatization, where athletes can adapt to high levels of anxiety by training with smaller levels of anxiety. A study done on 17 expert basketball players and 17 skilled dart players showed that training with induced anxiety over the course of five weeks reduced choking in a competitive setting, as such training helps athletes acclimatize to the self-regulatory processes of dealing with anxiety (Oudejans & Pijpers, 2009). This is therefore a highly useful strategy for exam takers and sportspeople during training and preparation for a high-stakes exam or game.

As presented, multiple strategies exist to combat and minimise choking under pressure. Since choking is caused by excessive anxiety, worry, or self-awareness in a stressful situation, understanding these mechanisms can help an individual improve their performance under pressure. It is important for choking-prone individuals to also identify their triggers and reasons for choking, as this will determine which strategies could be effective specifically for them.

Conclusion

Choking under pressure, as explored, is a very common phenomenon that can affect individuals in many different contexts. Due to its high prevalence, finding methods to reduce choking is necessary, leading to the question ‘Which strategies best minimise choking under pressure.’ In this study, I explored various theories and coping techniques relating to the phenomenon which can help minimise choking. Based on my research, the most beneficial strategy appears to be training under pressure. Since it applies to both sports and exam contexts, is time and cost-efficient, and generates long-term results, training under pressure can help acclimatize individuals to high-pressure situations and reduce choking. However, the fact remains that not all strategies can work for everyone - it is essential to examine what factors are

causing choking and accordingly devise a plan of action. Further research may explore how training under pressure works in those with excessive self-focus and those that get distracted easily. Differences in motives can also be further explored. This may help to address the remaining questions of choking under pressure, such as which theories and strategies can help the most people.

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Serial Killer or Psychopath? + Analyzing Joe Goldberg Under the Parameters of John Bowlby's Attachment Theory By Khushi Patil

Introduction

There has been a drastic increase in the presence of serial killers and psychopaths in society over a multitude of realms, including literature, media, and day to day crimes in different parts of the world (Conrath 144). How, though, can a serial killer and psychopath be defined? Although there have been conflicting interpretations, most agree that a serial killer is “someone who, through premeditation, kills three or more people over a period of time,” (Scott 2) and “social misfits that operate without a motive, essentially asserting that serial killers harm people without any reasoning” (Federman et al. 44). Additionally, the most common evaluation of a psychopath is “a cold and ruthless killer who acts with no regrets or remorse” (Federman et al. 48) in addition to being “self-centered, dishonest, and undependable” (Lilienfeld and Arkowitz 80). Although there are distinctions between the two, there are also several similarities. Federman and colleagues claim that psychopathy stems from a lack of attachment to their loved ones early in an individual's childhood, and Scott claims that serial-killer behavior is deeply rooted in impaired childhood attachments and formative traumatic experiences. These patterns can be traced back to John Bowlby's attachment theory, which states that “the early attachment relationship with a primary caregiver is a prototype for later love relationships” (Crowell and Waters 31). The attachment theory is a reliable resource to offer a link between “early adversity and sexually abusive behavior in adulthood” (Grady 433). Child maltreatment disrupts the child's socioemotional development, which is why the fundamentals of this theory can be seen in serial killers and psychopaths.

Literature Review–Serial Killers

Regarding serial killers, “a variety of different murdering genres exist: serial killers, mass murderers, and spree killers” (Conrath 144). Each offender is classified based on the severity of their violence, which ranges from mild to severe. Mass murderers tend to be manic, depressive, and unemployed. Spree killers exhibit similar behaviors, but they kill people one after another. Serial killers, opposingly, “have a banal and self-effacing profile” (Conrath 144). Their drive to kill is not usually suppressed rage, but the desire and pleasure they receive from murdering other

people. All serial killers, though, possess a similar characteristic - they are prompted to commit their murders by a pathological urge with a result of a psychological reward (Edelstein 68). This is worth noting because it displays the selfish nature of serial killers.

To taper the specifics of serial killers, they can be placed into distinct categories. Hannah Chambers, an entertainment editor at *Cosmopolitan*, references the Federal Bureau of Investigation's (FBI) Classification Manual as it identifies three types of serial killer classifications: the medical killer, the organized killer, and the disorganized killer. Medical killers are efficient in covering up their crimes and have a high IQ level. To further clarify the behavior of medical killers, Fiona Guy, the owner of Crime Traveller, a criminal psychology writer, and a researcher, emphasizes that medical killers "have been documented throughout history highlighting how trusted positions and access to vulnerable patients can be abused in the worst way possible".

The organized killer is a type of killer with a high education status and is "super organized" and is able to commit crimes without getting caught (Chambers). Research has shown that organized killers will watch/stalk their victim for periods of time before attempting to murder them, which stems from the murderer's internal sexual desire. Sexual sadism (or "lust murder") has almost always been associated with fantasy (Chan and Heide 38). Researchers from Britain also maintained that sadistic murderers are introverted, overcontrolled, timid, and socially isolated, which leads to an understanding of why sadistic murderers possess these characteristics. Chan and Heide believe that problematic familial upbringings (trauma, developmental failure, and interpersonal failure) was the primary contributor of violent behaviors that defined the personality of sadistic murderers.

The disorganized killer is the polar opposite of an organized killer. These killers rarely plan their murders. The crime scenes of these killers "tend to have plenty of evidence left behind" (Chambers). Disorganized killers are usually those of low IQ levels and isolated from society. Chambers states that the murders performed by disorganized killers are "sudden and unplanned" - bodies are usually left at the crime scene.

Psychopathy

Recent studies have affirmed that psychopathic behavior and serial killer behavior are linked (Federman et al. 36). Psychopathy was first described by Hervey M. Cleckley, a

psychiatrist at the Medical College of Georgia, in 1941 (Lilienfeld and Arkowitz 80). The study of psychopathy is founded upon two thoughts - 1). Criminals choose to commit crimes, regardless of economic, personal, and psychological forces that play a role in their decisions and 2). A belief that scientific progress can determine what makes up behavior abnormalities and that conducting studies and in depth research on the brain can help in identifying personality or behavioral disorders (Federman et al. 38). Some possible explanations how psychopathic behavior is developed stems from outright violence, brain injuries, or hormonal imbalances. Due to this, psychopaths have more obscure and dangerous motives than criminals as their crimes are more violent and visual (Federman et al. 40).

There is a relationship between psychopathy and aggressive behaviors in antisocial youth and adults (Bezdjian 1267). Researchers state that there are two types of aggression - proactive and reactive, but argue that psychopathy is correlated with proactive aggression, as proactive aggression is related to psychopathic personality traits. Some examples of psychopathic personality traits include a lack of empathy and remorse, dangerousness, evil, and being diagnosed with an illness or disorder (Federman et al. 51). A psychopath's family, school, and social life are main contributors to how these personality traits (mentioned above) are influenced and developed overtime.

Attachment Theory

The attachment theory, as developed by John Bowlby, a psychologist and psychoanalyst who “researched the effects of separation between infants and their parents” (Ackerman) and “made significant contributions to the social and behavioral sciences, specializes in how an individual's childhood relationship with their caregiver and general experiences influence their relationship, personality, and behavior in their adulthood in addition to having a direct impact on their cognitive and socioemotional development (Hendrick and Hendrick 38). Attachment theory strongly suggests that the maternal figure (usually the primary caregiver), has a large effect on the attachment style that the infant formed. “These attachment behaviors are instinctive responses to the perceived threat of losing the survival advantages that accompany being cared for and attended to by the primary caregiver” (Ackerman). With the presence of a consistent caregiver in one's early childhood and infancy, the individual feels secure. Opposingly, the

exposure and experience of distress, illness, danger, or extreme novelty causes individuals to seek out safety within others (Crowell and Waters 32).

How can one classify what makes an attachment, and what is this classification based on? According to Hazan and Shaver, “bonds that satisfy the criteria for being attachments - that is, that include proximity maintenance and safe-haven and secure-base behaviors are commonly developed with other adults as well as with older siblings.” There are four different types of attachment with an infant towards their caregiver - the secure, anxious-resistant, avoidant, and the disorganized-disoriented attachment types (Ackerman). In secure attachment relationships, infants showed distress upon separation but sought comfort and were easily comforted when the parents returned (Ackerman). Hope Gillette, a freelance writer, published novelist, and mental health advocate maintains that “the four S's of a secure attachment style refer to feeling safe, seen, soothed, and secure.” Conversely, in anxious-resistant attachments, a smaller portion of infants experienced greater levels of distress and, upon reuniting with the parents, seemed both to seek comfort and to attempt to “punish” the parents for leaving (Ackerman). An individual who embodies the anxious-resistant attachment style has an intense fear of rejection and a desire of approval from others (Lebow). Infants who exhibit avoidant attachment showed minimal stress upon separation from the parents and actively avoided the parents upon reuniting (Shaver and Fraley 109). As per Lebow’s prior research, people who display the avoidant attachment have a difficulty expressing their feelings and oscillate between wanting to be emotionally close to others and a needing to take space from them. In later years, researchers added a fourth attachment style to this list: the disorganized-disoriented attachment style, which refers to children who have no predictable pattern of attachment behaviors (Ackerman). The attachment styles formed in one’s childhood is “successively incorporated into peer relationships across adolescence and young adult life” (Crowell and Waters 31). With the presence of a consistent caregiver in one’s early childhood and infancy, the individual feels secure. The opposite occurs for insecure attachments (anxious-resistant, avoidant, and disorganized-disoriented).

Portrayal in a TV Show

Federman and colleagues claim that the most brutal forms of murder and serial killings by serial killers and psychopaths are found in the media and are at an all time high in being widely representative in psychological thriller TV shows and horror movies. *You* (a TV show) is

an excellent form of media that encapsulates serial-killer and psychopathic behavior in addition to principles of the attachment theory. This show “centers around narrator Joe Goldberg, a young man who has a pattern of becoming obsessed with certain women, stalking them, winning them over, and killing anyone around them he believes has wronged his lover” (Naftulin). Many believe that Goldberg exhibits behaviors of both serial killers and psychopaths. Additionally, Naftulin highlights that Joe’s personality traits include a lack of empathy, high levels of manipulation, violating another person’s privacy, and a heightened sense of self importance to hide their insecurity and relatively low self-esteem. Being familiar of Joe’s behavior in addition to the indications of the attachment theory prior to analysis will help answer the following research question: according to John Bowlby’s prominent attachment theory, which attachment type is portrayed the most in the character of Joe Goldberg in the Netflix hit thriller, *You*, and which label - psychopath or serial killer - is most applicable to Goldberg’s behavior patterns?

Gap

From the beginning of the show’s production, Joe Goldberg never received an explicit diagnosis regarding his behavior by the writers, but many believe that he exhibits serial-killer and psychopathic behaviors. However, Naftulin states that mental health experts, on the contrary, refute this argument as Goldberg’s mental health is more complicated and the term “psychopath” doesn’t define his character as a whole. Thus, for a more accurate understanding of Goldberg’s character, an accurate and correct label should be determined. Additionally, Goldberg’s character has never been analyzed under the parameters of Bowlby’s attachment theory. With the guidance of this theory, Goldberg’s behavior patterns will be better understood.

Methods

The most effective approach to accurately examine the characteristics of Joe Goldberg’s behavior and persona (relative to Bowlby’s attachment theory and the behavior patterns/personality traits of psychopaths and serial killers) was to conduct a content analysis. This method was chosen as it enables the researcher to analyze concepts, themes, and relationships present within a certain realm (Columbia Public Health). The output of a content analysis offers new observations and a clear perspective on the topic being examined. To conduct this content analysis, the following materials were gathered: a computer, an online random

number generator, and access to a Netflix account. The online random number generator served as a tool to help randomize the episode selection process from each of the three — currently out — seasons of *You*. The first number the random number generator chose would be the episode watched from season one, the second number the random number generator chose would be the episode watched from season two, and the third number the random number generator chose would be the episode watched from season three. The online random number generator chose the following: episode number three for season one, episode number one for season two, and episode number five for season three. Three separate data tables (for the three episodes that were watched) were created on a Google Document. Each data table contained Bowlby’s four attachment types; every attachment type had its own, respective row. An additional data table was made to represent the total of each attachment type’s appearance throughout the three episodes. The setup was complete, and that was when episodes were watched for the first time — beginning with episode number three from season one.

Whilst watching the selected episode from each season for the first time, behaviors related to each of the four attachment types were observed. When a behavior relative to a specific attachment type was observed, the episode would then be paused. Time stamps during which a specific behavior was exhibited were then charted in the table on the Google Document, respective to the season and episode number that was currently being watched. After watching the three episodes for the first time, each episode was rewatched to transcribe the behaviors (qualitative data) exhibited by Goldberg under the charted time stamps recorded for each attachment type. An example of this could be the following:

Episode Three, Season One

	Time Stamps	-	-	-
Attachment Type				
Secure	2:00-3:50 Goldberg was distressed when his lover left for work, but			

	experienced comfort when she returned home.			
Anxious-Resistant	12:00-12:34 Goldberg was distressed when his lover left for work, but when she returned home, he experienced comfort but was also upset that she was gone for a long period of time.			
Avoidant	29:10-29:33 Goldberg paid no mind when his lover left for work, and ignored/avoided her when she returned home.			
Disorganized-Disoriented	19:22-21:33 Goldberg's behavior regarding his lover going to work and returning home varies everyday.			

Figure 1

After rewatching each of the three episodes, an analysis was conducted in order to determine which attachment type Goldberg encapsulated the most. For accuracy, the most recurring attachment type in all of the episodes combined will determine Goldberg's attachment type. There may be instances where Goldberg's attachment type varies (an occasion when Goldberg fits two attachment styles equally, etc.). In this case, a more developed new understanding is formed; that an individual can exhibit behaviors of more than one attachment type equally, or any other variation that may occur.

After determining the attachment type (or types) that Goldberg encapsulates, his behavior patterns and personality traits were compared to psychopaths and serial killers in order to determine which label is most applicable to his character. The comparison will be based on the prior research collected in the literature review from the subheadings “serial killers” and “psychopathy”. As there have been conflicting interpretations on the classification of Goldberg as a psychopath or serial killer, this comparison, alongside the assistance of Goldberg’s attachment type label, will categorize this character as the former or the latter.

Data and Discussion

The following tables represent the time stamps, with their correlating transcription, for each of the three episodes watched (table one for the episode watched from season one and so on). Transcription enabled Goldberg’s thoughts, feelings, decisions, and actions to be translated into specific behaviors relative to one of the four attachment types.

Episode Three, Season One

	Time Stamps and Transcription	-	-	-
Attachment Type				
Secure	1:12 - 1:55 Goldberg was smiling at Beck, his current lover, while narrating that he could give her all that she ever needed. He felt safe and happy with her.	20:10 - 23:42 Beck texted Goldberg to help her build a new bed after hers broke. Goldberg felt needed; he was someone Beck viewed as secure. In result, the		

		depths of their relationship grew.		
Anxious-Resistant	4:37 - 5:38 Goldberg attempts to find a quick solution to dispose of Benji's (Beck's ex-boyfriend" body). Goldberg doesn't want Beck mourning another man. He wants to be validated by Beck's love.	8:12 - 8:29 Goldberg overhears a conversation between Beck and her friends regarding Beck's hesitancy to pursue Joe. This frustrates Joe and makes him upset.	12:50 - 13:31 Before their shopping trip, Goldberg picked Beck up in a fancy, vintage car. He desired Beck to view him in a more positive light and hoped Beck's hesitancy about pursuing him would disappear.	28:20 - 29:14 Goldberg journeys to find the perfect place to burn Benji's body. His narration during this duration encapsulates his true feelings for Beck - how he would go to extreme lengths for her because he was the "one" for her.
Avoidant	2:04 - 2:32 Goldberg seems distant as he avoids talking about his past girlfriend when	36:14 - 36:40 Beck confronts Goldberg, asking him questions about his life that he hasn't been		

	Beck brings her up.	forthright about. Goldberg had been giving Beck space and avoiding topics related to his life as he wasn't sure what to and not to share about his life due to his dark past.		
Disorganized-Disoriented				

Table 1

Table one is representative of episode three from season one. Episode three consisted of variations between three of the four attachment types. For example, Goldberg felt secure with his current lover, Beck, — as indicated by his smile and narration whilst in her company — but quickly exhibited behaviors of avoidance when questioned about his romantic past. A few minutes later, Goldberg ventured to dispose of Benji’s body. Benji was Beck’s ex-boyfriend who Joe unintentionally murdered out of spite and jealousy. Goldberg truly believed that Benji was selfish and incapable of fulfilling Beck’s needs. Consequently, during the time stamp from 4:37 - 5:38, Goldberg expressed his desire to be the ideal man for Beck; his main goal was to feel validated by her love. At this moment of the episode, the symptoms of Bowlby’s Attachment Theory became increasingly apparent. Every interaction with Beck offered more available insight on Goldberg’s mind, personality, and rationale. Behaviors relative to the recorded attachment types were consistent throughout the episode.

Consider the following transcription from table one:

“Beck confronts Goldberg, asking him questions about his life that he hasn’t been forthright

about. Goldberg had been giving Beck space and avoiding topics related to his life as he wasn't sure what to and not to share about his life due to his dark past."

This transcription was categorized under the "avoidant" attachment type. Usually, the beginning of a serious romantic relationship is dedicated to getting to know the potential partner and understanding their past. Some individuals may be hesitant to share details about their past, while others may be forthcoming. The former applies to Goldberg. "Avoiding details related to his life" and "giving Beck space" were behavior patterns that were heavily observed during this recorded time stamp. Hesitancy was observed when Goldberg was unsure about what he should or should not share about his past. Goldberg was not intentionally avoiding Beck and her questions; he was held back by feelings that stemmed from traumatic memories and events that consumed his past.

What was most noticed in the transcription of episode three was the absence of time stamps under the "disorganized-disoriented" attachment category. As with many TV shows, the first season serves as the foundation to the main themes, concepts, and patterns that would be established and built upon in later seasons of the show. This is a reasonable explanation as to why it was too early for any sporadic and inconsistent behaviors exhibited by Goldberg. Additionally, it offers justification as to why the episodes from season one could possibly differ from those in season two and season three. As Goldberg's character development continued, though, behaviors relative to the "disorganized-disoriented" attachment type gradually increased and were thus able to be recorded.

Episode One, Season Two

	Time Stamps and Transcription	-	-	-
Attachment Type				
Secure	13:21 - 16:18 Goldberg meets	25:32 - 26:02 Whilst	34:43 - 35:12 Love comes	

	<p>Love Quinn, his soon-to-be lover, for the first time at a grocery and bookstore (Anavrin) that he was hired at. He stops, smiles, and stares when he sees Love, remembering how pure it feels to be loved. Love notices his apron and mentions that she also works at Anavrin. Goldberg knew that was the beginning of their story, whether he wanted to pursue a relationship or not after his previous mishaps with Beck.</p>	<p>applying for a driver's license and taking the test at LA's DMV, Goldberg unexpectedly runs into Love. Goldberg thinks to himself: "What are the chances?" He is surprised, but feels comforted by the sight of Love. She approaches Goldberg, expresses her shock for running into Goldberg as well, and kisses him on the cheek for "luck" on his driver's test. This</p>	<p>over to Goldberg's apartment after the manager of Anavrin tells her that Joe has a bad sunburn. She tends to his sunburn in hopes of making him feel better. Joe looks at Love in a loving way and feels happy that she came over. As per the pattern, he feels secure with this new girl.</p>	
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		<p>interaction increases the tension between Goldberg and Love.</p>		
<p>Anxious-Resistant</p>	<p>1:38 - 1:47 During this narration period, Goldberg highlights the events that led Beck to finding out about Candace, Goldberg’s previous lover. Beck found Candace’s necklace and other personal belongings Goldberg had collected in an old shoe box.</p>	<p>31:36 - 33:03 The foundation of Goldberg’s intense desire for love and to find his “home” is revealed during this flashback scene. He is a young boy at a beach where he expresses his affection towards his mother. He tells her that she is his home. After his mother reciprocates, however, she</p>		

		<p>abandons him at the beach to attend to her own needs - her abusive partner. Due to this, Goldberg feels rejected and unseen.</p>		
Avoidant	<p>1:48 - 2:27 As season two begins, Goldberg narrates his mistakes with his ex-lover Beck, specifically how she uncovered his past with Candace. Candace was someone Goldberg never intended Beck to find out about.</p>	<p>41:30 - 42:23 In an emotionally intimate scene, Love uncovers the depths of Goldberg - his pain, his desire to fall in love, etc. Goldberg was taken aback as no one could figure him out so quickly. Based on his body language (wide eyes and stiff posture), he was fearful of Love's</p>		

		<p>ability to read him so well. Therefore, he comes off as somewhat stand-offish and vague whilst formulating a response to Love.</p>		
<p>Disorganized-Disoriented</p>	<p>6:48 - 8:45 Goldberg reminisces on his memories with Beck, completely forgetting that he went to extreme lengths to kill her. Additionally, a flashback scene is presented where Goldberg encounters Candace where he finds out she is not dead. In this flashback scene, Candace and Goldberg are at</p>	<p>16:39 - 17:38 The flashback scene with Candace is resumed in which Goldberg escapes his confrontation with Candace through a window of the men’s restroom at the diner even though he is aware that the way he treated Candace was</p>	<p>20:00 - 21:28 After Goldberg’s second interaction with Love Quinn at the store’s cash register, he takes a break and fantasizes about pursuing Love. He resists every thought and urge related to pursuing Love.</p>	<p>21:53 - 22:47 The final flashback scene with Candace is shown. In this scene, Candace warns Goldberg that she will hunt him down and find him so that he repays for the mistakes he made during the course of their relationship,</p>

	<p>what seems to be a diner where she confronts Goldberg about his malicious actions and threatens him. During this two minute scene, Goldberg experiences a plethora of emotions.</p>	<p>horrific and wrong.</p>	<p>Regardless of his internal desires, he stops his fantasizing from escalating and returns back to his job.</p>	<p>with the most vicious being thinking Candace was dead and leaving her body in the middle of a forest. He spirals, breaks his phone, and moves to a different city under a new identity.</p>
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Table 2

Table two is representative of episode one from season two. Based on the season one recap present at the beginning of this episode, Goldberg brutally murdered five people. In efforts to escape and remain hidden from his past in New York, Goldberg adopted a fake identity under the name “Will Bettelheim”. He intended to begin a new, more simpler life. Was he able to fulfill his desires, though? Will Bettelheim is later revealed to be an actual man who was trapped in a clear, box-like cage. According to the season one recap, this exact cage made several appearances before - Goldberg imprisoned each of his victims from season one in this cage before they were murdered.

Unfortunately, season two’s storyline is similar to season one, specifically regarding the intentional and unintentional murders of other people. What, though, motivated Goldberg to continuously murder innocent people? Similar to season one, Goldberg found a new woman to obsess over - Love Quinn. Despite his internal adamance to not become romantically involved shortly after his relationship with Beck, he falls prey to his attraction to Love. Without any

regards to his maltreatment towards Beck and the consequences he faced for his horrendous actions, Goldberg daydreams about pursuing Love and building a life together. He remembers the pureness of feeling loved by someone and reassured himself that this time would be different. Goldberg desired redemption and took advantage of this opportunity to find genuine, healthy love.

Consider the following transcription from table two:

“Goldberg meets Love Quinn, his soon-to-be lover, for the first time at a grocery and bookstore (Anavrin) that he was hired at. He stops, smiles, and stares when he sees Love, remembering how pure it feels to be loved. Love notices his apron and mentions that she also works at Anavrin. Goldberg knew that was the beginning of their story, whether he wanted to pursue a relationship or not after his previous mishaps with Beck.”

This transcription was categorized under the “secure” attachment type. Smiling while simultaneously staring at a person denoted positive behaviors. Further, the overflow of memories that Goldberg experienced while smiling at Beck displayed the safety and comfort that he felt around her. It can be presumed that these feelings stemmed from an empty void that Goldberg’s caregivers failed to fill (proper nurturing, empathy, sympathy, etc.). Thus, Goldberg actively seeks feelings of security within his romantic partners, which supports Bowlby’s attachment theory.

Contrasting with the episode from season one’s data, episode one of season two marked a presence of Bowlby’s four attachment types. This was no surprise; the TV show had developed a solid foundation and provided viewers with background information about Joe, his recurring behaviors, and his past. The duration of each recorded time interval were about the same; each ranged from one to three minutes (which was the average approximation of the length of each scene). Additionally, Goldberg’s sudden transition from one behavior to another provides justification that a person can encapsulate multiple attachment types. Thus, it can be presumed that for Goldberg and humankind alike, attachment behaviors vary based on one’s environment and situational circumstances.

Episode Five, Season Three

	Time Stamps and Transcription	-	-	-
Attachment Type				
Secure	<p>7:17 - 10:25</p> <p>Goldberg interacts with one of his colleagues, Marienne, at the library that he works at. He admits that he is attracted to Marienne but abstains from making any sort of move because he is married. He cannot help but feel drawn to Marienne's energy. He feels comforted and at peace with this woman which he wasn't able to feel with Love for a very long time.</p>	<p>38:13 - 39:06</p> <p>This period of the episode covers the final portion of the previously shown flashback scene. Young Goldberg is comforted by the facility's counselor. As someone who has been through similar situations, Goldberg's counselor reassures him that she understands what he's going through and his emotions. They both make a deal to protect and look out for each other. At that moment, young Goldberg feels "safe, seen, soothed, and</p>		

		secure.”		
Anxious-Resistant	<p>13:28 - 15:58</p> <p>Goldberg walks in on Theo (their teenage neighbor) and Love in the middle of a conversation. He has an odd feeling that he interrupted something important and starts overthinking the entire situation. He looks for clues that may indicate a romantic involvement between Love and Theo and finds multiple uber charges to his credit card. Love then admits that she helped Theo get a ride home when he was intoxicated and that Theo kissed</p>	<p>18:00 - 18:12</p> <p>A flashback scene occurs where Joe remembers how unsafe he felt with the other boys at the facility he lived in during his childhood. All he wanted was to feel like he belonged.</p>		

	<p>her before he left for school.</p> <p>Goldberg becomes furious and spirals.</p>			
Avoidant	<p>4:41 - 6:12</p> <p>Goldberg has difficulty expressing his emotions regarding Love's change of character upon moving to the suburbs. He puts up a front, smiling and fulfilling everything his wife asks for. However, everything still feels off and Goldberg does not prioritize confronting this problem.</p>			
Disorganized-Disoriented	<p>0:49 - 3:28</p> <p>The start of this episode begins with Love and</p>	<p>27:45 - 28:47</p> <p>The flashback scene resumes and cuts out repeatedly with what</p>		

	<p>Goldberg attending marriage counseling. There have been rough patches in their marriage and both partners are working towards mending the tension, or so it seems. Joe puts on a stoic front, pretending everything in his marriage is improving. In reality, there still seems to be many issues he has to work with, not particularly in his marriage with Love but also an excessive amount of internal turmoil.</p>	<p>was currently happening at the camping trip. Cary, one of the guys Goldberg went on the trip with, reminded Goldberg of a boy who used to bully him when he was younger. He channeled all of this anger and punched Cary. Additionally, in the flashback scene, Joe seemed scared and tried to find places to hide from his bullies. He experienced past and present emotions simultaneously.</p>		
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Table 3

Table three is representative of episode five from season three. Season three’s storyline continued developing Goldberg’s relationship with Love (now married) as they started a family together in Madre Linda - a suburb of San Francisco. Goldberg worked at the local library where

he met Marianne, his love interest for this season. Surprisingly, Love also had a romantic interest this season - her teenage neighbor Theo. Goldberg's and Love's secrecy with their new romantic affairs caused havoc to wreak within their relationship. Behaviors exhibited by both characters indicated that their attachment types were similar; this was an unexpected plot twist by the writers of this show. As this content analysis only focused on Goldberg's behaviors, Love's behaviors were not recorded. However, the complexity of Love and Goldberg's dynamic in season three greatly assisted in discovering new aspects of Goldberg's character.

Season three served as a heavily layered foundation for *You* as a wider expanse of key concepts were explored and Goldberg's capacities — ranging from mental to physical — were put to the test. Examples of such tension-inducing elements include navigating a new marriage and making unwise decisions with serious consequences (as aforementioned, having affairs, etc.). As displayed by the table, Goldberg's behaviors were consistent throughout this episode; each attachment type recurred either once or twice. This is significantly different from the other two episodes as there is a clear distinction as to which attachment type appeared more than the others.

Nevertheless, a notable similarity existed in both the episode from season two and season three - flashback scenes. These scenes supplied the content analysis with information regarding Goldberg's childhood and adolescent behavior patterns, which was essential in gaining an in-depth understanding of how Bowlby's Attachment Theory can be applied to his character. Furthermore, the flashbacks enabled a deeper understanding of Goldberg's convoluted-esque emotions.

Consider the following transcription from table three:

“A flashback scene occurs where Joe remembers how unsafe he felt with the other boys at the facility he lived in during his childhood. All he wanted was to feel like he belonged.”

This transcription provided a look inside Goldberg's childhood. As per the parameters of Bowlby's Attachment Theory, this flashback scene with young Joe and the emotions he felt during those moments directly influenced present-day Joe's outlook on relationships. Regarding the transcription, “unsafe” has a negative connotation, indicating that the emotions Goldberg felt during this particular scene was a contributing factor to his gloomy childhood. He felt rejected by

his peers. As a result, he isolated himself from the others at the facility. Unfortunately Goldberg was aware that regardless of his efforts into developing friendships and conversing with the other boys, he would always be viewed as an outcast and loner. Thus, this transcription was categorized under the “anxious resistant” category.

	Season one, episode three	Season two, episode one	Season three, episode five	Total
Secure	2	3	2	7
Anxious-Resistant	4	2	2	8
Avoidant	2	2	1	5
Disorganized-Disoriented	0	4	2	6

Table 4
Overall Attachment Type: Anxious-Resistant

The data in table four represents the amount of times each attachment type appeared in a given episode; each individual number was then added up to reveal the overall total regarding which attachment type recurred the most. After a careful analysis, the totals in the data table indicated that Goldberg encapsulates the anxious-resistant attachment type the most. Goldberg exhibiting behaviors relative to every attachment type was inevitable. His behaviors displayed variety and complexity within his character and experiences. Humans are intricate and extraordinary specimens. Therefore, it was normal and expected to observe diversity in the range of Goldberg’s behaviors.

Comparison

Based on prior research collected from the literature review, it can be reasonably inferred that Goldberg does not exhibit behaviors relative to the three murdering genres: mass murderers,

spree killers, and serial killers. Although Goldberg suffered from an extreme amount of distress and anxiety from the various people he murdered, “manic” and “depressive” would not be appropriate terms that described his physical and mental state of being. Further, Goldberg was far from pleased by his murders; even though some killings were intentional, Goldberg carried a heavy weight on his shoulders, almost to the point of unbearability.

As Joe is not associated with the medical field, the “medical killer” label can be eliminated. Moreover, if Goldberg was a “disorganized killer”, he would have surely been caught in the midst of the murdering or the gruesome body disposal process. One element of the “disorganized killer” that Goldberg does encapsulate, however, are his spontaneous murdering habits - they are usually “sudden and unplanned”. Overall, his behavior patterns are not fully aligned with those of the disorganized killer.

However, the characteristics (introversion) and behavior patterns (overly controlling) of the organized killer describe Goldberg perfectly. Not much information was available regarding Goldberg’s education status, but based on his exceptionally high organizational skills and not getting caught while committing murders, it is reasonable to claim that he is an educated individual. Another factor that resembled both organized killers and Goldberg is obsession, which was seen through Goldberg stalking his lovers and other potential threats (i.e. Benji from season one) before murdering them. Research states that this particular behavior stems from internal sexual desire; Goldberg fits this criteria as his victims are somehow connected to his lovers. He is protective and defensive of his romantic relationships which is reflected in the anxious-resistant attachment type. The similarities between the organized killer and Goldberg can be traced back to his problematic familial upbringings.

As serial killer and psychopathic behavior are linked, there was a high likelihood that Goldberg also exhibited psychopathic behavior. Regardless of Goldberg’s economic, personal, and psychological circumstances, he still chose to commit his murders. This exemplifies one of the two founding thoughts of psychology, suggesting that Goldberg does, in fact, possess some psychopathic qualities. Aspects of psychopathy that do not apply to Goldberg include, but are not limited to, the general personality traits of these individuals: a lack of empathy and remorse, dangerousness, evil, and being diagnosed with an illness or disorder. Goldberg’s awareness of the harm of his actions prove that he is remorseful and not unempathetic or evil. Dangerousness is subjective; this term can hold different interpretations to different people, even if the person

being referred to as “dangerous” is not a psychopath. Lastly, Goldberg was never diagnosed with an illness or a disorder by the writers of the show. A proper diagnosis would require a separate study of the character. Although Goldberg did not have a stable family, school, and social life, the term “psychopath” fails to fully capture Goldberg’s personality and behavior patterns. Thus, the “organized killer” (a subset of the serial killer category) is the most accurate label for Goldberg.

Conclusion

There is no doubt that Joe Goldberg is a complex character. What our world and society fails to recognize, though, is that Goldberg symbolizes the influence that proper/improper upbringing and nurture has on love. He is a representation of the positive and negative effects that love, lust, and obsession evoke. The discoveries made by psychologist John Bowlby forever transformed the ways in which humans observe behavior patterns and its root causes. Although *You* explored Goldberg’s romantic relationships, the attachment theory can be applied to any type of relationship (but is more suitable for love relationships).

Limitations

There were limitations that restricted the overall accuracy of the content analysis. Firstly, only one episode per season was watched and transcribed. If more than one episode per season were watched and transcribed, Goldberg’s gradual character development and progress within each of his romantic relationships could have been better observed. This would have made the ability to determine Goldberg’s attachment type more efficient. In addition, Goldberg’s murders were dispersed throughout the three seasons, and to analyze each murder scene would require watching numerous episodes, some more in one season than another. Random sampling, which was the guideline that this project’s method followed, ensured that each episode had an equal chance of being selected (bias skews results).

Implications

Implications of this project include understanding the importance and prevalence of the attachment theory in people’s daily lives (as it establishes the importance of the caregiver’s role in our gradual psychological and evolutionary development) and recognizing the significance

and symbolic representation of characters in media. The new understanding that resulted from this project was identifying if a noteworthy character in today's media shared similar characteristics of psychopaths or serial killers, and if early attachment patterns influenced our future relationships. Goldberg's, in fact, shares similar characteristics to a sect of serial killers - the organized killer, which supports the accuracy of his portrayal. Further, the label of the "anxious-resistant" attachment emphasized how Goldberg's upbringing impacted his chaotic — to say the least — romantic relationships. The presence of attachment types help people recognize positive and negative behavior patterns in the relationships they currently have and will develop.

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The Effects of Meditation on the Brain In Alzheimer’s Disease By Abhiram Upendram

Abstract

Alzheimer's disease is the most common cause of dementia and affects more than 6 million people in the United States. It breaks connections between neural networks and a shrink in many regions in the brain causing cognitive decline and memory loss. Recently, an antibody medication, lecanemab, was approved as a form of treatment where it reportedly slowed down cognitive decline by 27%. But rather than injected medicine as treatment, A weekly meditation session could be the desired intervention that may have a similar effect of slowing cognitive decline as consistent meditation has led to an enhancement in cognitive functions such as memory, attention, and executive function. However in the studies described in this paper, the feasibility of MBSR for patients with Alzheimer’s may be low, with minimal changes in cognition. However, accounting for several study design flaws such as short-time spans and small sample sizes, the use of MBSR on Alzheimer’s patients could be continued but restructured.

Introduction

Alzheimer’s disease is widespread, is recognized for its effect on memory, and it typically affects individuals 65 and older. The initial symptoms of Alzheimer’s include memory loss, lack of spatial awareness, and difficulty of completing daily tasks. Building up to Alzheimer’s, two proteins, amyloid-beta and tau, accumulate in regions of the brain involved with memory such as the hippocampus and frontal cortex. This buildup causes neuronal death, which is associated with cognitive decline but potential treatment for Alzheimer’s could include meditation. Meditational studies have shown that there is a way to retain more memory in regular patients through a type of mind-body intervention called Mindfulness-Based Stress Reduction.

Mindfulness-Based Stress Reduction (MBSR) is an 8-week mindfulness training program that is used for chronically ill patients and has proven to be effective at combating depression and anxiety for such patients. MBSR consists of a variety of different exercises most commonly including yoga, walking meditation, body scan, and awareness mindfulness. More importantly, this technique has demonstrated increases in gray matter concentration (gray matter is responsible for memory, emotions, and movement control) in the posterior cingulate cortex,

cerebellum, and temporoparietal junction evidence that participating in an 8-week MBSR would result in structural changes of these three areas. Other benefits have been shown such as improvement in cognition; more specifically, working memory and attention which are deficits in those with Alzheimer's. If MBSR increases gray matter concentration and improves cognitive performance in normal patients, then it might have similar effects on Alzheimer's patients.

Methods & Clinical Trials

With recognition of MBSR and primary use of treatment for depression, anxiety, or chronic illness, clinical trials were done to assess its effectiveness in older participants who have cognitive concerns or are clinically impaired. A randomized clinical trial done by Lenze and colleagues explored the effects of MBSR training on improving cognitive performance through cognitive test scores in older individuals with cognitive concerns but not clinical impairment. 585 adults between the ages 65 and 84 participated, and the intervention was conducted over 18 months. Participants were first randomized into four different groups consisting of an MBSR alone, exercise alone, MBSR and exercise, and a control group of no MBSR nor exercise. Of those 18 months, 6 months were an acute phase to treat the symptoms shown by patients and 12 months of a maintenance phase which attempted to prevent the occurred symptoms. For the MBSR group, interventions included 2.5 hour classes of mindfulness meditation and other strategies weekly for eight weeks along with a daily hour of at-home meditative practice. The exercise group focused on improving strength, balance, mobility, flexibility, and aerobic fitness through a 300 minute goal including classes and prescribed at-home exercise. The third group of both MBSR and exercise had the combined goals, classes, and home assignments for both groups. Neurophysiological tests of executive function (Dimensional Change Card Sort test, Flanker Inhibitory Control and Attention Test, List Sorting Working Memory Test) and episodic memory (Picture Sequence Memory Test). These tests were taken at 0 months, 3, 6, and 18 months where at 18 months of the intervention, the measured hippocampal volume on the y-axis for both groups decreased while the memory composite score in the second graph increased.

The MBSR group had a slightly higher median, but it isn't noticeable enough to be considered as a possible method of prevention or treatment. There is a small increase in memory composite score, but again, not noticeable enough to be considered useful so it is shown by this group that MBSR does not affect cognitive performance through differences in hippocampal

volume. As seen by this clinical trial, MBSR does not seem to have positive changes on the brain so from this intervention, it can be concluded that MBSR does not have an effect on the brain.

Another randomized clinical trial by Whitfield and colleagues studied the effects of MBSR on participants with subjective cognitive decline showing self-reported confusion or memory loss which were some of the noted cognitive concerns in the first intervention. However, this trial had a smaller sample and shorter time frame. 147 adults participated and were randomized into two interventions: Caring Mindfulness-based Approach for Seniors or a health self-management program. Cognitive tests were used to assess participants at baseline (beginning of intervention), week eight, and week twenty-four. These tests formed three composites: Cognitive composite, attention composite, and executive function. Out of the three composites, the cognitive composite slightly increased while the attention composite had weaker evidence and the executive function had no change compared to the individuals of the self-management group. (Figure 2) As seen by this trial, a noticeable change in executive function and attention wasn't seen but a change in cognition is seen so it can be concluded that MBSR can positively affect cognitive function which is the reflected result in the intervention. However, MBSR may have a different effect on those who are cognitively impaired rather than suffering cognitive concerns.

Rather than MBSR being used as a preventative measure against dementia in individuals with subjective cognitive concerns, a clinical trial by Paller and colleagues studied MBSR on individuals who were cognitively impaired, having received a clinical diagnosis of mild cognitive impairment or dementia. However, the sample size compared to the previous interventions is quite smaller where there were only seventeen participants with progressive decline and of those participants, nine had dementia due to Alzheimer's disease. A series of cognitive and psychological tests were taken at baseline and again assessed post-intervention or within two weeks of the 8-week MBSR session. After the intervention, participants were retested and their scores on the Neuropsychological status minimally differed to baseline scores.

While the bar graph shows changes in quality of life, global deterioration scale, and brain-artefact interface, an increase in cognition was not seen in the participants who had dementia. It can be concluded from this trial that cognitive function is not affected by MBSR but rather quality of life and activity-induced plasticity are affected in individuals with dementia through an MBSR intervention.

Discussion

After extensive clinical trials using MBSR as an intervention in patients with cognitive concerns, cognitive impairment, or Alzheimer's, a seven week MBSR intervention has a minimal effect on cognition and brain volume in Alzheimer's patients. However there are several intervention limitations that restrict possible changes in the brain. The clinical trial by Lenze and colleagues involved participants with cognitive concerns and after a mean score was gathered through a series of cognitive tests the changes in score demonstrated a slight increase in hippocampal volume since the beginning of the trial. Yet the intervention specifically focused on the hippocampus but other regions of the brain may have had a different effect. Another flaw is the time-span and this applies to all interventions listed. If more time was given to the interventions, then a change in brain volume would be noticeable and if compared to the brain volume of an older adult who was not involved in the intervention and was at the same stage of Alzheimer's, then it may be possible to see changes in brain volume. Brain volume in adults above 40 changes at the rate of 5% per decade. Thus if a reflected change is to be seen from MBSR, an increased time span would benefit the intervention results.

The trial conducted by Whitfield and colleagues also involved participants with subjective cognitive decline. After participants were tested at baseline and post-intervention, executive function scores were not affected, attention and cognitive function scores slightly increased compared to the self-health management trial. Again, this trial has time limitations and participants who suffer cognitive symptoms of cognitive disorders rather than cognitive disorders themselves.

The Paller trial had included individuals with dementia, frontotemporal dementia, and Alzheimer's. Considering that the previous clinical trials did not record a noticeable change in unimpaired adults with cognitive concerns, it would be logical that MBSR does not have a reflective change on Alzheimer's patients and it did not. Expectedly, the results expressed a minimal change in cognitive function. The trial also included positive psychological changes and that was more reflected than cognition because MBSR was originally meant for stress-reduction. Regarding the changes in quality of life and mood, it should be recognized that MBSR is primarily used to treat anxiety and depression but this original purpose could serve as an intervention for caregivers and Alzheimer's patients who struggle to work together. While the

trial included individuals with Alzheimer's rather than patients with cognitive concerns, the sample size and time frame was miniscule compared to the other trials, having only 7 participants with Alzheimer's disease and an approximate 10 week intervention. While the previous trials showcase similar results, these results cannot be fully considered without a larger sample size. Prevalent in other trials, the time-span of the trial is too short to see any differences in executive function attention, or other cognitive domains.

Regarding the flaws and limitations of the clinical trials, the clinical trial I would construct would address these flaws and therefore increase the likelihood of yielding a noticeable cognitive change in the intervention group. First, the participants of the trials have to be diagnosed with Alzheimer's and should be split into two groups. The first group included the patients with Alzheimer's and the second being the control group of volunteers. It should also be noted that the participants of the first group should have been diagnosed at around the same time frame because Alzheimer's patients of different stages would not show similar or comparable results because they could be more severely affected by the disease compared to other Alzheimer's patients. Second, the trial will have a time span of five years where for the first four years, three 8-week MBSR sessions will occur each year. Both groups will be tested at each end of the year(after the MBSR sessions) because the rate of change in brain volume in Alzheimer's patients would be 3-4% per year. Thus it would be logical to track differences after 5 years to see noticeable results. The fifth year will be responsible for tracking changes in cognition after the intervention. Third, the tests used will include cognitive tests, quality of life tests, executive function tests, and attention tests which will form an average for the two groups. Lastly, after the five years, the results will be recorded in the form of a series of box & whisker plots similar to the image of the Lenze trial where at the end of the trial, a change in cognition or brain volume may be seen.

Conclusion

Out of the given trials/papers, all did not support a positive change in cognitive function in patients with cognitive concerns and Alzheimer's. A noticeable positive change has not been recorded, and compared to an individual who did not participate in an MBSR intervention, the differences are minimal. However, considering the short time span and sample size of individuals

in the intervention who actually have Alzheimer's, MBSR's feasibility should be reconsidered with a clinical trial that addresses the flaws and limitations of the previous clinical trials.

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The Implementation of AI Technology in Financial Markets By Vaishnavi Girish

Abstract

The impact of AI on financial markets has been significant and far-reaching. This paper presents a novel approach to how AI is transforming the financial market, the benefits and challenges of using AI in financial decision-making, and the potential risks associated with AI adoption. This paper explores various AI applications in financial markets, such as trading, fraud detection, risk management, and portfolio optimization. The implications of AI on market structure and considering the future of AI in finance, potential ethical considerations, and the need for ongoing research and development to ensure that AI is used responsibly and ethically are discussed. This research study will address the gap in AI technology being observed through a secondary and primary analysis process. Finally, a statistical model to simulate the potential returns of the S&P 500 index for the next 30 years is implemented. This paper provides a detailed explanation of the methodology to forecast a 50% chance for the ROI to be below USD \$3,680,578, for an opening investment of USD 100,000, followed by an annual investment of \$10,000 yearly, for the next 30 years.

Literature Review

Financial AI is used for risk management, fraud detection, personalized banking, and cyberattack prevention (Koksal 2019). According to the Financial Inclusion Report from 2018 through 2019, financial inclusion refers to having access to affordable and valuable financial products. Regarding products and services, this includes transactions, payment systems, and the use of financial technology (Lee 2020). An evolving wave of artificial intelligence (AI) gives rise to the concept of machine learning. Artificial intelligence improves accuracy, increases speed, and minimizes human error. AI and big data can be used for machine learning. Specifically, big data possesses the ability to collect and store large amounts of information daily, which is a task that can be accomplished more efficiently with the implementation of AI technology. Ever-increasing data and advanced computing power in various industries, including finance and medicine, have rapidly increased the number of extensive data analyses and AI studies. Through the Internet, companies can gather information based on patterns and behaviors. Data collected by this system supports aspects of everyday routines, including shopping needs.

This information can also be used to target personalized advertisements to consumers, relating to financial markets.

Financial Marketing Systems

The efficacy of different forms of communication is determined by a regression analysis to allocate the advertising budget. In the model referred to in “Assessing AI Fairness in Finance”, each factor was analyzed for its influence on the involvement in attracting new customers. This refers to the efficiency with which AI can improve marketing in the financial sector compared to manual advertisement methods (McCalman 2022). With AI, financial intermediaries can reduce their compliance costs, which can lead to more investment firms providing services to investors. It is possible to use AI devices to detect violations of market integrity, including market manipulation, disinformation, insider dealing, and money laundering¹. Detecting and preventing such misconduct using AI devices is possible for financial institutions, regulators, and even private consumers (Adami 2021).

Brain Processes & Data Science

Computer systems and data storage have advanced, making artificial intelligence (AI) and big data analytics more efficient (Ahmad 2021). The rapid increase in significant data analyses and AI studies has been facilitated by the continued growth of advanced computing power in many industries, including finance (Ahmad 2021). AI technology that leads to a possible strategy for increasing the efficiency of financial markets often involves imitation (Yamakawa 2021). In the brain-inspired AI development process, two steps are involved: designing the neuronal network and developing the algorithm, which consists of the brain reference system, and developing the AI architecture, which provides the flow of information and a diagram of the corresponding components. Using human brain processes as reference models when manufacturing certain types of AI technology, such as deep learning systems, proves beneficial since they have created neural networks. Neural networks are a method of AI technology that utilizes interconnected nodes that are assembled in a bedded structure in order to imitate the connections within the human brain (Mendez 2019). Some examples of AI

¹ Money laundering refers to a financial transaction conspiracy that enables money to be utilized in an illegal manner.

technology that neural networks have made possible are the Boltzmann machine² and the multilayer perceptron³ (Shankar 2016). Regular brain processes and developed forms of AI technology both include nodes in neural networks. The difference is that in AI technology, these nodes are able to be programmed to function at a faster rate in comparison to interconnected nodes in the human brain. This results in AI technology working more efficiently in some sectors, such as finance.

Understanding AI Technology

With the increased implementation of artificial intelligence in the financial sector, its uses and capabilities must be understood correctly. Artificial intelligence can be easily misused. From neuroscience data, it is difficult to extract brain-based cognitive-behavioral functioning principles (Yamakawa 2021). Although the desire to conduct this form of research increases as AI is further introduced into a number of industries in which deep learning has been the forefront of. Machine learning algorithms can access higher-level features from images by using multiple layers of data (Russell 2020). Since it is highly complex, there are frequent discussions on whether its positive effects outweigh the preparation (Alashquar 2022). In the media, theorists often refer to the current period as the fourth industrial revolution, which conveys how rapidly change occurs. The rapid pace of change inevitably leads to debate. Security is always a topic of debate, and the constant presentation of risks in public spaces and the effort to reduce them significantly contribute to a sense of security that artificial intelligence can provide or easily undermine (Russell 2020).

Gap

It is difficult to extract principles of cognitive-behavioral function from neuroscience data, so this system is tested and implemented on the basis of a hypothesis. Not all financial systems depend on artificial intelligence, so it is difficult to test whether there are more positive or negative effects. The potential implementation of AI technology in forms of financial markets, such as stock markets and marketing systems, must be tested through simulation. Through simulation processes, it will be possible to test whether forms of AI that benefit a certain portion of a financial market will be applicable to another part of the market. The extent to which

² The Boltzmann Machine refers to a system of associated neuron-like structures that are designed to hypothesize.

³ A Multilayer Perceptron refers to a connected class of artificial neural networks.

simulation processes are able to capture the competence of AI technology will be compared to real-world implementations of machine learning processes. This research study will be addressing the gap of AI technology being observed through both a secondary and primary analysis process.

Hypothesis

Systems such as algorithmic trading and security systems can benefit financial markets through artificial intelligence. Through detailed processes modeled after brain systems, AI can also assist in improving financial markets by increasing data collection and processing efficiency, while working alongside models such as the [Monte Carlo Analysis] (Mendez 2019). The use of artificial intelligence can also improve customer relationship management (CRM), as it can complete tasks more efficiently than human-operated systems (Bellotti 2001). Forms of AI technology, such as deep learning systems, could benefit certain portions of financial markets in contrasting ways.

Method

In order to observe the relationship between the increased implementation of artificial intelligence (AI) and financial markets, a qualitative and quantitative study will need to be conducted. The study is mainly qualitatively driven through the observation of the effects that AI has on financial markets but also includes a quantitative aspect through the collection of numbers that compare user interaction when financial markets are heavily AI-run to when they are mostly manually run. The dependent variable that will be observed is the change or development in financial markets after the increased implementation of AI. The change in customer interaction will also be a part of the dependent variable observed. The independent variable that is being tested is a simplified form of computer software being used to represent artificial intelligence. This simplified form of AI developed through Microsoft Excel⁴ will be used for data collection and analysis; the collected data will then be compared to a manual data collection and analysis process. The method being used will also include components of a secondary data analysis and a form of primary data collection, as mentioned above.

⁴ Microsoft Excel is a spreadsheet software program used for data analysis and visualization.

Secondary Data Analysis

The first portion of this research study will include an analysis of existing research studies that measure the increased implementation of AI in certain forms of financial markets, such as stock markets and currency markets. There will be an analysis of graphs and dot plots that measure the rate of consumer interaction, which will allow conclusions regarding the efficiency of AI to be drawn in comparison to manual systems. These conclusions drawn from secondary data will be represented in the second portion of the study, and the results of both studies will then be compared with regard to the time frame and form of AI technology. The results of this portion of the study, showcasing the efficiency of AI in comparison to manual processes in financial markets, will also be compared to the results of the study involving primary research findings. An example of a study that utilized this method is the study conducted regarding an "Design of an Adaptive Examination System Based on Artificial Intelligence Recognition Model" (Wang 2020). After both portions of the study are conducted, an analysis will be implemented to search for similar patterns between the complex study and the simplified primary version.

Primary Data Collection

The primary data collection portion of the research study will include a simplified version of the complex studies observed in the secondary analysis portion of the study. The reason for this is the accessibility of certain forms of highly developed AI that are implemented in active financial markets. Simulation software that is accessible through a desktop will be used for a data collection process involving participants. This same data collection process will be tested, with only the variable of AI changing. The use of a simplified version of AI technology will be replaced with a manual data collection process involving a more tangible data recording process and the same participants to avoid any discrepancies that were recorded through the secondary analysis process previously mentioned. This data drawn from the secondary analysis study will be compared to the conclusions drawn from the primary analysis process to fill the gap of how a simplified version of AI implemented into financial markets compares to the complex forms of artificial intelligence that are actively a part of existing financial markets.

Secondary Analysis Details

The secondary analysis process was completed through the observation of the [S&P 500 Market]. The S&P 500 is a stock market index that measures the performance of 500 large companies listed on US stock exchanges. In regard to historical performance, the S&P 500 has traditionally given investors accurate long-term returns, with an average annualized return of about 10%. The index may experience severe short-term volatility. As for composition, the S&P 500 is composed of companies from various sectors, including technology, financials, and consumer goods. This diversification can help reduce risk, but it also means that the index can be influenced by factors that affect different industries. In regard to market trends, the performance of well-known companies is reflected in the S&P 500, which makes it a helpful indication of broader market trends. A number of economic factors, such as interest rates, inflation, and GDP growth, can have an impact on how the S&P 500 performs.

Figure 1: S&P 500 Sector Investment

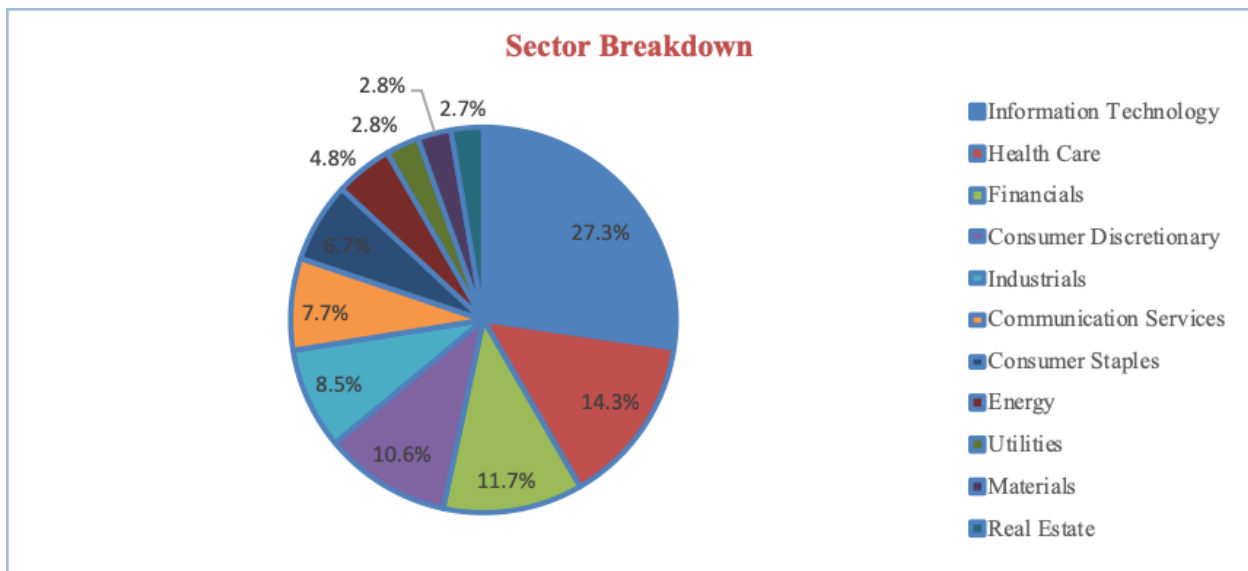


Figure 2: S&P 500 Index Characteristics

Index Characteristics	
Number of Constituents	503
Constituent Market [USD Million]	
Mean Total Market Cap	69,490.90
Largest Total Market Cap	2,345,015.67
Smallest Total Market Cap	3,334.81
Median Total Market Cap	30,644.92
Weight Largest Constituent [%]	6.60
Weight Top 10 Constituents [%]	25.60

Primary Analysis Details

For the primary analysis, an instance of the widely known Monte Carlo analysis was used to evaluate the uncertainty of the S&P 500 over the next 30 years. The process involves simulating 1000 potential outcomes based on historical market data for the S&P 500 and calculating the expected returns for each simulation, based on a predetermined formula. This allows investors to assess the probability of various outcomes. The following input parameters were evaluated during the primary analysis process.

Opening Investment: The initial sum of money invested in the S&P 500 is \$100,000, followed by an annual investment of \$10,000 every year, for the next 30 years.

Average Return: The average return is a measure of the average gain or loss generated over a certain period of time.

Standard deviation: is a measure of risk, funds/stocks with high standard deviation are considered to be riskier than those with low standard deviation.

Period of Investment: Time in years in which the investment occurred.

Annual Investment: Annual investment refers to the amount of money invested into a financial asset on an annual basis.

The aforementioned Monte Carlo Analysis was simulated through the platform of Microsoft Excel, and the previously declared variables served as the input variables. These input variables were determined in the secondary analysis process.

Findings/Results

The forecast of returns for the next 30 years (2024 - 2054) was positive. There is a 75% probability that the returns will be below \$ 3.34 MM, 50% probability that the returns will be below \$ 1.08 MM, 25% probability that the returns will be below \$ 380K, 10% probability that the returns will be below \$168K, 5% probability that the returns will be below \$93K. This makes the AI impact on Financial Markets very profound, as it gives us the visibility of the likely outcome of investments, in addition to a view of a further effective processing of the underlying data from related sources.

Figure 3: Potential return over a period of 30 years

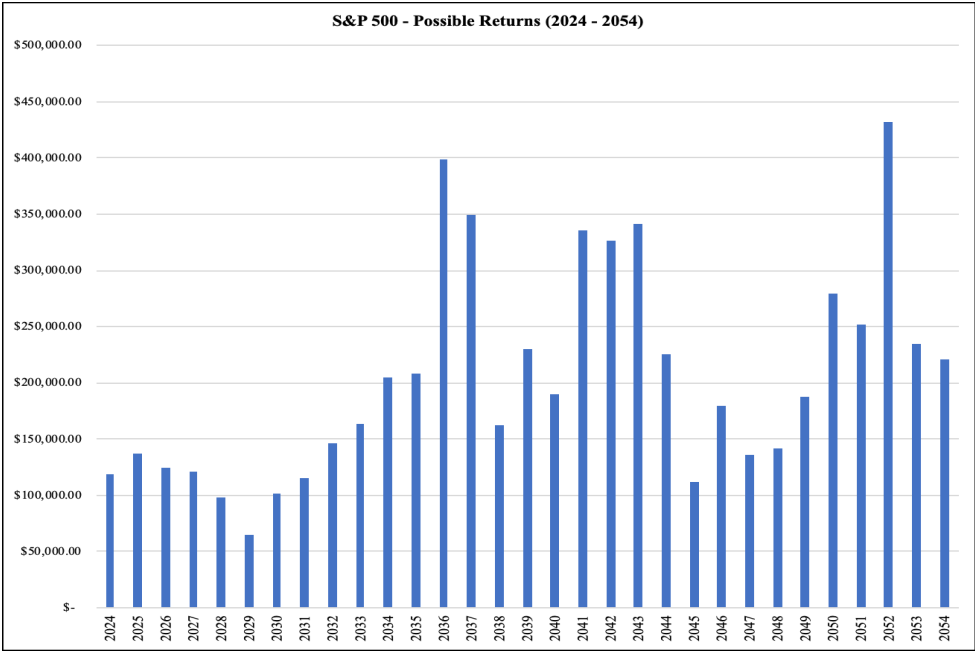


Figure 4: Percentile distribution of returns over a period of 30 years

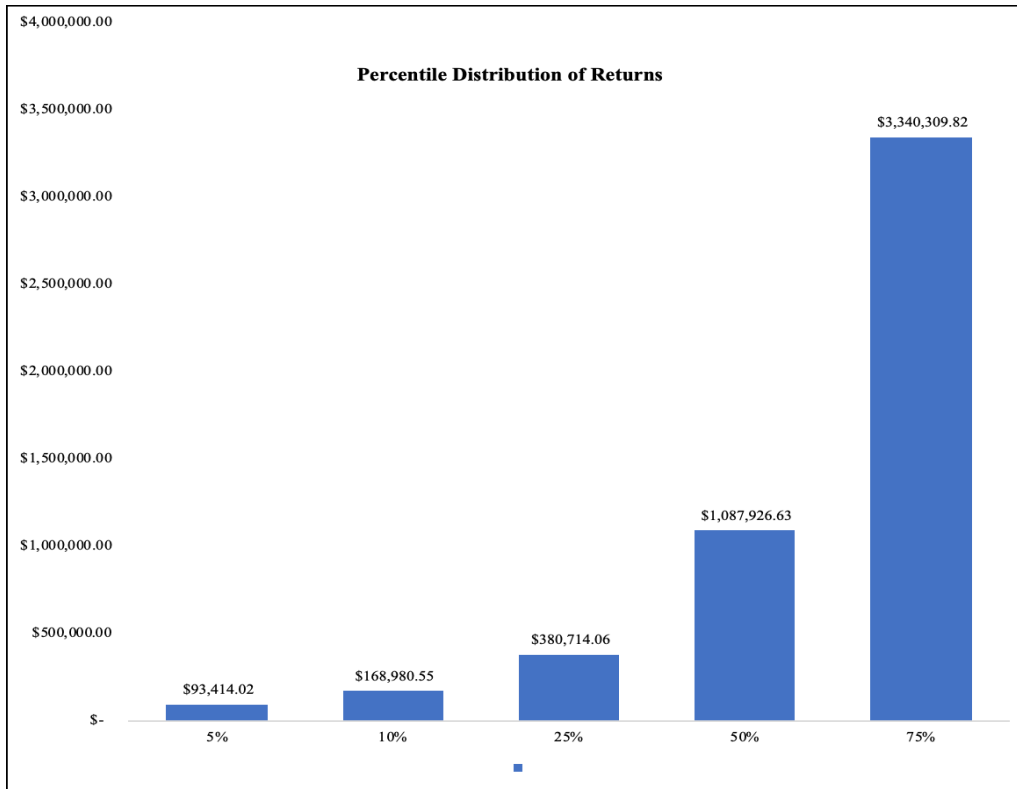


Figure 5: Simulation (15 Iterations out of 1000)

Simulation	
Iteration	\$
	9,458,892.42
1	1,420,050.41
2	4,200,860.56
3	4,772,702.06
4	11,398,354.80
5	2,352,289.76
6	4,745,272.35
7	10,385,300.26
8	2,453,334.34
9	5,380,174.19
10	916,951.24
11	26,578,260.53
12	4,026,840.87
13	2,830,500.26
14	5,603,858.86
15	1,560,966.53

The statistical analysis of this data involves the following terminology

Mean: The mean, also known as the average, is a statistical measure that represents the central tendency of the returns over a time period.

Median: The median is a statistical measure that represents the middle value in a dataset. It is calculated by arranging the values in a dataset in numerical order and then selecting the value that is exactly in the middle of the data.

Percentiles: Percentiles are a statistical measure that indicates the value below which a certain percentage of the data falls. For example, the 25th percentile (also known as the first quartile) indicates the value below which 25% of the data falls.

Figure 6: Final Value after and Percentiles

Mean	\$ 3,761,318.39	Median	\$ 1,060,275.81	Std. Deviation	\$11,332,671.53
Final Value		\$ 3,576,677.71			
Percentiles					
5%	\$ 80,345.04				
10%	\$ 143,304.87				
25%	\$ 367,923.18				
50%	\$ 1,060,919.97				
75%	\$ 2,877,338.76				

The 25th percentile (also known as the first quartile) indicates the value below which 25% of the data falls, so there is a 25% chance for the ROI to be below \$1,342,732. The 50th percentile (also known as the median) indicates the value below which 50% of the data falls, so there is a 50% chance for the ROI to be below \$3,680,578. Overall, the implementation of AI to efficiently analyze data and couple Monte Carlo Analysis is shown to result in a beneficial impact on financial markets.

Discussion/ Analysis and Evaluation

AI enables the development of software that can impact every facet of human life (Bellotti 2001). AI attempts to develop machines that are capable of carrying out operations that ordinarily require human intelligence (Bellotti 2001). Machine learning, computer vision, natural language processing, and robotics are a few of the subfields of AI (Alashqar 2022). A technique for teaching computers to learn from data without being explicitly programmed is called machine learning. As a result, sophisticated AI systems have been created that can analyze and forecast the future. A wide range of applications, including financial trading, are currently using AI (Shah 2020). This paper is restricted to financial market operations by automating many tasks,

providing new ways to analyze data, and making predictions about market movements. Some of the most common applications of AI in financial markets include the following concepts: Using AI to analyze market data and make trades based on pre-set rules and algorithms is known as algorithmic trading. Utilizing AI to analyze financial data and identify potential risks allows for proactive mitigation measures, which can be classified as risk management (Koksal 2019). Implementing AI to analyze financial transactions and detect fraudulent activity (Chung 2021). Applying AI to analyze financial data and make predictions about future market trends enables effective management of investment portfolios and the identification of profitable opportunities, through systems such as the Monte Carlo Analysis which closely aligns with AI technology.

Challenges of Implementing AI Technology in Financial Markets

The creation and use of artificial intelligence (AI) systems are fraught with difficulties. These operational challenges include Many AI systems, particularly those based on deep learning, are known as "black boxes" because it might be difficult to understand how they arrived at a particular choice (Mukhamadiev 2022). It could be difficult to accept and comprehend the results of these systems as a result. When educated on biased data, AI systems have the potential to reinforce and even amplify pre existing biases, producing unfair or discriminatory results. To continue, concerns regarding the safety and dependability of AI systems are growing as they get more complicated. As AI systems proliferate in society, a range of legal and ethical concerns must be addressed, including those relating to data security and privacy, accountability for accidents brought on by autonomous systems, and the ethical application of AI to decision-making. There are also numerous technical challenges that can simultaneously occur during the process of implementing AI technology in financial markets (Mukhamadiev 2022). As for data reliability, financial institutions must have dependable, accurate, and comprehensive data to build and test their AI models. Financial institutions must also ensure that the sensitive client data they manage is secure from hacks. Using AI technologies can make data breaches more likely, so it's critical to have strong data security procedures in place. As for compliance and regulation, financial institutions are required to follow a number of regulations and compliance criteria. Legacy systems are also utilized by financial organizations and are frequently not designed to support AI technology. Therefore, it can be difficult and expensive to integrate these systems with AI technology. There is also a vast

amount of expertise and knowledge that is required to efficiently implement these technologies. Financial institutions may find it challenging to incorporate AI technologies due to a potential shortage of qualified expertise in the industry. The application of AI technologies in the financial industry involves issues of bias, fairness, and responsibility. When developing and implementing AI systems, financial institutions must take these concerns into account and work to resolve them. Financial institutions should also collaborate closely with regulators and AI specialists to address these issues and make sure that their AI systems adhere to moral principles.

The Potential of AI in 2023's Financial Services

Many are still living in worry regarding financial services in 2023 because of the extraordinary financial hardships 2022 presented (Parker 2021). Financial institutions are more likely than ever to turn to innovation to solve top possibilities, such as utilizing AI to deliver more value, develop relevant client experiences, and increase operational efficiency, due to high inflation and rising interest rates (Parker 2021). The abrupt demise of the cryptocurrency exchange FTX earlier this year is an excellent illustration of how quickly unforeseen hazards may materialize for companies. In 2023, financial institutions will enhance AI for risk management as the value of real-time risk assessments becomes more and more clear (Koksal 2019). To make real-time judgments in the current unstable financial environment, more precise risk values are required. More businesses will use accelerated computers to quicken backtesting, risk assessments, and pricing discovery. The phenomenon of ChatGPT from OpenAI, which demonstrates the power of generative AI for a variety of use cases from narrative writing to authoring software code, was witnessed by the world this year. Banks will likely take advantage of this trend in 2023 to use large language models (LLM) to enable a variety of applications. Software engineers may utilize generative AI to produce emails that are tailored to each customer's profile, and marketers can use it to develop cross-sell messaging that is effective. As for digital banking, the chatbot has continuously been a mainstay of client assistance in the financial services sector (Parker 2021). However, a lot of people complain about how disconnected they find the experience to be. The disparity is that chatbots can often lack empathy. Banks will likely increase their investment in digital avatars in 2023 to enhance the client experience. Beyond chatbots and rules, digital avatars allow for face-to-face interactions with customers by using eye contact, gestures, and sounds. They also employ LLMs, which

increase the number of queries and tasks they can handle while remaining constrained by the parameters set by the data scientists who are responsible for fine-tuning the models. Virtual assistants' appearance and behavior will alter thanks to digital avatars, which will ultimately increase bank customers' trust.

API in Financial Markets

An API (application programming interface) is a set of protocols, and tools used in the financial sector to create software. It outlines how software components should collaborate with one another so that various systems can communicate. Financial market APIs can be used to conduct trades, manage accounts, obtain market data. They can be used by companies and individuals to create unique trading bots and financial applications. With technology transforming the financial services sector at an exponential rate, one option for buy-side firms to improve access and transparency while reducing costs and inefficiencies is the use of APIs. Leveraging the power of the massive quantity of data that is continually being collected would be difficult without readily available artificial intelligence (AI). On the qualitative front, the application of natural language processing (NLP) to sentimentally assess news articles and social media posts is one example of how AI is having an effect on the stock market. However, this necessitates a substantial amount of data and processing power.

Conclusion

The financial sector is increasingly using artificial intelligence (AI) when making investment decisions (Parker 2021). Machine learning algorithms are frequently used in AI-powered investment strategies to evaluate vast volumes of data and find patterns and trends that can guide investment decisions. One of the key benefits of using AI in investment decision-making is that it can assist investors in processing enormous amounts of data efficiently, which can be challenging for human analysts to achieve. By doing so, investors may be able to spot investment possibilities that they may have missed using conventional analytical techniques. Regarding a word of caution, it is crucial to remember that AI-powered investment techniques might still have risks and are not infallible. For instance, biases in the data that AI systems examine may cause them to make poor investing judgments. Additionally, investors may find it impossible to accurately analyze the performance and potential hazards of AI algorithms because

of their complexity and difficulty in understanding them. Despite this AI technology can enable lasting beneficial effects.

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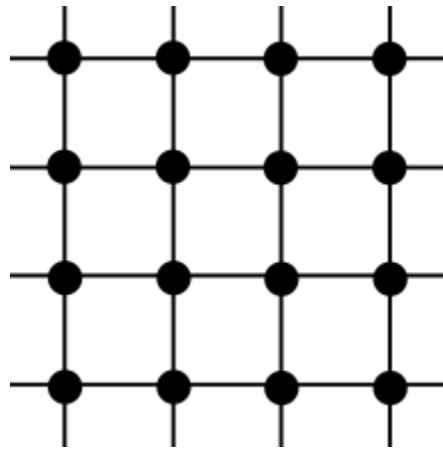
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Average Distance in a Square Lattice with Given Size By Ayush Kumar

Abstract

In mathematical graph theory, the average distance in a graph is defined to be the mean length of the shortest path between any pair of vertices. The goal of this paper is to identify a general, closed-form formula for the average distance in a square $n \times n$ lattice graph in terms of the number of nodes on each side, n . We break the average distance into a “horizontal” and “vertical” component, and compute the average distance by adding these components.

Keywords: Average distance, shortest path, lattice graph



Introduction

Consider an $n \times n$ square lattice graph. The graph consists of a total of n^2 vertices. Four of these are “corner vertices,” each with a degree of two. $4n - 8$ of these vertices are “edge vertices,” each with a degree of three. Finally, the remaining $(n - 2)^2$ vertices are “inside vertices,” each with a degree of four. Suppose we take two vertices from this graph randomly without replacement and attempt to calculate the distance between them. This distance is defined to be the length of the shortest path between the two vertices. There exists a formula in terms of the side length, n , that allows us to find the average distance for square lattices of any size. The average distance over all pairs of nodes in the graph and the expected value of the distance between two randomly selected nodes is one and the same. This is because expected value gives the average outcome if we were to continue to draw pairs of nodes and compute the distance between them for a long time. Since the probability of drawing any particular pair is the same,

this expected value should approach the average distance over all pairs in the graph. The goal of this paper is to use this fact to find and prove the formula for the average distance in a square lattice by calculating the expected value of the distance.

Method

We start by recognizing that the distance between two points in an $n \times n$ lattice is equivalent to the sum of the “horizontal” and “vertical” distances between them. Therefore, we can calculate each of these components separately and add them to find the total distance. By symmetry, the formula for the average horizontal distance should be the same as the average vertical distance, so to make things simpler we reduce the graph to one dimension.

Assume that the first point we draw is in the k th column of the graph, where k is an arbitrary integer between 1 and n . Then there are n ways to draw the second point from the first column, n ways to draw it from the second column, and so on for every column except the k th column itself. Since we have already drawn a point from this column, there are $n - 1$ ways to draw a second point from it.

To find the expected value of the average horizontal distance, we calculate the probability-weighted average of the distances to each of the columns. In general, the likelihood of drawing the second point from a particular column i that’s to the left of the k th column is $\frac{n}{n^2-1}$, and the distance to that column is $k - i$. The likelihood of drawing the second point from a particular column j that’s to the right of the k th column is $\frac{n}{n^2-1}$, and the distance to that column is $j - k$. The likelihood of drawing the second point from the k th column itself is $\frac{n-1}{n^2-1}$, and the distance from the k th column to itself is 0. Thus, the probability-weighted average of the distances to each of the columns can be expressed as follows:

$$\frac{n}{n^2-1} \sum_{i=1}^{k-1} (k - i) + 0 \frac{n-1}{n^2-1} + \frac{n}{n^2-1} \sum_{j=k+1}^n (j - k) = \frac{n}{n^2-1} \left(\sum_{i=1}^{k-1} i + \sum_{j=i}^{n-k} j \right)$$

Using the Gauss sum formula, this simplifies to the following:

$$\frac{n}{n^2-1} \left(\frac{(k-1)k}{2} + \frac{(n-k)(n-k+1)}{2} \right) = \frac{n}{n^2-1} \cdot \frac{k^2-k+n^2-nk+n-nk+k^2-k}{2} = \frac{n}{n^2-1} \cdot \left(k^2 - k - nk + \frac{n^2+n}{2} \right)$$

This is the average distance given that the first point was selected from a particular column k . To find the true probability-weighted average, we must sum this expression over all possible k s (every integer from 1 to n) and multiply by the probability of picking any particular k , which is $(\frac{1}{n})$. We proceed as follows:

$$\frac{1}{n} \cdot \frac{n}{n^2-1} \cdot \sum_{k=1}^n \left(k^2 - k - nk + \frac{n^2+n}{2} \right) = \frac{1}{n^2-1} \cdot \left(\sum_{k=1}^n (k^2) - \sum_{k=1}^n (k) - n \cdot \sum_{k=1}^n (k) + \sum_{k=1}^n \left(\frac{n^2+n}{2} \right) \right)$$

Now, note that $\sum_{k=1}^n (k^2) = \frac{n(n+1)(2n+1)}{6}$, as it is the sum of the first n perfect squares.

$\sum_{k=1}^n (k) = \frac{n(n+1)}{2}$ by the Gauss sum formula, and $\sum_{k=1}^n \left(\frac{n^2+n}{2} \right) = \frac{n(n^2+n)}{2}$ since we are simply

adding $\frac{n^2+n}{2} n$ times. Thus, the above simplifies to:

$$\frac{1}{n^2-1} \left(\frac{n(n+1)(2n+1)}{6} - \frac{n(n+1)}{2} - \frac{n^2(n+1)}{2} + \frac{n(n^2+n)}{2} \right)$$

The last two terms in the parenthesis cancel, and what remains is the following:

$$\frac{1}{n^2-1} \left(\frac{n(n+1)(2n+1)}{6} - \frac{n(n+1)}{2} \right) = \frac{1}{n^2-1} \cdot \frac{n(n+1)}{2} \cdot \left(\frac{2n+1}{3} - 1 \right) = \frac{n(n+1)(2n-2)}{6(n^2-1)} = \frac{n}{3}$$

Thus, the average horizontal distance between two randomly selected points in an $n \times n$ lattice graph is simply $\frac{n}{3}$. Since the average vertical distance will be the same by symmetry, the total average distance is simply the sum of these components, or $\frac{n}{3} + \frac{n}{3} = \frac{2n}{3}$.

Conclusion

We have proven that a two dimensional square lattice of side length n has an average distance of $\frac{2n}{3}$. Analogously, if we were to find the average distance in an $n \times n \times n$ graph of three dimensions, the result would be $\frac{n}{3} * 3 = n$, with each dimension adding an additional $\frac{n}{3}$ to the total average distance. Because the distance between two points in a lattice graph can always be broken into components for every dimension, in general, the average distance in a graph of k dimensions is $k \cdot \frac{n}{3}$.

A future direction for exploration that is not discussed here could be calculating Euclidean distance instead of geodesic distance. This would entail calculating the average distance between two nodes “as the crow flies,” without having to travel on the edges of the graph. Another direction could be to eliminate the nodes entirely and to look at the average Euclidean distance between two randomly drawn points in a square, cube, or some other shape.

Perceptions of Turkish and Armenian People on Each Other and on Their Shared Past in Los Angeles

By Oona Koslu

Introduction

It is of relevance and importance in our day and age to revisit the debate over the Armenian Genocide, realizing that it continues to be the cause of conflicts and clashes between Armenians and Turks today. Events such as the assassination of Hrant Dink in Turkiye (Turkiye is the new name for Turkey after the United States approved the name change on January 5, 2023), the assassination of a Turkish diplomat in Los Angeles and most recently, the terrorist attack on a Turkish restaurant in Beverly Hills by Armenian Nationalists prove that it remains an important and relevant subject (Daily Sabah 2014, LA times 2022).

As the daughter of a Turkish immigrant in Los Angeles, I find this subject intriguing as well as saddening. Most of my Turkish family still lives in Turkiye, and many do not believe that the massacres in 1915 even took place. Their denial regarding this sensitive subject is not their own fault: it manifested because of how they were raised, educated and the environment surrounding them.

I intend to explore the causes behind the Turkish people's denial, the Armenian people's resentment, and their overall hatred towards each other. To my knowledge, no previous research has examined the social relationships between Turkish and Armenian people outside of Turkey and Armenia. Los Angeles is an area of interest because of its large Armenian population and the numerous clashes between Turks and Armenians that have occurred here.

Literature Review

Before discussing the modern relationship between Turkiye and Armenia and between their citizens, it is imperative to understand the historical context between the two countries. Their shared history is the root cause of their political and social turmoil today. The majority of the Western World acknowledges the massacres carried out by the Ottomans in 1915 as genocide. However, different narratives can simultaneously exist because "revision of history is constant" (Suny, 2009). Suny explains how historians are constantly revising, making new interpretations of historical events (Suny 2009). One such event is the Armenian Genocide/Massacre, one of history's most fiercely debated, controversial events. Suny points out

that many Armenian and Turkish historians actually "agree on the majority of the basic facts" (Sunny 2009). Thus, let it be known then that the differences between the Turkish and Armenian perspectives are merely a difference in the interpretation of the events. While "Armenians passionately defend the case that massive deportations and massacres of a peaceful, unthreatening people were ordered by and carried out by the Young Turk authorities and that these events constitute a genocide", the Turkish people "reject the notion of genocide" and "argue that the tragedy was the result of a reasonable and understandable response by a government to a rebellious and seditious population in time of war and mortal danger to the state's survival." (Sunny 2009). Sunny defines the Turkish point of view as a "Raison d'Etat", meaning that the Ottomans justified their actions because the Armenians were a threat to the Ottoman empire during the World War. From their point of view, their actions were caused by the war, not by racism towards a different ethnic population. These contradicting historical claims cause clashes between Armenians and Turks today.

Nationalism has always been strong among Turks, from the time of World War 1 to the modern-day. The Oxford Dictionary defines nationalism as the identification with one's own nation and support for its interests, especially to the exclusion or detriment of the interests of other nations. Researcher Ayla Göl believes that a characteristic stemming from nationalism is the "othering" of different people or nations. In the Ottoman Empire, "the Armenians became the first 'others'" because of their religious difference from the other citizens of the Ottoman Empire (Gol 2005). Ulgen also states that "dominant discourse of the nationalist movement between 1919 and 1922 was one of 'Muslim nationalism' with a very polarized rhetoric against Christians" (Ulgen 2010). It is natural, then, that the Turks antagonized the Armenians and that they became an immediate target when the paranoid Ottomans suspected internal threats while they were losing the war. Nationalism is particularly strong in Turkiye. Mustafa Kemal Atatürk is known as "The Father of the Turks". He is a celebrated hero to all Turkish people because he saved Turkiye from the European colonization to which the other peoples of the Ottoman Empire became subject. Atatürk's values are described by both Gol and Ulgen as being highly "nationalist". Atatürk did not speak often about the events of 1915, but he did refer to it as "a shameful act" (Ulgen 2010). Atatürk wished to distinguish the modern Republic of Turkiye from its Ottoman past. In this way, the Turks became detached from the crimes carried out by the Ottomans, not considering them to be relevant to modern-day Turkiye (Ulgen 2010).

In addition to Turkish nationalism, Armenian nationalism also exists. Recent events, such as the attack on a Turkish restaurant in Beverly Hills (Patel 2020), and the assassination of Turkish diplomat, Kemal Arıkan (Daily Sabah 2021), prove that nationalistic crimes by Armenians continue to happen today, even here in Los Angeles. Hate for Turkish people has become a part of Armenia's national identity (Demirel 2020). The nationalists from both sides are fiercely against Turkish-Armenian reconciliation. The case of assassinated journalist and activist Hrant Dink confirms this claim. Hrant Dink was a Turkish-Armenian man who appealed for reconciliation between his countries. He was assassinated at the hands of a Turkish nationalist group, and the Turkish government has yet to punish his killers. They killed him because "he was speaking truth to power" (Kasbarian 2015).

Sinem Adar examines the relationship between emotions and nationalism, and Angela Moré examines the effect that emotions have on the social dynamic between Turks and Armenians. Strong emotions such as guilt, pride, or shame for Turks, and anger, resentment, and pride for Armenians can amplify their nationalism and, additionally, their disdain for each other (Adar 2018). These negative emotions yield negative consequences for the social dynamic between both groups causing their social relations to be extremely poor (Moré 2021).

Adar writes that the Armenian Genocide has "shaped societal interactions in the decades following 1915" (Adar 2018). Although the two countries are neighbors and Armenia was established more than thirty years ago, they have yet to reconcile and establish diplomatic relations, being stuck in a seemingly permanent state of political stalemate (Goshgarian 2005). Most researchers agree that the chances of reconciliation are low as long as Turkiye neglects the Armenian Genocide. Only Deniz Altınbaş has a positive take on integration, claiming that if it was possible for the European countries to reconcile and unite after the events of World War 2, then it is possible for Turkiye and Armenia to reconcile too (Altınbaş 2010). Although political and economic relationships would be especially beneficial to Armenia, Armenia would have to sacrifice their stance on the Armenian Genocide, which they are unwilling to do (Grigoryan et al.). Turkiye refuses to open its borders to Armenia unless Armenia agrees to three conditions which are: "Armenia should not pursue international recognition of the Armenian Genocide, Armenia should recognize the existing borders between Armenia and Turkiye, Armenian Diaspora should stop "damaging" international reputation of Turkey" (Grigoryan et al.). Armenia

will obviously not give up its fight for genocide recognition; thus, relations between the two countries will be permanently stuck until one of them finally gives up the fight.

The issue of genocide recognition has always been at the heart of relations between Turkiye and Armenia, both politically and socially. The United Nations defines the notion of genocide as being "a crime committed with the intent to destroy a national, ethnic, racial or religious group, in whole or in part". The Turks' unwillingness to acknowledge the violence committed against the Armenians leads to resentment and diminishes the chances of reconciliation between the two countries (Ulug 2020). Ulug mentions a study that proves this claim: "Kalayjian et al. (1996) have demonstrated in their study, where the experiences of the survivors of the Ottoman-Turkish Genocide of the Armenians (1915–1923) were explored, that Armenian genocide survivors expressed a range of negative affect, including resentment, hatred, and rage when asked about their reactions to the Turkish denial of the genocide" (Ulug 2020). As stated before, Turkish and Armenian historians actually agree on the majority of the basic facts on what happened in 1915 (Suny 2009). The most significant disagreement began when "the term genocide was invented and Armenia decided to convince the international arena of the necessity of the applicability of this term to the "massacres of Armenians" in the Ottoman Empire" (Vidlickova 2012). Although only a minority of countries recognize the massacres of 1915 as genocide, that minority is comprised of many influential countries, such as Russia, Canada, the United States, and many European countries.

While there has been plenty of research done on the manner in which non-immigrant groups interact with immigrant groups in a society, there has been little research on how different immigrant groups interact with each other. Research on interactions between immigrant groups is indispensable for my understanding of how Turkish and Armenian immigrants interact with each other. Nancy Foner researched factors that explain the phenomena occurring when different immigrant groups meet and interact. However, two of these factors stand out the most when examining Turkish and Armenian relations: the importance of shared history and identity (Foner et al. 2018). The shared history between the two groups is unfortunately evident and induces animosity between these two immigrant groups. Secondly, identity is at the heart of social issues between Turkish and Armenians. Nationalism is strongly associated with one's identity with their country. Research shows that those Turks and Armenians who identify the strongest with their countries are the most likely to antagonize each other. It is, therefore, of interest to examine the

level of nationalism and identity among immigrant groups of Turks and Armenians and to find out whether it has the same rapport to their alienation of each other. Armenians have adopted the memory of the Armenian Genocide as "a centerpiece to Armenian national identity" and portray themselves as people who have endured much suffering (Souleimanov 2015). Their identity as a people encompasses their past, resulting in a disdain for all Turkish people and sometimes outright racism towards them (Souleimanov 2015). Moré theorizes that guilt is passed down through generations of Turkish families in a concept she names: transgenerational transmissions of guilt. Moré theorizes that guilt is passed down through generations of Turkish families and will continue to cause bad relations between Turks and Armenians as long as the event remains unresolved. Research on descendants of Nazis shows that the guilt which descendants of perpetrators often feel leads them to disassociate and alienate descendants of victims, sometimes to the point that they will not entertain any relations with the current members of the victim group. However, the Armenian Genocide remains a unique case because of the denial among the perpetrator group. While generational guilt can lead to positive things such as reaching out to the victims, seeking better relations with the descendants of victims (etc.), because the majority of Turks refuse to take responsibility and acknowledge their ancestors' actions, it yields primarily negative consequences for the social relations between victim and perpetrator groups. In parallel to Adar's theory that guilt among the Turkish population causes them to become more nationalistic, the consequences of transgenerational guilt include unwarranted hostility or simple estrangement toward the victim group.

All of these conclusions link history, emotions, and identity to the overall cause of the adverse social relations between Turks and Armenians today. There have been many studies conducted on the subject of the Armenian Genocide, some studies on the political relations between the countries, and a few on the social relations between Turkish and Armenian people within their respective countries. However, there has been no research to date performed on inquiring Armenian and Turkish people on their opinions of each other outside of their home countries. I intend to fill this gap by studying the social relationships between Turkish and Armenian people within Los Angeles. The Armenian diaspora is concentrated within several places in the United States, California having the highest population of Armenian-Americans out of all the states, with a population of 205,000, making Los Angeles an ideal location to gather research on this subject (Bolsajian 2018; Kiprop 2019). Moreover, it is necessarily interesting to

explore whether the perceptions of Turkish and Armenian immigrants of each other are as pejorative as those observed in Turkish and Armenians in their respective countries of origin (Grigoryan et al. 2019; Karasu et al. 2017).

Hypothesis

My leading theory regarding the outcome of my research is that the Turks and Armenians in Los Angeles will be more open-minded and express less hostility towards each other than those living in Turkiye and Armenia, as seen in several papers interviewing Turks and Armenians within their respective home countries (Grigoryan et al. 2019; Karasu et al. 2017). However, Armenians' and Turks' characterizations of each other will nevertheless remain negative in Los Angeles. Other sub-theories of mine include the theory that a higher percentage of Turkish people in Los Angeles will accept the notion of genocide as applied to the massacres of Armenians in 1915 than those in Turkey due to greater exposure to education on the subject. Lastly, I believe that the Turkish respondents will have a stronger desire than the Armenian people to repair their relationship, and the Armenian people will stay firm and stubborn in their views on integration: they will not entertain relations with Turks without genocide recognition. I will most likely observe some correlations between the participant's responses and their ages, political views and religious views. I expect that participants identifying as religious and/or conservative will be less open-minded than those who are not religious and liberal. I also expect that the younger the participant, the more open-minded they will be, whereas the older participants will have more polarized views and a harsher perception of Turks or of Armenians.

Methodology

For this sociological research project, I will be using a mixed methods form of research, combining quantitative and qualitative research methods. I will collect data from both people of Armenian and Turkish descent living in Los Angeles. To find subjects I will visit community centers such as churches, mosques, restaurants and grocery stores that are likely to contain Turkish or Armenian people.

I will use qualitative data in the form of open-ended interviews as done in the College Board sample paper: The Perceptions of Pakistani Immigrants in the Zurich Canton on the

India-Pakistan Conflict. I will then quantify the data obtained in these interviews by identifying recurring themes within them using thematic analysis.

Q methodology will be used to gather quantitative data. Q methodology helps to identify human subjectivity. This definitely applies to my research on the thoughts and opinions of Turks and Armenians towards each other where their opinions are unobjective because they can be easily influenced by their emotions. Mehmet Karasu and Melek Goregenli use Q methodology to study Turkish people's perspectives on the Armenian genocide.

In the first part of the survey, I gather the age group and the gender of the participant. Then I proceed by presenting the participant with a series of statements they can choose to agree or disagree with on a scale from -3 to 3 (strongly disagree, disagree, somewhat disagree, neutral, somewhat agree, agree, or strongly agree).

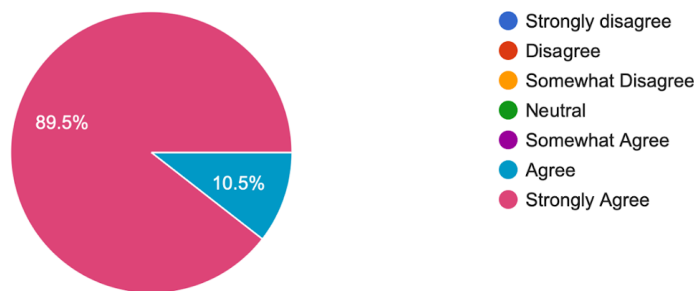
Given my limited resources and time constraints as a high school student, gathering quantitative and qualitative data will be the most informative approach to performing my research. Mixed methods research will acquire the maximal amount of data within a smaller pool of subjects.

Quantitative Data: Q-Methodology

Armenian Response

I believe that the massacres in 1915 should be labelled a "genocide"

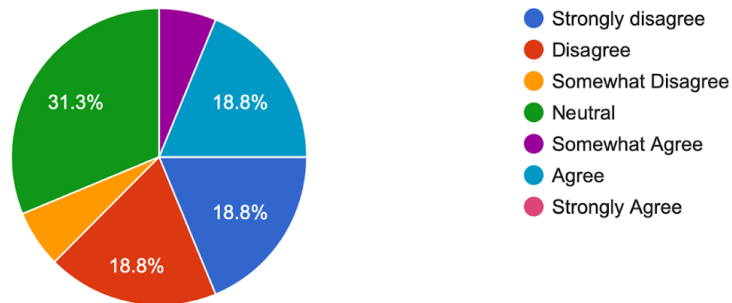
19 responses



Turkish Response

I believe that the massacres of Armenians in 1912 should be labelled a 'genocide'

16 responses

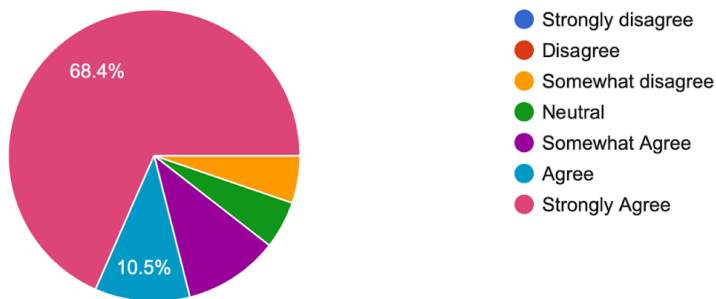


The question of whether or not to label the massacres carried out by the Ottoman Turks in 1915 as a genocide is undoubtedly the most important question within my research subject. The application of the term genocide to these massacres places stronger implications on the descendants of the perpetrators. Based on the Q-methodology study, the average response for the Armenians was 2.895 (on the scale from -3 to 3) and the average response for the Turks was -0.5625.

Armenian Response

The Turkish government should be held responsible for the massacres carried out by the Ottoman Empire in 1915

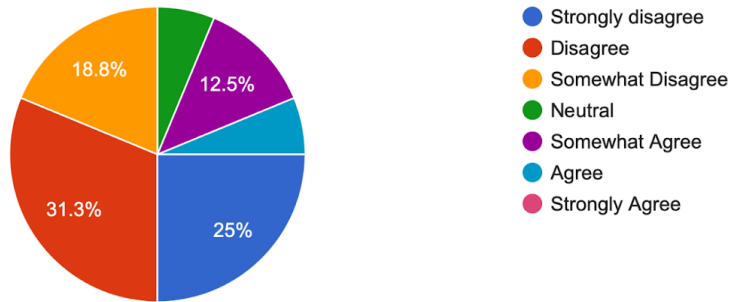
19 responses



Turkish Response

The Turkish government should be held responsible for the massacres carried out by the Ottoman Empire in 1915

16 responses

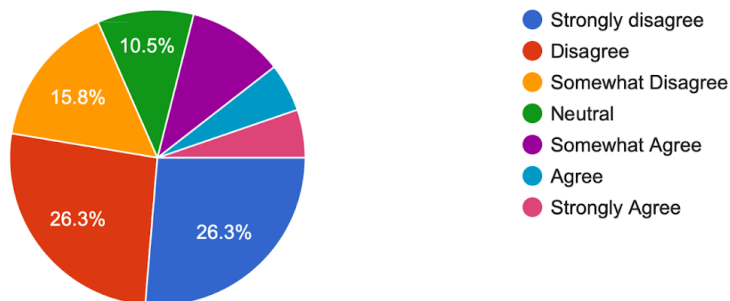


When proposed the question of whether the Turkish government should bear responsibility for the massacres of Armenians the average response for Armenians was 2.316 (strongly in agreement with the statement) and the average Turkish response was in disagreement with the statement, with an average value of -1.313.

Armenian Response

Both Turkish and Armenian people suffered in 1915

19 responses



Statement	Armenians	Turks
I believe that the massacres in 1915 should be labelled a "genocide"	2.895	-0.563
The massacres of 1915 were consequences of the war	-1.526	1.438
The Turkish government should be held responsible for the massacres carried out by the Ottoman Empire in 1915	2.316	-1.313
Turkish actions in 1915 were ethnically motivated	2.74	-0.313
Turkish and Armenian people have similar cultures	0	1.938
I want relations between Turkish and Armenian people to be improved	1.368	2.25
Turkey must officially recognize and apologize for the Armenian Genocide in order to improve relations between Turks and Armenians	2.316	-0.25
Turks are prejudiced against Armenians	1.68	-1.063
Armenians are prejudiced against Turks	1.316	1.563
Both Turkish and Armenian people suffered in 1915	-1.105	1.75
The Armenian genocide is a part of Armenian's national identity	2.263	n/a
I continue to mourn the Armenian Genocide	2.526	n/a

Within nearly all of the statements, the Armenians and Turks remain on opposite ends of the spectrum. They agree only with the statements that “Armenians are prejudiced against Turks” and that they “want relations between Turkish and Armenian people to be improved.” The former statement’s results confirm the prejudice of Armenians against Turks, and the latter statement gives hope that both sides are willing to and desire to improve their relations.

Qualitative Data: Thematic Analysis

Among the interview responses of the Armenians the recurring themes I identified were:

- Demands for Accountability
- Dislike for Turkish government but not Turkish people
- Genocide Recognition
- Belief that most Turkish people are ignorant/uneducated of their history

Among the interview responses of the Turks the recurring themes I identified were:

- Perceived prejudice of Armenians against them
- Defensiveness
- Dislike for Turkish government
- Separation of Modern Turkish people from the Ottomans
- Calls for open discussion
- Thinks Armenians need to be more understanding
- Sympathy for armenians
- Acknowledgment of the ignorance of most Turkish people om Turkish-Armenian history

Quote	Theme(s) Present	Respondent
They (the Armenians) do not realize that the Republic of Turkey is not the Ottoman Empire	Distinguishment from the Ottoman Empire	Turkish
Also I don't understand why Turkish people are blamed for something happened during Ottoman empire. Most Turkish people don't even appreciate Ottoman empire years.	Distinguishment from the Ottoman Empire	Turkish

<p>One obvious fact to me is that Republic of Turkey is not a continuation of the Ottoman Empire, and actually quite the contrary. It's a republic founded as a result of a successful rebellion against the Ottoman dynasty. I just can't see how it can be reasonably argued that Republic of Turkey needs to be accountable.</p>	<p>Distinguishment from the Ottoman Empire</p>	<p>Turkish</p>
<p>Things that happen during times of war should not be the responsibility of the current generations.</p>	<p>Armenian Genocide as a consequence of war</p>	<p>Turkish</p>
<p>I think the Armenian people are too prejudiced against Turks</p>	<p>Armenian prejudice against Turks</p>	<p>Turkish</p>
<p>They (the Armenian diaspora) usually act as if I ordered the round-up and exile of Armenians living in Turkey after learning about my Turkish background.</p>	<p>Armenian prejudice against Turks</p>	<p>Turkish</p>
<p>It is sad and unfortunate that they (Turks and Armenians) antagonize each other</p>	<p>Armenian prejudice against Turks</p>	<p>Turkish</p>
<p>We've seen some factions in the Armenian population take discriminative and even violent action against Turks</p>	<p>Armenian prejudice against Turks</p>	<p>Turkish</p>
<p>On a personal level I always had a fantastic experience meeting Armenian people. I really hope things get better so I can have these experiences more without initially being hesitant about it.</p>	<p>Turkish prejudice against Armenians</p>	<p>Turkish</p>

I don't interact much with Turkish people but need to catch myself when feeling prejudice towards an individual	Armenian prejudice against Turks	Armenian
3d or 4th generation Armenian immigrants may be slightly more prejudiced towards Turkish people.	Armenian prejudice against Turks	Armenian
Avoiding generalizations and realizing the policies of governments don't always overlap with the opinions of the public were the main things that helped changing my perspective	Separation of Turkish people from their government	Turkish
The denial from their government is the issue.	Separation of Turkish people from their government	Armenian
I have no issues with Turkish people. The government at the time was to blame for the genocide, not the people.	Separation of Turkish people from their government	Armenian
I think the Turkish government (not the people) is the gatekeeper of information and change, and is currently the most liable for enabling any kind of accountability.	Separation of Turkish people from their government	Armenian
My opinions are of the government, less of the actual people who potentially don't know any better because of propaganda, dictatorship and lack of open education	Separation of Turkish people from their government	Armenian
Is anyone proud of what (the massacres of Armenians) happened? No	Empathetic towards Armenians	Turkish
Armenians suffered terribly and unjustly during	Empathetic towards	Turkish

the war.	Armenians	
Rightfully, Armenians feel hurt by the genocide that took place and Turkey not recognizing the genocide is insult to injury and gets under people's skin	Empathetic towards Armenians	Turkish
They should recognize that these bad deeds were done and find a good way to make up for the wrongs committed by their ancestors, which could be in form of reparations to the Armenian people.	Empathetic towards Armenians	Turkish
Turkish people should share the sadness and grief the Armenian people have felt for decades, after all these deaths happened on Turkish soil.	Empathetic towards Armenians	Turkish
History has run its course and things have happened to both sides over the years.	The belief that both sides suffered equally thus relinquishing Turkish responsibility	Turkish
It (the Armenian Genocide) was really self-defense. It was being betrayed by those people you trusted and loved.	Armenian Genocide as a consequence of war	Turkish
There are two versions of this history, and probably the reality lies somewhere in between.	Turkish neutrality on the subject of the Armenian Genocide	Turkish

<p>I think both parties are at fault in certain aspects. I believe Armenian people ought to be more understanding of the War and the situation of the day.</p>	<p>The belief that both sides suffered equally thus relinquishing Turkish responsibility</p>	<p>Turkish</p>
<p>The freedom of speech rights being what they are in Turkey, this is not something that is easy to achieve, because the genocide is largely seen as a anti-Turkish stance and possibly prosecuted and even the sane voices have a hard time speaking on this subject, but in the long term I am hopeful this can happen</p>	<p>Turkish ignorance</p>	<p>Turkish</p>
<p>Armenians should also recognize that the Turkish population, similar to in any other country, studies a rather biased version of history</p>	<p>Turkish ignorance</p>	<p>Turkish</p>
<p>stop stop stop with the propaganda.</p>	<p>Turkish ignorance</p>	<p>Turkish</p>
<p>Most Turks don't even know what happened back in 1915.</p>	<p>Turkish ignorance</p>	<p>Turkish</p>
<p>(To improve Turkish-Armenian relations): Accurate history telling, less propaganda.</p>	<p>Turkish ignorance</p>	<p>Turkish</p>
<p>I don't think I'm educated enough on the subject to fully claim one way or another. I also haven't spent enough time reading about the nuances of the arguments.</p>	<p>Turkish ignorance</p>	<p>Turkish</p>
<p>Much of the current generation is not even aware</p>	<p>Turkish ignorance</p>	<p>Armenian</p>

of what took place over a century ago.		

Discussion–Important Theme 1: Genocide Recognition

The question of whether to label the Armenian massacres as genocide is the most divisive subject between Turks and Armenians. When asked, "What would improve the relationship between Turkish and Armenian people?" many of the Armenians responded with "genocide acknowledgment", "genocide acceptance" or "accountability". Ten out of eleven Armenian responses to this question directly mentioned or alluded to the need for genocide recognition. Of the Turkish people who responded to this question, only three out of thirteen participants mentioned genocide recognition. Some Turkish responses even suggested the opposite: to stop mentioning the genocide. For example, one Turkish respondent said: "Stop talking about the genocide, you've researched it enough." Another expressed, "if people would stop trying to egg everyone on and using the word genocide. Why are we constantly trying to create turmoil? The human race should stop with this bad publicity with these untruthful remarks. (...) stop stop stop with the propaganda." Among the thirteen Turkish responses, only five explicitly gave either an anti-genocide or pro-genocide recognition stance. The majority of the Turkish responses (the other eight out of thirteen) did not mention the genocide as a factor that would improve relations between Turks and Armenians: this is either a choice to remain neutral or a deliberate avoidance of the subject due to its controversy.

One of the Armenians responding to this question gave an unexpected answer; this individual suggested that Turks and Armenians stop bickering over the term genocide and that the only way to improve relations is to move on from this argument. While this individual responded previously in favor of applying the term genocide, she also wrote that dwelling on the issue of genocide recognition "keeps Armenians looking back instead of looking forward". This response is unusual because most Armenians are adamant that Turks must recognize the genocide before they will even consider entertaining relations with them. With the stubbornness of Armenians, and the unwillingness of the Turkish government to accept their war crimes as genocide, relations will never improve. However, if more Armenians were to adopt this mindset,

then there is hope that Turks and Armenians could reach a compromise and finally halt the animosity between them.

Important Theme 2: The Root Cause of Prejudice

The shared history between Turkiye and Armenia is an important factor contributing to their hostile relations today. According to the paper by Angela More, emotions emerging from traumatic historical events are passed down through generations of victim groups and perpetrator groups. We can observe this phenomenon among the Turks and Armenians: many of the Armenians interviewed expressed resentment towards Turkiye and Turkish people, whereas the Turkish people interviewed often appeared defensive whenever the 'Armenian Genocide' was mentioned. Some of the Turkish participants also disclosed that they felt animosity from Armenians towards them purely because of their Turkish heritage, such as this Turkish participant: "They (the Armenian diaspora) usually act as if I ordered the round-up and exile of Armenians living in Turkey after learning about my Turkish background."

As observed from the quantitative data section results, Armenians agreed that they hold prejudice against Turks. One Armenian respondent openly admitted to holding prejudice against Turkish people: "I don't interact much with Turkish people but need to catch myself when feeling prejudice towards an individual". It can be rationally concluded that Armenians do hold prejudice and resentment against Turks. However, it can be argued that they have a right to feel this way because of the atrocities committed against them by Turks' ancestors.

Important Theme 3: Disdain for the Turkish Government

Among both the Turks and Armenians I interviewed, I identified that many of them placed the blame on the Turkish government rather than on the Turkish people. The Armenians tend to blame the government for their treatment and justify it by saying that the Turkish people "don't know any better", whereas the Turkish people blame their own government in an attempt to defend themselves, saying that it is not their fault that the government will not accept the facts of the Armenian genocide.

One third of the Armenian respondents, when asked about their opinions on Turkish people, clarified that they thought negatively of the Turkish government but did not have anything against the Turkish people.

Most of the Turkish people I interviewed were liberal, and many liberal-minded Turks do not support the Turkish government. I observed that some of these Turks defended themselves by distinguishing themselves as individuals with different positions on the issue than those of the Turkish government. These respondents appear to take a defensive stance against the issue because they feel they are being overgeneralized and prematurely judged by the Armenians.

Important Theme 4: Separation of Modern Turks from the Past Ottomans

Many of the Turks interviewed had expressed a desire to be perceived as separate from their Ottoman past. This is a theme that I suspected would emerge after my preliminary research. Many Turkish people no longer identify culturally with the Ottoman Empire, and they consider the Republic of Turkiye to be completely independent of the Ottoman Empire. Thus, the weight of the Ottoman's actions do not apply to Turkiye, its government, or its citizens.

Armenians, however, do not share this same point of view with the Turks, and they believe that Turkiye today is still entirely responsible for the actions carried out by the Ottomans, their ancestors.

Conclusion

My hypothesis that Turks and Armenians in Los Angeles are more open-minded than those in Turkiye and Armenia is confirmed. The Turks have a more significant difference in their mindsets from those in their home country than the difference between the Armenians here compared to in Armenia.

Only about half of Turks and Armenians expressed antagonistic views towards each other. Armenians specifically said that they felt negatively toward the Turkish government but not toward the Turkish people.

Turkish responses, when asked about the genocide, were nevertheless defensive. Forty-four percent of Turkish respondents acknowledged the events as genocide. A large percentage- thirty-three percent -remained neutral on whether or not to label these events as genocide.

As expected in my hypothesis, Turkish people seemed more eager to improve Turkish-Armenian relations, whereas most Armenians remained indifferent.

My expectation regarding the correlation between age groups and political views with open-mindedness is confirmed, however for the Armenian responses, I require a more diverse range in age group since most of the respondents are middle-aged, and for the Turkish responses, I need more conservative and religious respondents since all my responses came from liberal-minded, non-religious Turks so far. Thus my hypothesis on the correlation between religion and a greater disillusionment towards Armenians among Turks remains inconclusive.

I encountered many limitations in my research. When considering my data, it is important to acknowledge that I am only a high school student with a limited amount of time and access to people and resources. Gathering participants for my study was much more difficult than I initially thought it would be. In the end, I was as thorough in pursuing respondents as was possible in the short time period available to me, and I received 35 responses total (16 Turkish responses and 19 Armenian responses) to my survey and 24 responses to the interview questions (13 Turkish responses and 11 Armenian responses).

The research question: "How do Turkish and Armenian people in Los Angeles perceive each other and their shared history" can be answered with the quantitative data gathered from the surveys and the qualitative data drawn from the recurring themes identified in the long answer responses. The conclusive response to this question is that Turks and Armenians continue to hold opposing viewpoints on their past and how to address their history, but they share some similarities amongst their responses to the two long answer questions.

As observed in the quantitative data section, both groups have expressed a desire to improve relations with each other, which yields hope for future reconciliation. Based on the qualitative data gathered Turks, once removed from the propaganda which infiltrates their home country, are past denying the existence of the genocide. None of the Turks interviewed denied the existence of the Armenian Genocide, only stating that they acknowledged the existence of these massacres but denied the application of the term genocide to such massacres. As I predicted in my hypothesis, the central point of disagreement between the Turks and Armenians is the application of the term 'genocide' and the question of whether Turkiye should be held responsible.

Two main factors come to mind when identifying Turkish people's defense against being liable for the Armenian Genocide. The first argument is that the actions of the Ottoman Empire have nothing to do with the Republic of Turkiye and its current government; Turks wish to

distinguish themselves from the Ottomans even though the Ottomans were ethnically Turkish. The second resurfacing argument is that the Armenian Genocide resulted from the war and was not a deliberate attempt to wipe out an ethnic group. Many Turks argue that both sides suffered during the war and that the Ottomans' organized killing of their Armenian subjects was an act of self-defense in desperation as they were losing the war. Many Turkish people in Turkiye deny the existence of genocide at all, so all of these excuses are nevertheless an improvement from outright denial. None of the American Turks surveyed or interviewed denied that the massacres of Armenians took place. This discovery strongly supports my hypothesis that American Turks would be more open-minded than Turkish Turks. Many of the American Turks acknowledged that Turkish citizens in Turkiye cannot be faulted for their denial because they do not receive accurate historical education on the subject. Free from the strong influences of their home countries, Turks and Armenians in Los Angeles have less extreme opinions of each other and their shared history.

Most of the Turks claimed that they had nothing inherently against Armenian people. However, many of them seemed to perceive a prejudice against them by Armenian people. They also believe the Armenians are too firm in their positions on the need for genocide recognition. They think the Armenians are unwilling to listen to a different point of view- the Turkish point of view- and they believe both sides would benefit from being more understanding towards each other. They perceive Armenians as being hostile toward them and unwilling to entertain an open dialogue. Thus they believe that the root of conflicts between the Turkish and Armenian people is that the Armenians refuse to listen and consider a different point of view.

There exists a solution to improving social relations between Turks and Armenians. While it is difficult to change the perspectives of Turks and Armenians in their home countries because their socio-political environments strongly influence their opinions, it will be much easier to improve the relationship between Turkish and Armenian immigrants in other countries. The key to this improved relationship is better communication between Turkish and Armenian individuals as well as a more open-minded, tolerant attitude towards each other. Once Turks and Armenians can better understand each other's unique perspectives, they will realize their similarities are much greater than their differences. Since it is impossible to control the Turkish and Armenian governments and their actions, It would be beneficial for our government (and the governments of other countries with large amounts of Turkish and Armenian immigrants) to

organize projects with the goal in mind of bringing these two communities together and initiating open conversation between them. Interaction and communication are key to mending a legacy of animosity between the Turkish and Armenian communities.

This topic requires further research. I hope that in the future researchers will be able to examine this topic more deeply than I was able to. In consideration of the implications that my findings hold, further research into the possible solutions towards the problems identified could significantly improve relations between Turks and Armenians.

Given the current context of the Nagorno Karabakh conflict, the political stalemate between Turkiye and Armenia and the numerous hate crimes and protests within Los Angeles, my findings demonstrate the importance of Turkish-Armenian reconciliation in our society foremost. The implications of my research have proven the continued existence of animosity between Turks and Armenians living abroad, identified the causes behind it and shown that reconciliation is possible in Los Angeles. It is my conclusion that the increased freedom of the press and the right to freely criticize one's own government and policies in Southern California allows for more openness and more empathy between groups of people who have traditionally harbored hatred and mistrust for one another.

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Reduction of Corruption in Higher Education in Kazakhstan By Abylay Iskakov

Abstract

Corruption in higher education has been increasing in Kazakhstan and affects the economic growth of the country and the mentality of future generations. The purpose of this research paper is to examine corruption in higher education as well as propose solutions. I explore the policies of other post-Soviet countries and discuss the successful cases of curbing corruption as examples for Kazakhstan to follow. One of the major findings of the study is that privatization of local universities created an unfair enrollment process, where schools are managed by “rectores,” who have direct ties with the officials, rather than controlled and funded by the government. The research I uncovered presents information about the drawbacks of the reforms undertaken, suggesting alterations like giving more freedom to universities’ councils, making the application process lengthy, changing employer behaviors, and adopting government financing, as well as collaborating with organizations in other countries. Further analysis should be devoted to creating ways under the academic process that will help students to curb corruption even more, meaning that the complexity for the academic processes should be included.

Introduction

In the contemporary world, education is a strong priority for most countries. Its development is a crucial contribution to a country’s economic growth and policy’s correction. One of the main factors limiting education in post-Soviet countries is corruption. In Kazakhstan, a major economic depression following the dissolution of the Soviet Union led to rising corruption in education.

Most governments implement reforms that allow them to combat corruption, but the effectiveness of the reforms varies. Opaque reforms can have a negative impact on higher education. Therefore, this paper aims to analyze major Kazakhstan’s reforms taken since independence and evaluate their influence on education. Simultaneously, the objective of the research is to propose suitable solutions to refine the problem.

This paper can point out the factors helping to sustain corruption in higher education, and the ways in which education is important to a stable economy. The research I present compares Kazakhstan with other post-Soviet countries’ anti-corruption policies. I describe what allowed

some countries to reduce corruption in higher education and where some countries tried and fell short of their goals.

Not all of the governments discussed in the paper have enough power to implement education reforms, and we lack data about the steps that some countries have taken.

This paper will contain three sections. In the first section, I discuss Kazakhstan's social and economic state after the USSR collapse, providing background information and the scope of the main topic. This part includes the country's reforms in the education sector, which have some drawbacks that are covered by providing cores of the research problem. In the second section, the paper analyzes the influence of corruption in higher education by viewing its negative impact on society. I show the impact of the structure of higher education on students' mentality and the national economy. In the final section, I propose ways to combat corruption generally and in higher education, improving Kazakhstan's situation by adapting the policies of successful countries.

Describing the Situation After the USSR Collapse

Overall corruption grew in Kazakhstan as a result of the disorder stemming from the collapse of the USSR. Kazakhstan experienced a major economic depression as well as inflation, which reached 3000 percent in 1992. Poverty increased as production and the value of the national currency, the "tenge", decreased. Expenses for social programs were cut by 50 percent and the Human Development Index (HDI) had decreased dramatically from 26 to 102 out of 175 countries [1].

Kazakhstan's poor economy reduced public funding for education, including universities. Professor salaries were low and professors therefore started engaging in corrupt activities to gain more money from their students. Students were able to successfully submit their exams by just paying money to their professors.

Kazakhstan continues to face the same issue, but on a larger scale. In addition to professors accepting bribes, there are also admissions officers and trustees who save money on labor expenses by gaining extra money from students. Combating bribes in universities increases costs money as expelling underachieving students reduces revenue [3].

Progress is still possible in Kazakhstan. Corruption was originally caused by a poor economy, but the country's mineral and oil products have potential to improve its overall wealth

and therefore funding for education. For example, Kazakhstan is ranked 15th in terms of oil exporting and has increased industrial production five times in twenty years [4]. The country has attracted \$320 billion investments from the US.

This economic growth stimulated changes in the early 2000s. Kazakhstan's Ministry of Education allowed the creation of private universities, new finance policies, and state development programs. The government had already allowed the creation of private universities in 1993, leading to their subsequent proliferation. In 2000, the government even allowed the privatization of state universities. This process transformed most of these educational institutions into joint-stock companies. While the government retained partial ownership as part of the shareholder reform, individuals or companies received the remaining shares. The shareholder reform led to a surge in partially privatized educational institutions in the early 2000s, numbering about 160 institutions [5].

Following the privatization, the government paid insufficient attention to the transparency of educational institutions and their management has led to new problems. Most of the universities are now private and belong to high-ranking officials or their relatives [5]. Officials have a financial interest in the sector for which they are responsible. Therefore, some private universities started becoming opaque businesses where diplomas can be purchased.

The Ministry of Education also changed how they financed the training of specialists. The student, rather than the school, receives grants or loans. The government thereby transformed from financing the object of education - the institution - to the subject of education - the student. However, the government provides inadequate funding. Since 1998, it has spent 18 percent of the budget on education, or 3.62 percent of GDP [6]. In comparison, the average rate of OECD spending on education is around 5 percent of GDP.

Finally, the government funded state development programs aimed at "improving the competitiveness of education, developing human capital by ensuring access to quality education for sustainable economic growth" [7]. The programs are implemented in two stages. The first stage was dedicated to development of the current national model of education and approach to international standards. At the second stage, the government implemented these models, obtained new equipment, and modernized the education infrastructure, personnel provision, information and methodological support.

Despite the implementation of this state program, Kazakhstan still experienced troubles while moving into remote education when the COVID-19 pandemic spread. It was necessary to develop training materials and launch a pilot version of specialized modules before any type of pandemic. Teachers should have had study plans for any extraordinary occasions in advance. Only 70 percent of students had access to the Internet and laptops at home. In 2018, 54 percent of students did not have the necessary skills to use digital technologies in education [5]. All things considered, Kazakhstan had only preliminary work on the transition to distance learning, and it was not financially prepared for it. If Kazakhstan launches state programs on education, the government must be aware of what they will do during emergencies.

From the academic point of view, the country launched several successful reforms. Firstly, they enhanced academic freedom for universities, which allowed universities to make their own academic curriculums for their students. Secondly, they made a lot of changes in national testing by creating conditions for all students from different social layers to pass the examination. Third, the government started putting more effort into developing vocational training for professors, leading to improvement in their qualifications and the From the academic point of view, the country launched several successful reforms. Firstly, they enhanced academic freedom for universities, which allowed universities to make their own academic curriculums for their students. Secondly, they made a lot of changes in national testing by creating conditions for all students from different social layers to pass the examination. Third, the government started putting more effort into developing vocational training for professors, leading to improvement in their qualifications and the quality of their teaching. Lastly, the government conducted another social-academic program, called “Bolashak”, which enabled students to qualify studies abroad at the expense of the state.

Influence of Corruption in Higher Education

As I will show later with survey data, corruption is the most overwhelming issue in Kazakhstan’s higher education system. Corruption begins with the national testing process for the bachelor, masters, and doctoral programs. One of the most common reasons for students to engage in corruption is a desire to get educational grants and scholarships in their educational institutions. Because the government allocates a small number of educational grants, it is challenging for students to obtain. On top of that, due to the instability of the domestic economy,

tuition and fees rise around 15-20% each year, making them less and less affordable for students [8]. Consequently, the expenses enhance their desires to receive educational grants and scholarships.

The common method that students undertake is:

- 1) Students resorts to reaching out to someone who knows their professors
- 2) Then, students start offering bribes in the form of gifts or other items to their professors. Related to this issue, on December 26, 2014, a new anti-corruption strategy was approved. Gifts can not exceed the price of 12025 tenge - nearly \$26
- 3) They bond with their professors and later begin discussing ways to deal with their problems.

When students start the academic year, they are bound to pass their exams, accomplish internships, graduate studies. Another method they undertake is to try to negotiate with their professors again. Even as a whole group of students, it is common to “buy grades” in bulk by paying thousands of tenge. Prices depend on the solidity of the higher education institution, as well as the scale of the subject.

At the same time, there are other crimes that involve the usage of corruption in different stages of application. For instance, before enrolling in certain universities, some professors or examination committees of that specific institution tutor students for additional payments in order to boost their chances to pass examinations. In the case of enrollment, some students try to acquire university discounts on top of student agreements, or alter the initial conditions of agreements. Moreover, some people, who did not even take any application steps, purchase diplomas straight away from higher educational institutions.

Another cause is that universities do not have true autonomy. In developed countries, control is solved through the accreditation system, the university is managed by the council, the “*rectore*” acts as a manager who is assigned tasks, and then the council evaluates his work. In Kazakhstan, universities are in the system of state enterprises, the rectore is responsible to the ministry, and this person has enormous powers. Rectores can neglect real checks and provide ministry fake information, if the person negotiates with them. Therefore, the rectore, who is bound with the ministry, is under their protection.

Underlying the corruption in education is the weak economic and institutional, as well as corruption elsewhere in the economy. Hence, economic causes of corruption from institutions'

admissions are low wages for civil servants, as well as a large number of prohibitive regulations and government’s high powers to influence the activities of firms and citizens. Institutional reasons are considered to be a high level of closeness in the work of government departments and a lack of transparency in the legislative system. Social and cultural reasons are the demoralization of society, lack of awareness and organization of citizens, public passivity in relation to dishonesty [8].

All those causes have some value, since education is one of the three most corrupt areas in the country along with agriculture and healthcare, it will have a lot of consequences on the economic growth of Kazakhstan. A diploma becomes a necessary formality to occupy a certain job position, and can be bought. Corruption in higher education allows for circumventing formal requirements for gaining a degree [2]. Corruption in higher education affects the number of “real” specialists in particular fields. Around 40% of all graduates do not work in the field they studied. This lack of formal education may be partially compensated for by years of working experience. Still, the country will spend years just getting employees proficient. In addition, a generation accustomed to corruption will normalize it elsewhere in the economy as in Russia. To prove it, NGOs conducted a survey. In Nataliya Rummyantseva’s survey, “about 12 percent of faculty think that charging students for a grade is either an acceptable or generally ignorable behavior,” while “50 percent of students and 28 percent of faculty do not see any negative impact on society from corruption in the higher education system.” Based on these results, corruption has already started to be a usual habit for the youth [9] (See Tables 3-6).

Why do people pay bribes?		
Obtaining admission in university	Receiving better grades	Other purposes
69%	10%	21%

Table 3: "Student Opinions on Bribes in Higher Educational Institutions"

Is there corruption in higher education?
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Students who agree	Faculty who agrees
74%	88%

Table 4: "Perceptions of Corruption in Higher Education: Survey among Students and Faculty Members"

Portion of people who are notified of rules against bribes	
Students who have read	Faculty who has read
10%	20%

Table 5: "Familiarity with Anti-Corruption Rules in Educational Institutions"

Are students concerned about this issue?	
Concerned students	50%
Not concerned students	50%
Concerned faculty	72%
Not concerned faculty	28%

Table 6: "Concern about Corruption in Higher Education"

Ways to Reduce Corruption in Higher Education

First of all, it is absolutely useful for the government to notify citizens about the issue. Therefore, Kazakhstan’s government has already started confronting corruption by establishing legislative acts [10]. In addition, the government established laws “on public control” [16] and “on access to information,” [17] which will allow building up and implementing a system of civil

control in the life of the state, ensuring free access of citizens to public information. Only information can influence the mentality of people.

Secondly, the higher education system should be open and highly controlled. The most crucial part of controlling the educational institution is the accreditation system. As mentioned before, university “rectores” are working for the ministry; consequently, the reports are not accessible for the university’s council. Universities can not officially declare certain crimes to their students which makes them unnotified. Also, students are afraid of talking about corrupt activities when they notice them. For example, in surveys that were taken from students, they tended to respond anonymously. Each group of educational institutions must be honest with each other.

Thirdly, in order to complicate the process of engaging in corruption, efforts should be put into reforming the application process. National universities accept students based on their results in national testing, examination. Only one step of the application makes it easier for students to pass the education system. Accordingly, one metric is required for educational institutions to look at the students’ profiles. If the education system starts requiring students’ extracurricular activities or essays, there will be more work for them to get into “desired” universities. When there is more work to do, hence, there are more contacts to negotiate with. Students should spend more material resources in order to achieve their goals. They will not be able to financially handle more and more bribes, especially the poor.

Fourthly, one of the solutions to academic corruption will be further development of the labor market, when knowledge obtained in universities, whether funded by the government or paid for by tuition, will be valued higher than personal connections, bribes, and other illicit benefits [2]. Kazakhstan, like Russia, is focusing more on exports and purchasing new equipment and materials for manufacturing. However, the government is not considering human capital as the beneficial power to develop the labor market. If students are treated well for their knowledge by businesses, they will realize the importance of knowledge they received rather than just obtaining diplomas to be recruited to the job. Employers should be seeking the professional skills of each individual and never be helping their “relatives” in the labor market. If there is even a choice for the proficient worker or a well-known contact, companies will still need to pick only the one who can make a potential impact on the company both on the short-run and long-term. Hence, the education system will not be monetary and corruption-based.

Case Studies: Estonia

Other takeaways can be found based on other post-Soviet countries' experience, which significantly combated corruption. Those post-Soviet countries are Estonia, Georgia and Armenia. Nowadays, Estonia is the country that has the lowest corruption rate among post-Soviet countries.

When Estonia was administered by the Soviet Union after the Second World War, Estonian people had experienced major changes in their cultural lives. The Soviet Union established a strict regime on Estonian territory, in which there were mass repressions and deportations against people who opposed the government.

Massive immigration from Russia and other parts of the USSR decreased the indigenous proportion of the population. Before the war ethnic Estonians made up almost 90 percent of the population. By 1990 the proportion had sunk to about 60 percent [11]. The government changed in an undemocratic way. Many countries did not recognize the new government in Soviet Estonia, and even considered the elections to be rigged. Either way, the country was ruled over by immigrants. Following the governmental alterations, Estonia transitioned to Soviet collectivization. All in all, the condition under which people survived was absolutely unfair and severe. The Soviet system was not transparent enough, especially in politics, so Estonians could not tolerate it. Simultaneously, most of the countries that tolerated this system had and still have high corruption perception rates. After a lot of opposition emerged during the USSR's political instability by the 1990s, Estonia declared its independence formally in August 1991 and it was recognized by the Soviet Union the following month. The Estonian government started developing a stable democracy and improving its economy.

As an independent country, Estonia has put a lot of effort in reducing the amount of corruption. A transparent decision-making process and public awareness were crucial in reducing corruption. In public policy, the government provides courses on ethics and conflict of interests to form awareness among officials and citizens. Most importantly, the main focus targets in increasing transparency is transparency of lawmaking, political decision-making, local financial transactions, government supplies, human rights institutions, state defense institutions, courts and healthcare. [12]. The Estonian Ministry of Justice makes all their fundings public, especially in state programs, and ensures the implementation of more efficient internal control systems. For

example, they have a state program that is called “Transparent Estonian state” (LER), which gives the public information about financial transactions of state institutions and other organizations of the government sector. In the healthcare sector, digital registries are being developed where people register for reception and the queue is clearly seen. To prevent corruption threatening foreign, internal and economic security, the Estonian government pays attention to corruption in human rights institutions and state security structures. All in all, the effectiveness of Estonia’s policy in the fight against corruption is 92,3% [18], which is a very impressive result among other post-Soviet countries. According to the Corruption Perception Index, Estonia is now ranked 13th out of 180 places.

In education, Estonia follows a comprehensive school system which aims to provide all students with the best education, regardless of their background [13]. The Republic of Estonia devotes 6.8 percent of GDP to education, and professors’ salaries are twice those of the national average. To increase students’ awareness of corruption, sample films and seminars are being prepared in educational institutions. Universities became free of charge for students studying full-time in Estonian in a public higher education institution. Other educational reforms also impacted on the improvement of Estonian education. According to the Programme for International Student Assessment, Estonia’s students showed one of the best performances among other European students; Estonia’s subjects’ results in Europe - second in reading, second in math, first in science. Also, in higher education, four universities in Estonia have already entered the global ranking of the best universities. For the future, the government has launched a new state program to continue developing national education which will last in the period of 2021-2035.

The transparency of the government was the key for the success of Estonia, which handled a difficult situation after receiving independence from the USSR. Kazakhstan should emulate Estonia’s transparency and generous funding of tuition and professor salaries (*See Table I*).

	Armenia	Estonia	Georgia	Kazakhstan
CPI ranking 2003	78	33	124	100

CPI ranking 2021	58	13	45	102
Changes from 2003-2021	+20 in position	+20 in position	+79 in position	-2 in position
Introduced privatization?	Yes	No	Yes	Yes
Year Joining Bologna	2005	1999	2005	2010
State Programs	Wind of change	Study in Estonia	Accessible Higher Education	State Program of Education Development
Financing education	Mostly students	State-funded	Students	Mostly students

Table 1: "Corruption Level (CPI) and Reforms: A Comparative Analysis across Case Studies and Kazakhstan"

Case Studies: Georgia

All post-Soviet countries experienced hardship after the USSR collapse, however, Georgia was one who suffered the most. As other countries, it had an economic depression, but on a larger scale. The Georgian people wanted to become a strong independent country and the opposition was really demanding. In 1991, Zviad Gamsakhurdia, known for his extremely nationalist views, was elected by an overwhelming majority to the presidency. However, after some time, resulting from the Civil War in Georgia, Gamsakhurdia was overthrown by opposition forces, on whose initiative, in 1992, the former Minister of Foreign Affairs of the Soviet Union, Eduard Shevardnadze, became the new head of state. Unfortunately, for 11 years of his reign, the country was in poverty, turning into a state with record corruption and an unstable economy. From 1990-1994, national GDP fell by three times [20]. At the same time, in 90s, almost 20% of the Georgian population emigrated from the country. In November 2003,

during the "rose revolution", Eduard Shevardnadze was ousted by members of the opposition. The corruption level in Georgia was at the level of some Central Asian countries like Azerbaijan, Tajikistan and Kyrgyzstan. In 2003, according to the Corruption Perception Index, Georgia was ranked 124th out of 133 countries which was an extremely low score.

On the 4th January of 2004, Mikheil Saakashvili's inauguration as president marked a turning point in the history of Georgia. During Saakashvili's presidency, Saakashvili restored infrastructure, established fiscal discipline, began to collect taxes, increased the state budget and formed a new state structure. Nevertheless, the most important policies that he undertook were the fight against corruption and the reform of law enforcement. The new government declared a policy of "zero tolerance" for crime and corruption. Reforms were carried out - the number of ministries and civil servants was enormously reduced. As well as, the salaries of civil servants were increased by 10-15 times in order for them not to engage in corrupt activities [22]. They simplified the procedure for detaining officials suspected of corrupt practices (only one suspect reason was enough) and provided for the confiscation of their property. They even approached the strict control for the traffic police which frequently got bribes. Eventually, they moved to the new system of the patrol police and fired almost 15 thousand police workers. Laws had been adopted, according to which thieves could be prosecuted not only for specific crimes, but also for the fact that they were part of a criminal group. Due to those reforms, according to the Safety Index by Numbeo, in 2013, Georgia was placed on the 6th place out of 67 countries. Georgia was making gradual improvements annually.

There were also reforms in education that affected the corruption level. For example, in 2005, they began to conduct unified national examinations for admission to universities. The entry of unified national examinations, the entry of a system of transparent competitive selection process eliminated corruption and improved access for higher education for many promising students. However, those exams were the entry criteria for universities on commercial tuition. Though the government resisted corruption in education, tuitions' prices were increasing.

Another problem that appeared while focusing on dealing with corruption is the quality of education itself. According to the Programme for International Student Assessment, in Georgia, the level of erudition of teenagers is below average. Nearly 25% of all students can not pass the national examinations. This low quality of education might be because of the teachers' low salaries and their low qualification. In 2015, after Saakashvili's presidency, the ministry of

education decided to conduct qualification exams for all teachers and those who did not pass were fired from their professions. At the same time, now, Georgia is the country that joined the Bologna process so its education system matches by all European standards. This makes it part of the unified educational space of Europe. Therefore, for instance, in higher education, there is a solid number of international students studying in Georgia. Also, 2 universities have already entered the global ranking of the best universities. All in all, the government truly controlled the influence of corruption in education and they tried to reduce it. Nevertheless, they were not that much inclined to work on the teaching staff and make higher education accessible for students with poor backgrounds.

Eventually, Saakashvili was blamed for abuse of power and illegal enrichment. Despite that scandal, Mikheil Saakashvili still was a person who managed to bring some crucial changes in the country. Kazakhstan’s government can take some anti-corruption rules from those strict rules that Saakashvili’s team used. In terms of education, Kazakhstan should put more effort in developing the inner situation of education; for example, by funding it properly. Having said that, Kazakhstan entered the Bologna process 5 years later after Georgia did (*See Table 2*), which is an important step to increase academic mobility of students and give them opportunities in foreign universities. Hence, Kazakhstan should continue that type of collaboration with other international projects to provide quality higher education for citizens.

Country name	Portion of the funding from the state budget	CPI ranking 2021	Funding from GDP (%)
Armenia	12.2%	58	2.70%
Estonia	11.6%	13	5.26%
Georgia	14.1%	45	3.80%
Kazakhstan	13.2%	102	2.80%

Table 2: "Education Expenditure and Corruption Level (CPI): A Comparative Analysis across Case Studies and Kazakhstan"

Case Studies: Armenia

One of the recent countries that is trying to curb corruption is Armenia. Armenia managed to establish democracy and fight corruption more generally, despite having issues after the USSR collapse, but education reforms are not complete yet.

Before Armenia received its independence, the Armenian Soviet Socialist Republic launched the deinstitutionalization process which affected the quality of performance of regulatory functions in the country. The absence of substitute institutions and the absence of external control from the Soviet government led to an increase in corruption crimes. In 1990, there was an explosion of corruption which only intensified after Armenia gained independence [21]. In just one year, from 1989 to 1990, the total number of crimes related to the embezzlement of public property has doubled. As the trend was continuing, the Armenian government aimed to reach “minimum” level of corruption by developing an anti-corruption strategy and creating an implementation plan. Entrenched corruption, strong patronage networks, and a lack of clear separation between private enterprise and public office rendered the implementation of anti-corruption efforts relatively inefficient. The education sector was harmed by corruption too, in a way that it opened new opportunities for malpractice. In 2009, according to the Corruption Perception Index, Armenia was ranked 120th out of 180 countries which confirms the ineffectiveness of different anti-corruption campaigns. In this sort of corrupt system, there were a lot of fraudulent elections, one of them being the nomination of the former Armenian President Serzh Sargsyan for the post of Prime Minister in 2018. And that moment in Armenian history is called “Velvet revolution,” resulting in the resignation of Armenia's Serzh Sargsyan and the government and the rise of opposition leader Nikol Pashinyan as prime minister.

The new government began to fight against corruption and monopoly. One of the most important actions that the new government first undertook was that they filed criminal cases and launched property investigations against the former president and his entourage. In law enforcement, the government only changed the composition of the leadership, but did not change the workers. Despite this, some workers left voluntarily due to low wages. For the time being, according to the Corruption Perception Index, Armenia, starting from the 105th place in 2018, rose to 59th place among 180 countries. Another main direction where the new government began to focus on was democracy in the country. In the first year of the new government, the

British magazine *The Economist* recognized Armenia as the country of the year for achievements in building democracy.

Still, the new government has not implemented needed reforms related to elections and taxation. Also, they are planning to implement reforms in education to develop professional skills of the teaching staff, ways of teaching foreign languages, formatting of a creative academic environment, the activities of state universities and other topics. Pashinyan has repeatedly said that in order to achieve this result, the education system and universities must be apolitical. As an example, he cited the composition of the boards of trustees, which at that time consisted of representatives of the previous government [13].

Though the new government insisted on implementing a lot of reforms, there was a factor that worsened Armenia's economic and social situation. In 2020, Azerbaijan defeated Armenia in the Nagorno-Karabakh war which lasted for a month and 2 weeks. From the Armenian side, 3825 people died and 11000 troops were wounded [14]. Due to the lost war, protests began in the country, which demanded the resignation of Pashinyan. The budget deficit has increased by about three times compared to the original forecast [15]. Therefore, the government is now unable to implement budget projects planned for the near future.

Despite the fact that Armenia got into conflicts in international politics, resulting in economic and social disorders in the country, it still has potential to continue the fight against corruption even further. Armenian people showed a successful example of organizing revolution in the country which entirely altered the policy of Armenia. They have reached a particular level of democracy and considerably curbed corruption (*See Table 1*). Also, Kazakhstan is capable of considering a new form of the policy with the effort in areas of education and businesses as Armenia did.

Conclusion

The existence of corruption in higher education has brought complexity to the labor market and affected the future generation's mindset. Though the government tries to combat this issue by conducting reforms, their effectiveness varies. Corruption is sustained by the privatization of educational institutions, opaque inner structure of the university management, and inaccuracy in finding employees in the labor market. Nevertheless, necessary reforms like ensuring civic control on people, redistributing rights in the universities' management, loading

the application process, and disciplinary expertise can help to reduce corruption. If the corruption is not reduced in higher education, it will weaken the potential of Kazakhstan in economy, labor market, quality of education and quality of civil life, negatively impacting the mentality of future generations.

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Supply Chain Finance: An Alternative to Traditional Banking Credit By Quim Adrià

Abstract

This article aims to discuss the importance of the financial tool known as Supply Chain Finance, or Supplier Finance, to the business world. The tool consists in the intermediation of a financial agent in a business transaction between a buyer and a supplier. The article will also analyze the pertinence of implementing Supply Chain Finance in countries such as Brazil and how it can provide solutions to the business world, making it more accessible to small suppliers. To accomplish this purpose, the article is structured in a context introduction, an explanation of the tool and concepts, analysis of multiple perspectives, and a conclusion.

Key-words: business, working capital, interest rates

1. Introduction

If you are to ask for a money loan from a bank in Brazil, you might not like what they have to offer. Traditionally, the interest rates that financial institutions provide are not cheap. For example, according to the website Trading Economics, in December of 2022, the Brazilian interbank rate reached 13.75% a year - one of the most expensive rates in the world, occupying the 21st position among 147 countries. To compare with other countries, the lowest interbank rate was from Japan (-0.1%) at the same time. Regarding the wealthiest economies in the world, those indexes were 4.25% in the U.S.A. and 3.65% in China. (Trading Economics, 2022; appendix A).

If the interbank rate runs at high levels in Brazil, bank rates for personal or business loans become prohibitive. Although the high interbank rate can be purposeful to reduce inflation, some variables regarding inflation must be taken into account, such as the type of inflation, the optimum value of the interbank rate to control it, and the actual interest rate (the subtraction of the inflation from the nominal interest rate). Currently in Brazil, the high interbank rate does not seem to be the solution for controlling inflation. Thus, maintaining this value seems to be affecting, negatively, the businesses rather than reducing inflation. More recent data from the National Association of Finance, Administration, and Accounting

Executives (Anefac) indicate that the average interest rate for individuals reached 121.72% per year, in September 2022, while for legal entities, the rate reached 60.47%.

From a small company perspective, a high interbank rate can be a huge problem to keep business running. Small companies tend to ask for a monetary loan, so they can deliver their product or service and bear the production costs. As a result, high interest rates will encumber their business. Within this context, a search for alternatives to traditional credit offered by large financial institutions is crucial. A solution that has been gaining ground in the last decade in the financial market is Supply Chain Finance. It is an alternative financing system in anticipation of receivables, involving large purchasing companies and their supply chain, with the engagement of financial institutions. Supply Chain Finance has guaranteed considerably lower interest rates to small suppliers, because it is not a direct loan to the supplier, it is a financing chain for the receivables/payments in the deal with the purchasing company. So the interest rate will be applied considering the purchasing company rather than the supplier, as the former becomes the creditor of the transaction. It is possible to find multinationals in the Brazilian market that managed to reduce the rates charged to their suppliers to 1.2% per month in 2022, much lower than the average practiced by banks of 4.02% per month (Anefac), once the spread (the difference between lending and funding rate) is applied to the basic rate.

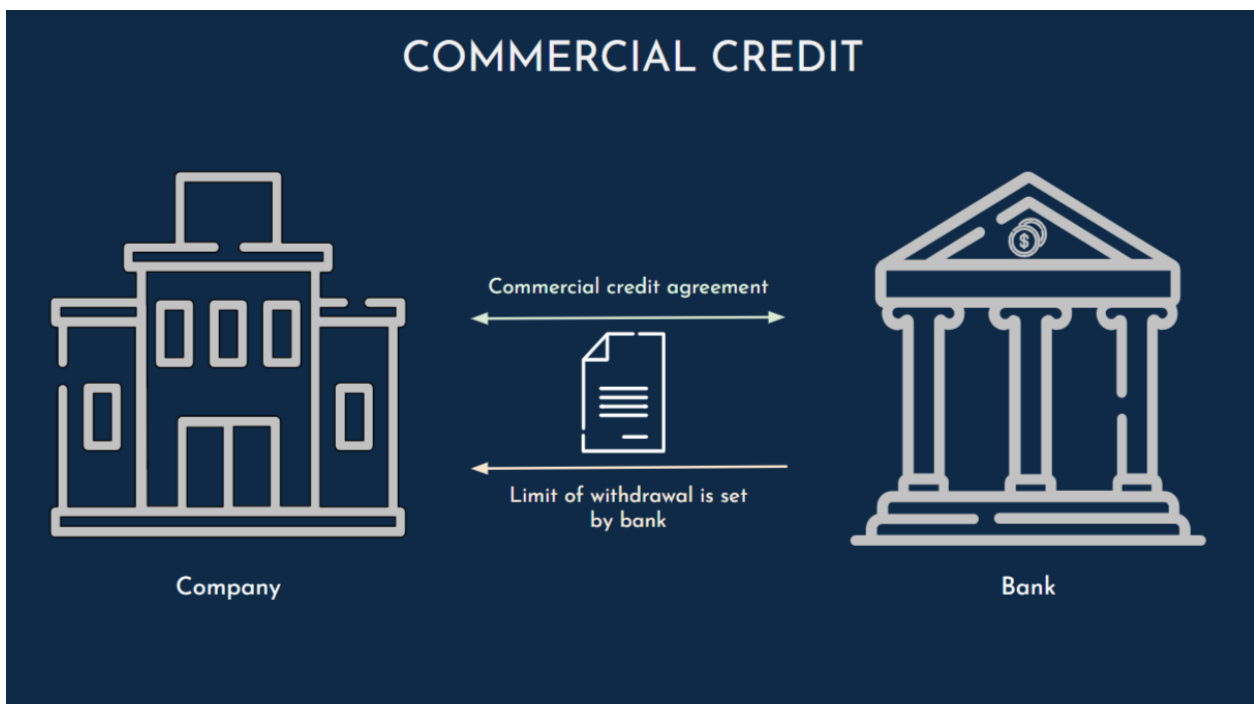
Transactions involving receivables move considerable amounts of money around the world. “According to *Global Business Intelligence*, there was approximately US\$8 trillion in globally outstanding credit sales receivables in 2014. This value is generated when a supplier sells a product, but does not receive payment until a few days or sometimes months later. The supplier, in this case, is offering what mirrors a loan to the buyer, also called a trade credit. McKinsey & Company [(a management consulting company)] estimated, in 2015, that, from US\$8 trillion, US\$2 trillion have low credit risk and a good possibility of being financed, but only a fraction of that US\$2 trillion (something close to 10% or US\$ 200 billion) would be financed with Supply Chain Finance.” - (Alexandre Cracovsky, 2022). In Brazil, R\$175 billion (approximately US\$32 billion; July 2022) in discounts were made on trade receivables in June 2022 alone, which indicates that there is great potential for expansion of Supply Chain Finance in the country.

2. Theoretical Basis–Working Capital

Working capital is the money available that is applied to short-term obligations, representing the operating liquidity. Working capital is generally used when there is a gap between delivering the product/service and receiving the payment from customers. Therefore, the money is typically addressed to pay employees, to cover general expenses, or to fund obligations with suppliers and/or the government. Working capital also enables organizations to exploit supplier discounts by purchasing in large quantities and helps mitigate the seasonal gaps in cash flow. In summary, working capital affects many aspects of a company's business, being fundamental for the health of the organization.

2.2 Bank Credit

Bank Credit is the money offered by a financial agent to a client, who is committed to returning it in the form of debt. The total amount to be paid is the money offered, plus interest, as negotiated in the contract. This characterizes the commercial credit agreement. After the contract is arranged, the bank sets the terms of withdrawal and the transaction is completed.

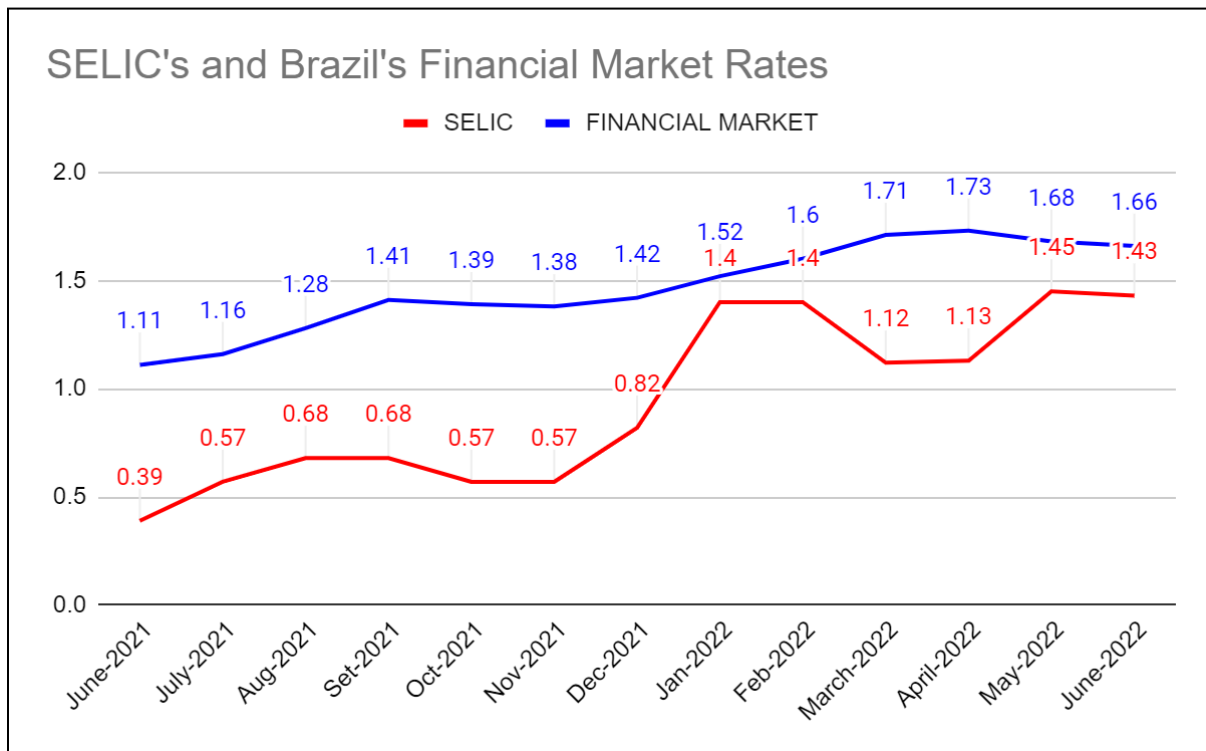


(Image 1)

The rate charged by banks fluctuates according to the country and its political-economic moment. Countries that are seen as safe places to invest, with solid and sustainable economic politics and stable political systems, tend to have lower rates in the world market. The greater the political and economic uncertainties of a country, the higher the interest rates implemented by the local banks.

2.3 Selic's and Financial Market's rates

The Selic rate is Brazil's basic interest rate. The Selic rate influences interest rates from all over the country, affecting multiple economic sectors. It is the rate used to calculate the interest rates that involve the National Treasury bonds. Thus, if the Selic rate varies, other indexes can vary. As a result, it is the reference that banks build upon to establish their rates and spreads. As it is seen in the graphic below, the Selic rate does not surpass the financial market rates, because if it did, the financial market agents would not have profit.



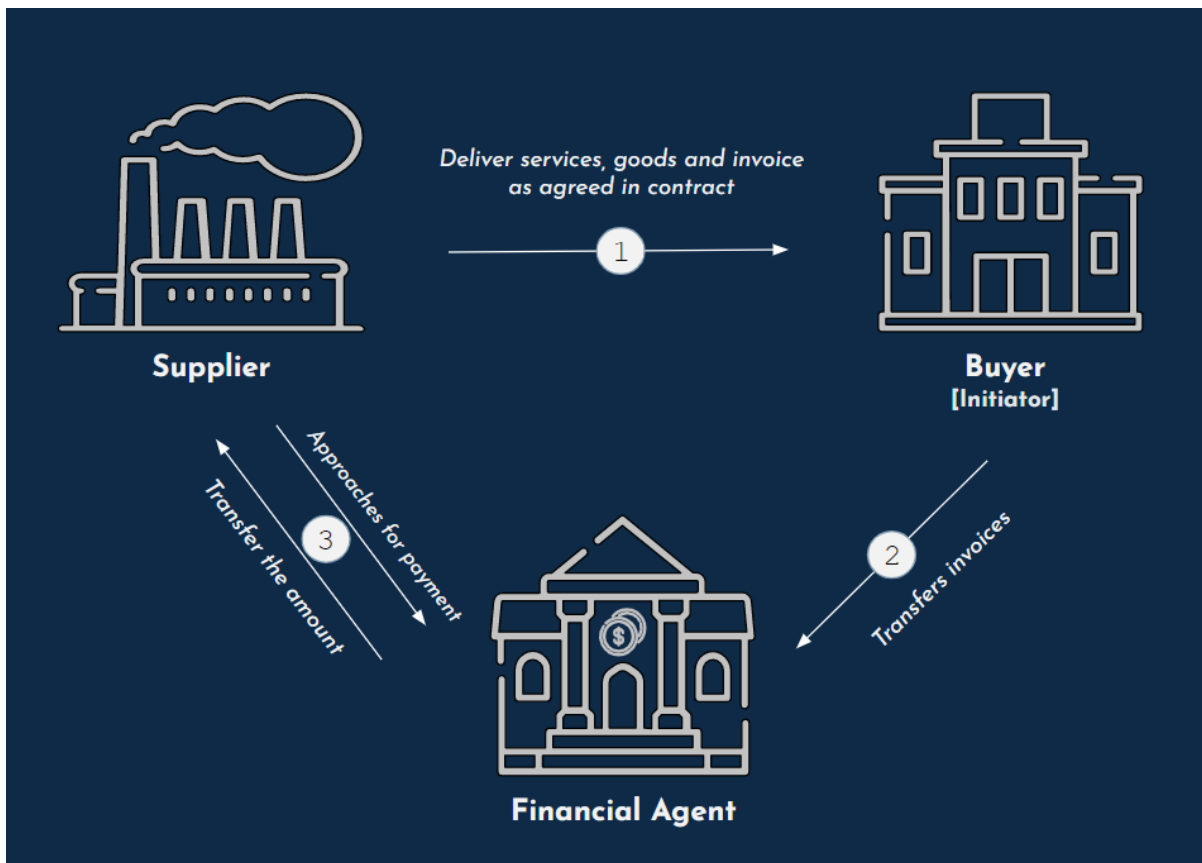
(Image 2)

Therefore, banks will add the spread to the Selic rate that is already high. This means that asking for a money loan from a bank can lead to the insolvency of small businesses.

3. Supply Chain Finance

Supply Chain Finance, also known as Supplier Financing, is a set of processes that are related to financing and business strands. It allows businesses to lengthen their payment terms to their suppliers while providing the option to pay them earlier. The initial business begins with a supplier and a buyer, but then a financing partner comes in to make the transactions more beneficial for the players, often offering lower interest rates than the market.

Introducing a third-party financier can lower the costs and improve the efficiency of the parties involved, helping the cash flow of both the buyer and the supplier. The solution, through credit rating from the buyer, aims to optimize the cash cycle, resulting in liquidity for the parties involved, and mitigating the adverse effects of longer payments.



(Image 3)

Why is that important, though? The problem relies on the contrast between big buyers and small suppliers, and the need for working capital for both of them. Generally, after delivering a product or service, big buyers pay the supplier within a certain amount of

time that the small supplier cannot afford to wait because it does not have enough working capital. With a financial agent intermediating the business, it can directly pay the supplier faster, charging an interest rate. Then the buyer pays the financial agent, in the agreed period, instead of the supplier directly, anticipating the payment for the supplier. For the buyer, the solution presents a form of cash release and financial health, as they maintain their standard amount of time to pay the invoices.

Let's create a simple and hypothetical scenario to understand the transaction. Say the supplier has delivered a service for US\$1,000.00. The buyer will pay for that service within 90 days but the supplier cannot wait that amount of time. That is when the financial agent comes in, offering a monthly interest rate of 1%. Since the payment period will last 90 days, the total interest rate will be, approximately, 3.03% in total (1.01^3). This means that the buyer will continue to pay US\$1,000.00, however, the money will go directly to the financing partner, in 90 days, but before that, almost immediately after the parties have reached an agreement, the financial agent will pay US\$969.70 to the supplier, keeping those US\$30.30 to reimburse of the cost of capital.

Particularly in Brazil, this method of anticipating receivables is essential and should be better explored. Brazil is one of the countries with the highest cost of capital, currently at 13.75% a year (Trading Economics, 2022). In simple terms, this means that financial institutions offer extremely high interest rates on money loans. The perspective of economical inflation combined with political-economical volatility, increases the cost of capital, as these conditions engender a lot of risks to financial organizations.

Usually, small suppliers do not have enough working capital to close a deal, so they ask for money loans. The bank will offer, though, a high interest rate because it sees the small supplier as having a high risk of defaulting on the money lent. Additionally, specifically in Brazil, the base interest rate, the Selic rate, is already expensive. With Supply Chain Finance, the bank's risk is transferred to the buyer, since the bank will not receive the money from the supplier anymore, but from a company with a higher credit rating. As a result, the bank will charge a smaller interest rate, as it has mitigated the risk of the return payment. "Smaller companies tend to pay very high rates, which increase their finance costs, while companies with higher credit ratings benefit from low interest rates provided by

banks” (Alexandre Cracovsky, 2022), therefore, making this ‘transfer of risk’ essential to lower the interest rate.

4. Corteva’s Supplier Financing

Corteva Agriscience is a multinational company in the area of agricultural technology dedicated to the production of seeds, crop protection products, and digital agriculture. The company can provide the buyer’s point of view of the Supply Chain Finance.

Corteva, in Brazil, applied standard payment terms. However, the global standard payment terms were difficult to be accepted by suppliers that demanded “faster payments and more competitive rates”, says Robert Suquet (Logistics Procurement Director at Corteva). The program had a partnership with Major Global Financing Institutions, but the tool workflow offered was not meeting the supplier’s needs. Suppliers were promised to be paid in shorter lead times, which was hard to meet, and buyers stopped offering the program until they could adjust the Supply Chain Finance to an optimal solution. The traditional flow is done in five steps. Step 1 of the program was the supplier’s registration and onboarding in the process. Step 2 was the supplier’s submission of its invoice to Corteva. For Step 3, Corteva would submit the invoice to the financial institution tool. Step 4 was the payment done by the financial institution to the supplier, in 7 days on average, and the fifth and final step was the buyer paying the financial institution, exiting the payment terms. The challenges were in steps one and three. In the first step, the problem was that the suppliers were taking almost a month to be onboard in the process. In the third step, the buyer took too long to submit the supplier’s invoice on the financial institution’s platform.

Bruno Damasceno, Corteva’s treasurer of Latin America, states that Supply Chain Finance is a process that is commonly used, as a program that big companies recommend to their suppliers to have access to cash. However, to solve the suppliers’ demands - those Robert commented - and find a substitution for the Traditional Financial Institutions' workflow process, the Procurement and Treasury functions started to look for solutions in the market. Finally, the digital platform of Idtrust had the best solution for Corteva’s Supplier Financing Program. Firstly, instead of having one financial agent, Corteva and Idtrust offered the supplier's invoice to some financing partners, which will compete for financing the invoice and, therefore, will bid the lowest interest rate possible. This gives more

transparency and fair fees to suppliers. Secondly, the platform offered a quicker and easier onboarding process.

Although those changes improved Corteva's businesses, they proved to be insufficient to attend to all of Corteva's challenges with Supplier Financing. The company still needed to shorten the time it took to complete all the postings to book the transaction. To address this, Bruno and his team developed a solution, granting them the IBEF 2022 Innovation Award. The solution was to make the supplier's invoice available to the financial agents before the accounting, but only just after Corteva had accepted the product or service. Parallely, the accounting would be done. Therefore, the whole process is automated and would attend to the supplier's demands and solve Corteva's issues with its Supplier Financing.

This method Corteva developed will revolutionize the Supply Chain Finance process, likely transfer to other companies and benefit many more buyers, suppliers, and financial agents all over the world.

5. *Grupo Toniato: The Supplier's Point of View*

Grupo Toniato Logistics Solutions is one of Corteva's main suppliers. The organization mainly operates in the logistics, transportation, engineering, and technology areas.

From their point of view, Supply Chain Finance is an operation that allows GT Logistics Solutions to have more working capital. Since the process offers lower interest rates, it helps them to reduce their costs, anticipating their receivables.

GT Logistics Solution mainly operates in a seasonal market, which means that there are periods of time when they do a lot of deals, while in others, the business is scarce. In those times with fewer deals, Supply Chain Finance offers an excellent opportunity to better manage cash flow. However, as the CEO of the company, André Façanha relates, the process of Supply Chain Finance must be carefully thought through because anticipating the receivables is also taking future money (i.e. the income that would come in the established period that was not anticipated). The greatest benefit of the process for the supplier is to be paid earlier. On the other hand, the money would be paid in a certain amount of time, so the income is just being advanced. Furthermore, the transaction involves a financial agent that

will charge some interest rate resulting in less profit for the supplier. GT Logistics Solutions could think through Supply Chain Finance because they had enough working capital to do it, but as Façanha says, the smaller the supplier, the better to use the process of Supply Chain Finance.

The Supply Chain Finance solution came to be particularly important when well managed, mainly on how the organization operated financially to deal with a scarcity of money before. Those situations occurred mostly when there was a mismatch in the deadlines of their receivables. For example, when a client had to pay within 30 days, the other in 50 days and the last in 90 days. Another critical financial situation happened when unexpected events occurred and had to be dealt with right on time. In those situations, the organization had to ask for a money loan, reaching a financial institution, which would offer high interest rates. Therefore, Supply Chain Finance came as an important process to anticipate their receivables and deal with emergencies.

6. Conclusion

As a process of anticipating the receivables, Supply Chain Finance is an important solution, guaranteeing a win-win-win situation for all the parties involved. Mostly, Supply Chain Finance guarantees working capital and cash flow to the buyer and supplier, allowing them to do better business. The financial institution also can benefit from the transaction because of the interest rate they would charge to anticipate the receivable.

The process is still able to be perfected, as some innovations are trying to be attached to the Supply Chain Finance (e.g. Corteva). Also, specifically in Brazil, the solution has room to grow and be an important part of business strategies.

However, SCF must be thought about carefully, especially from the supplier's point of view. Since the money is advanced, the future income from the business will not exist, guaranteeing immediate money at the expense of the later income. Besides, the supplier will have less profit, because the financial agent will charge some interest rate to make the transaction possible.

Supply Chain Finance is a complex process that requires careful thought to be applied. It appears, though, as a great alternative to traditional bank credit, since it helps small suppliers to have more accessible interest rates from financial institutions, as the risk

of payment is mitigated by the buyer. Direct contact between financial institutions and suppliers results in high interest rates because it is attached to the credit and risk the bank sees in the supplier to have their loan returned. With SCF the business becomes less prohibitive and can leverage all kinds of business because of its versatility and benefits, stimulating deals and financial turnover.

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2023

How Do Individuals With TBI Differ in their Cognitive Abilities and Brain Function as Measured by fMRI By Riya Hashem

Abstract

Approximately 70,000 people who suffer traumatic brain injuries (TBIs) will experience permanent damage in cognitive function each year. The objective of this investigation is to examine how cognitive ability, like working memory, is impacted by TBI. Further, the present review will determine how brain function differs between individuals with and without TBI. To investigate these questions, we will evaluate studies that leverage fMRI data collected during working memory tasks from both groups. Investigations of this nature are important in developing treatments and therapies which may improve conditions for those suffering from TBIs.

Introduction

One million people are seen in the emergency department for TBI-related injuries annually, prompting discussion regarding the causes and symptoms of TBI, as well as the prevention of negative long-term outcomes (Hu et al.). One of the most common forms of TBI is a concussion, a form of mild TBI (Klebine). While concussions typically have less adverse side effects compared to more extreme cases of TBI, neurocognitive impairment may last days to months post-injury for even mild cases (Jagoda et al.).

As more people continue to suffer year-round from concussions and the associated symptoms, questions on the long-term impact are still being investigated. The purpose of the present review is to understand the impact on the brain after a mild head injury, like a concussion, in adults. Effects ranging from acute symptoms, like headaches, to severe problems in the brain post-injury, like comas, are the focus of this review.

Types of TBI

TBI can range from mild head injuries like a concussion to more severe such as a coma or even death(CDC Injury Center). TBI results from the brain bouncing in the skull, leading to chemical changes to the brain and damage to neurons. These impacts on the brain result in changes to how people think, sleep, and learn. Physical symptoms can include photophobia,

phonophobia, dizziness, headaches, and changes in vision. Common symptoms of mild TBI and concussions may be hard to recognize and can be overlooked by healthcare professionals. Symptoms of cognitive impairment associated with TBI include being unable to focus or sustain attention, as well as being easily distracted. Cognitive impairment may be partially explained by direct injury to the frontal lobe (“Attention and Concentration Problems”). A person with repeated mild TBIs or concussions may experience a longer recovery time and more severe symptoms. They may also suffer from long-term impairment with concentration, memory, and occasionally physical signs such as balance (Bramlett and Dietrich). Most TBIs are mild, and therefore not life threatening if identified and treated properly.

The increasing risk of future TBIs and injury to the brain is more common in moderate TBI. People with severe TBI are also at risk for adverse health outcomes, including seizures, infections, and even pneumonia (CDC Injury Center). The severity of cognitive impairment depends on specific brain regions affected, and the extent of impact of the injury (MSKTC, Injury). Common physical symptoms of moderate to severe types of TBI include difficulty learning and thinking, trouble communicating, and problems with concentration. Motor skills and hearing problems are also common, with symptoms including weakness in the arms and legs, as well as problems with coordination, balance, hearing, and vision. According to the TBI Model Systems National Database, 22% of people (≥ 16 yo) who received inpatient treatment for TBI died within five years of injury (CDC Injury Center).

A person's life expectancy post moderate to severe TBI is around nine years shorter compared to people without TBI (“Life Expectancy After Traumatic Brain Injury (TBI)”). Severe TBIs often impact multiple areas in the brain, such as the frontal lobe and the temporal lobe, resulting in more long-term effects than concussions which may impact only a single lobe of the brain. More severe TBIs may also require long-term rehabilitation. In addition, those with moderate to severe types of TBI are fifty percent more likely to be moderately to severely cognitively disabled when compared to those without TBI (MSKTC, Injury). After a TBI a person's ability to process and understand information decreases. For example, those affected may require more time to grasp what others are saying, with further troubles in reading comprehension, reaction time, and executive function (MSKTC, Injury).

Those who suffer from TBI are also more likely to be unemployed, as well as have greater rates of long-term mental health effects such as depression and PTSD. Those with

moderate to severe types of TBI are also more likely to return to the hospital following their TBI for additional checkups, requiring post-recovery care (CDC Injury Center). Recovering from moderate to severe types of TBI requires specialized medical care including relearning skills such as driving and those necessary to return back to work.

Additional Effects on the Brain and Body

Even minor brain injuries can lead to long-term consequences, including brain atrophy and increased vulnerability to other neurodegenerative disorders (Bramlett and Dietrich). There is an increased risk of additional TBIs and other neurodegenerative diseases following an initial TBI. TBIs are also seen to create an increased risk for neurological problems, such as Alzheimer's disease, amyotrophic lateral sclerosis (also known as Lou Gehrig's disease), and dementia. Individuals who experience repetitive injuries to the head were found to have a three times increased rate of dying from neurodegenerative causes (CDC Injury Center).

More importantly, the cortex is susceptible to having extreme side effects from a TBI. Of the four main parts of the cerebral cortex, the frontal lobe seems to be affected more frequently by TBI. This is because of the frontal lobe's position in the front of the head, being more common in concussions and sports related injuries (["Frontal Lobe Brain Injury"](#)). Because the frontal lobe is responsible for higher level functions, a TBI affecting the primary motor cortex, which is part of the frontal lobe, has the potential to impact movement on the contralateral side of the body.

In recent studies, biomarker analysis, which is a biological molecule that is a sign of a normal or abnormal process suggesting a condition, has demonstrated evidence of active inflammation within the brains of TBI patients months after initial injury ([Definition of Biomarker - NCI Dictionary of Cancer Terms - NCI](#)). For example, activated microglia, a type of immune cell in the brain which controls the healing environment in response to damage, were found years after brain trauma occurred ([Bramlett and Dietrich](#)). However inflammatory processes can have damaging consequences, as inflammatory cells with high levels of cytokines can be pro-inflammatory and neurotoxic. However when dealt with a brain injury it could be beneficial to induce an inflammatory response. (Bramlett and Dietrich).

Cognitive Function

Cognitive function is essential in all aspects of life. However, disturbances in cognition can be the result of neurodevelopmental disorders or dysfunction after brain-related injury. Working memory is defined as a part of short term memory in which information can be held to complete cognitive tasks.

Different parts of our brain are responsible for specific aspects of memory, such as active recall and memorization, and damage or disruption to areas critical for these memory domains can therefore impair one's ability to recall information, for example. In an activity designed to evaluate working memory and cognitive function, participants completed a working memory task. The results suggested that those with TBI experienced a more deficit in cognitive tasks and memory, taking longer to complete certain tasks and less activation in task-relevant regions ([Chai et al.](#)). In another study of cognitive function in TBI, a group of individuals with TBI and controls was given cognitive tests to test for memory. The study concluded that the group suffering from TBI had a significant decrease in working memory scores compared to those who didn't suffer from any neurological cases. Specifically, McDowell and colleagues found that there was a decline in reaction time during a working memory task in individuals with TBI relative to controls. These results suggest that individuals with TBI experience impairment in cognitive function during working memory relative to healthy controls without TBI.

fMRI

Functional magnetic resonance imaging is a type of imaging modality which demonstrates changes in brain metabolism to infer changes in brain blood flow. fMRI measures blood-oxygenation-level-dependent signals which are then used to visualize brain functions. The long-term functional outcome following TBIs can be assessed using fMRI. In experiments using fMRI following TBI, individuals are given tasks in specific activities measuring how different regions of their brain respond (O'Neill et al.).

Role of fMRI in Research

As TBIs are becoming more common with thousands of visits happening a year, more research is needed on the long term sequelae of TBI, with hopes to reduce the progression of

disease. fMRI is paramount in answering questions for those suffering from TBIs, generating greater awareness of this condition.

As people suffering from mild to moderate TBI have profound impairments in attention and memory tasks, highlighting the scans on fMRIs shows extensive differences in the frontal lobe as well as relative circuitry. The discrepancy of those with mild TBI compared to no TBI is shown as these patients report “memory problems” with the feeling that they have to work harder for adequate performance. This is seen as mild TBI patients reported differences in working memory and cognitive tasks.

fMRI Testing on TBI Individuals

Using fMRI in cases of mild TBI is important as it shows the activation of the brain post-injury. The highlighting of any possible damage to certain parts of the brain, especially cognitive function, can represent the impact on the brain. In one study, participants were evaluated for any neurological differences between those with and without TBIs. (McAllister et al.).

The participants were healthy and were all confirmed to have a similar IQ level. Each participant completed three conditions of a working memory task (i.e., 0-back, 1-back, and 2-back), each of which signified increased working memory demands, in an fMRI scanner. The goal of the study was to determine whether there were significant differences in working memory in individuals with and without TBI. The fMRI results suggested that patients with mild TBI showed less activation in the 0-back and 1-back conditions, compared to individuals without TBI. However, individuals with TBI showed extensive activation in the 1-back and 2-back conditions compared to individuals without TBI. This suggests individuals with TBI showed less activation and processing as tasks increased in working memory load compared to individuals without TBI. Further, this study concluded that individuals with mild TBI had differences in their working memory ability. The mild TBI individuals also reported extensive attention and memory difficulties compared to the controls without TBIs.

Another test performed on 12 mild TBI individuals compared to 11 healthy controls. In both groups, patterns of frontal and parietal activation were low. This activation was consistent for low cognitive tasks. As the load increased, the controls showed a minimal increase in brain activation. However, the mild TBI patients exhibited a notable increase in the frontal and parietal

regions when the load had increased. In both studies, mild TBI patients had significantly more cognitive symptoms than the control, which included difficulty with memory. Showing patients with TBI experience significantly more increase in brain activation, and load when given cognitive tasks raising in difficulty. Patients had reported more cognitive symptoms, with them feeling they had to work harder to perform cognitive tasks (Yin et al.). The results of these two studies show a pattern of decreased cognitive and memory function given increased work loads measured by the working memory tasks.

Conclusion

TBIs are common, range in severity, and impact 1.5 million people yearly. Adverse long term effects of TBI, which include neurocognitive impairment, cognitive dysfunction, loss in memory function, death, or coma are becoming increasingly studied each year. Extreme cases of TBI can lead to death. Therefore, it is important to identify and treat people to improve negative outcomes. As TBIs become more common, it is important to recognize symptoms early to avoid long term neurological problems post injury. Advancements in fMRI technology help better assess the extent of damage to the brain after a TBI, allowing us to investigate further claims into the impacts of brain injuries. Hopefully, this deeper understanding will help us create effective treatments pertaining to the diagnosis (VA.Gov | Veterans Affairs).

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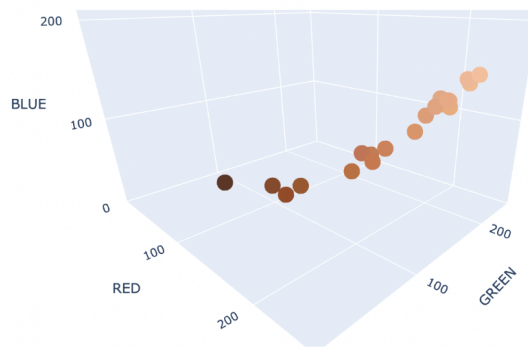
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How Diverse are Popular Clothing Brands in 2023? By Eileen Morales

We all love to go in stores or online and buy clothes from our favorite brands which could either be, Pacsun, H&M, Brandy Melville, urban outfitters and Hollister. Teens favorite clothing shops. As you're scrolling through the website have you ever stopped and realized whether the models represent you. If not, that's no mistake. The lack of diversity in the modeling world and media is caused by colorism. Colorism is when a person is discriminated against for their skin tone, especially an individual with a darker skin tone. Over time lighter skin tones have more representation than darker skin tones in the modeling industry. Usually there's this belief that people with a light complexion are more beautiful than a person with a darker complexion. Some clothing brands have been working on being more diverse like H&M while others need to work more on their representation like Brandy Melville.

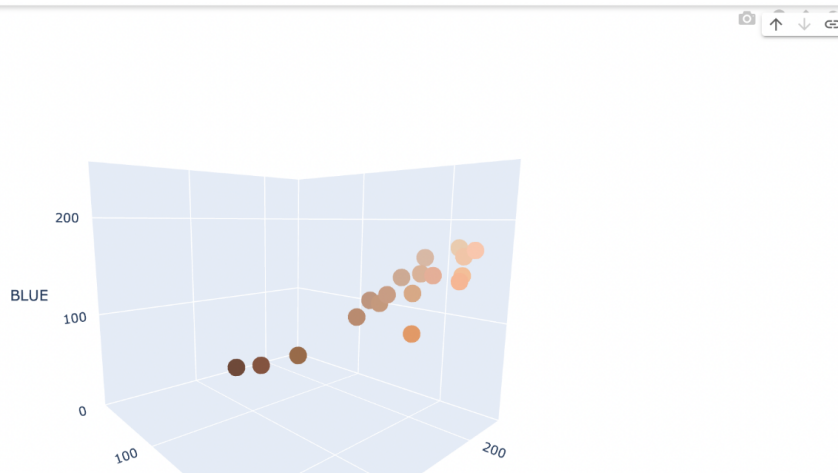
After a long time researching I stumbled upon the topic of embracing diversity in modeling. Lighter skin tones have more representation than darker skin tones in the modeling industry. The cause of lack of diversity is biases within the modeling industry. Unconsciously they have this standard of what's beautiful such as a thin, pale, blonde individual with blue eyes. The modeling industry claims that people don't need to look a certain way or identify with an underrepresented group in order to show diversity. With this argument, the modeling industry avoids the concept of diversity. In 2015 84.7% of models in advertisements were white. While it did decrease in 2016 with 78% of models being white in advertisements. (Melissa Keen) It's important for modeling industry to be diverse because it helps the world become more inclusive by acknowledging that the world isn't just made up by one culture, background and skin tone rather it made up by different cultures, backgrounds, racial, ethnic, body type, and skin tone. Young people of color will be inspired to pursue modeling careers if we get rid of colorist ideas and allow individuals with different skin tones to model.

For my own research I focused on five clothing brands. Pacsun, H&M, Brandy Melville, urban outfitters and Hollister. I collected data on their models' skin tone and created 3D scatterplots for each brand.



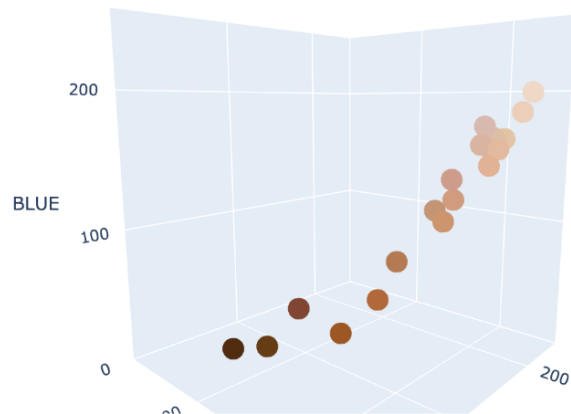
Numerical data from Hollister (Collected by Eileen Morales)

In the clothing website for hollister there seems to be some diversity. As shown in the 3D scatter plot there are a few models with a dark complexion and medium tone complexion but based on the cluster on the right there seems to be more light skinned models on the hollister website. Unfortunately hollister lacks diversity because it only has 3 dark skinned models out of 20 models which is less than 50%.



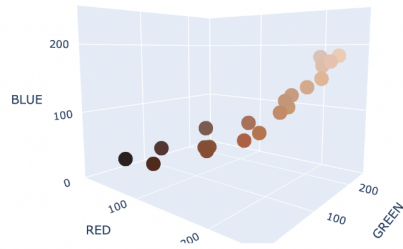
Numerical data from Brandy (Collected by Eileen Morales)

In the clothing website Brandy melville there seems to be a lack of diversity. As shown in the 3D scatterplot there are about only three models with a darker complexion. Although there are models with a darker complexion there could be models with an even more darker complexion like the models on the H&M website. Ultimately there are more light and medium skinned models since the scatter plot provides us with a cluster that contains light skin tone colors.



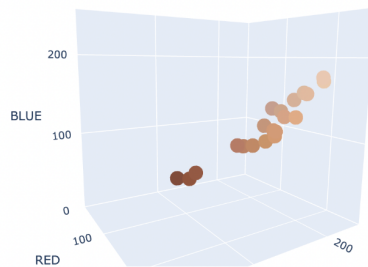
Numerical data from Urban outfitters (Collected by Eileen morales)

The clothing website urban outfitters is becoming diverse since it has a variety of models with different types of dark complexion. Although this scatterplot shows more diversity than the previous scatterplots from Brandy and Hollister there is still a cluster on the right that consists of light skin tone colors, ultimately implying that the Urban outfitters website consists more of light skinned models than dark skinned models.



Numerical data from H&M(Collected by Eileen morales)

The clothing website H&M is full of diversity and representation when it comes to their models. Out of all the clothing websites H&M has had the most dark skinned models, it even has a variety of dark skin tones. Although there is a cluster on the right that consists of light skin tone colors there is another cluster in the middle of the scatter plot that consists of dark and medium skin tone colors. Ultimately H&M has models that range from different complexions.



Numerical data from pacsun(Collected by Eileen morales)

The clothing website Pacsun is not diverse at all because they lack models with a dark complexion and most of the models that do have a dark complexion their complexion is still light. Also based on the scatterplot on the right there's a cluster that consists of light skinned tone

colors. Ultimately Pacsun needs to work on its diversity by having models with a dark complexion model their clothes.

During my research I may have experienced confirmation bias. Confirmation bias is when our brains only look for data that will confirm and prove our initial views as right. Even when we make an effort to be receptive to various viewpoints, our minds tend to gravitate back to the security and familiarity of our own initial views. I experienced confirmation bias throughout my data collection because prior to collecting data I read an article about the lack of diversity so when collecting data at times I found myself looking at models with only pale complexions. In order to stop this issue I looked at the top section and picked the first 20 models, that way the data would be random and prevent confirmation bias.

The strengths of my data is that I didn't just collect and analyze data from one clothing website but from various websites. Collecting data from different websites allows my data to be diverse and provides multiple results/perspectives towards my question. How diverse are popular clothing brands in 2023? For example H&M is extremely diverse while Brandy lacks diversity. Two different arguments. The Limitation for my data was that usually brands would use the same models so I tried to collect data from different models but sometimes it was the same person. It was hard because sometimes the model looked different in the previous picture so I couldn't tell whether it was the same or different model.

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