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UNDERGRADUATE RESEARCH JOURNAL

VOLUME 16

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LETTER FROM THE EDITOR

I am thrilled to welcome you to the sixteenth edition of *Lucerna*! This journal is the culmination of the exemplary research of undergraduate students at the University of Missouri–Kansas City and the hard work of the staff, advisors, and Honors Program student reviewers.

I have been involved with *Lucerna* since 2020 when I began as managing editor, and I would like to thank Richard Schneider (*Lucerna* Editor-in-Chief, 2020) for his guidance and patience. I would also like to thank our faculty advisor, Dr. Henrietta Rix Wood, as well as the Honors Program Director, Dr. Gayle Levy, and Director of Student Affairs Margo Gamache for their support in producing the journal each year.

This past year, we took on some exceptionally ambitious projects. We developed a guidebook to serve as a point of reference to assist future staff members and help make the process of creating each volume as efficient as possible. Like many students at UMKC in this past year, the *Lucerna* staff had to conduct business remotely. On March 11, 2021, we held our first virtual symposium in Zoom. Following the authors' presentations, there was an insightful question and answer session.

I would like to recognize Ellie Hale and Haylee Harrell for their wonderful work as copyeditors in this volume. It was thanks to their initiative that we experimented with alternate ways of sharing documents to further develop our editing process. I would also like to thank Professor Paul Tosh and his team of talented students at Egghead Design for their work. They are responsible for the beautiful design work you see within the pages of this volume.

Above all else, *Lucerna's* mission is to feature outstanding undergraduate scholarship from all disciplines, and I believe this year's volume is an excellent example of that mission. The papers you are about to read address topics ranging from arts programming in prisons to the impact of environmental factors on physical activity behaviors in marginalized areas of Kansas City to a timely analysis of vaccine perception. I wish the best to our contributors in all their future endeavors, and I am excited to see where *Lucerna* goes next.

Sincerely,
Lee Francis
2021 *Lucerna* Editor-in-Chief

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The Neuropathological Analysis of Sport and Blast TBIs

By Lauren Cooper and Brooke Friday

Abstract

Traumatic brain injury is a commonly diagnosed brain dysfunction in the United States. Although advancements in medical technology have improved diagnostic techniques, many cases of mild traumatic brain injuries (mTBI) remain undiagnosed. While medical imaging may provide researchers and medical professionals with evidence of secondary injuries, the only way to definitively diagnose mTBI is through post-mortem analysis. As interest regarding neural variations following mTBI increases, sport and blast-induced TBI have become the focal point of recent research. While these two forms of traumatic brain injury seem to differ, recent studies suggest sport-related TBI (sTBI) and blast-induced TBI (bTBI) share more commonalities than previously suspected. However, differing in pattern, neuropathological markers such as beta-amyloid (Aβ) deposits and neurofibrillary tangles (NFTs) present in both sTBI and bTBI post-mortem samples. The neurocognitive deficits and long-term medical conditions associated with these two types of mTBI also appear to correspond. Primary differentiating factors of sport and blast-induced TBI include biomechanics. The addition of overpressure and neurochemical variations in bTBI cases may prove responsible for the presentation of PTSD in solely blast-induced cases. Although this meta-analysis suggests significant similarities between sport and blast-related mTBI, further advances in molecular and cellular neuroscience may introduce novel differentiating neuropathological markers.
Keywords: TBI, concussion, blast, sports, impact

It only takes one hit to alter one's life. Whether it's a hit from a player on the football field or an explosion from a hidden improvised explosive device (IED) on the battleground, it takes a split second for the brain to move in a coupe and counter-coupe fashion and sustain one of the most widely known neuropathological injuries: the traumatic brain injury. Also known as concussions, mild traumatic brain injuries (mTBI) commonly occur in those playing contact sports, such as football, hockey, and boxing. As the popularity

of high-impact sports increases, research surrounding sport traumatic brain injuries (sTBI) has become more pertinent. Another cause of mTBI that has recently gained the attention of scholars is blast-induced traumatic brain injury (bTBI). In videos of military vehicles striking IEDs and military personnel striking land mines, blast waves crash nearby service members and send them flying backward. Depending on the pressure of the blast wave and the proximity of the serviceman to the source of the blast, the initial impact of the first wave is capable of instantaneously producing an mTBI. Since the differing mechanisms of sport impacts and blast waves can lead to the same mTBI diagnosis, researchers question the relationship of injury induced by sTBI and bTBI. This research focuses on the relationship between sTBI and bTBI by analyzing biomechanics, neuropathological markers, and resulting long-term medical conditions.

Traumatic Brain Injuries

Defined by the Concise Medical Dictionary as an "injury to the brain due to external force," traumatic brain injuries (TBI) are common in the United States (Concise, 2020). Considered a common brain dysfunction, traumatic brain injuries accounted for nearly 2.87 million hospital cases in the United States in 2016 (EDHD, 2019). TBIs are debilitating neurological injuries caused by a variety of different factors. The most common ways by which one receives a TBI is by "direct head trauma, whiplash, falling, explosions, spinning your head, lesser brain injuries and previous concussion" (Neurotracker, 2018). After having sustained a concussion, the chance of undergoing an additional TBI increases exponentially. Recent reviews suggest that approximately 50% of patients diagnosed with TBI experience serious long-term cognitive impairment, including problems with executive function, learning memory, attention, processing speed, and language function (Geddes et al., 2018). In addition to these cognitive deficits, neurodegenerative diseases such as cerebral atrophy, Alzheimer's disease (AD), chronic traumatic encephalopathy (CTE), and Parkinson's disease (PD) have shown correlations with TBI, or in some cases, have been associated with TBI (Neurotracker, 2018). However, the underlying mechanism that links TBI to further neurodegeneration remains unknown.

Types of TBI

Due to varying modes and degrees of injury, TBIs are classified by severity. The distinction between mild, moderate, and severe TBIs is based on brain imaging and the state of consciousness, confusion, or memory loss (also known as post-traumatic amnesia) of the affected individual. Mild TBI

diagnosis consists of loss of consciousness (LOC) of less than 30 minutes, post-traumatic amnesia of fewer than 24 hours, and normal brain imaging (Brasure et al., 2013). Common symptoms may include headache, dizziness, problems sleeping, and impaired cognitive abilities such as attention, processing speeds, and memory (Prince & Bruhns, 2017). Moderate TBIs are characterized by LOC of no less than 30 minutes and no greater than 24 hours, post-traumatic amnesia (PTA) between 1-7 days, with either normal or abnormal brain imaging (Brasure et al., 2013). Severe TBIs include LOC of more than 24 hours, PTA of more than seven days, and normal or abnormal brain imaging (Brasure et al., 2013). Symptoms of moderate and severe TBIs include impaired cognitive abilities, slurred speech, nausea and vomiting, and weakness in extremities (Commissioner, 2019). To eliminate ambiguity and bias, researchers and medical professionals more accurately assess the severity of TBIs using the Glasgow Coma Scale (GCS). The Glasgow Coma Scale further delineates the patient's level of consciousness using three categories: eye-opening, verbal response, and motor response (Table 1). The summation of scores from all three types will indicate the severity of TBI. Diagnosis of mild TBI cases requires a GCS score of 13-15, moderate with a score of 9-12, and severe with a score of 8 or less (Mehta, 2019). While each category contributes to the accuracy of the overall diagnosis, the motor response component provides the most accurate assessment for all TBI patients (Healey et al., 2003).

	Score					
Response	1	2	3	4	5	6
Eye	No response (Does not open eyes)	Opens eyes in response to painful stimuli	Opens eyes in response to verbal stimuli, command, or speech	Opens eyes spontaniou-sly	N/A	N/A
Verbal	No response (Makes no sound)	Incompre-hensible speech	Utters inappropri-ate words	Confused, but able to answer questions	Oriented, converses normally	N/A
Motor	No response (Makes no movements)	Extension response to painful stimuli	Flexion in response to painful stimuli	Withdrawal in response to painful stimuli	Purposeful movement in response to painful stimuli	Obeys commands for movement

Table 1: Glasgow Coma Scale

(Healey et al., 2003)

Focal and Diffuse Injury

Once classified by severity, TBIs undergo further classification. Direct damage from TBIs occurs immediately after the following impact and is a direct result of linear or rotational (planar) forces (McCrory et al., 2017). The resulting injuries destroy and deform different regions of the brain. The secondary damage occurs as a result of the primary insult. Examples of secondary injury result from swelling, ischemia, intracranial hematoma, or infection that occurs as a direct result of the immediate damage (Kaur & Sharma, 2018). TBIs can also be classified as focal or diffuse. Focal injury pathology is characterized by focal lesions and is often associated with contusions, hemorrhages, and other forms of vascular damage (Kaur & Sharma, 2018). Diffuse injuries occur due to the primary damage force and are characterized by damage to white matter and axons (Rush, 2011). Since focal injuries damage the blood-brain barrier (BBB), the associated symptoms are localized, more diverse than those of diffuse injuries.

Biomechanics of TBI

Since this meta-analysis will compare the effects of TBIs resulting from sport and blast-related head injuries, the scope of this research will focus solely on mild traumatic brain injuries (mTBIs). The biomechanics of a TBI is defined broadly as the "interrelationships among the forces experience during impact, head and neck movements, stiffness of the tissue that composes the head/neck complex, deformation of structures at the macroscopic and microscopic level, and the biological responses to the various loading conditions imposed on the head" (Graham et al., 2014). Although both sTBI and bTBI are induced following an impact, the types of forces causing these mTBIs to differ. sTBIs are represented by "low-velocity injuries that cause brain 'shaking' resulting in clinical symptoms" (Agarwal et al., 2018). On the other hand, bTBIs result from multiple high velocities, positive pressure waves followed by long phases of negative pressure (Bryden et al., 2019). Since the forces associated with sport and blast-induced TBI differ, biomechanical analyses are necessary to determine the connection between the resulting injuries.

During a mild sports TBI event, the transmission of an impulsive force from the body to the brain causes rapid linear acceleration-deceleration of the cerebrum (Chen et al., 2013). During an acceleration-deceleration event, the acceleration induced from a blunt, external force causes a linear shift in cerebral position. Intracranial impact results in abrupt deceleration when the brain comes in contact with the opposite region of the skull. In sTBI cases, the impacts associated with this shift result in both focal and diffuse injuries. Focal injuries transpire from two regions of direct cerebral impact: the region from which the force initiated and the opposite region of the brain where the deceleration event occurred (Chen et al., 2013). The force of the initial impact and subsequent intracranial movement causes tissue deformation. Sudden variations in cerebral elasticity, plasticity, and viscosity inflict diffuse damage to glial cells, neurons, axons, and blood vessels (Laskowitz & Grant, 2016). The neuronal shear strains resulting from diffuse injury produce visible neuropathological markers on sTBI specimens. In addition to axon shearing, rapid cerebral acceleration induced neurotransmitter release, calcium influx, and overstimulation of the sodium-potassium pump in an attempt to maintain homeostasis (Mckee & Daneshvar, 2015). Application of ratiometric, high-affinity fluorescent $Ca2+$ indicators on isolated CA3 hippocampal neurons of rats suggests TBI-induced calcium influx may persist for approximately seven days post-TBI with normalization occurring within thirty days (Sun et al., 2008).

While the damage from a single sports-related mTBI often begins

to resolve spontaneously, repetitive mTBI can lead to numerous negative, long-term effects. Notably, Second Impact Syndrome (SIS) is an "acute, sometimes fatal, brain swelling that occurs when a second concussion is sustained before complete recovery from a previous concussion" (Agarwal et al., 2018). As the pressure in the cranium increases, this syndrome causes cognitive and neurologic deficits and vascular congestion. Other long-term medical conditions associated with repetitive sTBI include chronic traumatic encephalopathy (CTE) and dementia. These conditions will be described in greater detail later in this analysis.

Unlike the linear force causing sTBI, mild blast TBI (bTBI) occurs from both rotational acceleration-deceleration of the cerebrum and blast overpressure. Blasts associated with improvised explosive devices (IEDs) in combat settings produce a pressure gradient capable of repeated exposure due to reflective patterns (Bryden et al., 2019). The repetitive impact from an alternating "high positive pressure wave that expands radially from the blast site, followed by a longer negative pressure phase" is analogous to that of a planar wall repetitively hitting the body at astronomical speeds (Bryden et al., 2019). Additionally, the resulting overpressure, a transient increase in the overall atmospheric pressure differential due to the blast shockwave, negatively impacts the organs and vascular system of the victim. This rapid displacement of blood to the brain damages the blood-brain barrier (BBB) and cerebral blood vessels (Agarwal et al., 2018). Furthermore, the points of structural damage resulting from overpressure produce a pepper spray pattern of neuropathological markers.

Diagnosing TBI using Medical Imaging

Drastic advances in medical imaging technology have allowed for live observation of the human brain. Utilizing computed tomography (CT) scans, magnetic resonance imaging (MRI), and diffusion tensor imaging (DTI), researchers and medical professionals can visually observe irregularities within the brain (Bazarian et al., 2006). However, in most TBI cases, computed tomography (CT) scans cannot detect diagnosis-specific abnormalities within the brain. The only detectable abnormalities that indicate the occurrence of a TBI are the presence of hemorrhages or lesions. Long-term clinical observational studies of poor cognitive outcomes associated with TBI suggest brain injuries can be present despite the appearance of a normal computed tomography (CT) scan (Bazarian et al., 2006). In other words, computed tomography (CT) scans of an injured brain will appear nearly equivalent to those of a healthy, uninjured brain.

In further studies, researchers discussed the drawbacks of brain injuries being masked as a normal brain from computed tomography (CT) scan. By studying the pathology of brain tissues using various testing methods and machinery, researchers distinguished the strengths and weaknesses of various imaging methods. Figure 1 shows the clinical outcome and different, compelling data of the methods utilized by each type of machinery (Bazarian et al., 2006).

Modality	How Is Brain Injury Detected?	Frequency of Injury Detection in Mild-TBI Patients (%)	Correlation to Clinical Outcome
CT scan[44-46]	Only hemmorrhage (and occasionally edema) seen, not brain injury	3-5	Weak
MRI, T1/T2[47,57,58]	White matter lesions possibly consistent with axonal injury. Also, small hemorrhages and contusions	10-57 (diffusion-weighted and diffusion tensor imaging may be better at detecting axonal injury)	Moderate
Magnetic resonance spectroscopy[74,76,77]	Spectroscopic peaks show ↑ NAA, ↓ choline	Unclear (see text)	No data
Functional MRI[78,80,81]	↑ ratio oxyHb to deoxyHb (↓ O^2 utilization)	Unclear (see text)	Good
SPECT[84-87,92]	↓ uptake of radio labeled technetium-99m (↓ regional cerebral blood flow)	59-87.5	Moderate
PET[105]	Initially ↑ followed by ↓ uptake of radio labeled glucose and 0 (↑ then ↓ neuronal metabolism)	Unclear (see text)	Unclear (see text)

Figure 1. Strengths and weaknesses of medical equipment discovered through observation of traumatic brain injuries. Functional MRI (magnetic resonance imaging) is superior in the detection of various brain injuries. On the other hand, computed tomography (CT) scan is considered the worst equipment option for brain injury detection. (Bazarian et al., 2006).

Alternate Methods for TBI Diagnosis

Aside from neuroimaging, TBI diagnosis can be determined by using biomarkers and analysis of neuropathological markers. While brain imaging commonly requires fMRI and CT to observe brain damage, biomarkers collected from cerebrospinal fluid samples can detect specific chemicals and indicators of a disease or TBI. However, the most accurate method of diagnosing TBI is through analysis of a neural specimen. Although neuropathological breakdown can occur following a biopsy, the most

common diagnostic examination is performed on a neural sample post-mortem. Studies utilizing neuropathological markers for TBI diagnosis help researchers and medical professionals determine specific damage induced from differing forces. Unlike medical imaging and biological indicator analyses, direct observation of microscopic and macroscopic neuropathological markers is the only way to diagnose mTBI definitively.

Defined as "the study of diseases of the nervous system," neuropathology analyzes the presence of specific, visible markers on the brain to diagnose TBI and resulting diseases (Neuropathology, 2020). Neuropathological markers indicating positive mTBI diagnosis and the diagnosis of associated diseases include abnormal structures and quantity amyloid deposit patterns and the presence of neurofibrillary tangles. In addition, recent studies suggest the hyper pigmentation of substantia nigra, cerebral atrophy, and Lewy bodies may also be promising neuropathological markers for TBI diagnosis.

Beta-Amyloid Deposits

Beta-amyloid (Aβ) deposition is a promising neuropathological marker in individuals with mild cognitive impairments stemming from an mTBI. While amyloid is the "general term for protein fragments that the body normally produces," beta-amyloid refers to the protein fragment derived from an amyloid precursor protein (APP) (Campbell, 2020). In a healthy brain, these beta-amyloid proteins are broken down by enzymes such as tripeptidyl peptidase (TTP1), β-secretase 2 (BACE2), and matrix metalloproteinase 9 (MMP-9) (Purdy, 2006). Astrocytes, the important support cells of the blood-brain barrier, help create MMP-9 and maintain ideal concentrations of beta amyloids by degrading toxic beta-amyloid protein aggregations. In the event of a TBI, disruption resulting from blood-brain barrier damage and axonal shear tears damage the enzymes necessary for beta-amyloid protein degradation. This leads to an abnormal increase in beta-amyloid protein concentration within the brain.

Beta-amyloid proteins are initially found in small strands which can be broken down, dissolved, and removed from the brain. However, in some cases, β-site APP cleaving enzyme-1 (BACE-1), which converts APP to beta-amyloid, can be imperfect. This imperfection may lead to the production of abnormally large beta-amyloid proteins. Unlike normally sized beta-amyloid

proteins, large beta amyloids cannot be readily degraded by enzymes. Over time, individual molecules within these abnormally large beta-amyloid strands become sticky and aggregate into deposits known as plaques (Campbell, 2020). As the plaques begin to develop, the protein fragments become established in various regions of the brain. These plaques can block cell-to-cell signaling between neurons and activate additional inflammatory responses. The resulting inflammation is responsible for many of the symptoms associated with TBIs (Galiox, 2020).

Beta-Amyloid Deposits in Sport TBIs

In sport-induced traumatic brain injuries, the impulsive force acting on the body is instantaneously transmitted to the brain. This force induces cerebral movement and causes the brain to collide with specific regions of the skull. Resulting from this impact are damages to axons and other supporting structures within the neural tissue. Since axonal injury disrupts transportation processes throughout the cerebrum, beta-amyloid precursor proteins begin to accumulate. PET scans and other neuropathological analyses of sTBI samples show increased concentrations of beta-amyloid plaques in impact-specific regions of the brain. Plaque formation prevents cell signaling within these areas and inhibits access to the enzyme responsible for deposit degradation.

Beta-Amyloid Deposits in Blast TBIs

Unlike beta-amyloid aggregation patterns in sTBI, the repetitive blast wave impacts and overpressure in bTBIs produce widespread neural damage. Cerebral has implications within the skull, and BBB damage from overpressure has a pepper spray-like pattern of neural damage (Mouzon et al., 2017). Within these damaged tissues, aggregations of beta-amyloid plaques begin to form. Although these aggregations appear to be scattered randomly throughout the cerebrum, the formation of these plaques is localized based on impact and damage. Figure 2 compares the patterns of beta-amyloid plaque aggregations in an unaffected brain (s-sham and r-sham), a brain with sports injuries (s-mTBI), and a brain inflicted by repetitive impacts (r-mTBI) similar to those found in bTBIs. The beta-amyloid plaques (red) in sTBI cases are in high concentrations in few areas. In contrast, the amyloid plaques observed in the repetitive TBI sample (similar

to bTBI) are more dispersed.
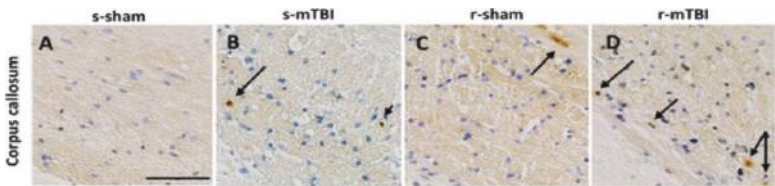
Figure 2. The formation of beta-amyloid aggregations in unaffected mouse brains (s-sham, r-sham), mouse brain with induced sTBI (s-mTBI), and mouse brain with repetitive induced mTBI (r-mTBI), which relates to those of bTBI (Mouzon et al., 2017).

Neurofibrillary Tangles (NFTs)

Similar to beta-amyloid plaques, the presence of neurofibrillary tangles (NFTs) is also a definitive neuropathological marker for TBIs and associated neurodegenerative diseases. Neurofibrillary tangles (NFTs) are abnormal tau protein (p-tau) aggregations that collect inside neurons (Richaol, 2016). In normal quantities, p-tau regulates tubulin in the production of microtubules within neurons and supports neuron structure (Alonso, 2018). While p-tau is an essential protein for cognitive function, abnormal hyperphosphorylation from an mTBI impact leads to p-tau aggregations. The resulting structural change inhibits p-tau from binding to tubulin and performing critical life functions (Lucke-Wold et al., 2014).

Additionally, once p-tau aggregations form a tau oligomer forms. This oligomer is large and leads to the improper functioning of many systems, including tau phosphatases that dephosphorylate these oligomers. The inactivation of tau phosphatases leads to higher accumulations of the intracellular mutated tau proteins. As a result, NFTs form and mature under the influence of lysine's 280p residue acetylation (Lucke-Wold et al., 2014). Through tau seeding, these NFTs then cause other monomeric tau proteins to misfold and aggregate. This chain reaction is propagated and enhanced until behavioral and motor symptoms are exerted from decreased functional stability and neuronal outgrowth of the microtubules (Childs, 2019). In the case of large NFT accumulations, neuronal cell death is possible, which can lead to death in abundance.

NFTs in Sports TBIs

Unlike the rapid formation of beta-amyloid aggregations following an sTBI, NFT formation occurs slowly after multiple sTBIs. Recent post-mortem neuropathological studies found a 43% increase in NFT formation following multiple sTBI occurrences within a single year (Graham et al., 2014). Repetitive linear acceleration associated with the biomechanics of sTBIs is believed to cause mechanical injuries to the axons of the neurons. This axonal damage leads to hyperphosphorylation and abnormal formation of p-tau aggregations (Graham et al., 2014). Since NFTs have become a consistent observation in post-mortem samples associated with repetitive sTBIs, these neurodegenerative p-tau aggregates are considered a key neuropathological marker in mTBI diagnosis.

NFTs in Blast TBIs

Unlike the biomechanics associated with sTBI, a single blast from an explosive device produces positive and negative pressure phases resulting in the production of a vacuum. This vacuum disrupts the tau phosphatases and causes a pepper spray pattern of multi-point neural damage. In a post-mortem analysis of neural tissue from four military service members with known bTBI and four professional athletes with known repetitive sTBI, Lee Goldstein, associate professor at Boston University School of Medicine, found indistinguishable differences in the accumulation patterns of NFTs (Greenemeier, 2012). Thus, although the servicemen only experienced a single blast-related injury, the biomechanics of bTBI caused multiple mTBIs to occur during a single blast event.

Neurobehavioral Deficits

The complex nature of the damage sustained from mTBI occurrences often results in abnormal neurocognitive and neurobehavioral functions. Psychophysiological studies utilizing fMRI suggest a link between pain and neurocognitive function following TBI (Lavigne, 2015). Interestingly, patients reporting moderate pain from sTBI injuries had greater mid-dorsolateral prefrontal cortex and neurocognitive function activation than patients sustaining non-sport-related TBI injuries with severe pain (Lavigne, 2015). Lack of documented neurocognitive and neurobehavioral deficits

in sTBI injuries suggest an unknown component could be involved in the biomechanics of sTBI.

On the other hand, both neurocognitive and neurobehavioral changes result in military personnel sustaining bTBI. Although it is unclear whether these changes are the primary or secondary result of bTBI, deviations in sleep habits, mood, sensory function, and cognition are commonly reported (Hendrickson, 2018). These neurological changes overlap with the symptoms documented in PTSD cases. These shared symptoms suggest PTSD results from both the biomechanical injury and the physiological response to traumatic experience (Hendrickson, 2018). In other words, the structural damage sustained due to the biomechanics of the bTBI results in impaired or altered neurological function. This physical damage combined with fluctuating neurochemical concentrations due to the traumatic experience results in PTSD and other neurocognitive and neurobehavioral deficits.

Chronic Traumatic Encephalopathy (CTE)

Due to "neuronal loss, persistent inflammation, and cytoskeleton pathology," TBIs have also been linked to the development of neurodegenerative diseases (Johnson et al., 2010). Repetitive mTBIs have been linked to CTE in both sport and blast-related cases. CTE is a form of neurodegeneration that occurs due to the excess accumulation of misfolded tau proteins. Unlike other neurodegenerative diseases caused by p-tau, CTE is also characterized by a distinct neuropathological lesion and an irregular dispersion pattern of p-tau [Figure 1] (McKee, 2016). Beta-amyloids may also be present. Since neurodegenerative conditions such as CTE can only be diagnosed definitively via autopsy, many CTE cases go undiagnosed. Clinical manifestations of the disease include cognitive impairment, depression, irritability, aggression, mood swings, explosivity, paranoia, and suicidality (Van Itallie, 2019). Since these symptoms coincide with the symptoms of other psychological disorders, high collision sports such as football, hockey, and boxing have increasingly become the focus of neurodegenerative studies. One study conducted by J. Mez and Boston University's Department of Neurology diagnosed 110 out of 111 brain samples from veteran professional football players with CTE (Van Itallie, 2019). The results of these studies suggest repeated blunt trauma to the head is highly associated with CTE. Likewise, bTBI sustained by military personnel have also been linked to

CTE. Due to the biomechanics of the bTBI, the brain sustains multiple injuries from a single blast. According to researchers, within a decade after 2001, roughly 20% of 2.3 million troops had sustained an mTBI while serving (Greenemeier, 2012). In a postmortem study on the brains of military veterans with known mTBI, all four specimens exhibited neuropathological markers for CTE (Goldstein, 2012). Although the biomechanics differ between sTBI and bTBI, the neuropathology of CTE diagnosed in both forms of mTBI is equivalent and easily distinguishable from other neurodegenerative diseases.
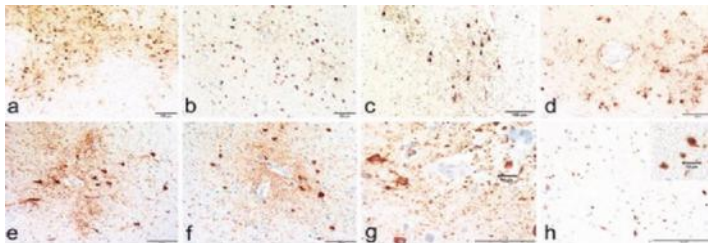
Figure 3. The distinguishing lesion and irregular dispersion pattern of p-tau in CTE (McKee, 2016).

Dementia

Dementia arises following mTBI and the neurodegenerative processes that lead to CTE. Dementia, the advanced case of CTE, is characterized by motor problems and cognitive deficits such as difficulty concentrating, memory loss, inability to solve problems, problems with language, and deficiencies in thinking abilities (Ling, 2015). For many years, dementia resulting from head injuries was thought to occur due to only moderate or severe TBIs. However, a recent study on military veterans revealed dementia might be associated with a single bTBI and other mTBI (Barnes, 2018). Neuropathological markers associated with mTBI induced dementia include the presence of some beta-amyloid and excessive p-tau aggregations (Washington, 2016). Considerable evidence suggests the presence of these Aβ deposits ``may be the initiator in a cascade of events that indirectly leads to age-related cognitive decline" (Kimbler et al., 2011). In some instances, the presence of Lewy bodies–abnormal aggregations of alpha-synuclein protein within the brain-was also noted. The presence of Lewy bodies in mTBI

patients suggests Lewy body formation may result from traumatic brain injury (Nguyen et al., 2018). Since dementia is the advanced form of CTE and CTE occurs similarly in sTBI and bTBI, dementia would likely present equivalently in sport and blast TBI cases.

Analysis

While mild sTBI occurs due to rapid linear acceleration-deceleration of the cerebrum, mild bTBI results from rotational acceleration-deceleration and blast overpressure. Although secondary injuries occur in both sport and blast-related TBIs, the associated primary injuries differ. The single blunt impact involved in sTBI results in a single primary injury. Since bTBIs involve two separate mechanisms, multiple primary injuries occur during a single event. Although secondary insults such as hemorrhaging or lesions can be observed through medical imaging technology, neuropathological evidence of the primary injury remains undetected in living patients. Only post-mortem analyses of TBI samples can reveal specific patterns in neuropathological markers that then lead to accurate diagnoses. In both sTBI and bTBI, beta-amyloid (Aβ) deposits and neurofibrillary tangles (NFTs) are common neuropathological markers utilized for diagnosis. However, the patterns of beta-amyloid deposits appear to present differently in sTBI and bTBI cases. In sTBI cases, beta-amyloid aggregations present in regions of direct impact between the brain and skull.

On the other hand, beta-amyloid aggregations develop differently in samples affected by bTBI. In addition, the beta-amyloid appears to occur in a pepper spray pattern across the brain rather than in impact-specific regions. This pattern is likely due to blast overpressure damaging dispersed areas of the brain. Although the presentation of these neuropathological markers differs, the long-term medical conditions associated with sTBI are consistent with those associated with bTBI.

Conclusion

Initial impressions may lead to the belief that the severity of blast-related TBIs is far greater than that of sport-induced TBIs. This research is expected to find significant differences in the neuropathology of sTBI and bTBI. However, the results of this meta-analysis suggest the neuropathology of bTBIs is similar to that of sTBIs. Both types of TBI present with beta-amyloid aggregations as well as neurofibrillary tangles. Although the

patterns of these neuropathological markers differ due to differences in biomechanics, the specific neuropathological markers and long-term medical conditions associated with these two types of TBI are considerably similar. The presentation of PTSD symptoms in solely blast-related TBIs is due to differences in biomechanics and psychological experiences. However, the neuropathological markers remain consistent with those found in sTBI patients. Further research of neurological mechanisms may unveil additional neuropathological markers that further differentiate the two types of TBI. However, this research confirms an analogous relationship exists between the neuropathology of sport and blast-related TBIs.

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From MMR to COVID-19:
A Study of Vaccination Perception Over Time and the Modern Effects of Social Media
By Anuhya Dayal

March 2020, 2021, and now 2022. It's hard to believe that three years have passed amid a pandemic. This global crisis forced a reevaluation of seemingly simple behaviors like grocery shopping and sneezing in public, once thoughtless actions, and now both processes filled with hesitation and concern. COVID-19, the deadly coronavirus that started as a minor foreign detail in the collective worldview, has now taken it over, dominating every conversation, every decision, every area of daily life. But what is COVID-19? As the name suggests, it is a virus, indicating that it is a composition of genetic material and proteins that is neither alive nor dead. No medication can cure this because it is not bacterial–it is impossible to kill something that is not alive in the first place. Viruses had long proven to be a difficult challenge for humanity, until 1796, when the first vaccine was created for smallpox (Riedel, 2005, pg. 24). Vaccination is the process of introducing the body to weakened or dead viruses to stimulate the immune system to produce antibodies (proteins used to combat pathogens) against the specific virus; as the CDC website explains, vaccination is a method of prevention, not cure. This medicine concept is not easily understandable, creating resistance and opposition to vaccines–a sentiment only furthered by the faux science presented in the widely-known "Vaccines cause Autism" study.

In 1998, Andrew Wakefield published a study in *The Lancet*, a respected English medical Journal, regarding the correlation of the administration of the measles, mumps, and rubella (MMR) vaccine and abnormal cognitive development. Publication of this revolutionary study spurred the anti-vaccination movement and the notion that vaccinations were experimental, unfounded, and dangerous. This study has long since been retracted, and Wakefield's medical degree rescinded. Yet even today, in the areas of the US and UK, parents influenced by this movement are willing to expose their children to the chickenpox virus through infected lollipops to develop

"natural immunity" rather than taking the vaccine–a vaccination that has statistically prevented 3.5 million cases, 9,000 hospitalizations, and 100 deaths every year (Brown, 2020; CDC 2021). But how did this movement gain so much influence? The anti-vax movement, which stemmed from the Wakefield autism study, is fueled by media outlets and conflicts with a scientific understanding of vaccination. This creates a predisposed negative connotation of vaccines through which public perception is skewed.

MMR: The Origin of it All

"In eight children, the onset of behavioural problems had been linked, either by the parents or by the child's physician, with measles, mumps, and rubella vaccination" (Wakefield et al., 1998, para. 15). That is the statement that confused the scientific community and enraged the parental community. This study was a clinical trial, and the results focused on 12 out of 40 children (ages 3-10) observed. Twelve experienced changes in gastrointestinal functionality; 8 were found to have abnormal cognitive development. A 1998 *PR Newswire* article reports that Wakefield and his co-researchers emphasized that "they were not claiming to have proved a cause and effect relationship between MMR vaccine and the children's health problems" but instead were, "calling for more studies to resolve the question" of whether this correlation exists and/or has more evidence behind it (Parent Groups..., 1998, para. 4). Additionally, various scientists, vaccine policymakers, and public health officials jumped to discredit the study. Despite these actions, parents of the Autism Research Institute and Cure Autism Now (CAN) joined with the NVIC (National Vaccine Information Center) to call for "independent studies conducted by non-governmental researchers into the possible link between vaccines and autism using a portion of the one billion dollars appropriated to the Department of Health and Human Services (DHHS) every year to create, buy and promote vaccines" (Parent Groups..., 1998, para. 2). This immediate reaction was reported by media sources, creating an adverse public response to the vaccine.

While the Wakefield study was the genesis of the most notable anti-vax movement, it triggered built-up frustrations and mistrust in the government and medical profession. These hesitations already existed but needed an event as a forum to voice them. A 2007 study analyzed the sources of information that parents generally tended to believe about the MMR vaccine. The study describes how "the consensus among parents was that politicians were untrustworthy in matters of health" (Hilton S., Petticrew M., Hunt K., 2007, g. 5). The study explains how the UK had experienced a poorly-managed outbreak of BSE or bovine spongiform encephalopathy (mad cow

disease) just a few years before the MMR scare. This condition is a brain disorder that results in cerebral deterioration after eating affected dead meat. The government had not handled the crisis effectively; one politician went so far as to encourage the public to continue eating meat by publicizing a video of him feeding his daughter a hamburger (Hilton S., Petticrew M., Hunt K., 2007, pg. 5). Having happened just a few years before the MMR scare, there was a deep-seated mistrust in the government in terms of healthcare.

However, the government was not the only entity parents doubted; many were suspicious of medical professionals as well. Parents were unsure whether doctors were acting out of the patient's best interest, whether they were merely advocating governmental policies, or whether they had personal financial gains in mind (Hilton S., Petticrew M., Hunt K., 2007 pg. 5). This uncertainty about the doctors' motives in encouraging vaccination further increased parental doubt and hesitancy towards it. Ultimately, it was concluded that parents felt "particularly drawn to anecdotal stories involving real people and . . . [found] other parents' stories more convincing than statistics and reassurances from scientists and politicians . . . because they were perceived to have no apparent conflicts of interest" (Hilton S., Petticrew M., Hunt K., 2007, pg. 6). Thus, the effects of the Wakefield study were widespread and powerful. Still, the anti-vaccine sentiment was nothing new to the discussion and has only increased since 1998, despite the acceleration and advancement of modern science. But how?

The Primary Perpetrator: Social Media

While vaccines have been around since 1796, anti-vaccination sentiment has been propelled in the last 20 years largely through social media. The instantaneous communication and lack of fact-checking accuracy in these speedy interactions tend to propagate misinformation or invalid conclusions without scientific evidence quickly. In the 1990s, such information proliferated through newspapers, magazines, radio, television, and word of mouth; today, "social media is a major contributor to vaccine misinformation" (Doustmohammadi, 2020, para.1). Physicians are largely baffled by this movement, as in medicine, vaccination is seen as a requirement, not an option, for community safety and herd immunity. This is shown through the school vaccination requirements, a preventative measure taken for public health. The World Health Organization identified "vaccine hesitancy--the reluctance or refusal to vaccinate despite availability" as one of the top ten global health threats in 2019. Yet, "attention paid by the media to unconventional alternatives to vaccination would seem to encourage the persistence of the vaccine debate" (Brown, 2020, para. 1). The media has

played and continues to play a big role in the anti-vaccination movement, and it is blatantly visible in today's COVID-19 vaccination sentiment.

With COVID-19 determining the activity status of our lives as seen with the dips and spikes in case of numbers over the past three years, the public is impatient, angry, confused and frustrated by the way this virus has affected the world. And yet, while a vaccine should sound like a savior serum, many people are hesitant or outright opposing the vaccine for multiple reasons. A strong connection has been identified "between trust in one's government and trust in a vaccine" (Camero, 2020, para. 4). While it is understood that the COVID-19 vaccine has largely become a politicized issue, "international experts say the current levels of willingness are 'insufficient to meet requirements for community immunity,'" levels that are largely fueled by social media (Camero, 2020, para. 3). A study in April 2020 about the coronavirus misinformation spread through Facebook found alarming claims circling the platform and receiving "hundreds of thousands of views," including claims such as "black people are resistant to coronavirus" and "coronavirus is destroyed by chlorine dioxide" (Tidy, 2020, para. 10). The social media company can take up to 22 days to flag posts with coronavirus misinformation and flag a significantly smaller proportion of posts written in different languages (only 50% of Portuguese content, 32% of Italian content, and 30% of Spanish content are flagged). By the time a misinformation post is flagged or taken down, it has been shared thousands of times, and clones of the post have already been made (Tidy, 2020, paras. 12-15). Facebook, one of the world's largest sources of information and public outreach, cannot aptly monitor the accuracy of its' members' content-- and it is not alone. An article in the *Harvard Gazette* detailed the main contributing factors to the proliferation of misinformation regarding COVID-19, stating that though "Facebook, Twitter, and YouTube have recently ramped up efforts" to restrict and takedown misleading posts, "social media platforms 'fall short' when it comes to curbing the flow" (Pazzanese, 2020, para. 17). Due to the sheer quantity of content to monitor, many social media platforms use artificial intelligence technologies to flag misleading posts instead of human moderators. While this technology is significantly faster, it is not nearly as accurate, leading to ineffective and weak filtering of misinformation spread.

Additionally, many of these platforms are "reluctant to spark a regulatory backlash by policing their platforms too tightly and angering one or both political parties" (Pazzanese, 2020, para. 19). Social media platforms want to maintain their core mission of enabling communication while offending any political party or organization. These barriers contribute to the hesitancy to filter information and the easy spread of false vaccine concerns.

It does not help that today's society, especially the younger generation, has grown to rely more on social media and its key spokespeople for COVID-19 information and news updates. Specifically, with young adult and adolescent populations, figures in music, TV shows, reality, and film industries are idolized, and those with radical views are lifted forward and across wide people by the sheer energy of their viewers. Such "pioneer" celebrities do not have the scientific credentials to propagate any movement of vaccine sentiment, let alone a negative one; yet, the public relies on such famous icons due to the accessibility of their viewpoints via social media and their following. One such public figure, Jenny McCarthy, is currently one of the panelists of the vocal show "Masked Singer" and is a well-known actress, model, and television host. She writes in her book that her son was diagnosed with autism shortly after receiving the MMR vaccine. She explains the therapies she used to help her son, how his symptoms were reversed, and his current growth without any developmental inhibitions (Frontline, 2015, paras. 1-22). While it has not been confirmed by McCarthy herself, the symptoms experienced by her son (seizures, loss of speech) are similar to that of Landau-Kleffner Syndrome. This rare condition is treatable with the correct medication and diet therapy. While it is widely known that there is no "cure" for autism, Kleffner is treatable with the correct medication and diet therapy. The fact that her son's symptoms were resolved with the therapies as mentioned above suggests he may not have had autism at all (Einbinder, 2020, para. 4). Due to her personal history, she has become known as a vocal anti-vaccine advocate. In an interview with PBS, she says, "We firmly believe the cause of the epidemic of autism is due to a vaccine injury and/or other environmental exposures—pesticides also. But what on this earth we all kind of share the most is vaccines" (Frontline, 2015, para. 33). McCarthy speaks with such conviction that viewers who are uneducated or unconvinced on the scientific reasoning behind vaccination are influenced by her confidence and public sway. It is easy to empathize with her situation, as she details a very painful and difficult story about her child. Still, she claims to get her information from "the University of Google" (Frontline, 2015, para. 1-23). Sharing information like this may come from good intentions to prevent what she considers to be the dangerous implementation of vaccines; however, the data is not credible. The lack of data and evidence, scientific or anecdotal, to support the claims made indicates that information like this should be taken with a sizable grain of salt.

Jim Carrey ✓
@JimCarrey

Greed trumps reason again as Gov Brown moves closer to signing vaccine law in Cali. Sorry kids. It's just business. ;^[

2:11 PM · Jun 27, 2015 · Twitter for iPhone

1,038 Retweets   **82** Quote Tweets   **2,034** Likes

Figure 1. A tweet from Jim Carrey regarding vaccine requirement for schoolchildren in California (Jim Carrey, 2015).

Jim Carrey ✓
@JimCarrey

Save our vaccines! Save our kids! Let the truth be known! traceamounts.com tinyurl.com/jkg94qv

👤 Grace Hightower and 2 others

8:18 PM · Apr 13, 2016 · Twitter for iPhone

1,295 Retweets   **77** Quote Tweets   **4,937** Likes

Figure 2. A tweet from Jim Carrey regarding an article that linked the MMR vaccine to a child exhibiting symptoms of autism (Jim Carrey, 2016).

Another vocal figure, well-known actor, comedian, artist, and writer, Jim Carrey, vocally identifies a clear correlation between vaccine administration and the greed of pharmaceutical companies. While it can be assessed that Carrey is very political in his messages, his posts on Twitter have shown direct and confident anti-vax sentiment. For example, he tweeted this in response to a bill in California that would mandate vaccination for school children: "Greed trumps reason again as Gov Brown moves closer to signing

vaccine law in Cali. Sorry kids. It's just business" (JimCarrey, 2015). This statement propagates a clear negative association of vaccines with a greedy, corrupt industry. Keywords such as "greed" and phrases that indicate a solemn resignation towards the situation in the terms "Sorry kids" and "It's just business" actively creates a bias in readers' minds. Such rhetoric brings attention to the situation and attributes a sense of hopeless societal demise to the implementation of vaccines. He also tweeted, "Save our vaccines!" Save our kids! Let the truth be known!" linking an article that talks about a child exhibiting symptoms of autism after receiving the MMR vaccine (Jim Carrey, 2016). First, the conviction with which this is said, despite no scientific background or evidence, convinces the general public to believe such messages. Secondly, the use of the phrase "Let the truth be known!" implies that deception is at play. It causes readers to doubt the information they are receiving and spreads mistrust of any data, valid and invalid alike. It is hard to believe that such well-known figures would purposefully lie to the public, so the public trusts them; however, the keyword here is "lying." Many of these public figures genuinely believe that vaccines are malicious–they have no intention to spread misinformation but instead believe in the anti-vax movement based on speculation.

Figure 3. A tweet from Florida Representative Matt Gaetz regarding the timing of COVID vaccination discovery and the US 2020 presidential election (RepMatt Gaetz, 2020).

That being said, there are people out there merely trying to spread misinformation, to incite panic and confusion. On Twitter, US Representative Matt Gaetz wrote, "There's something a little suspicious about the fact that we have COVID vaccine breakthroughs days AFTER the election" (RepMatt Gaetz, 2020). With such a tweet, a statement without a single piece of evidence, based entirely on speculation, and with the clear intent to create doubt in people's minds, such sentiments provoke a negative outlook on the vaccine. Because this is coming from a Congressman, someone verified by

Twitter, an impartial, third-party service, it is easy to assume that this must be a credible source, but that is the same mistake people keep making. Vocal presence, popularity, and fame do not prove credibility, but they do provide access to resources and a wider platform to propagate their views. Well-liked and well-known people carry an assumed sense of authority and credibility, which holds a persuasive power it shouldn't. The concept of authority lends itself to leadership and validity. Still, this internal tendency must be overcome to actively search for proven information rather than merely going with what is initially presented in the media and circulated by the masses.

How do we fix this problem?

People tend to doubt the things they do not understand and empathize with what they do understand. As we can see through the events highlighted above, the origin and evolution of the anti-vaccine sentiment, people tend to believe sources of mass media and social media rather than scientific or statistical information. After the Wakefield study was published, MMR vaccination rates in the United States dropped in over half of the states and decreased by over 2% in 16 states (CDC, 2018). According to the WHO, there has been a 556% surge in the reported cases of measles and a 50% increase in deaths since 2016 (Kuehn, 2021, pg. 213). Quantitatively, MMR vaccination has declined, and this is leading to new outbreaks in the unvaccinated population. This trend may be due to how the media presents information in simple, quick, and easy ways for the layman to understand. It often connects the reader to another story or person on a more intimate level. Medical jargon and raw numbers are confusing, messy, and difficult to understand for most populations; hence, people tend to mistrust what they do not comprehend. The anti-vaccine movement has plagued the world for longer than it should have–now it is time for society to collectively implement strategies to eliminate these dangerous notions by educating the public and re-instilling faith in the medical professional community.

One of the primary avenues of education that should be pursued is explaining the functionality of vaccines, starting early in school. R.T. Chen, Chief of Vaccine Safety and Development in the CDC in 1998, demonstrated that introducing "science/epidemiological education in grade school and high school as well as in college" will help inform the next generation of the functionality of vaccines, why they work, and the immense beneficial effects societal vaccination has on the community. In addition to this, "empathy, patience, and a careful assessment are all needed to effectively address vaccine concerns from a clinical perspective" (Chen, R. T. & Hibbs, B., 1998, pg. 10). Doctors and medical professionals should focus on establishing trust

and credibility with their patients, and carefully explain the objective benefits and processes of vaccination, distilling "scientific facts and figures down to easily understood concepts" (Chen, R. T. & Hibbs, B., 1998, pg. 10). They should also provide "emotionally compelling first-hand accounts of the effects of vaccine-preventable diseases" to show the importance of these preventative measures. "Clarifying the distinction between theory, fact, and perceived and real risk for the concerned public is critical;" this study analyzing the current and future challenges of vaccine safety published a mere few months after the Wakefield study accurately predicted the problems and provided the solutions we need today (Chen, R. T. & Hibbs, B., 1998, pg. 10).

Conclusion

Having looked at the facts and figures, articles from then and now, ultimately, this paper concludes with a mission statement for the future. The Wakefield study was the tipping point of an iceberg of mistrust in vaccines, propagated by poor governmental handling of healthcare issues and the conflict of interests among medical professionals. Avenues of media communication helped spread misinformation and panic regarding the side effects of the MMR vaccine, a parallel we see in today's society and the distribution of COVID-19 misinformation. Vaccine hesitancy is a life-or-death issue of public health, worthy of attention, resources, and rectification–in the form of education. Society tends to overlook what they do not understand and connect with personal stories. There is a clear emphasis on pathos and empathy in primary human communication and the reason why social media is inadvertently more powerful than credible scientific journals. Educating the public about why vaccines are effective and the grave nature of the diseases they protect against will help give the vaccines greater importance and ideally eliminate the anti-vaccination movement.

Scientific advancement can be scary; there is no doubt. But, on the other hand, every new study could be revolutionary, for better or worse. Wakefield was revolutionary. Let's hope the COVID-19 vaccines prove to be extreme, too, for the better. As society awaits the booster shot and the medical community continues to support its efficacy, maybe there is hope to go back to a society where pandemics are obsolete, where people can justifiably trust the vaccine information they receive from medical professionals, where families can go to school, parks, and the grocery store without the fear of an unseen virus.

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Exploration of the Referral Process of Social Work Within a Policing Structure
By Karah Chappel

Much of the day-to-day work of police officers resembles social work (Muir, 1979), however, police officers are rarely trained for the skills needed by professional social workers. In fact, much of the current discussion surrounding defunding the police after the murders of George Floyd and Breonna Taylor has highlighted this problem, challenging governments to move tasks from police to professionally trained and licensed social workers. While the public debate surrounding the role of police continues, the designated police department in this study (PD) initiated a program to embed social workers within their organization. However, little is known about the role of the social workers within the designated PD, how they are perceived and utilized by officers, and how exactly they receive and make referrals.

Music therapy is a growing field, expanding into many different populations. There is research to support music therapy achieving goals that may be common to victims of violent crimes such as managing pain, building resilience, or mitigating symptoms of Post-traumatic Stress Disorder (PTSD) (Mondanaro et al., 2020; Stewart, 2019).

This study will bridge the gap between the needs of the service persons of social workers and resources provided by music therapists. By elucidating the existing phenomena surrounding social service referral processes and possible barriers to music therapy, this study will provide recommendations for music therapists to better service social work populations.

History of Social Work Within Policing

Police throughout the United State's history have often taken on social worker's role. One publication created at Harvard University listed a police function as "social services" in the nineteenth century (Kelling & Moore, 1988).

Beyond doing the work themselves, police departments have a history of referring to additional services for needs related to issues such as public intoxication, mental illness, or family crisis. A Department of Justice study (Scott & Moore, 1981) collected data on which organizations police officers

referred to the most, the kinds of funding and services those groups entailed, as well as what influenced the referral process. Overall, 7.2% of the police-citizen encounters studied included at least one referral. While 16% of citizens who interacted with the police surveyed said police referred them to another service such as a nonprofit or other government agency, only one-third of those were directly aided by police in contacting the agency (Scott & Moore, 1981). This suggests a positive correlation between direct police assistance and actual citizen services obtained. Scott and Moore (1981) also examined officers' attitudes toward referral by rank. The data showed a juxtaposition between officer attitudes, their knowledge of helping agencies, and actions about the referrals.

Police most often refer to agencies who service the following areas: public intoxication, mental illness, drug abuse, juvenile problems, family crisis, runaways, victim assistance, problems of the elderly, and problems of the indigent (Scott & Moore, 1981).

Social Workers in Conjunction with Police Officers

Several police departments in the US are known to employ social workers. For example, states such as Missouri, Kentucky, Oregon, Texas, Illinois, and Wisconsin all employ social workers (James-Townes, 2020; Patterson, 2008; Smith, 2020; Wood, 2020). The social workers provided non-law enforcement aid to citizens in need. This aid included referring to outside services, providing follow-up support for individuals with "long-term" needs that police officers cannot address, dealing with mental health concerns, handling crisis response, and aiding for issues such as domestic violence, elder abuse, and mental health.

While there is no research specifically about social service interactions within the chosen PD, studies surrounding dynamics of social service and police relationships have been conducted in other places. Cooper, Anaf, and Bowden (2008) focused on interactions between social workers and police officers, specifically concerning bikie (motorcycle) gang violence, and helping women escape abuse from the gangs in Australia. The results demonstrated that officers focused on the evidentiary and legal benefits the women may provide in police investigations, whereas social workers emphasized keeping the women safe from retaliation and the women's holistic needs. These differences can be tied back to the histories of the two groups. Police in Australia are governed by a hierarchical, patriarchal structure similar to the military and are seen as an arm of the state that maintains order through the use of force. Social workers in Australia see their work through a lens of social

justice, human rights, and how cooperation can achieve human wellbeing. The obvious divide in ideology led to a breakdown in communication and a lack of trust between the two branches during work around bikie gangs (Cooper, Anaf, & Bowden, 2008). Parallels in basis can be drawn to the US counterparts of these two groups.

Patterson (2004) looked at the efficacy of social workers in conjunction with police Crisis Intervention Teams (CIT) in the US and found that social workers needed to be aware of the paramilitary organization of police departments and its associated culture. The study also noted that social workers were perceived to be beneficial to police, but only when police officers are satisfied with social workers' contributions (Patterson, 2004). It should also be noted that some social workers oppose integration with police departments because of differences in philosophical approaches and past police traumas (James-Townes, 2020). Though they raised several barriers including education, appropriate training/supervision, and position of social workers within department divisions, Patterson (2008) believed in the efficacy of social workers in policing.

Music Therapy

Music therapy is defined by the American Music Therapy Association (AMTA) as the clinical and evidence-based use of music interventions to accomplish individualized goals within a therapeutic relationship by a credentialed professional who has completed an approved music therapy program. These goals could include physical rehabilitation, recovery from brain injuries, emotional support, pain reduction, and other quality of life-related needs (AMTA, 2021). Many of these goals overlap with the goals of service persons seen by social workers, as noted in earlier studies (Scott & Moore, 1981).

Music therapists have also long worked in forensic settings. The study by Hakvoort et al. (2015) found that offenders who received music therapy anger management programming showed greater change in increased positive coping skills (post-test control: M=1.77 and treatment: M=2.13) and decreased the use of avoidance, a negative coping skill, (post-test control: M=1.94 and treatment: M=1.52), than the control group. While this work focused on offenders, there are reasonable transfers to victims as well.

Existing research supports the feasibility of music therapy treatment with individuals with trauma or PTSD, and survivors of sexual assault, again overlapping with needs of individuals seen by social workers (Scott & Moore, 1981). Stewart (2019) exemplifies the use of somatic, or sense-based, music therapy treatment to overcome PTSD symptoms. Hakvoort et al.

(2020) studied the efficacy of music therapy to regulate arousal and attention in patients with Substance Use Disorder and PTSD, and found that music therapy treatment significantly decreased symptoms of PTSD experienced by the participants overall. Strehlow (2019) outlines the use of music therapy with children survivors of sexual abuse, noting the use of music to respond to areas linked to the child's ability to form healthy attachments.

Resiliency is a characteristic involving one's ability to respond positively during times of stress, a characteristic necessary for victims of crimes and other persons seen by social workers. Mondanaro et al. (2020) found that music therapy notably increased resilience in patients as measured by on the Wagnild Resilience Scale (change at posttest: control = -3.16, treatment = 4.09), decreasing pain levels and increasing comfort in the short-term as well as moderating perceived stress levels.

The purpose of this phenomenological study was to illuminate the experiences of the social workers to recommend steps for music therapists to better serve service persons seen by the social workers. With this knowledge, music therapists will be better positioned to serve populations encountered by social workers embedded in police departments.

Method

Theoretical Framework

Seeing as this study aims to build a better holistic, descriptive, and narrative understanding of social workers directly employed by the designated PD, a qualitative approach was appropriate (Astalin, 2013). More specifically, a phenomenological study design was used. Phenomenological designs clarify and explain gaps in understanding (Astalin, 2013). As there is no standing research about the social workers employed by the chosen agency, this study explores many facets of the role, including coworker perceptions, social worker roles, and regulations through the lens of the social workers themselves. Phenomenological studies are particularly relevant for phenomena that are dependent upon an individual's attitudes and perceptions, and for setting aside researcher assumptions about the situation being studied (Lester, 1999). Social workers, as they exist now, being a recent development for policing and the difference between social work and police cultures being large, no assumptions can be made about work environment or responsibilities.

Sampling and Recruitment

This study was conducted using purposive sampling. Because of the

small number of possible subjects in certain interview categories and the desire to maximize the range of experiences by subjects with social work, purposive sampling provided the best option to choose subjects. In this study, subjects were recommended by contacts within the PD, beginning with the social workers. Several social workers were able to recommend additional subjects after their interviews were completed to avoid bias in their responses. Aside from being recommended to the study based on contact knowledge of the requirements, subjects were then confirmed to fit the following requirements: Subjects had to be at least 18 years of age, directly employed by the chosen PD, and meet one of the following operational definitions of subject types.

Officer	District officer working on the ground who makes referrals to a social worker on a regular or frequent basis
Social Worker	Employee of the chosen police department to do non-law enforcement social work
Supervisor	Division command staff for a unit containing a social worker wherein the social worker directly reports to the division command staff or other administrative personnel with substantial knowledge of the social workers

Table 1 (One other term is important to note: the term "service person" will be used to refer to individuals who received non-law enforcement aid or resources from social workers.)

Participants

A total of nine participants were interviewed for this study. The participant pool was composed of males and females. All the social workers held a minimum education of a bachelor's degree, with some of participants also holding master's degrees in criminal justice or social work, including social work licenses in two states. All social workers had experience in a social work-related field before being hired at the specified PD. Social workers had been employed by the designated agency for a range of 6 months to 3 years,

with a mean of 2.2 years. All supervisors and some officers held bachelor's degrees. Sworn personnel had been employed by the agency for a range of 6 to 22 years, with a mean of 15.75 years. All identifying information has been stripped from participant responses to keep participants anonymous.

Procedures

Semi-structured interviews allowed for exploration of each participant's lived experiences within their work. The researcher created an interview script for each of the three subject types that provided consistency across all the interviews; it also left room for additional questions depending on subjects' responses. Questions discussed educational and work background and common workplace interactions. Most questions centered around referrals to social workers, including frequency, service person goals and outcomes, and process, as well as referrals from social workers to other organizations including frequency, organization characteristics, process, and limitations. Subjects then were asked about perceptions of social services and the viability of music therapy as a possible referral placement. The conclusion of the interviews included open questions for subjects to offer any additional information or insights into the program.

All written materials, as well as consent procedures used in the study, were approved by the Institutional Review Board at the researcher's university. Once participants read and agreed to the informed consent procedures, a mutually agreeable interview time was set up. Due to issues surrounding the COVID-19 pandemic that began in 2020, some interviews were conducted over Zoom while others were conducted in person. Each interview was captured on audio recording. Before the start of recording, the researcher verbally reviewed and confirmed participant agreement to the informed consent document. Each interview lasted 20-45 minutes in length. At the end of each interview, the researcher thanked the subject for their participation and notified them that they could contact the researcher with any additional information or if they needed to withdraw any statements.

Data Analysis

Each interview was recorded and transcribed. The researcher then read each transcript several times to obtain a general sense of the individual's attitudes and experiences and noted specific sentences that directly related to the phenomena being studied, following Lester's (1999) recommendation. These sentences were then distilled down to a short quoted or paraphrased statement that captured the essence being expressed. These points were

each written on a "post-it'" note and organized by subject type; repetitions or marked differences between answers were noted. As exemplified by Ghetti (2011), no singular shared experience was forced upon participant answers; rather, an attempt was made to compare unique experiences and elucidate commonalities or notable deviations between them. At this stage, data points were again aggregated, this time to reflect themes more broadly across all study subjects. Once these themes were noted and summarized, transcripts were re-read for any additional relevant points.

The reasons for referral to and from social workers were coded as to how they fit within the structure of Maslow's Hierarchy of Needs. Maslow defines five levels of needs for human fulfillment. At the base of the pyramid, the most basic needs are "Physiological." These include food, water, shelter, air, and warmth. Next is "Safety," examples of which are safety, steady job, insurance. "Social Needs" is composed of belonging, love, and family, followed by "Esteem Needs," such as self-worth and accomplishment. Finally, the top of the pyramid is "Self-actualizing Needs" which are defined as self-aware personal growth (Aanstoos, 2019). The methods of participant selection allowed for deep descriptions of experiences related to social workers within the PD, which was valued over the ability to generalize from sample to population that random sampling would have allowed.

Researcher Bias

As the individual who selected this area of interest, it could be argued that the researcher would inherently be biased in the analysis of findings. The researcher approached this study as a student music therapist with a belief that music therapy can serve the needs of service persons seen by the social workers and with a special interest in individuals affected by crime and trauma. The researcher's beliefs directly impacted interview scripts and most likely impacted interview conduction and data analysis as well. In addition, many of the interview questions were qualitative in nature, gathering personal perceptions of the participants as seen through their lived experiences. This again opens data to the possibility of bias. Recognizing the inherent potential for bias in any ethnographic or qualitative endeavor is an important step to minimizing the negative effects of bias. Conscious of this fact, the researcher made efforts to minimize these risks and promote objectivity when collecting, analyzing, and interpreting data.

Results

Social Workers

While the reporting structure of the social workers was not specifically included in the purpose of this study, its unorthodox approach seems to have rippling effects into the culture and interactions surrounding the social workers, and thus should be briefly mentioned. As civilian members of the PD, social workers do not follow the same chain of command outlined by and for sworn officers. Each of the social workers housed within a specific patrol division delineated three supervisors. First, they report to the division's Operations Sergeant for day-to-day needs and liaison to other administrative staff, their Division Commander for formal needs and occasional additional referrals, and a Human Resources Division Commander who had been working closely with the social work program since its inception. There was some confusion across the board as to which supervisor would be completing the social workers' end-of-year evaluations.

The social worker role required taking and completing referrals from officers for the "lost population of people that we couldn't help out," as one supervisor stated. The role also includes riding along with officers on patrol, following up with on-going referrals, and building relationships with and discovering new resources. Social workers said that their day "varies a lot" and "is never the same," and that "anything can happen." First, most social workers split their weekly hours between day and night shifts. They also mentioned that holding different hours allows them to interact and build relationships with more officers, a theme that returns throughout the data. Social workers are currently working a full time schedule, which includes a 40-hour work week, paid overtime, health benefits, sick time, and paid time off.

Social workers listed many daily tasks. These included attending roll call, responding to email, riding along with officers on patrol, following up with service persons via phone or in-person meeting, initiating new service person contacts upon receiving referrals, and being called out to the field for referrals. Social workers also listed many members of the PD as having had regular interactions. These members included patrol officers, detectives, division command staff, headquarters administrative staff, and special unit officers. From the perspective of officers interviewed, both supervisors and referring officers, interactions with the social workers occur "almost daily" across the board.

There are no formal rules regarding referrals to social workers. One social worker said simply that it "must be a sworn officer," meaning a uniformed member of the PD, not a civilian. Across all interviewees, the

following referral methods were listed: phone call, text message, email, ride along, called out over radio, face-to-face directly from the division commander, and note left on desk. Several social workers stated that an official referral system is currently being created and will be online soon. Social workers receive referrals from several personnel, including patrol officers, detectives, special unit officers, division commanders, and civilians walking in the lobby.

The process of an officer to decide to refer to a social worker can be distilled to one phrase— "officer discretion." The remaining interviewees stated that it "depends on the situation" and "if the officer knows the severity of it." All the officers and supervisors interviewed stated directly that they had not received training to work with the social workers. Several interviewees confirmed that training on interacting with and utilizing social workers will occur at the 2021 in-service training. The content of this training is unknown. One supervisor mentioned that they "wouldn't be surprised" if utilizing social workers was included in training for new officers at the academy, but this is unconfirmed.

Reasons for referral to a social worker span a wide range. The reasons were categorized by Maslow's Hierarchy of Needs. See Figure 1.

Figure 1. (Adapted from Aanstoos, 2019)

The frequency of referrals to social workers also encompasses a large range. Social workers described receiving anywhere from five to thirty new referrals per week. Several interviewees also noted that social workers work with different types of referrals. One officer described going to the social worker with "small inquiries almost daily" while they only reached out to the

social worker with large referrals three to four times per month. One social worker also stated that they continue to work on long-term referrals for weeks or even months after the initial referral is received. The frequency of multiple service person contacts within one referral varies.

Referrals to Resources Outside of the Police Department

Social workers refer to resources outside of the agency "almost every time" they receive a referral. It should first be noted that the social workers as a department within the PD do not receive funding to provide to service persons. Social workers stated that service persons had "long-term" needs that other organizations could handle. All interviewees confirmed that the PD has no standards for social workers to follow when referring to resources outside of the PD.

Social workers listed many reasons for referring to organizations outside of the PD. This set of reasons has again been categorized using Maslow's Hierarchy of Needs. See Figure 2.

Figure 2. (Adapted from Aanstoos, 2019)

Social workers described the location as being a "huge" consideration. Factors for its importance first include the service area of any given organization. Most social workers noted the consideration of service person transportation, especially in regard to bus routes.

As far as costs, social workers described this consideration as "one of the biggest things that keeps individuals from services." Many referrals include going to organizations specifically for funding requests, such as when a service person needs assistance paying bills. Some services are offered on

a sliding scale or are covered by insurance. In other cases, service persons pay out-of-pocket. It should also be noted that officers and social workers personally paid out-of-pocket when resources were not available for service persons.

Resources Outside of the Police Department

The types of organizations mentioned most were victim services and community resource centers. Organization types that were mentioned by, both social workers and sworn officers were sexual assault services, community resource centers, and medical facilities. Most outside organizations referred to are nonprofits. Social workers expressed no partiality towards any type or size of organizations.

Attitudes and Perceptions

Officers stated, in regard to relationships with social workers, that "it's a must" and that "it makes our job easier." They also noted that they needed to first collaborate with the social worker before believing in their importance. A social worker echoed this stating, "it takes a while to find our place." When asked about colleagues, interviewees portrayed an overall positive response. Almost all social workers agreed that they "love [social workers] once they use us." One social worker noted that officers who were older and who had been employed by the agency longer were less likely to refer to the social workers.

Violent Crime

The most typical instances of violent crime social workers get involved with include homicide, assault, robbery, domestic violence, rape, and abuse. The frequency of referral varied from "very rarely" to "70%" of all referrals received by a social worker.

When asked about which organizations they refer out to for violent crime related needs, social workers listed the following types of organizations: children's services, sexual assault and domestic violence services, victim services, medical facilities, and victim advocacy. Across all supervisors and police officers in this study, there was awareness of a sexual assault service, a victim service, a community resource center, and a medical facility. One social worker described, "a lot of the time [when] we get in there for violent crime-related, what we're working with isn't necessarily the violent crime." The social worker said they are usually working with other issues besides violent crime, so they use "pretty much all of the normal partners."

Music Therapy

All supervisors and referring officers answered "no" to being familiar with music therapy and having interacted with a board-certified music therapist in a professional capacity. Almost all the social workers were familiar with music therapy, and several of them had interacted with a board-certified music therapist, though not through PD work. All interviewees had positive responses to the viability of music therapy with service persons.

Cost was the most frequently named obstacle to music therapy services. Other interviewees cited the location of the services, availability of music therapy, and stigma around going to therapy.
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Discussion
Reasons for Referral

Referring to Figure 1, there is much to be observed about the reasons for referral to social workers. The areas suggested by non-social workers only appear in the bottom three tiers of the pyramid. These areas are often immediate needs that present physical signs. While mental health and therapy are listed in this figure, those areas were mentioned by social workers—more long-term problems, often not evident visually. The comparison of the two reason groups shows a philosophical difference between police officers and social workers: police officers look to solve immediate needs, while social workers look for long term needs that are often root causes of immediate ones. As Figure 2 shows, there is a wide span of needs, but there are fewer items listed, again showing the social workers' overarching view of needs.

Necessary Program Elements

One of the most salient themes is social workers interacting "alongside our officers, not instead of," one social worker described. While most aid provided to service persons is facilitated by the social workers, the officers are the initial point of contact, without whom the program could not continue. The relationship between officers and social workers needed to maintain and grow the program is built on mutual respect, understanding, and a desire to help.

Respect

Officer respect for social workers is influenced by social workers' inclusion, or lack thereof, in the report structure of the PD. Social workers

are differentiated as outside of this system by the fact that they are not sworn officers. Beyond that, even though the social workers are full-time, they are not included in the direct lines of report that the sworn officers follow. Confusion about the report structure leads to differences in how supervision roles are viewed and enforced, opening the door for miscommunication. One supervisor also mentioned purposefully enforcing the separation of officers and social workers, saying of the social worker, "we try to distance [them] a little bit from the PD while remaining a PD employee." They described the social worker wearing casual street clothes rather than a uniform as evidence of the "distance." Tying into data from earlier in the study suggesting that officers utilize visual cues to determine reasons of referral, it follows that officers would respond to the visual reminder of separation between themselves and the social workers when social workers do not wear uniforms. The supervisor justified the difference as a way for civilians to feel more comfortable interacting with the social worker. Both the unintentional and purposeful separation of social workers from sworn officers has positive effects on community interactions and connectivity, but negative effects on intra-PD relationships.

Another widely mentioned theme is that "cops are bad at change." The amount of time social workers spent in a patrol bureau was directly related to officers' willingness to work with them. The social worker interviewed who had been with the PD the longest approached the interview much like interviews with sworn officers and received violent crime referrals every day. Another social worker who had only been at their patrol division for a short amount of time interviewed showing much more emotion than the contrasting social worker. The second social worker received almost no violent crime referrals, rather searching out their own through a city-wide PD report system. This shows social worker time spent at the agency and assimilation to PD culture correlate to the number of violent crime referrals.

Understanding

Lack of officer training manifested in a lack of understanding about social workers' role and abilities. It also led to inconsistency in types and numbers of referrals. There were no specific factors listed that impacted officer discretion or whether these factors vary between officers. More detailed training could improve quality and consistency of referral.

Training could include overviews of a service person's successful outcome to provide officers with a bigger picture. This would help bridge the gap between the police officers' short- term approach and the social workers' long-term approach. When asked about successful service person outcomes,

social workers listed that the service person could "progress"; beyond service person-specific outcomes, social workers described aiming to "rebuild trust in law enforcement." One social worker described "holistically wanting to help people." This mindset taught to police officers, including education on invisible needs like mental health, could increase the number of referrals to social workers.

Desire to Help

The third important factor of officers being the first line of referral is "if it's working, it's working with us and we're working together," as one officer stated. Collaboration must be rooted not only in mutual respect between officers and social workers, but also a genuine desire to help people. Almost all interviewees directly stated that officers also "want to help people." Almost all social workers and half of the officers stated that officers are "also great about coming back," meaning that after making a referral they will check in with the social worker to see how the referral turned out and how the service person is doing. A few social workers also described taking the referring officer with them to follow-up visits, not only so service persons "can see that [the officer] cared enough to follow up and bring [the social worker] into the situation," but also because the officer has "made that initiation to start helping somebody . . . and they want to carry it out."stated. Collaboration must be rooted not only in mutual respect between officers and social workers, but also a genuine desire to help people. Almost all interviewees directly stated that officers also "want to help people." Almost all social workers and half of the officers stated that officers are "also great about coming back," meaning that after making a referral they will check in with the social worker to see how the referral turned out and how the service person is doing. A few social workers also described taking the referring officer with them to follow-up visits, not only so service persons "can see that [the officer] cared enough to follow up and bring [the social worker] into the situation," but also because the officer has "made that initiation to start helping somebody . . . and they want to carry it out."

Barriers to Music Therapy

Cost

About half of the interviewees listed cost as a barrier to music therapy services. When a service person is low income, paying for additional services beyond basic needs can be difficult. One social worker suggested that service persons could not afford music therapy unless the therapist was doing "pro

bono work out of the goodness of their heart" or if "they were affiliated with a nonprofit who covered . . . their price." To this end, the other services provided to service persons of social workers are sourced through nonprofit organizations that either entirely cover or mostly cover the cost of services. This implies that the best way to introduce a new service such as music therapy would be through the same channels already in existence: provisions by nonprofits and existing agencies.

Availability

About half of the interviewees also mentioned availability of music therapy services as a limitation to use. Two social workers knew of music therapy services at two local hospitals. One social worker suggested that it would be beneficial for there to be "more" music therapy services, split between non-profits organizations and private practice. There are two possible reasons for the current lack of availability: there may not be music therapists in the community serving these populations; if the services are in the community, more advocacy may be needed to increase awareness.

Stigma

Stigma surrounding therapy was also mentioned as a barrier to music therapy referral by about half of the interviewees. Several social workers made comments about service persons having "reservations" about "therapy and different kinds of therapy." One social worker mentioned service persons having aversions to talk therapy because "it has a bad rap, or it hasn't worked for them in the past." As noted above, additional advocacy about music therapy services, and mental health in general, could be a solution. One social worker mentioned that many of their service persons are prescribed psychotropic drugs to treat mental illness through a medical facility, so advocating for increased emphasis on therapy in conjunction with medication could help reduce stigma.

Location

While only one interviewee mentioned location when specifically asked about barriers to music therapy, the large emphasis placed on location in all other areas of referral imply it is equally important for this service. A supervisor noted that ease of transportation for service persons to arrive at the service or the mobility of the music therapists to visit service persons would contribute to referral numbers. A possible solution could be if a music therapist is comfortable doing in-home visits with service persons. While this would add ease from the service person's perspective, it would

have implications for the music therapist including travel cost, limitations of equipment, and range considered reasonable for delivery of services. Another solution would be for the music therapists to be housed in a permanent location in multiple communities to provide close options for service person access.

Recommendation for Music Therapists

It is unclear how many music therapists are positioned to work with these populations. This may be because of a lack of awareness from providers such as service-based nonprofits, so increasing advocacy specifically to nonprofits could increase availability of music therapy. This may take the form of a private practice reaching out to contract with an existing provider, or it may be an individual music therapist proposing the creation of a music therapy therapy. This may take the form of a private practice reaching out to contract with an existing provider, or it may be an individual music therapist proposing the creation of a music therapy program within an existing service agency.

Based on existing research, it appears not many music therapists serve individuals affected by violent crime. Trauma care in music therapy education is often treated as an advanced-level practice and is not a specific focus of undergraduate music therapy education. Music therapists are encouraged to use their clinical experience to extrapolate from similar research available.

Conclusion

"Looking at last week, we had two people killed . . . We had three people shot. We had one rape that occurred, and that was about an average week." This statement from a supervisor interviewed underscores the intense need for additional services for victims of violent crimes. The profession of music therapy can help meet this demand. Officers and social workers need to have mutual respect, understanding, and a desire to help for the program to continue to grow and be successful. More consistent and in-depth training for officers on goals for referral and continued integration of social workers into the PD will increase the regularity of referrals for violent crime-related needs. In addition, barriers to music therapy such as cost, availability, stigma, and location should be addressed. Increased advocacy targeted at community members, non-profit organizations, and social workers by music therapists could begin to bridge the gap.

As the social worker program continues to grow, additional investigation should be done into emerging procedures, officer training, and quantitative data associated with tracking outcomes from referrals. From

the music therapy side, the profession would benefit from investigating music therapist's perspectives on working with this population. A third area involving non-profit awareness of music therapy should also be expanded upon.

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Associations of Environmental Factors and Physical Activity Behaviors: A Photo Analysis
By Denise Dean

Abstract

Physical inactivity continues to be a serious problem in the United States. The built environment is instrumental in encouraging healthy behaviors. Unfortunately, underserved communities are faced with inequities in their built environment. The injustices present are poor conditions of sidewalks, unfavorable land use, and other factors that hinder physical activity. Therefore, the purpose of this study is to examine specific built environment characteristics within marginalized communities of Kansas City, Missouri, to determine whether these barriers significantly contribute to physical activity behavior.

Methods

A content analysis of 477 photographs assessed the environmental factors and physical activity behaviors of 10 census tracts randomly chosen in marginalized areas. Undergraduate students collected photographs during the Spring 2019 and Fall 2019 semesters. In addition, faculty developed a coding guide, and undergraduate researchers coded data in NVivo (version 12.4) to identify themes.

Results

Walking was depicted in 72.1% of photographs and was positively related to lighting ($r=0.13$, $p<0.01$) and shade ($r=0.12$, $p<0.01$) and negatively related to lack of eyes on the street (e.g., absence of people, no houses or storefronts), ($r=-0.11$, $p<0.05$). Biking was depicted in 11.5% of photographs and was positively related to bike lanes ($r=0.16$, $p<0.05$), bike lane connectedness ($r=0.14$, $p<0.01$), and marked crosswalk ($r=0.14$, $p<0.01$).

Discussion

There appears to be a clear association between the built environment and physical activity behavior. In areas with bike lanes, shade, and lighting,

individuals were seen to be more active in the community. This study may help to explain why individuals in marginalized areas live, on average, 16 years less than those in more affluent areas of Kansas City, Missouri. Therefore, public health practitioners should focus on improving the built environment in Kansas City, particularly in areas with a lack of eyes on the street, to improve physical activity and overall life expectancy for marginalized communities.

In Missouri, 73.2% of adults reported engaging in any physical activity last month (Centers for Disease Control and Prevention [CDC], 2020). Furthermore, 53.3% of the total US adult population meet the physical activity guidelines of 150-300 minutes of moderate-intensity aerobic physical activity per week, with 23.2% meeting the physical activity guidelines for both aerobic and muscle-strengthening physical activity (CDC, 2020). Several authors have highlighted the need to improve physical activity as a mechanism of improving overall health (Haskell et al., 2009; Hills et al., 2015; Tuso, 2015).

Consequently, nearly 71.6% of the US adult population aged 20 and over are overweight or obese (CDC, 2020). According to recent data collected by the Missouri Department of Health and Senior Services, two out of every three adults in Missouri are overweight or obese. Overweight is defined as having a body mass index (BMI [index of weight-for-height]) range of 25.0-30.0, and obese is defined as a BMI that exceeds 30. Adults of marginalized and minority communities are more likely to suffer from being overweight or obese. For example, non-Hispanic Blacks had the highest age-adjusted prevalence rate of obesity at 49.6%, followed by Hispanics at 44.8% (CDC, 2018). Adults suffering from obesity are likely to experience a lower quality of life in comparison to their counterparts, as well as an increased risk of developing Type 2 diabetes, cardiovascular disease (e.g., heart disease and stroke), hypertension, and obesity-related cancers (Dixon, 2010; Ortega et al., 2016).

Fortunately, engaging in physical activity is shown to significantly reduce the prevalence of overweight and obese individuals (World Health Organization [WHO], 2020). In addition, research findings suggest that regular physical activity is associated with decreasing an adult's risk of all-cause mortality, hypertension, type 2 diabetes, dementia (including Alzheimer's disease), and some cancers (i.e., breast and colon) (Ahlskog et al., 2011; Lauby-Secretan, 2016). Despite this evidence, physical inactivity remains a nationwide concern, and Missouri is no exception. Physically inactive individuals have up to a 30% increased risk of death compared to physically active individuals (WHO, 2020). Federal organizations such as the CDC and the WHO highlight the need to improve physical activity levels for adults.

The built environment is one factor that influences individual and population-level health (Pinter-Wollman, 2018). The built environment includes all components of life, work, and play (CDC, 2011). The built environment (e.g., sidewalks) plays an essential role in supporting healthy behaviors, particularly physical activity. According to the National Complete Streets Coalition, everyone, regardless of age, race, income, or location, should have safe and comfortable access to community destinations, whether driving, biking, walking, or taking public transportation (Smart Growth America, 2018). However, current sidewalks, land use, and lack of bike lanes in Kansas City, Missouri (KCMO) are not equitable for all citizens. Furthermore, individuals in low-income, marginalized communities of KCMO live in deleterious environments and suffer from higher rates of poor health and lower life expectancy. For example, a 16-year difference in life expectancy exists between these communities and adjacent communities (Kansas City Health Department, 2019).

Historically, reaching and engaging minority and underserved individuals has been a challenge for most city governments. As a result, there is also limited input from these communities in the development of city infrastructure. To address this challenge, equitable engagement can be achieved by utilizing the social-ecological framework model and citizen science methodology. The social-ecological framework is based on evidence that there is a complex interaction between factors at different levels of influence (individual, interpersonal, community, and societal). Citizen science methodology is a new and emerging science conducted with community members in collaboration with professionals from the field. Thus, researchers and community leaders can gain an in-depth understanding of which environmental characteristics influence physical activity behavior among KCMO citizens residing in underserved communities.

This study highlights behaviors of individuals who have been underrepresented in the past and suffer from harmful environmental conditions. This study aims to conclude a relationship consistent with existing literature regarding physical activity behaviors and unfavorable environmental factors such as vandalism, poorly maintained property, and excessive litter. We predict supportive environments that include maintained sidewalks, bike lanes, and lighting will encourage physical activity.

Materials and Methods

Data Collection and Sample

During Spring 2019 and Fall 2019, undergraduate students enrolled in

Public Health Principles, a EUReKa course (Experiences in Undergraduate Research), participated in a community engagement project within two of the six city council districts KCMO. EUReka courses offer undergraduate students the opportunity to explore areas of interest while building a relationship with faculty. In Microsoft Excel, census tracts were randomly chosen from the Council Districts 3 and 5, districts with the lowest life expectancies in KCMO (Fig.1) (Kansas City Health Department, 2019). Students were assigned into one of ten student groups, where each group was randomly assigned to assess one census tract, and each group was provided a map of their assigned census tract. Before taking photographs of people in the community, students were required to obtain Collaborative Institutional Training Initiative (CITI Program) certifications. Significant efforts were put in place to ensure the data collected was representative of diverse groups within KCMO. Students were required to take at least twenty-five photographs of individuals and their surrounding environment in their assigned census tract. The University approved all study procedures of the Missouri-Kansas City Institutional Review Board.

Measures
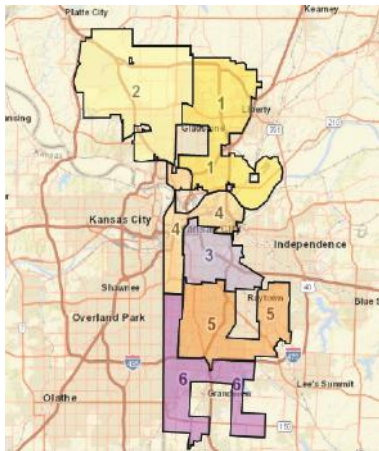
Figure 1. Kansas City, Missouri City Council Districts (https://www.kcmo.gov/city-hall/kcmo-council-districts-map)

Physical Activity

Five activity behaviors were assessed by indicating yes or no, including 1) sitting (e.g., in a seated position/bottom half resting while the top half is

in upright position), 2) standing (e.g., posture or maintaining an upright position), 3) walking (e.g., lifting and setting down each foot in turn, never having both feet off the ground at once), 4) biking (e.g., seated on a bike, feet positioned on pedals), or 5) driving (e.g., control or operation of motor vehicle, also passenger). In addition, students were asked to describe community member's behavior through photographs and written text for all subjects.

Environmental Factors

A total of 28 environmental factors were assessed and determined as including or lacking the factor of interest (yes/no); one environmental characteristic, bike lane connectedness, was assessed and determined as including, lacking, or unsure (yes/no/unsure). Sidewalks, public transportation, and bike lanes were further evaluated by using sub-criteria. Each sidewalk was assessed for having curb cuts, being usable, in good condition, and connected (continuity of sidewalk). The bike lane was assessed for signage, being marked, usable, in good condition, and connected (continuity of bike lane). Each photograph with public transportation was also assessed for having signage, benches, and covered benches. Other environmental factors assessed were marked crosswalk, crosswalk signal, stoplight, shade, lighting, trees or greenery, landscaped, poor lighting (low or no lighting on surrounding neighborhood streets), graffiti (markings or paintings that reduce the visual quality of the area), vandalism (damaged signs, vehicles, etc.), excessive litter (noticeable amounts of trash, broken glass, etc.), vacant or unfavorable buildings (abandoned houses, liquor store), poorly maintained property (overgrown grass, broken windows), lack of eyes on the street (absence of people, no houses or storefronts). Figure 2 illustrates an example of the physical activity behavior of biking. The photograph also depicts ten environmental variables: sidewalk, usability, good condition, curb cut, connectedness, trees or greenery, lighting, public transportation, and signage.

Figure 2. illustrates the physical activity behavior of walking and one additional environmental variable: trees or greenery. (Photo by students in Dr. Joseph Lightner's Public Health 158 classes Spring 2019 and Fall 2019 at UMKC)

Figure 3. (Photo by students in Dr. Joseph Lightner's Public Health Public Health 158 classes Spring 2019 and Fall 2019 at UMKC)

Data Analysis

Students submitted data through text messages. Photographs were imported into QSR International NVivo 12.14 qualitative data analysis software (NVivo, 2018). Then based on the coding structure (Sup 1), photographs were coded for behavior and environmental variables. One undergraduate research assistant coded all the pictures. A random sample of photographs (10%) was coded independently by another undergraduate researcher to assess reliability. Research assistants agreed 95.1% of the time, showing appropriate reliability (McHugh M. L, 2012). Coding results were exported from NVivo into SPSS statistical software (version 25.0 [Internet]) (IBM SPSS Statistics for Windows, 2019). Univariate statistics (means, standard deviation) and bivariate correlations were conducted to analyze the relationships between study variables. All correlations were conducted at a significance level of $p < 0.05$.

Results

Table 1 presents the univariate results from photographs collected. On average, the most common physical activity behavior was walking, reported in 344 photographs (72.1%), followed by standing in 100 photographs (21.0%). Biking (11.5%), sitting (5.0%), and driving (1.5%) were not frequently recorded in the photographs.

The most common environmental factor present was trees or greenery reported in 409 photographs (85.7%). Sidewalks were reported in 383 photographs (80.3%); 73.1% were coded as usable, 64.4% were in good condition, 60.4% were connected, and 54.4% had curb cuts. Public transportation was reported in 73 photographs (15.3%); 11.1% had signage, 7.5% had benches, and 6.1% had covered benches. Bike lanes were reported in 5 photographs (1.0%); 0 0.6% were marked, 0.6% were connected, 0.4% were usable, 0.4% were in good condition, and 0.4% had signage. Additionally, there were less common environmental factors reported in the photographs, including lighting (47.8%), poor lighting (29.9%), stoplights (27.9%), shade (18.9%), landscaped (18.2%), crosswalk signal (13.8%), excessive litter (14.0%), marked crosswalk (11.7%), poorly maintained properties (9.4%), lack of eyes on the street (4.6%), vacant or unfavorable buildings (4.4%), vandalism (2.7%), and graffiti (1.0%).

			N (477)	%
Physical Activity Behaviors				
	Sitting		24	5.0%
	Standing		100	21.0%
	Walking		344	72.1%
	Biking		55	11.5%
	Driving		7	1.5%
Evironmental Variables				
	Sidewalk			
		Unstable		80.3%
		Good Condition		73.1%
		Curb Cut	302	64.4%
		Connected	258	54.1%
	Marked Crosswalk		288	60.4%
	Crosswalk Signal		56	11.7%
	Stop Light		66	13.8%
	Bike Lane		133	27.9%
		Marked	5	1.0%
		Unstable	3	0.6%
		Good Condition	2	0.4%
		Connected	2	0.4%
		Signage	3	0.6%
	Public Transportation		2	0.4%
		Signage	73	15.3%
		Bench	53	11.1%
		Covered Bench	36	7.5%
			29	6.1%
	Shade		90	18.9%
	Lighting		228	47.8%
	Trees & Greenery		409	85.7%
	Landscaped		87	18.2%
	Poor Lighting		142	29.8%
	Graffiti		5	1.0%
	Vandalism		13	2.7%
	Excessive Litter		67	14.0%
	Vacant or Unfavorable Buildings		21	4.4%
	Poorly Maintained Properties		45	9.4%
	Lack of eyes on the street		22	4.6%

Table 1. Univariate Results of All Study Variables

Walking was positively correlated to lighting (r=0.13, p<0.01) and shade (r=0.12, p<0.01) and significantly negatively correlated to lack of eyes on the street (r=-0.11, p<0.05). Standing was positively correlated with public transportation (r=0.02, p<0.01), bench (r=0.20, p<0.01), covered bench (r=0.21, p<0.01), and negatively correlated to poorly maintained property (r=-0.11, p<0.05) and signage (r=-0.18, p<0.01). Sitting was positively correlated to marked crosswalks (r=0.135, p<0.01), crosswalk signal (r=0.19, p<0.01), public transportation (r=0.22, p<0.01), covered bench (r=0.22, p<0.01), bench (r=0.37, p<0.01), and signage (r=0.10, p<0.05), and negatively correlated to sidewalk connectedness (r=-0.11, p<0.05). Biking was positively correlated to bike lanes (r=0.16, p<0.05), bike lane connectedness (r=0.14, p<0.01), and marked crosswalk (r=0.14, p<0.01). No negative correlations to biking were identified. No environmental variables were significantly correlated to driving in this sample.

Discussion

The purpose of this study is to determine if the built environment is related to physical activity behavior within marginalized communities of KCMO. Overall, individuals were more active in areas with more positive environmental factors (bike lanes, shade, lighting, etc.) than in areas with fewer positive ecological factors. Further, negative environmental factors such as lack of eyes on the street, poorly maintained property, graffiti, and vandalism were negatively correlated to physical activity behavior. These study findings are consistent with existing literature in the field; a systematic members' review of one hundred peer-reviewed articles found that walking was significantly correlated with safety from crime, walk-friendly infrastructure (e.g., lighting), and aesthetically pleasing environments, suggesting that the built environment plays an integral role in physical activity (Barnett et al., 2017).

Walking is the most common type of physical activity reported in this study. It is the most common form of physical activity among women with Diabetes Mellitus in the United States (Hu, 2001; Manson, 2000). Walking at a moderate pace has also been shown to meet physical activity guidelines of moderate-intensity aerobic physical activity (Ainsworth, 2000). Previous research has found that walking is significantly correlated to the built environment and that greater network connectivity predicts longer walks (Sun, Oreskovic, & Lin, 2014). The results of this study report a significant negative association between walking and lack of eyes on the street, indicating that communities within both 3rd and 5th city council districts of KCMO may benefit from improved efforts of safety to facilitate healthy

behaviors.

However, the current study found that biking was positively correlated to bike lanes; only 1.0% of photographs reported bike lanes. Bike lanes are limited in KCMO, particularly in the 3rd and 5th districts. These findings support previous research that has found significant positive associations between bike lanes and biking (Chen et al., 2012; Buehler & Pucher, 2012; Krizek et al., 2009; Teschke et al., 2012; Parker et al., 2011). Interestingly, bike lanes were positively correlated to public transportation usage and signage. This relationship suggests that bike lanes are integrated along transit routes in these districts, positively influencing physical activity. The current findings highlight the importance of bike lanes and the need to expand upon existing bike infrastructure within the 3rd and 5th city council districts of KCMO to facilitate healthy behaviors.

This study design has strengths and weaknesses. First, we assessed an area in the community where individuals suffer from lower life expectancy rates than nearby council districts, which are underserved communities that are often excluded from research. Then, the study is further strengthened by the random selection of census tracts within select council districts, which helps to reduce bias. However, this study is limited by its cross-sectional design and cannot determine causation between physical activity behaviors and environmental factors. Finally, the results of this study have limited generalizability due to the narrow focus of this study, which includes marginalized communities in KCMO.

The current findings can inform public health interventions to improve the built environment to increase physical activity, decrease obesity, and reduce inequalities in life expectancy rates. Marginalized communities may benefit from built environment interventions, as they tend to have lower life expectancies and lack supportive built environments. To improve physical activity and overall life expectancy for marginalized communities, public health practitioners should improve the built environment. Future research should explore individuals' sense of safety and comfort in marginalized communities. Further, research should explore other barriers to physical activity behavior for individuals living in underserved communities. Although these results may not be generalizable, study findings are important to inform built environment changes for marginalized communities impacted by unsafe and unsupportive built environments within KCMO.

It is imperative that future organizational and coalition efforts in the 3rd and 5th city council districts of KCMO support built environment changes that promote physical activity behaviors through policy, specifically related to walkability and bike-ability.

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ACKNOWLEDGEMENTS

The Necessity of Art Programming in Restructuring the Prison System
By Lauren Textor

The United States has the highest incarceration rate of any country in the world. The sheer number of inmates can make it difficult to conceptualize each of them as individuals with different needs, histories, and sentences. Incarcerated people are easy to overlook in terms of social justice advocacy because they are not as visible as other groups. Fine arts programming is one strategy that has been proven to help inmates expand current skills and develop new ones (Brewster 9).

Founder and Director of Justice Arts Coalition Wendy Jason knows what a significant difference fine arts programming can make for incarcerated people. When Jason facilitated a creative writing group for a men's prison in New Mexico for a year, she observed that some of the inmates strengthened their relationships with loved ones by sharing their work, which placed them in an unusually vulnerable position. Jason recalls a male participant who had not spoken to his teenage daughter in several years:

> He reached out to her when he heard from his ex, his daughter's mom, that she had been dabbling in poetry. And that's what he was doing, too, so he reached out to her with one of his poems and she wrote back and sent him one of hers. They started exchanging their poetry, so this reignited a relationship that had been dormant for many years. I could see how powerful creative writing as a tool could be with the healing of relationships and the building of new ones. (Jason Interview)

This type of programming allows inmates to form new connections and rebuild old ones by providing participants with healthy emotional outlets. Providing fine arts programming in prisons is a long-term investment that has been proven to lower recidivism rates, or the likelihood of incarcerated people returning to prison after release. Fine arts programming varies from prison to prison, but it can include classes in creative writing, painting, drawing, or anything else that provides creative diversion and positive opportunities for expression. The current US prison system harms the

individuals that it houses by neglecting to prepare them for the outside world and providing meaningful mental health resources. Art programming helps individuals on a personal level, while also restructuring the justice system on a wider scale to emphasize rehabilitation over punishment. In order to decrease the recidivism rate, major institutional reforms are necessary. In the meantime, additional rehabilitative programming contributes to the well-being of inmates.

For this study, I interviewed seven people who have worked with a total of five different organizations, programs, and prisons. My sources include a prison administrator, a nonprofit organization director, a former student representing a UMKC program, and fine arts program facilitators. Many of the people I interviewed had the most experience with creative writing as a form of fine arts programming, as it is the most cost-effective in terms of materials. Throughout this paper, I use a variety of terms to refer to the people who are currently housed by the justice system. These terms, all of which were common in my source material, include prisoners, inmates, incarcerated people, offenders, and people with criminal records. I use all of these terms to reflect the current language surrounding the US prison system, although incarcerated people best reflects the importance of individualism and humanity within the justice system.

My first interview was held in Zoom with David Ranney, a retired newspaper reporter who facilitates the creative writing group at the Topeka Correctional Facility. I explained my purpose in writing the paper, and then left it up to Ranney to tell me what he felt was most important. Along the way, I asked questions when clarification was needed, or when I was curious about some aspect of how programming worked, but mostly stayed quiet and let him talk. Ranney's voice was steady and thoughtful as he described how working with inmates had impacted him on a personal level. He has volunteered with prisoners for 14 years, and it was clear how much he cares about their well-being. While this interview was eye-opening, it was also difficult to hear about the abuse, drug addictions, and poverty that incarcerated people have experienced in their lifetimes. One story that Ranney shared was about how he had never understood why kids were given participation trophies until he started volunteering at the women's prison. Ranney said: "So all those years later, I'm at the women's prison and I'm dealing with all these people who have never been told 'good job,' who have never gotten a participation trophy, and I'm seeing the effect it's had on their self-esteem. Man, I'm telling you, I drove home that night feeling just about two inches tall," (Ranney Interview).

Fine arts programming works to improve poor self-esteem levels, as well

as developing incarcerated people's personal skills and positive attitudes and behaviors.

Rehabilitation Reduces Recidivism

According to the Bureau of Justice Statistics, at least 95% of inmates will be released back into society at some point in their lifetimes (Hughes and Wilson). Taken at face value, this seems to indicate the system's success. However, a 2014 study titled "Recidivism of Prisoners Released in 30 States in 2005: Patterns from 2005 to 2010" showed that more than three quarters of the offenders released from state prisons were arrested again within five years of their initial release (Durose, Cooper and Snyder). This study demonstrates a definite failing of the system to be either rehabilitative enough to help former inmates rebuild their lives or punitive enough to deter further crimes. People with criminal records often have complicated histories of poverty, addiction, and abuse.

The Prison Policy Initiative (PPI) is a nonprofit organization that found in 2014 that inmates had an average pre-incarceration income of only $19,185, which is 41% less than non-incarcerated people of similar ages (Rabuy and Kopf). According to the U.S. Department of Health and Human Services, the federal poverty guidelines say that individuals who make $12,760 or less per year are below the poverty line (Rabuy and Kopf). This means that most inmates were below the poverty line even before they were incarcerated. Additionally, research from the National Institute on Drug Abuse has shown that an estimated 65% of inmates have an active substance use disorder, or SUD, although the institute admits that it can be difficult to measure the rate of SUDs ("Criminal Justice DrugFacts"). The most recent Bureau of Justice Statistics report on the incidence of abuse stated that 19% of state prison inmates and 10% of federal inmates reported that they had been physically or sexually abused prior to incarceration (Wolf Harlow). Additionally, people of color are far overrepresented as offenders. PPI notes that, "These racial disparities are particularly stark for Black Americans, who make up 40% of the incarcerated population despite representing only 13% of U.S. residents.

The same is true for women, whose incarceration rates have for decades risen faster than men's, and who are often behind bars because of financial obstacles such as an inability to pay bail" (Sawyer and Wagner).

Despite all of the glaring negatives of the prison system, it remains the safest place for some of the most vulnerable members of society. Topeka Correctional Facility creative writing facilitator Sharon Sullivan said:

You know, I had [a] woman one year who I asked one of my

writing questions, which was "what's the best thing about prison?" They talk about knowing where their next meal is coming from, knowing where they're going to sleep tonight, that they're going to have clean clothes, and that they're going to get to see the doctor, which are pretty basic things. And that's the best thing about prison [for them]. That's really painful for me, you know? I just think that they deserve better. (Sullivan Interview)

Food, shelter, clothing, and access to healthcare are basic human rights. The reality is that, as dismal and as corrupted as the prison system may be, it offers protection and consistency to those that it houses. The short-term benefits of being in prison can sometimes seem to outweigh the long-term detriment for incarcerated people who come from a background of poverty and abuse. Prison offers a temporary reprieve. However, over the years that individuals spend in the system, it becomes more and more difficult for them to return to life on the outside. The current structure of the system sets incarcerated people up for failure, which often results in them returning to crime.

The Prison Systems Harms Incarcerated People

The prison system may give inmates access to the bare essentials, but ultimately it ends up doing more harm than good for the people it houses. Private companies profit off of inmates through maximizing occupancy and by selling essential services and goods. Many different organizations have made it their mission to document how damaging mass incarceration can be, including the Prison Policy Initiative. According to PPI, private prisons sometimes lobby politicians in order to have laws more strictly enforced, which results in a higher number of people that go to prison for breaking those laws, and ultimately the prisons make more money off of having more inmates in their facility (Sawyer and Wagner). While this is concerning, less than 9% of all inmates in the United States are held in private prisons.

The bigger issue is that basic services like phone calls, medical care, and commissary (the provisional stores within the prisons) are often privatized, even in public facilities (Sawyer and Wagner). Inmates end up paying for these services, even though those same inmates were often living in poverty even before they were convicted. Inmates do often have jobs within their facilities, but this can be problematic as well. Less than 11% of inmates are employed by private companies, so prison employment is not necessarily an issue of privatization. The main problem is that prisons often rely on inmates for services such as food and laundry while paying them much less

than minimum wage. According to a 2017 study by the Prison Policy Initiative entitled "How much do incarcerated people earn in each state?" inmates earn between $0.86 and $3.45 on average per day (Sawyer). These wages, coupled with the fact that inmates have to rely on the commissary for goods, make it nearly impossible for them to save any money to use after they are released. Furthermore, these workers have few protections for jobs that are usually mandatory (Sawyer and Wagner). For example, inmates are not allowed to unionize legally and a refusal to work may result in sanctions (Benns). Prison jobs can be meaningful to inmates if there is proper training, attention to safety, and fair wages, but the current system is lacking in these areas. It is beyond the scope of this paper to go further into this issue, but it is an important one.

Inmates are also isolated, not only from the outside world, but from each other as well. Without programming, they do not have much opportunity to gather or connect with others. Humans are inherently social creatures, and these conditions can be damaging to mental health, especially as so many inmates already have mental health conditions. According to the Bureau of Justice Statistics's 2006 report titled "Mental Health Problems of Prison and Jail Inmates," more than half of all prison and jail inmates had mental health issues (James and Glaze). Prisoners deserve access to resources to combat these problems, and isolating them further is not the answer.

Art Programming Improves Quality of Life for Incarcerated People

General programming such as vocational training and adult education classes gives inmates a chance to socialize, learn new skills, and enjoy themselves, but fine arts programming has proven just as beneficial. Researcher Larry Brewster notes that inmates develop communication, emotional, and behavioral skills as a result of fine arts programming (Brewster 9). His survey of inmates who participated in California's Arts-in-Corrections found that "a significant majority, regardless of years in the program, said they 'wanted to learn new skills,' and they liked 'to be creative.' Also, many were motivated by a desire to 'change their lives,' and they wanted to have something to share with their families" (Brewster 6).

The Justice Arts Coalition is a unifying body for organizations and individuals who provide or participate in art classes in prison facilities. It exhibits and publicizes inmate artwork while also providing networking opportunities and support to both volunteers and artists. Bringing attention to the creativity and individuality of inmates as well as their struggles is a task that requires the efforts of many different methods and volunteers, and

a centralized hub such as the Justice Arts Coalition connects these diverse operations. Founder and Director Wendy Jason said arts programming in prison matters for so many reasons:

> First of all, I think all of us can understand and relate to the need to be able to express ourselves and of course the arts are an amazing medium for that. Whether it's through writing or music or visual art or dance, we all need some way for our voice and our stories to be heard. And for people in prison, of course their opportunities to do that are so much more limited than ours. The prison system really effectively takes away people's sense of voice and their sense of identity and their sense of humanity, right, and so providing opportunities for them to engage creatively and share that work [is even more important]. Giving them the opportunity to do it is one thing and having that extra opportunity for them to share their creative work with those of us on the outside who can appreciate it means an incredible, incredible amount to them. It really is a way of reclaiming their sense of identity, reclaiming their voice, reclaiming their agency, and for me I see it as a very courageous act. (Jason Interview)

The uniformity of the prison system can make it difficult for inmates to hold onto their individuality, but art programming offers an opportunity for a creative outlet, and sometimes even a connection to the outside world.

Sullivan explained how she has watched self-esteem levels rise as a result of programming. She shared a story about how a woman who had dropped out of school in the eighth grade decided to work toward getting her GED because of the confidence she gained from participating in her creative writing group. Sullivan said, "She's [incarcerated] for life, so the prison is not going to invest a lot in her, but I think that people still deserve programs, they still deserve education, they still deserve to be heard, and they still deserve the opportunity to express themselves and be creative" (Sullivan Interview). People who receive life sentences are often treated as "throwaways" or "damaged goods" under the assumption that they will be unable to contribute to society from the inside of a prison cell. This idea is not only harmful to the incarcerated individuals that it directly impacts, but also to society as a whole.

Facilitators of these fine arts groups often end up learning from the experience as well. Ranney explained how the reality of the programs sometimes turn out differently from expectations. During each class, the facilitators give writing prompts to the participants, but in Ranney's experience many of the prompts often go unused. He said:

I'd always put up two or three prompts about your favorite pet, your favorite meal, your best birthday present–– stuff like that. But they never generated much of a response, so one day, I just said, 'You don't seem to be responding to these innocuous questions. What's up with that?' And they were like, 'Dave, who do you think we are?' That's when it dawned on me that if you're in my writing group, you already have stuff that you want to get out. Most of them don't pay attention to the writing prompts because they have plenty of stuff that they want to write about. The issue here is they've never had anybody listen, they've never had anybody interested, and they've never had anybody willing to believe them. (Ranney Interview)

Sharing artwork of any kind is often vulnerable for the artist, so it is important that there is a level of trust and a culture of respect developed within the group. The significance of this type of support system cannot be overstated. Many of the inmates that Sullivan and Ranney interact with have not been able to trust many people, which results in the idea that the world leaves every person to fend for themselves. In order to truly rehabilitate inmates, there needs to be more focus on community building and how an individual's actions impact others.

Sydney Harvey, the former director of UMKC's Philosophy in Prison program, has also had positive experiences with prison programming. While philosophy is not a category of the fine arts programming at the focus of this paper, the approach to teaching each of these subjects in prison is similar, as are the benefits. Providing access to programming, whether in art or other fields, reduces educational barriers for inmates and creates community. Both fine arts programs and philosophy programs are typically more accessible and inviting for incarcerated people who were unable to complete their high school diploma or any higher education. The emphasis in fine arts and philosophy programs is on learning as a group and building a sense of community rather than getting a degree, which can be less intimidating to incarcerated people who have had limited experiences with formal educa-tion. Harvey led a group of about six undergraduate students who worked with eight or nine inmates at the Lansing Correctional Facility. Harvey said that once the student volunteers get into the seminar room, it "feels more like a community center than a prison" (Harvey Interview). She described the inmates as warm and generous people who are welcoming and eager to learn. Harvey said, "The student learns philosophy from a new perspective, which is kind of priceless in this field! Most philosophers come from a certain

background with a certain kind of education. We try to show the students that anyone who has a passion for it can do philosophy!" (Harvey Interview). Subjects such as philosophy can be intimidating even to college students who decide to major in them, so having volunteers act as facilitators who are there to learn alongside the inmates reduces pressure for everyone involved.

Barriers to Reforming the System

The issues within the prison system may be clear, but the path to resolving them is not. Many Americans have an out-of-sight-out-of-mind mentality. Because we do not see or hear about problems facing the prison population on a regular basis, we are more able to look the other way when our justice system fails or to consider the failure to be a singular instance instead of a pattern. If the general public does not care about an issue, then lawmakers are less compelled to care as well. Through the internet, we have access to many different sources and media about prison, but the picture that many of us have in our minds is inaccurate. Nicole Fleetwood is a professor of American Studies and Art History at Rutgers University who has done extensive research on prison artwork. In her book, Marking Time: Art in the Age of Mass Incarceration, she writes:

> In popular entertainment, journalistic exposés, and documentaries, images of "life behind bars" fascinate, horrify, and titillate. They also offer a familiarity with prison as a cornerstone institution of modern life, but one that the majority of people never enter. The nonincarcerated public comes to recognize prison and the imprisoned almost exclusively through a set of rehearsed images created by the state and by nonincarcerated image makers––images like arrest photos, mug shots, the minimal furnishings of the prison cell, fortress-like walls, barbed wire, bars, metal doors, and the executionist's chair. (Fleetwood 15)

Americans see the sensationalized aspects of prison life, but for the most part have no idea of the everyday struggles. This allows discussion on polarizing issues like the death penalty while overlooking the general monotony and unfairnesses of prison life. America's obsession with true crime series like Forensic Files and gruesome murders such as those committed by Ted Bundy means that in the general consciousness there's a sense of fascination with the criminal justice system that is reserved for big, controversial cases. Smaller, less glamorized crimes where the facts are less clear and the scene is less bloody go widely unexamined for injustice. When

the trial is over and Netflix has run out of a fresh angle, the issues quickly lose the public's attention. For structural changes to be implemented on a widespread basis, the government has to get involved.

Art programming is by no means a solution to all of the problems that face inmates, but it is a way to improve the quality of life for those who are currently serving time. Still, programming comes with its own set of complications. Facility Services Administrator Holly Chavez has been with the Kansas Department of Corrections since 2001. She said she believes that programming is one of the most important responsibilities of correctional facilities because it is the facility's job to start preparing inmates for release as soon as they first walk through the door. However, Chavez said that it can be difficult to determine which programs to allow in the prison, as programs need to be backed by strong evidence (Chavez Interview). Evidence is decided on by the system-wide management team, which includes an educational and programs manager who provides guidance regarding which programs are chosen. The evidence must show that the program will reduce recidivism and positively change behavior. Staffing and finding an appropriate space to host programming can be difficult. Funding is also a constant issue. Volunteers are usually responsible for financing all necessary supplies, including paper, canvasses, paint, paint brushes, crayons, and markers. No volunteers are currently allowed inside the facility due to the health dangers presented by the coronavirus pandemic. Chavez said, "During this time, it is really difficult. We're managing the best that we can. It's really hard for those who have the heart for volunteering . . . This [the pandemic] is a time when everyone wants to help, but we can't open our doors and do that. We can't do that safely" (Chavez Interview). At this point in October 2021, volunteers are allowed back into the facility in a limited capacity to follow Coronavirus protocols and mitigate exposure. Normally, volunteers must send in an online application, go through a background check and training, and receive their badge (Chavez Interview). The pandemic has certainly changed the way that programming can be implemented, but it hasn't stopped it entirely.

Justice Arts Coalition Founder and Director Wendy Jason discussed one approach to working with the pandemic restrictions. Jason said:

We're actually launching right now our first art program for a specific prison. We're launching a distance learning program for a women's prison here in Maryland. We brought together a group of four local teaching artists who were all working in prisons prior to the pandemic. One of them worked in this particular women's prison teaching poetry. They're putting together these really amazing multidisciplinary

packets of activities in creative writing, poetry, theater, and visual art that we're going to be sending inside to the women. So while we won't be in person, which creates a very different dynamic, it'll be interesting to see what we get in response and how much risk the women are willing to take with what they share. (Jason Interview)

Technology is making it easier than ever to collaborate with other artists an to ensure that everyone has quality access to programming. Even with continuously updating coronavirus guidelines, there are ways to provide diversion for inmates while still keeping everyone involved safe.

Conclusion

Prison art programming is not only effective in creating more positive attitudes and behaviors in inmates, but it is also a fundamental step in restructuring the justice system to create a society that is more focused on rehabilitation and less on punishment. Every inmate's story is different and every one of them deserves the opportunity to share it, just like anyone else. Sullivan heard many stories from the inmates in her creative writing group. She said:

You don't always see it because they're fronting so much, but so many of them hate themselves so much and blame themselves so much for what they've done. I'm not saying you shouldn't take responsibility for what you did, but I think we should also understand that these are issues that are pretty complex choices and experiences that folks have had, so I can't judge them. I don't judge them. (Sullivan Interview)

Not everyone has the experience of getting a participation trophy or being told that they've done a good job, but it is possible to create a culture that lays the groundwork for individuals to feel more appreciated and have better access to resources that they need to be successful. Fine arts programming is a viable option for improving the lives of incarcerated people even as the US awaits stronger institutional changes to its prison system.

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Reconciling Two Identities:
The Letters of Dr. Anandibai Joshi
By Niki Joshi

As India's first female physician, Dr. Anandibai Joshi is revered as a trailblazer in Indian history and a symbol of unrelenting ambition and persistence. However, before she graduated from the Woman's Medical College of Pennsylvania in 1886, Joshi's pursuit of education was the subject of intense public criticism and received very little support from Indian institutions. Joshi's ambitions were instead fueled by the clarity of her own visions as well as through support she received from American institutions that praised her goals and aspirations.

While Joshi's accomplishments are celebrated today, the complexity of her circumstances forced her to navigate the clashing values and cultures of the East and the West. Fully integrating into Western society would prove to be an impossible feat. Yet Joshi's fierce independence put her at odds with the historical, social, and cultural expectations of her homeland. As a result, Joshi unwittingly resolved to become a bridge between the two contrasting worlds. The following essay will identify the roots of gender disparities in Indian society, explore the role and influence of formative figures in Joshi's childhood, and–most importantly–follow Joshi's journey to the United States through the lens of the letters she wrote between 1881 and 1883. In these writings, an intensive study of the language and rhetoric will reveal how Joshi capitalizes on her own cultural values in order to co-opt the support of American institutions, ultimately underscoring a larger cultural dichotomy that divides the ideologies of the East and West.

The Origins of Gender Discrimination and Segregation

The precedents of nineteenth-century India evidenced a significant inequality in the education of girls and young women, especially compared to their male counterparts. This inequality can be dated back to India's Vedic

Era between 1500 and 500 BCE, during a marked shift in which the role and socialization of girls began to transform, limiting their intellectual prospects and capabilities (Chanana 39). The propriety, equality, and legitimacy they were once entitled to seem to have vanished, quickly rebranding girls into vessels designed to preserve a patriarchal lineage. This era also led to the practice of "pardah" in India, regarded as the presently enduring social enforcement of sex segregation and gender seclusion.

The practice of pardah lay the foundation for a model that left girls without any control over their lives and choices, instead normalizing the institutions of child marriage, sati–defined as "the practice in which widows commit suicide by burning themselves (or being burned) on their husbands funeral pyres" (Mollett 50)–and the prohibition of remarriage following the death of one's husband. In this context, however, it most notably was initially responsible for denying girls education altogether. Towards the end of India's colonial period and years after Indian independence, gender discrimination affected the nature and quality of female education; it is observed that female education was not only separated from male education, but pardah was instituted as "a strategy adopted to assure parents that established social values, norms and practices would be reinforced within the new institutions, and their daughters were 'safe'" (Chanana 49). This meant that the curriculum often focused on instilling the importance of religion, motherhood, and domesticity, typically offering courses on the subjects that stressed "music, home science, first-aid, nursing, midwifery, along with languages" (Chanana 51). Regarding the study of languages, the curriculum varied by region, focusing on Sanskrit, Gurumukhi, or Urdu, as they were the languages of religious scriptures and texts. The limited scope of subjects and study solidified the roles and destinies of girls in Indian society, refusing them resources or knowledge that would allow them any semblance of financial autonomy or independence.

Joshi's Divergence from the Status Quo

Anadibai Joshi seemed destined for a similar education, lifestyle, and fate had it not been for her father, Ganpatrao Joshi. Despite being born into a traditionalist, upper-caste Brahmin family, Ganpatrao ensured that Anandibai was adequately educated, enrolling her "in the school held in a part of the family mansion, where she picked up rudimentary literacy" (Kosambi 3189). Although Ganpatrao garnered great pride when bragging to family, friends, and visitors about his daughter's literacy and intellectual prowess, the looming issue of marriage always shrouded above the family's head. The stress came from Anandibai's "not quite good-looking [features]

and . . . smallpox marks on her face, who, at nine, seemed to have already outgrown the marriageable age due to her robust health and temperament" (Gurjarpadhye 37). In addition, Anandibai seemed to lack the inherent respectability and gentility imbued into most aristocratic girls and was nicknamed "the wrestler" after beating her older male cousin in a friendly brawl.

However, to her family's relief, the twenty-seven-year-old widower, Gopalrao Joshi, agreed to marry the indecorous nine-year-old, which seemed to be another twist of fate for the young girl. Gopalrao burdened himself with the responsibility of providing Anandibai with a comprehensive and all-encompassing education. Gopalrao began by preparing lessons he taught at their home, eventually resorting to relocating by accepting positions in Bombay, Calcutta, and Kolhapur "whenever he found that his wife's educational prospects were brighter at those places, by meeting highly-placed British officers directly and explaining to them his agenda" (Gurjarpadhye 37-38). He also solidified relationships and partnerships with missionaries who allowed Anandibai admission into the prestigious and highly revered colonial schools.

It is difficult, however, to classify Gopalrao as a true forward-thinking progressive, considering that Anandibai was impregnated by him and eventually miscarried at the age of twelve (Kosambi 3190). It was also noted that when Anandibai was truant as a young girl, he would beat her "mercilessly with instruments such as firewood or wooden chairs until they broke" (Gurjarpadhye 37). However, his progressive approach and philosophy regarding the education of Anandibai, along with the independence and autonomy he imbued in her, merited resistance and pushback from relatives, acquaintances, and the public. As a result, the couple was publicly shamed, heckled, and ridiculed even in large cities. It prompted a desire to relocate to America so that Anandibai could continue her studies by pursuing higher education.

After Gopalrao published an ardent plea in the 1879 edition of *Missionary Review of the World*, Anandibai was contacted by the American missionary, Theodicia Carpenter, in the spring of 1880 as she expressed her sincere support of Joshi's ambitions. The two developed a nurturing, intimate, and platonic relationship, and they cultivated their transcontinental friendship over two years, almost exclusively through the mailing and exchanging of letters.

Dissecting Joshi's Letters and Writings

Examining Joshi's language and rhetoric in her letters to Carpenter

intimately reveals her inherent nature, character, and hardship while simultaneously showcasing the ideological divide that distinguishes the cultural identities and value systems of the East and the West. Additionally, Joshi's writing also demonstrates how she approaches reconciling these contrasting ideologies.

Published in Meera Kosambi's "Anandibai Joshee: Retrieving a Fragmented Feminist Image" is an excerpt of one of the first letters a sixteen-year-old Joshi wrote from January 20, 1881. The near-instant connection, endearment, and adoration of a girl are underscored as Joshi replies to Carpenter: "I already wish and feel that I should call you my aunt. There is a saying among us, 'it does not matter much if a mother dies, but let not an aunt die.' This expression will show you in what respect and estimation a maternal aunt is held among us. Therefore, if you allow me, I wish to look upon you as such" (Kosambi 3190). This attachment is likely a reflection of the neglect and harshness of Joshi's girlhood after leaving her family home at such a young age, enduring the regiment and harshness throughout her marriage with Gopalrao, as well as constant public attacks on her identity; Carpenter's kindness, intrigue, and genuine support is certainly a rarity.

Although Joshi's language is quite plain and straightforward, her writing exudes warmth and vulnerability as she purposely asks permission to articulate a deep, familial bond with Carpenter. Without having physically met or verbally spoken to Carpenter either, Joshi's letters serve as an extension of herself as she not only communicates her thoughts and feelings but does so by rooting her expression in her country, culture, and community. Through statements such as, "There is a saying among us . . . ," Joshi emphasizes the distance and separation between herself and Carpenter, not just to solidify her conviction and earnestness to Carpenter but to also further stress the discrepancies that distinguish the East and the West. It cements the fact that both of them are of different worlds. However, this becomes an opportunity to discover new aspects of Joshi's character and personality, bridge the divide, and uncover the veil of illusion through this new relationship. It allows Joshi to prove her dedication to her aspirations, allowing her to demonstrate that space could be made for her in the United States.

This is seen in the contents of several other letters that have been transcribed into a biography about Joshi written by her former classmate at the Women's Medical College of Pennsylvania, Caroline Wells Healey Dall. Documented in *The Life of Dr. Anandibai Joshee: A Kinswoman of the Pundita Ramabai* is an undated exchange later in 1881 between Joshi and Carpenter that exhibits Joshi's awareness and ambivalence:

I wish to preserve my mannerisms and customs unless they are detrimental to my health. Can I live in your country as if it were my own, and what will it cost me? When I think over the sufferings of women in India of all ages, I am impatient to see the Western light dawn as the harbinger of emancipation. I am not able to say what I think, but no man or woman should depend upon another for maintenance and necessities (Dall 38)

Joshi's desire to study in the United States is apparent and clouded with the fear of abandoning her heritage and cultural identity. Her ambivalence seems to reflect the Eastern viewpoints of the Western world, considering that it is based on the fear that she would have to wholly integrate and assimilate into American society to maximize her experience. She not only asks, "Can I live in your country as if it were my own?" but follows with, "And what will it cost me?" The question underscores the gravity of the impending choice she must make, stressing the significance of relocation as not only a physical endeavor but also an emotional and cultural sacrifice.

Joshi recognizes that preserving her customs and heritage while living in the United States will not be easy. Still, her question seems to beg Carpenter for reassurance as her tone shifts to one of desire and longing. While Joshi appears to express a seed of doubt in her question, her burning desire for the West's opportunities is palpable. It is most visible through her diction, comparing the United States to a light that serves as a "harbinger" and provides her with "emancipation." The language creates a distinctly positive connotation and is associated with the ideas of agency, freedom, and individualized thought.

Through this expression, she alludes to "the sufferings of women in India of all ages," taking advantage of another opportunity to begin characterizing herself as a possible bridge between two worlds. This starts through her attitude towards the United States, demonstrating that, despite Joshi's hesitation, the allure of the United States promises liberty, opportunity, and–most importantly–a sense of freedom, equality, and confidence to achieve one's goals and desires. By pairing this praise with the concern she voices toward the abilities and position of women in Indian society, she begins creating an association that sheds light on her ambitions and demonstrates her interest in bringing the "Western light" to the East through the championship of equal autonomy and expression between both men and women.

Joshi's excitement about her journey to the United States is most visible in her letter to Carpenter dated August 12, 1882, in response to "a long, careful letter, detailing the manner and expense of coming to America" (Dall 69). Joshi writes with undeniable enthusiasm and conviction as she replies to the

fears and impending perils ahead:

> I am prepared to go alone to America . . . . You have reason to think that
> a very distant voyage will be hazardous for a girl of eighteen because the
> world is full of frauds and dangers, but dear Aunt, wherever I cast my
> glance, I see nothing but a straight and smooth way. I fear no miseries.
> I shrink not at the recollection of dangers, nor do I fear them. (Dall 70)

 Joshi's response to Carpenter is one of assurance and confidence,
despite the uncertainties that may lay ahead. She acts with the conviction and
desire that aims to negate the risk involved in her endeavor. And in doing so,
she separates her appeal into two parts.

Joshi begins by stating and acknowledging Carpenter's concerns,
touching on both the length and distance of her travels along with their
inevitable danger and uncertainty. She does not simply glance over these
anxieties; instead, she thoroughly addresses and recognizes these fears
through her diction, choosing rousing language through words such as
"hazardous," "frauds," and "dangers." Through this, she begins to alleviate
any doubts or hesitations expressed by Carpenter by demonstrating her
understanding of the gravity and risk involved in her decisions.

She bridges the two parts of her appeal by incorporating the phrase,
"dear Aunt." In this, she speaks to Carpenter directly to quell her fears and
inspire the same enthusiasm and confidence. Through explicitly addressing
Carpenter, Joshi creates a mood of thoughtfulness by illustrating a sense
of empathy. However, it is more than Joshi simply voicing her empathy for
Carpenter's fears for Joshi's safety. In addition, Joshi seems to ask Carpenter
to draw upon her sense of empathy to truly feel Joshi's desire, passion, and
fearlessness as she follows with vivid language and imagery that elucidate her
excitement.

The visuals and imagery of "a straight and smooth way" draw a parallel
to the physical voyage Joshi intends to make, which serves as another device
that hopes to mollify Carpenter's fear of disruption and dangers during Joshi's
journey. Paired with the conviction Joshi communicates through decided
diction and syntax, a strong argument is made as she asserts the strength of
desires. She "fears no miseries," assuredly and succinctly summarizing the
depth and nature of her confidence as she makes plans to forge ahead.

It was not until April 7, 1883, that Anandibai Joshi finally began her
journey to the United States after spending several months rallying wider
support for her education and fundraising for the cost of her travel and
tuition. She traveled alone, and upon arriving in New York, she met Theodicia

Carpenter for the first time and spent the summer at Carpenter's residence in Roselle, New Jersey. In that time, Joshi and Carpenter worked together to prepare Joshi's application to the Women's Medical College of Pennsylvania.

Joshi's application included an admissions essay dated June 18, 1883. The document is three pages long and penned in neat and impeccable cursive with black ink. The papers have two horizontal creases running along with them with a single and deliberate circular puncture in the upper left-hand corner. It suggests that the papers were bundled together, folded into an envelope, and mailed from Carpenter's home in Roselle. A scanned copy of it is available in both the South Asian American Digital Archive and the online Drexel University College of Medicine Archives & Special Collections.

In the essay, it appears that many of the thoughts and sentiments portrayed in Joshi's letters to Carpenter–especially those of American prosperity–are reflected in her writing. She addresses the university's admissions representative, Alfred Jones, and begins the essay with the greeting, "Dear Sir," directly paralleling the structure of a letter. Thus, the document becomes another opportunity to express herself, piecing together a narrative that intends to both seamlessly fit her into the pulse of American society while also distinguishing her as a strong and promising candidate capable of succeeding and enriching the university's prestige and legacy through the motivations provided by the state of her homeland.

The beginning of the essay outlines Joshi's credentials, indicating her financial stability, good health, and educational background. Then, she offers the most detail about her previous studies, noting:

> I have been through English Grammar, have studied through Arithmetic in my own language, and as far as Division in English, and I am now pushing forward in this as fast as I can. I have read the histories of England, Rome, Greece, and India. I have learned to read and speak in seven languages, including Marathi (my own), Sanskrit, Bengali, Gujarathi, Ganari, Hindoostani, and English. (Joshi 1-2)

It seems that her prior education does not suffice on its own, however. Instead, the most notable aspect of her application is her appeal to the university as she describes her motivations for studying medicine in the United States. It is through this aspect of the application that she bridges her experiences of the East and the West:

> . . . and this, with that determination which has brought me to your country against the combined opposition of my friends and caste

ought to go along way towards helping me to carry out the purpose for which I came: to render to my poor suffering country women the true medical aid they so sadly stand in need of, and which they would rather die for than accept at the hands of a male physician. (Joshi 2-3)

The vulnerability she expresses in her previous letters to Carpenter seems to be apparent here, as well. Joshi reveals personal details of her life, speaking to the noble sacrifices she made in hopes of pursuing the greater good for the women of her community. She divulges the terms she left her old world behind and illustrates how her decision speaks to her commitment to her education.

Through this characterization of herself, she exhibits the motivation and dedication associated with the larger idea of American idealism, hoping to use her experiences in the United States as a means of addressing the problems of the world outside of the West. It serves as another example of how she tries to bridge both Indian and American identity notions, demonstrating how she can serve as a medium that links two contrasting parts of the world. Her desire to relieve the suffering of women in India demonstrates a sincere fidelity to her people and heritage, an ideology championed by the East that stresses the importance of community. Meanwhile, her willingness to leave her life behind despite vehement opposition also demonstrates a streak of ambition and individuality, a value championed by the West.

These two larger parts of her identity are further illustrated in a far more impassioned and emotional appeal as Joshi concludes her essay:

The voice of humanity is with me and I must not fail. My soul is moved to help the many who cannot help themselves and I feel sure that the God who has me in his care will influence the many that can and should share in this good work to lend me such aid and assistance as I may need. I ask nothing for myself, individually, but all that is necessary to fit me for my work. (Joshi 3)

In these final words, it seems that Joshi stresses the gravity of her circumstances. While she begins by focusing on her role as an individual, her gaze progressively widens, moving to the larger issues that define the importance of her goals. She shifts from the individualism of "I." She widens her focus to the larger scope of humanity, again demonstrating how she carries a unique ability to marry two entirely different sets of ideologies and values. And by recognizing this uniqueness, she also expresses a profound

desire to use her perspective, experiences, and abilities to alleviate the hardships of the suffering and disadvantaged.

Her allusions to religion and spirituality support this ambition, generating clear imagery and associations of purpose and divinity. It characterizes Joshi as a divine entity or vessel with the express purpose of serving a much larger mission. As a result, it conveys Joshi's aspirations as not simply hopes or desires but as urgent and dutiful responsibilities that honor a spiritual and divine purpose. The appeal to pathos is certainly effective and is likely made in earnest considering Joshi's several allusions to religion in her letters to Carpenter. For example, in a letter dated January 16, 1883, Joshi writes: "Never mind, the opposition of friends brings God to my side. I am not discouraged" (Dall 75). It, again, is another indication of her unshakeable persistence along with her vulnerability. The conclusion reflects her authenticity and genuine intent, not just exhibiting her desires for mobility, autonomy, independence, and success, but also a testament to the greater motivations that inspire and enthrall her to help a larger collective group of girls and women in her homeland.

The essay also reflects a sincere passion and enthusiasm for the opportunity and prospects offered to Joshi in the United States. However, it alludes to a sense of exclusivity, implying that the United States is the only place in the world that will allow her the knowledge and possibility she needs to fulfill her dreams. This theme may reflect global perceptions of the United States, clearly demonstrating that Joshi's outlook is predominantly forward-looking and positive. Her perspective and rationale might also mirror those of several other Indian graduates who later attended the Women's Medical College of Pennsylvania, including Dr. Premala Shahane, Dr. Dora Chatterjee, and Dr. Mary T. Kukde during the twentieth century.

Impressed with Joshi's application, Rachel L. Bodley, the Dean of the Woman's Medical College of Pennsylvania, offered Joshi admission. In a letter to Alfred Jones, Bodley wrote: "Would it be possible for your Committee to perform the graceful act of awarding her [Joshi] a scholarship? This would at once distance all the competing institutions and make her sojourn with us, certain. Her talents and learning will undoubtedly qualify her for the scholarship. So much interest is felt in her . . . (Bodley 3).

Medical School and Joshi's Legacy

While living in Philadelphia, Joshi spent her three years of medical school residing in Bodley's home. She had also fulfilled her goal to "go to America as a Hindu and return as a Hindu" as she continued wearing Hindu garments throughout her stay in the United States while adhering to a strict

vegetarian diet. However, it is documented that Joshi's health began to fail towards the end of her studies as "the combined effect of the cold climate, the burning of anthracite coal in the heaters, and the rigors of the demanding medical studies took a heavy toll" (Kosambi 3191).

Despite her illness, Joshi still graduated in the class of 1886 just before her twenty-first birthday. Her husband, Gopalrao, made a tedious voyage to the United States to attend her graduation ceremony. In addition, Joshi was recognized widely by the American press for her accomplishment, as well as by Queen Victoria in a letter of congratulations, reading: "Queen Victoria expressed her interest and appreciation when the first Hindu woman to receive a medical degree in any country–Dr. Anandibai Joshee–graduated from the Woman's Medical College of Pennsylvania in 1886."

Dr. Anandibai Joshi had already made history and was prepared to return to India to cement her legacy. Upon her arrival, however, her health rapidly declined, and she was diagnosed with tuberculosis. Before she had the opportunity to begin her medical practice, Joshi died on February 26, 1887, at the age of twenty-one, unable to truly realize her dream.

While her ending is certainly tragic, Joshi's early work as a young woman forging an identity within worlds of two contrasting ideologies contributes to the larger ongoing phenomena of globalization and transnational dialogue. Most immediately, her legacy undoubtedly paved the way for Indian women in the twentieth century, clearly visible in the continued arrival of young Indian scholars at the Women's Medical College of Pennsylvania.

Sparking a Cultural Dialogue

On a grander scale, Anandibai Joshi's life and experiences also speak to a larger conversation about the persisting cultural dichotomy between the East and the West. It questions long-standing and antiquated expectations of passiveness and submissiveness from girls and young women and instead tries to bring commonality and fluidity between two contrasting worlds. In her lifetime, Joshi tried to do the impossible: remain grounded in her heritage, customs, community, and traditions while still embodying an autonomy, individualism, and mobility that outwardly defied the governing institutions. And while she accomplished an admirable task and left an indelible mark on both Eastern and Western society, her experiences bring into question the larger ambiguity surrounding cultural identity.

In this contemporary era that champions accessibility and equality, a crisis of identity and belonging unquestionably exists that puts girls and young women of color, especially, in a position that leaves them stranded; they often cannot be fully integrated or feel as though they belong to one

world, life, or culture. Instead, they find themselves trying to navigate two worlds as they hope to toe the line between respecting their heritage and culture while upholding their individuality.

This experience begs to be explored, and Joshi's hopes and endeavors of beginning to bridge two cultures together could be viewed as a starting point. While Joshi's unique role as a contributing catalyst helps begin a larger conversation about the place of girls and young women caught between two civilizations and identities, her journey and introspection of identity harbor parallels to the ongoing conversation that aims to find an intersection between differing value systems.

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The Many Names of Post-Traumatic Stress Disorder: How They Have Improved and How They Can Continue to Improve
By Robin Conrad

Trauma can happen to anyone, anywhere, at any time. Soldiers witnessing or committing unspeakable acts in a war zone, workers being involved in an accident caused by heavy machinery, a person surviving an assault, or even children witnessing the death of a loved one are examples of the many different traumas people experience every day. These traumatic events can leave lasting negative impacts on people's mental states. The help available to those who survive these traumas has varied greatly through the years. Mental health aid offered or forced upon people in the past is drastically different from aid available to people in current times.

The terminology for post-traumatic stress disorder (PTSD) also has changed. For example, in the 1800s, individuals who had PTSD, or any other mental illness for that matter, were written about and spoken of more like animals than people. In contrast, individuals who have PTSD today are treated with more dignity and respect. In this paper, I will investigate the progression of the terminology used to describe PTSD and the patients who suffered from it. I use archival research to find soldiers' medical records from past wars and textual analysis to analyze these records. Due to the Health Insurance Portability and Accountability Act (HIPAA), accessing medical records is rightfully impossible past 1996, so I will analyze texts discussing the remaining stigmas of PTSD.

My analysis of medical records will use Eugenia Siegler's method. In "The Evolving Medical Record," Siegler provides examples of medical records dating from 1797 to 1922. While Siegler never explicitly mentions mental health records or records taken from an asylum or mental institution, she provides an in-depth analysis of how and why medical records changed through history (671). For example, Siegler explains in the earlier years, patients were treated using a didactic approach because doctors were still learning about all kinds of diseases and treatments; these doctors were more interested in sharing bizarre cases with their medical students than actually treating the patient (672). As time passed, treatment methods became more patient-based (Siegler 675). Siegler shows this transition through a series of

medical records, which are later translated in the article's appendix. I plan to use this method when discussing how medical records changed for people suffering from PTSD.

Throughout my research, I found that while treatment and discussion or writing of PTSD has greatly improved, there is still a long way for it to go. I found that most researchers discussed the history of PTSD as if terminology had reached a standstill, and PTSD would forever be what the disorder is called. I add to the discussion of language used for patients with PTSD because I believe there is still progress to be made in the destigmatization of mental disorders.

The History of PTSD Terminology

While the first official report of a condition resembling PTSD was not written until 1798 by Dr. Philippe Pinel, there are examples of it appearing in different literary works including the Bible (M.A. Crocq and L. Crocq 47). Historians have found detailed descriptions of PTSD and its symptoms in the tale of Gilgamesh, works by Hippocrates, poems, and even in Shakespeare's *Romeo and Juliet* (M.A. Crocq and L. Crocq 48). While the condition and symptoms of PTSD were merely described and never given titles in these literary works, they show how long PTSD has existed.

Although early literature did not give PTSD a name, many titles were given to it starting in the late eighteenth century. For example, in 1798, French physician Dr. Pinel observed that his patients who had fought in the French Revolution suffered from "cardiorespiratory neurosis" and "idiotism" (M.A. Crocq and L. Crocq 48). These terms, namely "idiotism," were highly derogatory to these soldiers, but they were not the only people suffering from PTSD at this time. Anybody who experiences a traumatic event can have PTSD, as seen throughout the 1800s, when "[t]he Industrial Revolution and the introduction of steam-driven machinery [gave] rise to the first civilian man-made disasters and cases of PTSD outside the battlefield," according to M.A. Crocq and L. Crocq (48). While many of the new machines led to industrial accidents, mainly train derailments and other railway accidents led to lasting trauma. At this time in history, the terms "railway spine," "railway brain," and "traumatic neurosis" were used to describe people who had PTSD but who were not in combat (M.A. Crocq and L. Crocq 48).

In 1904 and 1905, traumatized soldiers in the Russo-Japanese War were diagnosed with "combat hysteria" and "combat neurasthenia" (M.A. Crocq and L. Crocq 49). In 1907, German physician Dr. Honigman coined the term "war neurosis" to refer to PTSD (M.A. Crocq and L. Crocq 49). When World

War I began in 1914, French physician Dr. Milian claimed the soldiers were suffering from "battle hypnosis;" German psychiatrist Dr. Gaupp also used this term in 1917 (M.A. Crocq and L. Crocq 50). Another German psychiatrist, Dr. Kraepelin, also invented the term "war-shakers" to describe traumatized soldiers and "nervous shock" to diagnose PTSD (M.A. Crocq and L. Crocq 51). Disturbingly, it was not just physicians and psychiatrists who used these terms.

An article published in *Times* magazine in February 1915 claimed these World War I soldiers were suffering from "shock" (M.A. Crocq and L. Crocq 52). This claim marks one of the only occurrences of a journalist creating a term for PTSD, but the term was used through World War I and caught on in the medical community. That month, physician Charles Meyer coined the famous term "shell shock" in an article published in the medical journal The Lancet (M.A. Crocq and L. Crocq 52).

By the time World War II began, more words and terms were used to label soldiers who had suffered trauma. In 1941, US psychiatrist Dr. Kardiner claimed it was a form of "psychoneurosis," or that the "effective ego" or "ego contraction" had something to do with the veterans' conditions (M.A. Crocq and L. Crocq 53). Crocq et al. observe that "the first time the term 'exhaustion' was prescribed as [an] initial diagnosis for all combat psychiatric cases" was April 26, 1943, by US psychiatrist Frederick Hanson (54). US psychiatrists Dr. Grinker and Dr. Spiegel diagnosed soldiers with "war neuroses" or "operational fatigue syndrome"; these psychiatrists were also very clear in defining the difference between "reactions to combat" and "reactions after combat" (M.A. Crocq and L. Crocq 54). The final contribution to PTSD terminology in World War II was from Russian psychiatrists Dr. Gurevich and Dr. Sereyskiy in 1946; the terms they used were "affective shock reactions" and "irritable heart" (M.A. Crocq and L. Crocq 54). With so many physicians and psychiatrists from so many countries creating diagnoses left and right, it was nearly impossible to find common ground on PTSD during World War II. It would not be until the Vietnam War that the world came to a consensus on what to call it.

The first edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-I) was published by the American Psychiatric Association (APA) in 1952 (M.A. Crocq and L. Crocq 55). Just after World War II ended, the APA used the term "gross stress reaction" (M.A. Crocq and L. Crocq 55). As ineffective as this term was, it was better than what the APA decided to do in the DSM-II in 1968: remove the term and fail to include a category regarding psychological reactions to trauma (M.A. Crocq and L. Crocq 55).

The term, post-traumatic stress disorder (PTSD), finally emerged and

has been used since DSM-III was published in 1980 (M.A. Crocq and L. Crocq 55). The name was derived from the term "Post-Vietnam Syndrome," which had been used to diagnose soldiers with symptoms of PTSD who fought in the Vietnam War (M.A. Crocq and L. Crocq 55). DSM-V, published in May 2013, is the most current manual and uses the term PTSD. The term PTSD has been used for more than 40 years since the DSM-III was published, but groups are working to change the term something less stigmatizing, and I will explore these arguments.

Tracking the Evolution of the Terminology

Several key sources exhibit the progression of PTSD terminology through the years. These sources start with didactic, inhumane terms used to describe patients, and end with psychiatrists dealing with their patients with far more respect and intention to treat patients successfully. This trend coincides with that of doctors studying patients' rare conditions and then, over time, becoming much more focused on patient care.

One source of inhumane treatment of veterans with PTSD comes from medical records written by Dr. Y.R. LeMonnier, the city physician and coroner of New Orleans from 1882 to 1888 (LeMonnier). LeMonnier's documents numbered each patient case, labeled the patient with their "type of insanity," gave the date of examination, gave a rundown of the patient's physical condition, and finally gave a report of the patient's information (LeMonnier).

LeMonnier's report was didactic and indifferent towards patients of all types, not just ones exhibiting PTSD. Diagnoses of all these patients included terms like "imbecility," "hallucination," "idiocy," "raving mania," "melancholy," and "stupidity" (LeMonnier). By the end of the Civil War in 1865, patients exhibiting symptoms of PTSD were admitted to this New Orleans asylum and asylums all across the country.

The first report dealing with PTSD diagnosed Richard Satterley with "chronic (intermittent) mania":

> This man has been insane for 10 or 12 years back, reports his brother, who says that "during the war, he was struck on the ear or wounded there", though I detect no signs of any injury. He has been insane several times& recovered. Two or three days ago while drilling, preparatory to the sham battle, he became nervous, and today he is completely insane. He is dangerous to others and has threatened to take his life. He will not speak, but his eyes and the movements of his hands indicate that his mind is concentrated on some imaginary thing or being." (LeMonnier)

Like so many others, was admitted and treated like an animal rather than a human being.

LeMonnier diagnosed another patient, James Trainor, with "chronic mania," reporting that "This man is insane . . . is unable to give an account of the date of the war, and yet says he was in the army, but knows not if he was in the Confederate or Federal army if the war took place 5 or 50 years ago" (LeMonnier). Like Richard Slatterley, James Trainor was treated with no dignity. Neither of these men was treated or rehabilitated in any way; rather, they were admitted into an asylum that could deal with them while their families could not. This was the sad reality for anybody who had a mental illness pre-WWI. Things began to change, though, during and after World War I.

Soldiers who fought in World War I and had PTSD were treated much better than the soldiers in the Civil War. The biggest difference was that physicians and psychiatrists finally realized that the soldiers' symptoms were caused by the trauma they had witnessed in battle; it was a mental illness to treat, not a physical one (Linden, Stefanie Caroline, and Edgar Jones 522). As a result, the medical records for these soldiers give detailed descriptions not only of their symptoms but also why they are under such mental strain.

For example, J. Milner, who was in the hospital suffering from severe, constant tremors and "shell-shock," was "nearly captured [by] German infantry [that] surrounded [him] and were only 300 yards away. [He] retreated stealthily, sometimes travelled all day & night. It is evident that the mental strain was considerable" (The National Archives). J. Milner was admitted due to the tremors he suffered from, as well as "weakness of the limbs" and an inability to speak (The National Archives). Another patient, H. Spink, was diagnosed with "shell-shock" due to his heart, which "[beat] violently, rapidly (100 bpm) but regularly" (The National Archives). H. Spink was admitted because ". . . a shell burst very near to him," and he did not improve from his "shell shock" after being given seven weeks off duty (The National Archives). These two patients were both treated during World War I. They were treated more humanely than soldiers in the Civil War, but physicians and psychiatrists still did not know the best way to treat them.

Soldiers who had PTSD after World War I were treated better than soldiers suffering during World War I. By that time, there was a collective idea that these soldiers needed mental help and could be helped. These patients were respectfully called "gallant soldiers" and were "suffering from very severe mental and nervous shock due to exposure, excessive strain, and tension" (Linden, Stefanie Caroline, and Edgar Jones 528). It was believed that these men "[could] be cured if only they receive proper attention from

physicians who have made a specialty of treating such conditions . . . [and] their chance of recovery depends[ed] on absolute quiet and on the individual and prolonged attention of the physician" (Linden, Stefanie Caroline, and Edgar Jones 528).

By the end of World War I, officers, veterans, physicians, and psychiatrists all wanted to see traumatized soldiers recover, not put them away in asylums and hide them from society as was done in the past. And while medical phrases or terminology were not always the most respectful, there was drastic improvement from past wars. This improvement continued through World War II and then the Vietnam War. As mentioned, the Vietnam War finally led to the DSM-III giving PTSD its official name (M.A. Crocq and L. Crocq 55). That name has held since and is still the official title in 2021. However, advocacy groups are making arguments about who want to see the name changed once again.

While it is evident that the titles, terminology, and overall treatment of individuals with PTSD have improved significantly, some advances could still be made. The argument is that "although the quality and effectiveness of mental health treatments and services have improved greatly over the past 50 years, therapeutic revolutions in psychiatry have not yet been able to reduce stigma. Stigma is universally experienced, isolates people and delays treatment of mental illness" (Shrivastava, Amresh et al. 70). Stigma associated with PTSD, or any mental illness for that matter, often leads to "negative outcomes for those with mental illnesses" because it prevents people from seeking treatment (Shrivastava, Amresh et al. 79). These people fear people will think of them differently, avoid them, or even fire them from their jobs if they bring up their condition. People who have PTSD may not seek treatment out of fear of stigma from the public or even their family members. They do not want to be judged or outcasted. People with PTSD or any mental illness who go untreated are at a much higher risk of hurting themselves or others, which is why it is so essential that people feel comfortable to seek treatment (Shrivastava, Amresh et al. 79). Advocacy groups are working to reduce the stigma associated with PTSD, and one of the big ways is to change the name again.

In 2011, the Deputy Chief of Staff of the US Army requested that the APA change the name to "post-traumatic stress injury" (Jetley, R., et al.). Many individuals and groups supported this idea because they felt that the word disorder would discourage some people from seeking care or revealing their condition (Jetley, R., et al.). They also argue that plenty of conditions in the DSM-V do not contain the word disorder, like anorexia, parasomnia, social phobia, and more, so PTSD should not have to either (Jetley, R., et al). The

hope of changing the name would be that more individuals would seek help if the condition were referred to as an injury, not a disorder. But while some think this change would be helpful, others believe the term "disorder" is not stigmatizing, and changing the name likely would not encourage soldiers, or anyone who has PTSD, to seek help any more than they already do (Jetley, R., et al.). This debate over the name of PTSD is still going on, and likely will for the foreseeable future.

Conclusion

The term PTSD and its treatment has changed through history. While these changes have helped people who have PTSD, there are arguments that changing the name again may reduce stigma and encourage those affected to seek help or reveal their condition. I believe it should be up to people who have PTSD to decide how it is referred to. Anybody who is suffering and worried about seeking help should refer to it in any way that allows them to get help. The public can help by accepting rather than stigmatizing people who have this condition.

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A Simpler Annuity
By Dominic Guillen

Attempts to accurately value life annuities go as far back as the Roman jurist known as Ulpian (died 228 C.E), who published a table used to convert life annuities to annuities certain for specific periods of time (Halder 116-117). The task was also taken up in the early eighteenth century by the Swiss mathematician Nicolaus Bernoulli (1687-1759), who applied the work of Ulpian to advise various noble courts on the annuities that they intended to issue (Halder 117-118). All throughout Europe in the early eighteenth century, annuities were issued to fund wars, pensions, churches, trade, and other endeavors. At the same time, several countries banned the use of annuities due to great losses that their institutions incurred. Thus, there persisted many uncertainties about annuities into the eighteenth century, and as a result there remained a demand for greater analysis into the topic of annuities. The purpose of this paper and explication is to provide an overview of the life of a notable mathematician from this period, Abraham de Moivre, and to explore the terminology, assumptions, and theory of life annuities as proven by him.

Abraham de Moivre (which he signed in his manuscripts as both de Moivre and De Moivre) was born on May 26, 1667 in Vitry, Champagne, a city east of Paris in what is now Vitry-le-François, France. Although he was born to a Protestant Huguenot family, from a young age he studied humanities, arithmetic, geometry, and trigonometry under both Catholic and Protestant teachers (Bellhouse and Genest 110). As a teenager he was sent to the academy in Saumur, a town southwest of Paris. While de Moivre was there, he studied the work of Christiaan Huygens (1629-1695) and his 1657 treatise on games of chance, *De Ratiociniis in Ludo Aleae* (Bellhouse and Genest 111). After completing his studies at the academy in 1684, de Moivre went to Paris for further studies at the Collège de Harcourt but did not graduate. It is unclear exactly when, but by 1686 or 1687 he fled to England to avoid religious persecution that followed the 1685 Edict of Fontainebleau by King Louis XIV (1638-1715). This edict revoked the 1598 Edict of Nantes, which had granted rights to the French Protestants, also known as Huguenots. The Edict of Fontainebleau led to the destruction of Protestant churches, closure of Protestant schools, and imprisonment of Huguenots. If Huguenots refused to convert to Catholicism, they could face death by hanging (Bellhouse and

Genest 111-113).

After fleeing to England, de Moivre continued his studies in mathematics, and supported himself by working as a tutor. In 1692 at an age of approximately twenty-five, he became acquainted with influential members of the Royal Society of London, including both the astronomer Edmond Halley (1656-1742) and Sir Isaac Newton (1643-1727) (Bellhouse and Genest 114). In 1695, de Moivre had his work published in the Royal Society's *Philosophical Transactions*. Halley described the work published by de Moivre as an improvement on the methods of fluxions (derivatives with respect to time) invented by Newton. Some of de Moivre's other work included the formulation of a theorem for multinomials of the form $ax + bx^2 + cx^3 + dx^4$ and a theorem relating the centripetal force of a planet and its distance from the center of forces (Bellhouse and Genest 114-117).

After the publication of *Essay d'analyse sur les jeux de hazard* in 1708, a book on probability by the mathematician Pierre de Montmort (1678-1719), and with the encouragement of his friend Francis Robartes (1650-1718), de Moivre returned to the subject of probability. This led to the publication of the book *De Mensura Sortis* in 1711, which appeared in the *Philosophical Transactions* (Bellhouse and Genest 119-120). Later in 1718, de Moivre published another book on probability, *The Doctrine of Chances*, which became a highly influential book and remained popular for many years. This book was later expanded upon with the release of the second edition published in 1738. This edition combined *The Doctrine of Chances* and de Moivre's 1725 book, *Annuities upon Lives*, which is considered the first textbook in actuarial science. The addition includes discussion, calculations, and demonstrations on actuarial science topics like annuities and survivorship. A third and final edition would be published in 1756. In order to discuss his work, we must first explore the definition and terminology of annuities, as well as the pieces of information that led to the underlying assumptions made by de Moivre.

Simply put, an annuity is a contractual agreement for the issuer, the party that sells the annuity, to make a series of payments to the holder of the annuity, referred to as the annuitant. Historically, annuities have been sold by a governing body like the treasury of a kingdom or country as a way to raise funds for short-term expenditures. The issuer takes on a long-term debt liability, meaning the annuity acts as a sort of loan from the annuitant to the issuer. This "loan" is paid back with interest to the annuitant over the agreed upon time-period. However, there is a significant difference between a loan and an annuity. Unlike a loan, the principal, which is the amount of money that is loaned, is not returned with interest in the final payment. Annuity payments are typically distributed to the annuitant annually, hence the

name annuity, but they may also be sold with an agreement for payments to be made bi-annually or quarterly. The payments may last for some discrete time-period, say seven years, or they may be paid out for the entirety of the life of the annuitant. The former is referred to by de Moivre as an annuity certain for *n* years (time-periods), and the latter is referred as a life annuity. Throughout de Moivre's work, the present value of a life annuity, meaning what the combined value of every life annuity payment is worth in currency right now, is most often referred to as the "Value of a Life." Note that the Value of a Life, which will be further expanded upon, is not the same as the value of an annuity certain for *n* years, but as we will see they are closely linked.

In fact, the value of a life annuity cannot be determined without the present value of an annuity certain for *n* years, so let us examine this integral component. De Moivre's book, *Annuities upon Lives* outlines a method for calculating the present value. To do this calculation, it is required that three variables be known. The amount of money *D*, that the annuity pays out in each time-period, the number of time-periods the annuity lasts (not necessarily in years) *n*, and the interest rate *i*. Then, to find the present value of an annuity, each payment is "discounted" and then added together. Discounting is a process that adjusts the value of the payments due at a future date to the present in proportion to the interest rate (*Annuities upon Lives* 4-5). This is done since in theory, the sum of money that is to be received at the future date could be invested elsewhere during the time interval between the present and future dates. Doing this could lead to a growth of that money in proportion to the interest rate. Hence, the value of that future money must be reduced by the amount that interest could earn on each unit of currency.

Let us develop a formula to calculate this present value of an annuity certain for *n* years (time periods). Suppose we have a payment of *D* due in one future time-period (meaning $n = 1$). Over this period, the payment could be invested, where it could earn interest at the rate *i*. So then, in one future time-period, the payment could be worth

$$D + D * i = D(1 + i).$$

Hence, it is necessary to discount the payment and make it present by dividing by $1 + i$. This means that the present value of an annuity pament due one time-period from now would be

$$P(1) = \frac{D}{1 + i}.$$

If we consider a future payment of *D* that is due in two time-periods, we

could get:

$$[D(1+i)]*(1+i)= D(1+i)^2$$

To discount this payment to the present, we divide by $(1+i)^2$. This means that the present value of an annuity which is certain for two time-periods can be computed:

$$P(2)= \frac{D}{1+i} + \frac{D}{(1+i)^2}.$$

Here, a pattern emerges, allowing us to calculate the present value of an annuity certain for n time-periods as the sum of a finite geometric series using well-known methods (Katz 657):

$$P(n) = \frac{D}{1+i} + \frac{D}{(1+i)^2} + \frac{D}{(1+i)^3} + \cdots + \frac{D}{(1+i)^n} = \frac{D}{1+i} \sum_{k=0}^{n-1} \left(\frac{1}{1+i}\right)^k$$

$$= \frac{D}{1+i} * \left[\frac{1-\left(\frac{1}{1+i}\right)^n}{1-\left(\frac{1}{1+i}\right)} \right]$$

$$= \frac{D}{1+i} * \left[\frac{\frac{1}{(1+i)^n}}{\frac{1}{1+i}} \right] * \left[\frac{(1+i)^n-1}{1+i^n-1} \right]$$

$$= D * \left[\frac{1}{(1+i)^n} \right] * \left[\frac{(1+i)^n-1}{i} \right]$$

$$= \frac{D[(1+i)^n-1]}{i(1+i)^n}.$$

From this equation, tables for the present value of annuities certain for n years are easily computed for future use. The third edition of *The Doctrine of Chances* omits this derivation, and instead relies on already computed tables. Within the third edition, tables at common interest rates such as 3%, 3.5%, 4%, 5%, and 6% are included. As an example, the table of present values of an annuity with a 6% interest rate can be seen (*The Doctrine of Chances* 300):

Table 1: Table of the Values of an annuity for years *n* found in the third edition of *The Doctrine of Chances*

TABLE IX.

The present Value of an Annuity of one Pound, for any Number of Years not exceeding 100, Interest at 6 per Cent.

Years	Value.	Years	Value.	Years	Value.	Years	Value.
1	0.9433	26	13.0031	51	15.8130	76	16.4677
2	1.8333	27	13.2105	52	15.8613	77	16.4790
3	2.6730	28	13.4061	53	15.9069	78	16.4896
4	3.4651	29	13.5907	54	15.9499	79	16.4996
5	4.2123	30	13.7648	55	15.9905	80	16.5091
6	4.9173	31	13.9290	56	16.0288	81	16.5180
7	5.5823	32	14.0840	57	16.0649	82	16.5264
8	6.2097	33	14.2302	58	16.0989	83	16.5343
9	6.8016	34	14.3681	59	16.1311	84	16.5418
10	7.3600	35	14.4982	60	16.1614	85	16.5489
11	7.8868	36	14.6209	61	16.1900	86	16.5556
12	8.3838	37	14.7367	62	16.2170	87	16.5618
13	8.8526	38	14.8460	63	16.2424	88	16.5678
14	9.2949	39	14.9490	64	16.2664	89	16.5734
15	9.7122	40	15.0462	65	16.2891	90	16.5786
16	10.1058	41	15.1380	66	16.3104	91	16.5836
17	10.4772	42	15.2245	67	16.3306	92	16.5883
18	10.8276	43	15.3061	68	16.3496	93	16.5928
19	11.1581	44	15.3831	69	16.3676	94	16.5969
20	11.4699	45	15.4558	70	16.3845	95	16.6009
21	11.7640	46	15.5243	71	16.4005	96	16.6046
22	12.0415	47	15.5890	72	16.4155	97	16.6081
23	12.3033	48	15.6500	73	16.4297	98	16.6114
24	12.5503	49	15.7075	74	16.4431	99	16.6145
25	12.7833	50	15.7618	75	16.4558	100	16.6175

Source: Moivre, Abraham de. *The doctrine of chances: or a method of calculating the probabilities of events at play. The thrid edition, fuller, clearer, and more correct than the former. By A. de Moivre, Fellow of the Royal Society, and Member of the Royal Academies of Sciences of Berlin and Paris. Printed for A. Millar, in the Strand,* MDCCLVI. [1756]

This method only provides insight into the present value of an annuity that is certain to last *n* time-periods. If one were to consider the present value of a life annuity, the number of time-periods is not certain. The present value must reflect this uncertainty by considering the age of the annuitant, the life expectancy of the annuitant, and the probability that the annuitant will live

for each year in the interval between the current period and their expected demise. To do this, some further terminology must be defined, and new assumptions made.

De Moivre states in *The Doctrine of Chances*: "I call that the *Complement of Life*, which remains for the age given, to the Time of the Extinction of Life, which will be at 86, according to our Hypothesis" (265). The time of the extinction of life, which today we would call life expectancy, is assumed to be age 86 based on observational data. The sources for this data are the so called "tables of observation" published by several authors who have compiled life expectancy data using bills of mortality (*The Doctrine of Chances* 263). Bills of mortality simply track the number of people who die in some geographic area. Of special interest to de Moivre was one such table published in the *Philosophical Transactions* by his friend Edmond Halley in 1693. This table was instrumental in the development of the propositions and their accompanying proofs written by de Moivre in *Annuities upon Lives*. He states: "The Subject of Annuities on Lives, had been long neglected by me, partly prevented by other Studies, partly wanting the necessary means to treat of it as it deserved; But two or three Years after the Publication of the first Edition of my Doctrine of Chances, I took the Subject into Consideration" (*The Doctrine of Chances* 262).

In his publication, Halley presents his findings on the life expectancy of people living in the city of Breslau, the capital of Silesia, which is located in what is now modern-day Poland. He also presents a method for calculating the value of a life annuity, which takes into consideration this life expectancy. First, his data is presented in the form of a table, which he collected from his study of five years' worth of bills of mortality from the city. Halley writes: "From these Considerations I have formed the adjoyned Table, whose Uses are manifold, and give a more just Idea of the State and Condition of Mankind, than anything yet extant that I know of" (Halley 600):

Age. Curt.	Per. fons.	Age. Curt.	Per. fons.	Age. Curt.	Per. fons.	Age. Curt.	Per. fons.	Age. Curt.	Per. fons.	Age. Curt.	Per. fons.
1	1000	8	680	15	628	22	585	29	539	36	481
2	855	9	670	16	622	23	579	30	531	37	472
3	798	10	661	17	616	24	573	31	523	38	463
4	760	11	653	18	610	25	567	32	515	39	454
5	732	12	646	19	604	26	560	33	507	40	445
6	710	13	640	20	598	27	553	34	499	41	436
7	692	14	634	21	592	28	546	35	490	42	427

Age. Curt.	Per. fons.	Age. Curt.	Per. fons.	Age. Curt.	Per. fons.	Age. Curt.	Per. fons.	Age. Curt.	Per. fons.	Age. Curt.	Per. fons.
43	417	50	346	57	272	64	202	71	131	78	58
44	407	51	335	58	262	65	192	72	120	79	49
45	397	52	324	59	252	66	182	73	109	80	41
46	387	53	313	60	242	67	172	74	98	81	34
47	377	54	302	61	232	68	162	75	88	82	28
48	367	55	292	62	222	69	152	76	78	83	23
49	357	56	282	63	212	70	142	77	68	84	20

Age.	Perfons.
7	5547
14	4584
21	4270
28	3964
35	3604
42	3178
49	2709
55	2194
63	1594
70	1204
77	692
84	253
100	107
	34000
	Sum Total.

Table 2: Halley, E. "An Estimate of the Degrees of the Mortality of Mankind, Drawn from Curious Tables of the Births and Funerals at the City of Breslaw; With an Attempt to Ascertain the Price of Annuities upon Lives. By Mr. E. Halley, R.S.S." *Philosophical Transactions* (1683-1775) vol. 17, 1693, pp. 600

The table shows a sample of 1,000 people at age one and tracks how many of them are expected to be alive in each successive year. The first column in the body of the table shows the current age, marked "Age. Curt.," abbreviating the word "Current," and the second column shows the number of "Persons" alive at that age. The two columns on the right-hand side outside of the table show the total number of people that are of that age living in the city. Many pieces of demographic information can be derived from this table. As an example, one may determine the number of years that they could expect to live based upon their age by observing the age at which half of the individuals of the same age die. Most importantly to the valuation of annuities, one may determine the odds (distinct from probability) of an individual of a certain age surviving a number of years into the future, compared to them dying before then. This can be found by taking the number of people alive at some starting date and subtracting the number of people alive in the ending date, then dividing that by the number of people alive at the ending date (Halley 601-602). Based upon this table, the odds a person of age 30 has of living to age 40 can be computed as $\frac{531 - 445}{445} = \frac{86}{445}$

meaning the odds a person of age 30 has of living 10 years are 445 (living) to 86 (dead). Since these odds change as one ages, Halley argues: "On this depends the Valuation of *Annuities Upon Lives*; for it is plain that the Purchaser ought to pay for only such a part of the value of the Annuity, as he has Chances that he is living; and this ought to be computed yearly, and the Sum of all those yearly Values being added together, will amount to the value of the *Annuity* for the *Life* of the Person proposed" (602). Thus, using his method, the present value of a life annuity will be the sum of the discounted payments which are distributed yearly, multiplied by the odds that the annuitant lives through that specific year. This process, while straightforward, is arithmetically intensive since the required information must be derived from this table for each year that the annuity is expected to last.

It should be noted that Halley's table does not track mortality up to age 86, de Moivre's hypothesized age for the extinction of life. As seen in the table of observations by Willem Kersseboom and the table by Antoine Déparcieux, age 86 is not the greatest life expectancy seen at the time. Kersseboom's data, sourced from the Registers of the Dutch Annuitants shows life expectancy of his sample up to age 100, and Déparcieux's data, sourced from the Lists of the French Tontines (sometimes referred to as long annuities), shows life expectancy of his sample going up to age 95 (*The Doctrine of Chances* 345-346). In contrast to these two life expectancies, the table published by Smart and Simpson, which sources from the bills of mortality for the city of London, shows that the life expectancy of the city's residents are lower than all three tables previously mentioned (*The Doctrine of Chances* 347). The table by Smart and Simpson does not show life expectancy to go beyond age 80. The following graph displays the data from these four tables, all of which appear in *The Doctrine of Chances*:
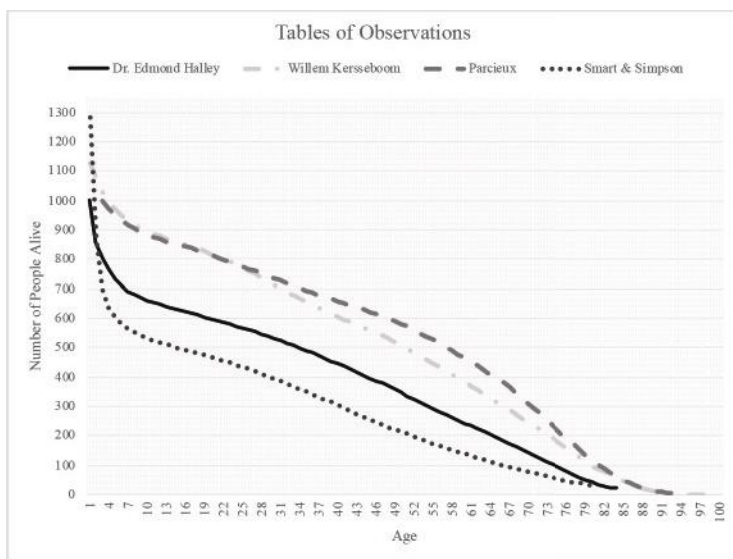
Figure 1. A Comparison of Tables of Observations between Halley, Kersseboom, Parcieux, and Smart & Simpson

From these observations, de Moivre argues that the data on life expectancy presented by Halley fits closest to the average global life expectancy, rather than that of one specific geographic area. Furthermore, upon examining these four tables, it can be observed that the time of the extinction of life, hence life expectancy, is approximately age 86. This number is much greater than the global life expectancy seen today, though this could easily be attributed to the small sample size of data points available in the eighteenth century. The World Health Organization reported in December 2020 that the global life expectancy in 2019 was 73.4 years ("GHE: Life Expectancy and Healthy Life Expectancy").

Another critical assumption to the forthcoming proposition comes as an observation by de Moivre on Halley's table. He writes: ". . . I found that the Decrements of Life, for considerable Intervals of Time, were in Arithmetic Progression; for Instance, out of 646 Persons of twelve Years of Age, there remain 640 after one Year; 634 after two Years; 628, 622, 616, 610, 604, 598, 592, 586, after 3, 4, 5, 6, 7, 8, 9, 10 Years respectively, the common Difference of

those Numbers being 6" (*The Doctrine of Chances* 262). Additionally, it can be observed that between the ages of 54 and 71, deaths remain constant at 10 per year.

With these assumptions, a proposition is set out in "Problem I" of *The Doctrine of Chances* on pages 265-266 to simplify the process for calculating the present value of a life annuity as presented by Halley. In the proposition: *"Supposing the Probabilities of Life to decrease in Arithmetic Progression, to find the Value of an Annuity upon a Life of an Age given,"* de Moivre claims that the value of the life is equal to $\frac{1 - \frac{r}{n}\ P}{r - 1}$. Here, the annuity has an annual payment of *1l.* or one Pound sterling (the currency used in the United Kingdom, but any unit of currency may be substituted). The rate of interest is equal to *r*, where *r* = 1 + *i.* This is the rate at which money has the possibility of growing per year (time-period). The complement of life is equal to *n*, and the value of an annuity certain to continue during *n* years (the previously discussed present value of an annuity) is equal to *P*. After providing examples that use this formula to value several life annuities, de Moivre proves this claim in the appendix (*The Doctrine of Chances* 310-312).

With that information, this proof shall be explored further. Comments made by this author are enclosed in brackets. In addition, longer comments have been double indented to provide clarity that they are from the author, and not de Moivre. Signs have been added where missing. It should be noted that "&c." is used in place of ellipsis or the phrase "and so on," or the Latin phrase "et cetera," where "&" is used to abbreviate "et."

Part II.

Containing the Demonstrations of some of the principal Propositions in the foregoing Treatise.

CHAPTER I.

I Observed formerly [on pages 265-266], that upon Supposition that the Decrements of Life [meaning the number of people that die in each year] were in Arithmetic Progression, the Conclusions derived from thence would very little vary from those, that could be deduced from the Table of Observations [by Dr. Halley] made at *Breslaw* [Breslau, Poland], concerning the Mortality of Mankind [life expectancy]; which Table was about fifty Years ago [in 1693] inserted by Dr. Halley in the *Philosophical Transactions*, together with some Calculations concerning the Values of Lives [the valuation of a life

annuity] according to a given Age.

[Proposition]

Upon the foregoing Principle, I supposed that if n represented the Complement of Life [age 86 minus the current age of the annuitant], the Probabilities of living 1, 2, 3, 4, 5, &c. Years, would be expressed by the following Series [sequence],

$$\frac{n-1}{n}, \quad \frac{n-2}{n}, \quad \frac{n-3}{n}, \quad \frac{n-4}{n}, \quad \frac{n-5}{n}, \&c.$$

[Which follows from the principle laid out in the introduction of *The Doctrine of Chances*: "The Probability of an Event is greater or less, according to the number of Chances by which it may happen, compared with the whole number of Chances by which it may either happen or fail," (1, Section 1). Hence, the probability of a person living m years, is the expected number of years remaining, which is the complement of life *n*, minus the number of years we are looking at, *m*, which is then divided by *n*. To illustrate this, the probability an annuitant that is 25 years of age has of living an additional year is:

$$\frac{(86-25)-1}{86-25} = \frac{61-1}{61} = \frac{60}{61} \approx 0.9836 \, .$$

The probability of the same annuitant living two additional years from their current age would be:

$$\frac{(86-25)-2}{61} = \frac{61-2}{61} = \frac{59}{61} \approx 0.9762 \, .$$

Hence, the general formula to find the probability of an annuitant living *m* years from their current age is $\frac{n-m}{n}$, where n is the complement of life, and m is the expected number of years that the annuitant will live.]
and consequently that the Value of Life, whose Complement is n, would be expressed by the Series $\frac{n-1}{nr}, \quad \frac{n-2}{nrr}, \quad \frac{n-3}{nr}, \quad \frac{n-4}{nr^4}, \quad \frac{n-5}{nr^5}, \&c.$

[The sequence can be rewritten $\frac{1}{r}\left(\frac{n-1}{n}\right), \frac{1}{r^2}\left(\frac{n-2}{n}\right), \frac{1}{r^3}\left(\frac{n-3}{n}\right), \dots,$ which follows from de Moivre's previous work stating "In all cases, the Expectation of obtaining any Sum is estimated by multiplying the value of the Sum expected by the Fraction which represents the Probability of obtaining it." (*The Doctrine of Chances* 3, Section 5). Here, the sum $\frac{1}{r}$ is

multiplied by the probability $\dfrac{n-1}{n}$, the sum $\dfrac{1}{r^2}$ is multiplied by $\dfrac{n-2}{n}$,

and so on. Recall the previously derived formula for the present value of an annuity certain for n time-periods,

$$P(n) = \frac{D[(1+i)^n - 1]}{i\,(1+i)^n}$$

Hence, if we let $r = 1 + i$, $P(n) = P$ and $D = 1$, we get:

$$P = \frac{r^n - n}{(r-1)\,r^n} = \frac{1}{r} + \dots + \frac{1}{r^n}.\,]$$

the Sum of which I have asserted in Problem I [found on page 265] to be

$\dfrac{1 - \dfrac{r}{n}\,P}{r-1}$ [which is to be demonstrated below], where the Signification of

the Quantities P and r is explained.

[End of Proposition]

As the Reasonings that led me to that general Expression $\dfrac{1 - \dfrac{r}{n}\,P}{r-1}$,

require something more than an ordinary Skill in the Doctrine of Series, I shall forbear to mention them in this Place; and content myself with pointing out to the Reader a Method, whereby he may satisfy himself of the Truth of that Theorem, provided he understand so much of a Series, as to be able to sum up a Geometric Progression.

[Proof of the Proposition]

DEMONSTRATION

$$P = \frac{1}{r} + \frac{1}{rr} + \frac{1}{r^3} + \frac{1}{r^4} + \frac{1}{r^5} + \dots [+] \frac{1}{r^n}$$

Therefore,

$$rP = 1 + \frac{1}{r} + \frac{1}{rr} + \frac{1}{r^3} + \frac{1}{r^4} [+] \dots \frac{1}{r^{n-1}}.$$

And

$$\frac{rP}{n} = 1 + \frac{1}{r} + \frac{1}{rr} + \frac{1}{r^3} + \frac{1}{r^4} [+] \dots + \frac{1}{nr^{n-1}}.$$

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Therefore,

$$1 - \frac{rP}{n} = \frac{n-1}{r} - \frac{1}{nr} - \frac{1}{nrr} - \frac{1}{n^3} - \frac{1}{n^4} - \cdots [-] \frac{1}{nr^{n-1}}.$$

But this is to be divided by $r - 1$, or multiplied by

$$\frac{1}{r-1} = \frac{1}{r} + \frac{1}{rr} + \frac{1}{r^3} + \frac{1}{r^4} + \frac{1}{r^5} + \frac{1}{r^6} [+], \&c$$

[A convergent geometric series with common ratio $\frac{1}{r} < 1$]

Then multiplying actually those two Series' together, the Product will be found to be

$$\frac{n-1}{nr} - \frac{1}{nrr} - \frac{1}{nr^3} - \frac{1}{nr^4} - \frac{1}{nr^5} - \frac{1}{nr^6} \; \&c.$$
$$+ \frac{n-1}{nrr} - \frac{1}{nr^3} - \frac{1}{nr^4} - \frac{1}{nr^5} - \frac{1}{nr^6} \; \&c.$$
$$+ \frac{n-1}{nrr} - \frac{1}{nr^3} - \frac{1}{nr^4} - \frac{1}{nr^5} - \frac{1}{nr^6} \; \&c.$$
$$+ \frac{n-1}{nr^3} - \frac{1}{nr^4} - \frac{1}{nr^5} - \frac{1}{nr^6} \; \&c.$$
$$+ \frac{n-1}{nr^4} - \frac{1}{nr^5} - \frac{1}{nr^6} \; \&c.$$
$$+ \frac{n-1}{nr^5} - \frac{1}{nr^6} \; \&c.$$
$$+ \frac{1}{nr^6} \; \&c.$$

[Here, the first row has the terms of the finite series

$$1 - \frac{rP}{n} = \frac{n-1}{n} - \frac{1}{nr} - \frac{1}{nrr} - \frac{1}{nr^3} - \cdots - \frac{1}{nr^{n-1}}$$

multiplied by $\frac{1}{r}$, the second row by $\frac{1}{r^2}$, the third row by $\frac{1}{r^3}$, and so on.]

And adding the Terms of the perpendicular [vertical] Columns together, we shall have

$$\frac{n-1}{nr} + \frac{n-2}{nrr} + \frac{n-3}{nr^3} + \frac{n-4}{nr^4} + \frac{n-5}{nr^5} + \frac{n-6}{nr^6} \qquad [+ \cdots + \frac{n-(n-1)}{nr^{n-1}}]$$

which consequently is equal to $\dfrac{1 - \frac{r}{n}P}{r-1}$: which was to be demonstrated.

[An example of this may help to better understand what is going on here. Given $n=6$, the numerator, which is the finite series $1 - \frac{rP}{n}$, becomes:

$$1 - \frac{rP}{6} = \frac{6-1}{6} - \frac{1}{6r} - \frac{1}{6r^2} - \frac{1}{6r^3} - \frac{1}{6r^4} - \frac{1}{6r^5} = \frac{5}{6} - \frac{1}{6r} - \frac{1}{6r^2} - \frac{1}{6r^3} - \frac{1}{6r^4} - \frac{1}{6r^5}$$

Multiplying through by the geometric series $\frac{1}{r-1}$, and arranging as de Moivre did, we get:

Adding the vertical columns together in the region marked **A**, we observe that in the first column we are left with a single term $\frac{5}{6r}$, adding the terms in the second column we are left with $\frac{4}{6r^2}$, adding the terms in the third column we are left with $\frac{3}{6r^3}$, and so on. Also note that in the final column in the region A, the terms add to zero. This leaves us with the sum

$$\frac{1 - \frac{rP}{6}}{r-1} = \frac{5}{6r} + \frac{4}{6r^2} + \frac{3}{6r^3} + \frac{2}{6r^4} + \frac{1}{6r^5},$$

which is exactly as constructed by de Moivre. Notice the values in the columns contained in the region marked **B** each sum to zero. In the first column, adding the terms together we have

$$\frac{5}{6r^7} - \frac{1}{6r^7} - \frac{1}{6r^7} - \frac{1}{6r^7} - \frac{1}{6r^7} - \frac{1}{6r^7} = 0,$$

in the second column,

$$\frac{5}{6r^8} - \frac{1}{6r^8} - \frac{1}{6r^8} - \frac{1}{6r^8} - \frac{1}{6r^8} - \frac{1}{6r^8} = 0,$$

and so on for all infinitely many columns.]

[End of the proof of the proposition]

[A further proposition is given for the case of death before the agreed upon date of payment for the annuity. The proof of this proposition is omitted here, but can be found on pages 338-339 of *The Doctrine of Chances*]

　　If it be required that upon the Failing of a Life [the death of the annuitant], such Part of the Annuity should be paid [by the issuer], as may be proportional to the Time elapsed from the Beginning of the last Year [previous payment], to the Time of the Life's failing, then the Value of the Life will be $\frac{1}{r-1} - \frac{1}{an}P$, wherein a represents the hyperbolic Logarithm of the Rate of Interest [$a = 1n(r)$].

　　[Observe the Value of the Life is:

$$\frac{1 - \frac{r}{n}P}{r-1} = \frac{1}{r-1} - \frac{P}{n} * \frac{r}{r-1}$$

$$= \frac{1}{r-1} - \frac{P}{n} * \frac{\frac{1}{r-1}}{r}$$

$$\approx \frac{1}{r-1} - \frac{P}{n} * \frac{1}{1n\ ln\ (r)}$$

$$= \frac{1}{r-1} - \frac{1}{an}P ,$$

where de Moivre uses $\frac{r-1}{r} = 1 - \frac{1}{r}$ as an approximation of *ln(r)*.

It is stated by de Moivre in his letter to William Jones in 1744 (*The Doctrine of Chances* 340) that although this is an approximation, he believes that any error is so slight that it is unnecessary to worry about in application. This proposition is likely included just to satisfy any curiosity one may have for the case of a life annuity being valued given an annuitant that dies before the next payment. De Moivre states that it is an established custom that the issuer of a life annuity continues to uphold the annuity agreement into the following time-period and make the payment to the heir of the annuitant (*The Doctrine of Chances* 337).]

But because there are no Tables printed of hyperbolic Logarithms, and that the Reduction of a common Logarithm to an hyperbolic somewhat laborious, it will be sufficient here to set down the hyperbolic Logarithms of 1.03, 1.035, 1.04, 1.05, 1.06 which are respectively [approximately], 0.02956, 0.0344, 0.03922, 0.04879, 0.05925, or $\frac{1}{35}$, $\frac{1}{31}$, $\frac{2}{51}$, $\frac{2}{41}$, $\frac{6}{103}$ nearly.

[End of explication]

Following this proposition and demonstration by de Moivre, further complexities are introduced into the valuation of annuities, such as annuities that pass on to second or even third generation annuitants. Since 1725, when these propositions first appeared, others have built upon these theories, tools, and assumptions. As an example, the tables of observations for bills of mortality, often referred to today as actuary tables, are maintained in many countries around the world by various institutions. One major example of this is the World Health Organization, which periodically publishes its data on life expectancy ("GHE: Life Expectancy and Healthy Life Expectancy"). Further, many of the principles discussed here have been extended into topics like bonds, pensions, and life insurance, which has led to the formation of an entire industry selling insurance and similar products which exists to this day.

The first use of these principles arose with the establishment of The Equitable Life Assurance Society, sometimes referred to as the Equitable Society, in 1762 which required its agents to be knowledgeable in topics like those introduced by Halley and de Moivre (Hald 509). Today there are professional societies in many countries around the world that are composed of actuaries who have extensively studied the topics introduced here, as well as more advanced statistical methods that were explored by de Moivre and other mathematicians such as Thomas Bayes (1702-1761), Pierre-Simon de Laplace (1749-1827), Karl Pearson (1857-1936), and others. Today, de Moivre's method is no longer in use, having been replaced by newer methods to find what is called the actuarial present value.

De Moivre would continue to make major advances in probability in his 1730 book *"Miscellanea Analytica"* (Bellhouse and Genest 124), as well as a statement of the Central Limit Theorem in his work *Approximatio ad Summam Terminorum Binomii* $(a+b)^n$ *in Seriem expansi* (Bellhouse and Genest 123-124). He continued to work on various topics in mathematics into old age, even as both his sight and hearing began to fail. However, shortly after his acceptance to the Royal Academy of Sciences in Paris (Bellhouse and Genest 129), and nearly sixty-eight years after fleeing that city, de Moivre met his own "extinction of life" at his home in England at the age of 87 on November 27, 1754.

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Performing Escape: Imagining Futures with Plato's *Symposium*
By Kai Milanovich

> [T]he foreclosure of fantasy . . . is one strategy for providing for the social death of persons.
>> -Judith Butler, "On Being Beside Oneself: On the Limits of Sexual Autonomy"

According to Aristophanes' myth, love did not used to exist. The myth also describes how originally humans came with eight limbs, that they sought to overthrow the Greek gods, and were subsequently split in half. Humans lived as the resultant four limbed beings–half of what they once were–desiring their lost half. The origin of love, according to the myth of Aristophanes, is both comedy and tragedy. Absurd in its fabrication but sentimental in its resolution, the story has remained in circulation for two and a half millennia. This is due, in part, to its popular retelling and reinterpretation–those functions which have kept it alive within discursive fields.

In what follows I center on Aristophanes' speech within Plato's *Symposium* and attend the historical reception it has received. This allows me to engage with the text as it is situated within different eras and social structures. Such an approach displaces the essence of any universal meaning within the text, for within each milieu these meanings–whether intentional or not–are ripe with contingency and anachronism. I begin with analysis of the text which attempts to locate the myth within its particular social and cultural history. Then, I examine how the myth's framework of gender/sex/desire was reutilized by the nineteenth-century German gay activists Heinrich Hössli and Karl Heinrich Ulrichs to produce an early gender theory for political means. Lastly, I examine how the myth was deployed within the musical *Hedwig and the Angry Inch*, focusing on trauma's role in creating reformed views of trans* embodiment. As a result, I show that classical texts have political power when interpreted anachronistically–either as rhetorical devices or as the conceptual tools for imaginative work–and that such anachronisms are crucial to queer histories.

With regards to methodology, this article deploys two primary techniques at large. The first is Carolyn Dinshaw's endorsement of amateurism in reading old texts. In her view, amateurism produces counter-knowledge by

situating readers in pointedly non-professional locales. Existing outside of the economic demands of institutionalized knowledge production, amateurs enable a "heterogeneous knowledge collective that values various ways of knowing that are derived not only from positions of detachment but also–remembering the etymology of amateur—from positions of effect and attachment, from desires to build another kind of world" (Dinshaw 6). Because amateurs are driven by their individual and collective goals rather than the normalized patterns of institutional knowledge, they are strategically situated to produce imaginative expertise for their ends. Especially, I might add, if these ends are largely detached from the socio-historical context of the text at hand.

Second, I endorse particular escapology that is distinctly reliant upon an imaginative relationship to one's social position and context. Utilizing this political stratagem theorized by Daphne Brooks, and pairing it with Judith Butler's "critical promise of fantasy," I show that the original myth, as well as the two pieces of reception I consider, depict an imaginative escape from the pressures of systems which they exist within. Coined from Brooks' analysis of Henry Box Brown's escape from slavery, "escapology" is the imaginative production of movement-- political, symbolic, or literal–by exploiting the current functions of oppressive systems and their ideologies. In his escape from American slavery, Brown mailed himself to abolitionists in a large wooden box. The journey, lasting more than a full day, was an imaginative solution made possible by Brown's ability to instate ownership over his own body for long enough to remain undetected (Brooks 121-122). By re-utilizing the discipline his body had been conditioned to, Brown reused the oppressive structures of the age to serve his ends. This forceful redeployment constitutes a "challenge the contingent limits of what will and will not be called reality," what Butler calls the critical promise of fantasy (Butler 29). Brown's solution was imaginative because it conjured the real out of the unreal. It created a survival strategy out of a death trap. Escapology and the critical promise of fantasy, taken together, are vital political tools found throughout my analysis.

Aristophanes' Speech

From the start, it is difficult to track the legitimacy of "who said what" within Plato's *Symposium*. Written by Plato, the dialogue begins with Apollodorus explaining an old story he has heard to an unnamed friend (Plato 172a). The story is about a drinking party, a symposium after Agathon wins a prize for a recently written play. At the party, the conversation of its attendees drifted to the topic of love (*eros*), and many party goers delivered a speech on the matter. The myth I focus on is presented in the address of

Aristophanes, a comic playwright who depicts this allegory to explain the origin of such desire. The start of the dialogue, however, obfuscates the origin of this very story. Plato writes the work, but the speech is spoken through the character of Aristophanes, who, while being a real playwright, likely did not craft this story (Plato 172b). But the re-presentation of the speeches within the *Symposium* is told from the voice of Apollodorus, who was not even in attendance. Rather, the night's events were said to Apollodorus from Aristodemus, who was in attendance. Why these complications?

I gesture to this hiccup to clarify that many accounts of antiquity are laden with authorial confusions. Separated by two millennia, antiquity stands in ambiguous relation to the contemporary era. Speaking to this troubled relationality, Sebastian Matzner notes, "Antiquity is the Other of contemporary society in which both positive role models and liberation from contemporary restraints are found" (68). Acting as the Other, antiquity is a reflective board in which current meanings find their content. Through pedestalizing political ideals from Greco-Roman history, we depict these practices as transcending time; by denying other then-common practices, such as pedophilia, antiquity becomes the awful state of "what we once were." Whether a lineage to keep alive or a past to overcome and forget, antiquity shapes current political, material, and symbolic practices. Tied in this complexity–with a narrow focus on the present as that which replaces the past–such confusion which opens *Symposium* reflects how the apparent actuality of the past is dissolved into intangibility, while the meanings of the present roll ever forward.

Within this messy context, Aristophanes' speech is typically understood as an allegory meant to explain the origin of love (Plato 189d). At the start of the myth, we are told of the origins of human nature: that human beings were once circular with eight limbs. There were three naturally occurring kinds: wholly female, male, and partially both (Plato 189e). This point about sexual kinds is taken up by German gay activists but receives little attention in the speech's telling. Trouble begins in the myth when these eight-limbed humans seek to overpower the Gods. Because the Gods are unwilling to do away with humans entirely, Zeus' course of action was to split these beings in two–effectively reducing their power (Plato 190d). Split into two, left to exist with literally half of who they were, they find themselves with a desire to find their other half. The resultant trauma of this separation aligns with my focus on *Hedwig and the Angry Inch*. Thus, within the context of *Symposium*, the speech depicts through allegory how love was born in humans. In telling this story, there is a naturalization of gender/sex/desire, which is baked into the embodiment claims at the start. When retold in nineteenth-century

Germany, these naturalizations are systematically developed and then discursively deployed. However, when retold in a 2000s rock musical, the focus is distinctly on the separation of past selves and its reclaiming of self-understanding.

Before examining these later developments of the myth, however, it should be noted that the production of the *Symposium*–both in the writing of the piece and any informative events which may or may not have occurred– were barred to a social elite within classical Athens (Skinner 146). While the writing does challenge some of the dominant norms of the milieu, it is certainly not attentive to many marginalized or oppressed persons within the era. Indeed, the topic of love itself presupposes many sufficient material requirements, not to mention social freedoms. The situatedness of both Plato and *Symposium* will come into play when considering the work of Heinrich Hössli and Karl Heinrich Ulrichs.

Toward German Emancipation

Nineteenth-century Germany was a significant era for the western development of homoerotic relations. The implementation of antisodomy laws to the German Imperial Criminal Code occurred in 1871. Homoeroticism increasingly became a subject of scientific study–what Foucault referred to as the search for the "truth" of sexuality (Foucault 51). But, significantly, resistance to criminalization was also present. If "deviant sexualities" are somehow present at birth or simply part of one's person, then what moral legitimacy was there to criminalize such persons? In response to the criminalization of homoeroticism, the Scientific-Humanitarian Committee was formed in 1897 to educate the public on the matter (Beachy 805). Because of a largely free press, many pamphlets were printed and distributed to increase awareness of the oppressed group. Such efforts were almost effective, for, in 1930, homosexuality was nearly decriminalized in Germany–though the newly powerful Nazi party suddenly shut it down.

This is the context in which Heinrich Hössli (1784-1864) and Karl Heinrich Ulrichs (1825-1895) did their work. Hössli, for one, took note of the importance which classical texts were given in German education. Indeed, in 1890 Kaiser Wilhelm II famously pushed for the education of *Germans* and not *Greeks and Romans*. Before this change in curricula, however, classical studies had sturdy ground. Matzner explains:

> While it may be an exaggeration to say that "the utopia of the sixteenth century, a world of Latin-speaking dentists, Homer-reading lawyers and Sophocles-quoting merchants, had become a reality around 1850,"

there was nonetheless a remarkably widespread familiarity with Greek and Latin texts in the original languages. Since they had become prerequisites for any kind of higher education, 'there was no one in any institution of higher learning who was unable to read Plato or Homer. (63-64)

Present in the minds of many Germans–to some degree–classical texts, myths, and references were well understood. Then, it might not be surprising that the development of German nationalism followed a parallel decline to the favor of classics at the end of the 19th century.

That homoeroticism was depicted in various detail throughout classical works did not go unmissed. Hössli, in witnessing public hostility toward homoerotic behaviors, saw this as a potential site of political strategy. In an 1836 work that compared modern sexual behavior to what was known of ancient Greek behavior, he describes the peculiar fixation which modern sexuality had with "outer signs," what we would call external genitalia (Matzner 72). Greek sexuality, Hössli argued, attended not to such signs but to "sexuality itself–the outer signs alone were for them not the entire human" (Matzner 72). The superficiality of sexual possibility is Hössli's diagnosis of modern German sexual ethics. There was a strong incongruence in how Greek culture was idealized by German culture at large, for their views on homosexuality differentiated so decisively from the Greeks. Hössli is asking, in effect, "if antiquity is the Other from which Germany normalizes its ideals, then why has sexuality been an exception to this rule?"

Matzner picks up on this gap. He argues, "In bringing out the homoerotic aspects of classical antiquity which were suppressed in contemporary mainstream classicism, Hössli text is engaged in actively 'queering' classicism" (77). Excusing Matzner's anachronistic description of Hössli's political action–for, indeed, "queering" is what Hössli has done, even if this word does not capture the precise intentions of the historical actor Matzner points out that Hössli's imaginary move was one of refocusing on what had historically been rendered background. This re-interpretive action functions as a displacement of the public hermeneutic, challenging the norms of how one made sense of history's organization of sexuality. A direct focus on homoeroticism within classical text-enabled Hössli to produce a political device out of a text which was, within his milieu, a powerful source of social and symbolic legitimization. Hössli's strategy, intentional or not, had the effect of turning the hegemonic authorizing structures of sexuality back on itself. If Athenian culture aligns with desirable virtue, then calling attention to classical homoeroticism tarnishes the Greek ideal, which stabilized the modern German norms.

Karl Heinrich Ulrichs took up a similar strategy. Ulrichs, like Hössli, was well educated on the classical texts rendered valuable at the time. However, his utilization of these is geared toward developing a concept of gender/sexuality/desire and then communicating this framework to others. After coming out to his family members, Ulrichs sought to formalize his thoughts in a series of pamphlets on the topic of same-sex attraction. In giving a summary of Ulrich's gender theorizing, Matzner writes:

> [Ulrichs] postulated the existence of two hermaphrodite seeds ("Keime") in the embryo, one for the biological sexual organ, one for the psychological, sexual desire/drive, both of which are supposed to develop into either a female or a male form, but since they do so independently a combination of male sexual organs with 'female' sexual desire (i.e., sexual desire directed at men) is possible. Ulrichs conceded that it was a natural law that both of these seeds should develop into the same direction but argued that there was a possibility for exceptions from the rule, resulting in persons with unaligned biological sex and psychological sexual desire who were neither totally man nor totally woman, and hence constituted "the third sex." (80)

This theorizing endorses two ideas that follow the Platonic tradition. First, the separation of body and soul (*psyche* in Plato) is seen in the postulation of the two seeds. Second, working from this distinction, desire–rooted in the sexed soul–necessarily seeks the body of the opposite sex. In this way, Ulrichs maintained that all sexual desire is heterosexual–for same-sex desire was only possible when one developed a sexed soul that was misaligned from their sexed body. Thus, for Ulrichs, all desire is heterosexual, and all sex is binary; it is only when the sexed soul of a person is unaligned with the sexed body that homosexuality occurs naturally.

Second, in naming the hypothesized third sex, Ulrichs again relies on *Symposium*, naming them "Uranians." In contrast, "Dionians" are those whose bodies/souls are properly aligned–what we would now call heterosexual (Matzner 80). This is another reference to the Symposium, where Pausanias makes a clear distinction between the two goddesses of Aphrodite. One is the daughter of Uranus, while the other is the daughter of Zeus and Dione (Plato 180d). As though it were not abundantly clear, Ulrichs uses this distinction to name homo/heterosexual desire.

Of course, Ulrichs' theory would fail to stand up to contemporary standards. Indeed, his gender theory, which sought to explain desire, mirrors the popular contemporary discourse on trans* embodiment. The idea that

one is "born with the wrong body" clearly fits within Ulrichs' separation of a psychological self from the bodied self. Viewed another way, Ulrichs' theory fails to make sense of sexual practice in classical Athens. Compared with Hössli's claim that many Greeks seemed indifferent to the sexed body at all, Ulrichs' notion of a sexed soul appears to be more of an invention within his milieu than anything directly derived from the Greeks. Although the theory of sex/gender/desire is said to fail outside of its milieu (and perhaps within it as well), the strategy that Ulrichs deploy represents a clear re-utilization of the oppressive system of his own time.

Similar to Hössli, Ulrichs was confronted with imminent social and political pressures. However, while Hössli aimed to question modern standards of sexual desire, Ulrichs instead sought a more direct form of self knowledge. Matzner refers to this as an *internally directed reception* of Plato's *Symposium* (Matzner 66). Conceived in this view, Ulrichs project is one of emancipation for himself and his community within their shared discursive fields. By (re)creating language that departed from the negatively value-laden terms like "sodomy," he carved out a linguistic space that was not deemed inherently abhorrent. By crafting new associations from artifacts known to his culture and even going so far as to advocate for the usage of the language and underlying concepts, Ulrichs took keen note of the oppressive systems which he faced and, in turn, fabricated these structures into an escape from the symbolic systems which restricted them.

Trauma and Trans* Imaginaries

Hedwig and the Angry Inch is a 1990s rock musical featuring a transexual/genderqueer vocalist. This musical reproduces Aristophanes' myth in its song titled "The Origin of Love," written by Stephen Trask. Thus, it finds its significance in situating the same narrative within a new historical locale and genre. The song is a musical retelling of the myth of Aristophanes, and it becomes an object of fixation for Hedwig within the musical. Trask's reinterpretation of the myth exposes Dinshaw's amateur historicism at work. There are two interesting modes of focusing on the reception within the musical, either 1) how Hedwig receives the song's meaning within the musical, or 2) how Aristophanes' myth is received in the song's composition. I want to focus on the latter of these options, for the composition's focus speaks more to a political redeployment of the ancient myth enacted by Trask.

The first verse lays the framework of the myth, keeping accurate to the major details outlined by Aristophanes. Verse two continues this trend, but by verse three, there is a deliberate mixing of the myth where Thor, Osiris, and "some Indian god" begin to play roles in the story (Trask 0:19:53).

This substitution of gods might be interpreted as an attempt to decolonize the historical position of classics; by placing non-Greek gods into a Greek myth, Trask challenges the viability and centrality of the myth's ability to be meaningful on its own. However, this blurring of mythic lines also works as a decolonial device in constructing antiquity as the Other. While historically the Other is made of a Greco-Roman tradition, the insertion of Norse, Egyptian, and Indian gods complicates the historical construction of that Other by displacing its significant figures and geographies.

After the climactic segment ends–the splitting of humans into two–there is a moment of instrumental stillness that steepens and slows. This verse reads:

> Last time I saw you we had just split in two.
> You were looking at me. I was looking at you.
> You had a way so familiar, but I could not recognize,
> 'Cause, you had blood on your face; I had blood in my eyes.
> But I could swear by your expression That the pain down in your soul was the same
> as the one down in mine.
> That's the pain, cuts a straight line down through the heart; we call it love.
> So we wrapped our arms around each other, trying to shove ourselves back together.
> We were making love. Making love. (Trask 0:20:30 - 0:21:15)

At this point, the song is going quite beyond the text of the *Symposium*. As an allegory meant only to depict the origin of love, Aristophanes' speech does not dive into the visceral trauma and blatant violence of the act of human splitting. There is no highlight of the particular moment in which the split self recognizes itself, and there is no emphasis placed on the contradiction of simultaneous self/other recognition. In Trask's retelling of the myth, love is not so much a desire to become whole again–as is often said of the original myth–but rather, it depicts trauma bonding. Trask emphasizes that "the pain down in your soul was the same as the one down in mine," less to reveal the sameness of two people's pain but to reveal that pain, not recognition, is the site of the bond. In the following line, "pain" is directly associated with "love" such that the former could not even be said to exist without the latter.

Going even further than the trauma bond thesis which Trask depicts, Sonny Nordmarken interprets the song–and thus the myth – as a model of

constructive self-identification. Noting that in Trask's retelling, love functions as a means to repair the harms of separation, Nordmarken extrapolates the theoretical possibilities that might be found in the imagined uptake of the myth. He writes, "Trans people, by integrating different gendered parts of ourselves, perhaps regenerate some of the power Zeus aimed to immobilize when he separated the androgynous being into two. Thus, the monstrosity of androgyny exists in every being—as being formally joined to another gender if not in current multi-gendered form—and can be a cathartic form of resistance" (48). By invoking Susan Stryker's proclamation of horror to appeal to the ways in which trans* individuals mimic the androgynous figures of Aristophanes myth, Nordmarken demonstrates that the culmination of trans* embodiment might be understood as a return to a bodied form, rather than a creation of a new body. Such a narrative rejects the strictly material picture in favor of the mythic in an attempt to defund cisnormative naturalization of embodiment. He continues: "Perhaps we can find freedom from pain through attaching again–to the fragmented parts of ourselves and to those who are separated from us. Perhaps we can claim the Others within ourselves, in our betweennesses, and claim other Others through restoring their place within us and our place within them to reconnect and rebuild our/themselves" (Nordmarken 48). Theorizing from the structure of the myth was similar to Hössli and Ulrichs, Nordmarken fantasizes over the possibility of utilizing the taleas a means to imagine an escape to a better future. He resists alterity by overpowering the allegorical gods' divisions to restore androgynous monstrosity and elucidate a viable political path forward. Nordmarkens constructive view of trans embodiment creates a political device akin to Ulrichs' that divorces itself from the era's standard (oppressive) cultural script.

Conclusion

I have shown how the critical promise of fantasy has made possible the escape from rigid social positions. By examining various receptions of Plato's *Symposium* in diverse historical situations, I focused on moments of anachronism–those which stood out in their historical context as inconsistent with their present because what they represented was supposedly impossible. Overcoming such impossibility requires keen attention to oppressive systems to imagine viable escapes. While these claims run the risk of seeming abstract, Butler reminds us that "the struggle to survive is not separable from the cultural life of fantasy" and that fantasy is a vital precondition for materializing difference (28-9). Imaginative work is thus political work, and it is a political work that shapes the in/possibility of the Real.

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Iran: Analyzing the Dominant Coalition of an Authoritarian Regime
By Ellie Jackson

Iran is a country located in western Asia that is slightly smaller than the state of Alaska. Its population is approximately 84.9 million as of 2021.The official language is Persian, although several other languages are spoken by different ethnic groups present in the country (Iran Population 2021). The majority of the country identifies as Shi'ite Muslim, with smaller populations of Sunni Muslims and other religious groups. As one of the oldest civilizations in history, it has experienced several different regimes, styles of government, and rulers. In this paper, I will explore the current authoritarian regime that came to power due to the Islamic Revolution of 1979, and analyze the organized violence, control, and rent distribution that the regime uses to stay in power.

Dominant Coalition

The dominant coalition in Iran is the group that serves the will of the Supreme Leader, Ayatollah Khamenei, and is made up of several distinct groups. First and foremost, the power of the dominant coalition flows through Ayatollah Khamenei's office (Takeyh). Khamenei ensures allegiance from various factions serving him by distributing rents and favors. These groups then seek to maintain their popularity with the Supreme Leader by ensuring his policies are carried out in the manner he wishes, including destabilizing or eliminating the opposition. Primarily, this dominant coalition comprises the Shi'ite clergy and the Islamic Revolutionary Guard Corps (IRGC).

The Iranian Revolution of 1979 placed the clergy at the "apex of Iran's political system," with the Supreme Leader and the most learned of the clergy being the head of the country (Safshekan and Sabet). The entire concept of *velayet-e faqih*, or guardianship of the jurist, is rooted in Islamic scholarship and requires an expert, or *Marja'*, to be the country's leader. The original Iranian constitution after the revolution of 1979 required the leader to be a Marja', until that requirement was removed to allow Ayatollah Khamenei to assume the office. The late Ayatollah Khomeini once wrote, "The clergy must rule as they are the most knowledgeable of the divine

line" (Takeyh). The second group of the dominant coalition is the Islamic Revolutionary Guard Corps, a group established by Ayatollah Khomeini shortly after the revolution of 1979 and tasked with maintaining the Islamic Revolution. They were seen as a counterbalancing force to the standard Iranian Army, whose loyalty was questioned shortly after the revolution and gained power under the current Supreme Leader. In recent years the IRGC has "mounted a challenge to clerical rule" by taking a more active role in politics and the economy (Safshekan and Sabet). In the political world, politicians who represent interests of the conservative clergy and the IRGC refer to themselves as the "Principalists," and have shut out the Islamic left, or Reform movement, from any power in the country. The apparent factors that align the dominant coalition are a commitment to the Supreme Leader, a continuation of the Islamic Revolution, and continued access to the rents that loyalty provides.

The most prevalent forms of competition within the dominant coalition are in the political world, where the Supreme Leader and the conservative factions that support him often tip their hand in favor of one candidate or another (Alamdari). The Supreme Leader makes many key appointments to head the security services, judiciary, and leaders of other government positions. The President of Iran appoints different key positions in consultation with the Supreme Leader. The elections in Iran merit a special mention here, as there are elements of the Iranian system that appear democratic to a casual external observer. The voters elect the President, the Assembly of Experts, and the Majles, with the latter functioning as a parliamentary body. Historically, the elections have been competitive, with Reform and Principalist candidates winning races and assuming some degree of power. However, all candidates are subject to disqualification by the twelve-member Guardian Council, half of which is appointed directly by the Supreme Leader (Takeyh). They routinely disqualify candidates who they feel have insufficient credentials, often a cover for not being acceptable to the Supreme Leader.

The political system has generated competition and danger to the dominant coalition. In 1999, newspapers that aligned with Reform candidates were shut down for being too critical towards the existing regime, sparking a large-scale student protest that had to be shut down violently by the regime's security services. Additionally, the Presidential election of 2009 was a pivotal moment for the regime where Reform aligned "Green Movement" candidates challenged Mahmoud Ahmadinejad's reelection -- as the election results showcased multiple inconsistencies that inspired average voters to doubt theresults and take to the streets. For the first time, many prominent clerics

politicians spoke out against the regime and the Supreme Leader, "a traditional red line in Iranian politics that clerics, politicians, and voters alike crossed numerous times after the polls closed" (Bohandy et al.). There was even an anonymous letter sent to the Assembly of Experts, the only body with the listed power to remove the Supreme Leader, by a group of clerics, and later by a group of politicians, asking them to look into the qualifications of Ayatollah Khamenei to be the Supreme Leader (Worth and Fathi). Unfortunately for the voters, Reform politicians, and aligned clerics, the uprising was suppressed brutally with public displays of violence by the regime; and methods to hold Khamenei accountable through the Assembly of Experts went nowhere.

Another common tactic within the dominant coalition is to remove members from the coalition through show trials, charges of corruption, or coordinated attacks on their character. In 2009, the Supreme Leader intervened on behalf of Mahmoud Ahmadinejad to support his Presidency. Yet, by the end of Ahmadinejad's second 2nd term in office, he was severely damaged politically for trying to challenge the Supreme Leader's power to control appointments to key ministry positions. After removing the intelligence minister, "Khamenei struck back and ordered" the minister be immediately reinstated (Dehghan and Borger). President Ahmadinejad "boycotted his own job and disappeared from office for 11 days" but had to return and accept the decision (Dehghan and Borger). After his challenge of the Supreme Leader, there were arrests of "at least 25 people close to him" (Dehghan and Borger), and a severe diminishment of his power at the end of his term. Since then, Ahmadinejad has worked to regain the favor of the Supreme Leader in hopes of a political comeback, but failed in the latest presidential election cycle after Khameini "suggested" that it was not in his best interest or in the interest of the country to run for office again (Dehghan).

Organized Violence

Organized violence in Iran is primarily controlled by the dominant coalition under the control of Grand Ayatollah Khamenei. From the beginning of the revolution in 1979 to current day, the regime has wielded considerable violence against the Iranian population and maintains a monopoly on violence potential. Potential and overt violence is carried out by the dominant coalition through many militarized groups, including the Revolutionary Guard, the Basij militia, the police, intelligence services, and other informal militia forces aligned with the dominant coalition (Milani). This violence primarily targets political opposition and perceived threats, and punishments can include imprisonment, torture, or even death.

The Islamic Revolutionary Guard Corps, the IRGC, has an inherently political mission that gives the IRGC more political power in state affairs than the regular Iranian Army. The current commander in chief of the IRGC is Hossein Salami, who is directly appointed by Supreme Leader Ayatollah Khamenei. This command structure, where the head of the IRGC is appointed directly by the Supreme Leader, ensures that the Supreme Leader can install someone loyal . That commander then selects commanders to the five units that compose the IRGC; including the Quds Force that is primarily responsible for actions in external countries and the Basij militia tasked with enforcing religious codes, among other responsibilities. The Basij militia is an all-volunteer force used by the regime and the IRGC to enhance force capabilities when needed by providing manpower (Safshekan and Sabet). Famously they were utilized as waves of human shields during the war with Iraq, clearing minefields by running into them , and being part of the force used to violently respond to protests and mass demonstrations within Iran.

The overt use of violence by the Iranian regime discourages political opposition and enhances support among the dominant coalition's base of supporters. In some instances, the regime has resorted to purges of political prisoners and opposition, such as the 1988 mass execution of political prisoners (Iran Still Seeks to Erase the '1988 Prison Massacre' from Memories, 25 Years On). In another instance, the regime directly attacked political demonstrators during the 2009 Green Movement, including firing live ammunition into the crowds causing many fatalities (Ahadi). Regime leadership justifies these acts of violence by framing the opposition in terminology that harkens back to the 1979 revolution, claiming that their opponents are puppets of the West and that action is necessary to protect the victory of the revolution by preserving the Islamic Republic. These acts of overt violence create widespread understanding of the violence potential of the regime and the dominant coalition that suppresses large-scale opposition. Large segments of the population have a sense of fear, malaise, hopelessness, or apathy about opposing the dominant coalition because the repercussions are so significant. The violence can also be so arbitrary and severe that those who previously were involved in demonstrations are traumatized from challenging the regime. The dominant coalition also uses this violence potential to control the distribution of social goods, as major industries have ties to the Revolutionary Guard, and thus the favor of the dominant faction. Those who stray too far out of line, especially the press, are shut down and replaced with more friendly people to the regime.

The potential of violence was more than likely instrumental in the early 2000s political gains made by the Principalists faction within the Iranian

political system based on overt violence used by the regime. The dominant coalition began shutting down reform-aligned newspapers in the late 90s, culminating in a large-scale student protest being shut down violently in 1999. The use of overt violence in that situation caused the reform candidates and political supporters to largely disengage with the political process over the preceding years, providing wins to conservative Principalist politicians. This gave considerable political and economic control to the conservative faction in the Majlis, or parliament, including a record number of IRGC veterans, elected to office or appointed to the cabinet by Mahmoud Ahmadinejad. This empowered the faction to use the same playbook of overt violence again in 2009 when reform politicians and supporters took to the streets to protest election regularities, and once again, the dominant coalition through the IRGC committed mass atrocities against the people to ensure they remained in power (Ahadi).

Social Functions

Access to economic activity, or production, in Iran is controlled by the various groups that make up the dominant coalition. The dominant coalition comprises two main groups that control multiple aspects of economic activity; the Shi'ite clerics and the Islamic Revolutionary Guard Corps (IRGC) and their various subsidiaries. Iran's economy is a mix of oil, energy, construction, services, and finance, with heavy reliance on energy. Different groups within the dominant coalition have stakes in or considerable control of these various aspects of the economy. Shi'ite clerics, for instance, have a significant impact on the success of local businesses based on their historical relationship with the *bazaar* or merchant middle class in Iran. "Business is no good unless you enjoy a government rent or are the son of a cleric" (Alamdari).] The Shi'ite religious institution also enjoys access to a large amount of state investment that allows them to control aspects of the Iranian commercial economy and make investments in large enterprises.

The IRGC has increased its footprint within the Iranian economy in recent years as it has enjoyed favorable access to state contracts in several sectors through companies owned by the IRGC. "From 2005 to 2011, the IRGC was awarded some $25 billion (USD) in contracts in the oil and gas sectors" (Forozan and Shahi). Additionally, the IRGC has received numerous state contracts for construction work, including a $1.3 billion contract for a gas pipeline and a $2.5 billion project to complete work on oil fields through the IRGC owned construction firm Khatam al-Anbia (Forozan and Shahi). With access to petroleum money through the strategic petroleum reserve and oil and & gas-related contracts, the IRGC has grown its influence and control

over Iran's primary economic sector.

Preaching in Iran is controlled by the Shi'ite clergy since it is the state religion of Iran. The Shi'ite clergy control many essential institutions within the Iranian government, not the least being the Supreme Leader's office, which by law must be occupied by a religious leader. The entire structure of the Iranian regime and the theology supporting the Supreme Leader is based on the Shi'ite clergy's ideas and power. There are differing opinions within the Shi'ite clergy, but those who step too far out of line, either by criticizing the Supreme Leader or undermining the regime's religious foundation, are expelled by the dominant coalition. Notable examples include Hussein-Ali Montazeri, who was next in line to be Supreme Leader and succeeded Ayatollah Khomeini until he criticized the government for executing political prisoners. He was removed from power and spent most of the remainder of his life under house arrest.

Educational goals in Iran are dictated by the Ministry of Education and are primarily tasked with providing students a foundation in Islamic education and instilling belief in the regime. Teachers are not chosen directly by the dominant coalition. All private schools were closed after the revolution in 1979, making public schools and universities the only feasible way to get educated in Iran. Universities, especially in large areas like Tehran, have been among the most consistent challenges to the regime and the dominant coalition. There have been large student demonstrations against regime activities suppressed by the dominant coalition through tactics like shuttering student newspapers and media, arresting students for political action, and even violently suppressing student demonstrations. The dominant coalition exercises control over education by controlling the student population

The relationships within the dominant coalition that provide access to these rewards are not monolithic. There are three main ways that people gain access to rents from the dominant coalition. First, the Shi'ite cleric establishment and related institutions, charities, and religious groups provide access to formal and informal rents. At the top of that establishment is the Supreme Leader, who ensures that the senior clerics within the religious establishment have support from state and private entities. Rents provided by the Shi'ite cleric establishment flow down through the entire establishment to the various groups and people that support the Islamic establishment in all areas of the country. Second, these opportunities are provided to the IRGC, and groups aligned with them. The IRGC is a crucial component of the dominant coalition and receives tremendous state support through military funding, employment opportunities after military service, and even support of their political candidacy if they choose to run for office. As discussed

above, the IRGC has access to large economic rents through preferential treatment when bidding for government contracts . For instance, a *Basiji* that joins the militia under the control of the IRGC could expect to receive a salary for his services, preferential job placement after service, and a pension funded by an Islamic charity controlled by the Shi'ite establishment. The third and final way these opportunities are provided is through traditional patron-client relationships, or old-fashioned nepotism. While the clerical and military pillars of the dominant coalition are specific to the Iranian regime, it remains true that, in a limited access order like Iran, knowing the right people is a powerful way to access rents.

Alamdari describes Iranian patron-client relationships as a "combination of the patrimonial and the saintly, in which both traditional and religious relations between superior and subordinates have been revived" (Alamdari). The patron-client relationships in Iran are driven by the patrimonial, who knows whom, and the saintly, including the Shi'ite clerical establishment and the IRGC that derives their power from protecting the gains of the Islamic Revolution. Many religious organizations are funded by private donations or directly by state funds, ensuring continual access to rents. There are also patron-client relationships within the clerical establishment that have resulted in the removal or killing of the perceived enemies of the dominant coalition.

Rent Distribution

Wealth distribution in Iran is defined by the unique characteristics of the regime and the dominant coalition's composition. The regime's foundation is the Islamic revolution, which prioritizes eliminating poverty and serving the needy. "The Constitution of the Islamic Republic" requires the government to use all of its resources for the elimination of poverty and the removal of all forms of deprivation in the areas of nutrition, housing, labor, and health" (Farzanegan and Habibpour). This is primarily structured through foundations supported by the State that provide services to those in need and other state initiatives to combat inequality. A significant amount of these funds come from oil and energy revenues generated by the regime. In addition to the State's wealth redistribution policies, there are additional methods of gaining wealth through rent-extractive activities primarily carried out by the IRGC, clerical establishment, and patron-client relationships in the dominant coalition (Farzanegan and Habibpour).

Wealth distribution is not equal. The top of the economy is occupied by a few wealthy businessmen friendly to the regime, and below that, a wealthy upper-middle-class of merchants known as the *bazaar*. Below those

classes sit the rest of the workers, and below that, the impoverished. Iran has several programs funded by the State designed to combat wealth inequality through redistributive policies, mainly through oil revenue. Under Mahmoud Ahmadinejad, the government created a fund to "help young people secure jobs, afford marriage and purchase homes" (Farzanegan and Habibpour). There have also been direct price subsidies on "petrol, gas, and electricity, and as well on staples," for direct consumer goods to help alleviate the costs of these items for the poor (Farzanegan and Habibpour). These programs have alleviated some of the pain felt by those excluded from economic opportunity. Still, the funds are highly dependent on oil revenue and have had to be cut or reformed when the regime faces an economic downturn. This has led to a backlash against the government on several occasions, as the material conditions of the poor and working-class suffer when these programs are cut.

The distribution of wealth is tied to the dominant coalition that controls social goods through the clerical establishment, the IRGC and its subsidiaries, and through traditional patron-client networks within the government. One of the wealthiest men in recent Iranian history, Asadollah Asgaroladi, was an exporter who increased his wealth during the same time his brother was the Minister of Commerce. Even within the merchant class of the *bazaar*, winners and losers can be determined not necessarily by your business acumen, but by who you know. Additionally, the IRGC has access to no-bid state contracts through its construction firms and other subsidiaries that put it in a position to increase wealth for itself, and funnel that to its members and employees.

The Iranian economy is filled with inefficiencies that prevent many people from finding any degree of success selling their skills on the open market. While there are women in the workplace in Iran, there is a dramatic and persistent gender gap in the labor market "with only 14% of (working age) women working in 2019/20" (World Bank). People who own companies that bid for state contracts with the regime also have to compete against the IRGC and other favored groups of the dominant coalition, limiting their ability to land coveted contracts. On top of rank favoritism in awarding contracts from the national government, the provincial governments also play favorites. The best chance of getting a job is to make friends with the local MP or be in the good graces of the local cleric. There are few explicit restrictions on selling personal skills on the open market, which creates a facade of an open economy, but the dominant coalition still extracts significant rents from the economy.

Payments flow through the patron-client networks primarily through

State funds and contracts. The regime is an active participant in many areas of the economy and has a significant presence through its statist policies meant to serve the poor. Getting access to those payments involves being part of the clerical establishment, part of the IRGC, or through the patron-client networks built by members of the Majlis. Starting with members of the Majlis or MPs, the Iranian constitution requires a "just distribution of national incomes among provinces and distribution of economic projects on the basis of needs and potentials of each area" (Mahdavi). The amount of money distributed in each province is calculated by that province's overall contributions to the Iranian economy, mainly through oil reserves. While the Majlis defines the overall budget, the actual distribution of the funds is at the local MP's discretion. This allows the formation of typical patron-client networks to the extent that MPs in oil-rich districts, with more resources to spend, have a higher incumbency rate than those in the rest of the country (Mahdavi). These MPs can use public expenditures to hire supporters for government jobs and invest in infrastructure favoring the groups they need to get reelected. They can also use this power to deprive less favored groups or those not in the dominant coalition from getting social goods, primarily through education and healthcare (Mahdavi).

The IRGC enjoys favorable access to state contracts in several sectors through its companies. When funds did not flow through these patron-client networks the way they had previously, the IRGC used their unique threat of potential violence to send a message and change the decision. In 2004, the IRGC closed the Tehran airport after a license to operate the terminal was awarded to another company under what some consider the guise of national security. With the support of others within the dominant coalition, they had the contract reversed, and the IRGC gained control of the airport (Forozan and Shahi). In addition to the lucrative contracts awarded the IRGC, its members have access to funds provided only for their members through various foundations. Even the voluntary *Basij* militia force has access to the Basij Cooperative Foundation, which "provides basic welfare to its members" (Forozon and Shahi).

Finally, the clerical establishment in Iran is vast and well funded, with responsibilities ranging from traditional worship services to running the foundations for the poor supported by state funds. The ICC plays a strong role in creating and maintaining local patron-client relationships by providing paid jobs or volunteer opportunities to supporters within those networks. The charity employs over "16,000 paid and 66,000 volunteer employees" that all support the charity and its mission to provide programs to the needy (Alamdari). The charity controls its own ports and trade routes

outside government control, often with explicit approval to do business outside the standard rules and laws. This gives the charity and the clerical establishment access to rents that can be shared with their employees, volunteers, and their families to maintain and build their support network.

Organizational Life

Collective expression in Iran is closely monitored and controlled by the regime and aligned groups within the dominant coalition. This control varies in form and intensity based on the level of collective expression being practiced and how much that expression differs from the regime's acceptable standards. Iranian citizens are expected to express themselves in a way that upholds the gains of the Islamic Revolution, and they are punished when they stray too far from the norm. Acceptable collective expression is allowed within the Shi'ite clerical establishment and within the IRGC, specifically in the furtherance of revolutionary ideals.

The regime exercises control over collective expression through specific state-controlled enterprises, like state media or the religious establishment, along with the military and police forces in more severe circumstances. There have been instances of groups attempting to organize against the dominant coalition that were short-lived and, in some cases, shut down violently. One of the ways the regime maintains this control is by limiting the freedom of the press. "Publications and the press have freedom of expression except when it is detrimental to the fundamental principles of Islam or the rights of the public" (Rastovac). In an infamous incident, several student newspapers were shut down violently when their support of Reform candidates and measures was deemed too dangerous to the regime to continue operation (Ahadi). In other instances, outside media are allowed to continue operations, but state-run media malign them as being influenced by western powers or that they have somehow been corrupted and are a danger to the gains of the revolution. Even with a legal basis for the state to censor unfavorable media, the regime also depends on members of the dominant coalition to enforce these rules, sometimes violently. "Quasi-official vigilante groups, such as Basīj, also intervene when state-implemented censorship fails to exert control. Self-mandated to protect society from damaging influences, they often use force, threats, and intimidation to ensure the public is upholding Islamic values" (Rastovac). This net of enforcement by the dominant coalition through official and unofficial means encourages a culture of self-censorship by organizations to prevent the damaging impacts of being singled out as non-compliant with these rules.

Other collective organizations are subject to regime control through various mechanisms that provide the dominant coalition the ability to neutralize or eliminate competition. Political parties must seek a license from the Ministry of Interior to operate and nominate office candidates. When a political party is deemed dangerous to the regime, either the Ministry or the Iranian Judiciary can invalidate the license; which can ban all candidates from that party from seeking office. This was recently exercised when three reformist parties were prohibited from seeking election in 2012 due to their involvement in the Green movement protests of 2012 (Ali). The government does allow other organizations to exist, like student groups, NGOs, and *shoras*. *Shoras* are worker councils that essentially absorbed the existing trade union movement that preceded the Islamic Revolution and turned them into Islamic worker councils (Povey). The workers' movements have played a significant role in the history of Iran over the past century under multiple regimes, and continue to play a prominent role today as *shoras*. Some of the largest movements in recent history have come from workers protesting unpaid wages and embezzlement of funds by management (Evans). Due to the revolutionary roots of the regime and the focus on egalitarian principles, the regime has continued to support shoras councils in the workforce.

Much like collective expression, individual expression is monitored and controlled by the regime to promote behavior that adheres to the dominant coalition's standards of the Islamic Revolution. Ayatollah Khomeini proclaimed, "The road to reform in a country goes through its culture, so one has to start with cultural reform" (Rastovac). The regime has a few different groups that monitor individual expression, with some groups responsible for cultural expression and others more focused on political expression. This is primarily done through the Ministry of Culture and Islamic Guidance that "consists of an elaborate system of councils that regulate and monitor every sphere of artistic expression" (Rastovac). This Ministry has overseen an extensive regulatory and legal apparatus focused on limiting the artistic choices of individuals in Iran based on the preferences of the clerical establishment.

Directly after the revolution, one of the main focuses of the Supreme Leader and the dominant coalition was to enforce cultural standards fitting their idea of the Islamic Revolution, especially after the invasion by Iraq. Culture was closely tied with political identity, and the regime was looking for every opportunity to stamp out what is considered "western" influence through culture and the arts, with a significant focus on music. "Music is like a drug, whoever acquires the habit can no longer devote himself to important activities. We must eliminate music because it means betraying our country

and our youth," (Rastovac). This focus on eliminating the western influence of music took on several legal forms, including banning "public concerts, music classes, solo female singing, and particular radio and television broadcasts of western and Iranian classical and pop music" (Rastovac). If an artist wanted to get permission to play traditional Iranian music on a TV show, radio program, or another public forum, they would have to go to the Ministry of Culture and Islamic Guidance for authorization. As members of the dominant coalition, this ministry could expedite authorization for favored groups and persons or move very slowly, or outright deny, similar requests from disfavored groups. This ministry makes an appearance in a recent film, *Argo*, as the ring that the protagonists must kiss to get permission for their scheme to film a movie in Iran (Affleck et al.). While there has been some loosening of cultural restrictions since the early years of the revolution, it is still a highly contentious area of individual expression in Iran.

Finally, the enforcement of these restrictions on individual expression can vary. In the early days of the revolution, being caught with banned pop music cassette tapes "cost individuals considerable fines and put them at risk of being jailed. Revolutionary guards frequently stopped cars in traffic searching for pop music cassettes and regularly raided homes if they suspected a party was being held" (Rastovac). When they weren't stopping cars in traffic to search for contraband cassette tapes, they were often raiding homes suspected of hosting house parties. "They descended on social gatherings where women mingled freely with men and clamped down on sinful polluters of the environment, in particular those who dared to entertain any thought of popular music and dance" (Afshari). Policing morality in Iran, especially towards citizens that broadly were used to enjoying these things before the revolution, was incredibly challenging. "Alcohol, music cassettes, videos, gambling, and prostitution were driven into a thriving underground" (Afshari). Even with the help of the Basij, the challenge of enforcing these rules became less of a focus in recent years as the regime has focused most of its activity on stifling political dissent and targeting dissidents.

Conclusion

The authoritarian regime in Iran has been in power for over 50 years, but has only had to deal with one true succession of power during that time. The regime structure is wholly designed to maintain control for the dominant coalition and serve the Supreme Leader's will. It is a labyrinth of competing organizations and interests that an effective leader can use to maintain power amongst different groups with violence potential. There is competition within the dominant coalition focusing primarily in two areas, gaining access to

additional rents and getting a greater say in the succession process for the next Supreme Leader. It is my firm belief that the IRGC will play a much more prominent role in the selection of Ayatollah Khamenei's successor and could outright challenge the regime if an unfavorable successor is named. The greatest risk to the regime at this point remains the key members of the dominant coalition, since they will be the ones wielding violence if the current regime structure breaks down. If Khamenei and the dominant coalition decide to name his son as his successor, which many observers believe may happen, there could be a greater window for instability and discord among the dominant coalition. Naming the next successor based on familial ties over political skill in managing the dominant coalition is a potential for rifts to open and widen within the dominant coalition, causing regime instability. As things stand now, the regime has total control over violence and has kept its supporters in line with access to rents and control of social goods. None of that is likely to change without some unforeseen event or dramatic shift in the circumstances within Iran.

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Spatial and Social Organization in Restaurants: The Dynamics of Cooperation and Contention
By Carson Rau

According to the U.S. Bureau of Labor Statistics, the food and beverage industry is projected to increase 10% from 2019-2029, making it the fastest growing sector of employment in the country. Food service jobs, specifically, make up 10.2% of the service industry (U.S. Bureau of Labor Statistics), and include everything from full-service restaurants, limited-service eating places, and mobile food services. This rapid growth has resulted in the production of new novel worker behaviors and identities. By bringing together individuals from such differing backgrounds, it creates unique social interactions that likely would otherwise not occur. While Bernard (2012), Demetry (2013), and Heerdink et al. (2013) have explored how restaurant and service industry positions impact their employees psychologically and socially, the effect that spatial and hierarchical structuring has on employees' social exchanges has yet to be systematically explored. This gap in research is significant because these spatial environments have the power to alter interpersonal interactions, as well as employees' self-perception, which can, ultimately, impact performance.

This study explores (1) how identities, behaviors, and relationships are negotiated between kitchen and service staff in sit-down restaurants and (2) how these social exchanges are impacted by spatial organization. It seeks to answer these questions by examining the data collected through ethnographic observation. Ethnographic observation is a qualitative research method in which the researcher studies a particular social or cultural group with the aim to better understand it. The present study aimed to gain an insider's perspective of restaurant workers' experience through firsthand observation, participation, and interviews with restaurant employees.

Job positions within restaurants are typically organized into front and back areas. Front of house positions normally require customer interactions and include bussers, servers, or hosts(esses). Back of house employees' interactions, on the other hand, are limited only to coworkers. Typically, jobs in the back of house, such as bakers, cooks, prep cooks, dishwashers, etc.,

entail tedious and hard labor. There is less emphasis placed upon language proficiency in the back of house, and employees often have limited English proficiency. This spatial, and often ethnic, division of labor influences employees' exchanges and is also taken into consideration when making hiring decisions. The findings of this study illustrate the impact that this type of social and spatial structuring has on workers.

There are complex relationships and social exchanges in kitchens, which is important to understand as these interactions play a role in labor relations and worker stigmatizations within the service industry. These types of exchanges shape the system of social organization, racial conceptualizations, and construction of workers identities. This research study aims to further break down factors which contribute to the behaviors, relationships, and identity formation of restaurant workers. Previously, restaurant workers have been found to exhibit solidarity, conformity, and deviant behaviors, such as engaging in counterproductive activities or the ostracization of other employees (Bazazi et al., 2019; Bernard, 2012; Heerdink et al., 2013; Kim & Choi, 2018; Stein, 2013). Other studies have found that people who work in restaurants are treated differently on the basis of gender, race, status, or culture (Bloomekatz, 2007; Caesens et al., 2020; Collins, 1998; Lee, 2019; Newheiser et al., 2017). This unequal treatment of employees is significant because it further supports the idea that space can be racialized and, ultimately, impacts the behavior patterns of employees. As such, this study sets out to investigate how a workspace can change self-perception and impact interpersonal communications. In setting these goals, I recognize there is the potential for observer bias within this study, as I have affiliations with the restaurant industry and the locations observed. Despite this potential for bias, I believe my insider experience has given me observational advantages that researchers without restaurant experience lack. In garnering a better understanding of the role that restaurant workers' behavior plays in existing theories, future or continued research can account for emergent patterns or observations in restaurant worker behavior that would suggest new theories.

Restaurants and Social Exchange

Restaurants and service industry positions can create unique labor environments that often impact the social exchanges, behaviors, and identities of employees (Demetry, 2013). Many restaurants promote conformity and solidarity among employees through standardized uniforms, dress codes, mandatory scripts, and formalized training (e.g. kitchen safety practices, consistent execution of menu items, portion and quality control,

etc.). This underlying sense of conformity and solidarity present within the industry affects the conceptualization of norms and the behaviors on an individual and staff-wide level. In this type of work environment the employees must conform to the expectations of management, which, in turn, forms solidarity ties between individuals who must work as a team to meet the demands placed upon them. The social exchanges and behaviors of restaurant staff are impacted by several nuanced concepts which only further illustrate the influence social exchange and spatial environment have upon them.

It is a popular belief that individual incentives, such as raises or cash bonuses, promote new ways of thinking and solutions. Oftentimes, however, the motivation such as why and how the team can achieve these goals and rewards themselves is undisclosed. Individual incentive structures, like the aforementioned raises, and collective incentive structures, such as performance-based rewards and team bonuses, are utilized in the workplace, which further impact the social exchanges performed within restaurants. Collective payoff, however, promotes diversity and accuracy among work staff (Bazazi, Bahrami, Richardson, 2019). This willingness to participate in individual or collective incentives sets the tone for cooperation amongst coworkers. When restaurant employees refuse to conform it creates intergroup conflict, which can shape individual tendencies to sacrifice for their groups, enforce norms through peer sanctioning, and relinquish decision making to leaders (Benard, 2012). This group behavior and performance ultimately affects leadership support and the tendency to turn to leaders for help or mediation, depending on the status perception of the group (Benard, 2012). This examination of conflict and its promotion of group cohesion is important for further study of the relationships and social organizations of restaurants.

The occurrence of conflict within restaurants is also relevant to how social exchanges and behaviors are performed. There is a strong indication that the reason majorities are able to exert control over minority groups is because conformity intentions form automatically, even if the conformity is improper (Stein, 2013). Restaurants, for example, have a behavior that can be seen as highly deviant (e.g. verbal aggression, social division, etc.), but are accepted by the majority of the workforce. Thus, if an individual joins the group, but disagrees with their organization or conduct, many will still conform to the behavior of the majority. Oftentimes, they join the group and accept their norms for fear of retaliatory ostracization or judgement.

Emotional expressions of group members also serve to shape conformity versus deviance in groups (Heerdink et al., 2013). Specifically, emotional

expressions can impact whether someone feels included as part of a broader collective (Heerdink et al., 2013). For example, if the majority group expresses anger toward a deviant group member, this member will feel further rejected; whereas if the majority expresses support, the deviant individual feels more accepted. The majority is capable of strongly affecting the behavior of the perceived deviant, resulting in conformity to group norms (Heerdink et al., 2013). However, this requires emotional labor from current restaurant workers to help new members feel part of the collective. Past research conducted by Hochschild (2012), Lee (2018), and Newheiser et. al (2017) has also explored how low-wage workers are often required to engage in extensive emotional labor in addition to their jobs. This labor is unrecognized and, therefore, undercompensated, but impacts how they are evaluated and treated by the rest of the staff. For example, dishwashers are commonly composed of minority staff and are expected to work quickly and efficiently, while being underpaid by management and demeaned by the rest of the staff.

Past research has explored employers' discrimination against U.S. workers in favor of immigrants who, because of their legal status, are more prone to be exploited (Bloomekatz, 2007). This is salient because the racial segregation of a physical space can foster multiple forms of political, economic, and social segregation (Collins, 1998). Employees are a constant concern for those running restaurants as the employees' work ethic, willingness to participate, skills, and emotions can impact productivity in the workplace. This devaluation of human labor directs negative stigmatization toward workers, which, in turn, impacts their sense of identity. Stigma is a trait that conveys devalued stereotypes and is defined by Erving Goffman (1963) as being an "attribute that is deeply discrediting." Negatively stigmatized individuals often have their well-being restricted on both micro-and macro-levels, which produces social inequalities through the maintenance of social and group hierarchies common in restaurant settings. These types of discredited attributes can be easily discernible (e.g. skin color), or less obvious (e.g. mental illness).

Devaluation of individuals via perceived negative attributes teaches an assigned valuation based on hierarchies of race, gender, ethnicity, sexuality, etc. which are socially constructed arrangements (Collins, 1998). The labor queue theory illustrates how management relies on racial and ethnic stereotypes and pre-existing patterns of occupational segregation to assign positions (Lee, 2019). Often in professional categories whites, Blacks, and Latinos are assigned roles and attributes, which impacts their work experiences and opportunities. This categorization reflects efforts to maintain racial purity, as people of color are seen as less capable of

entering managerial spaces (Collins, 1998). Racial ideologies, for example, portray people of color as intellectually underdeveloped, while whites are constructed as intellectually mature and more civilized (Collins, 1998). This type of worker stigmatization and segregation can lead to deviant behaviors such as workplace aggression, further complicating identity formation and self-perception of minority workers. Workplace aggression behavior is not only existent in interpersonal relationships, but also is directed toward the organization itself (Chernyak-Hai, et al., 2018).

Social exchanges, behaviors, and identities are affected by the aforementioned factors, as well as by spatial elements. Spatial and occupational pressures are prevalent in restaurants and can vary depending upon local culture (Demetry, 2013). External demands, such as a busy Saturday night, influence employees' use of space, their social experience of time, and coworker relations. Restaurants organize time and space in order to achieve goals and promote maximum efficiency, which reduces workers' autonomy. Internally created pressures, along with external demands, influence workers' relationship to space and time as they change their organization to maximize service (Demetry, 2013). These relationships to space and time further impact the social exchanges, relationships, and hierarchies that exist with restaurants.

Dramaturgical Perspective and Restaurant Workers' Behavior

The terms "front of house" and "back of house" are typically used to describe the spatial areas occupied by restaurant workers, and can also be indicative of the types of behaviors which can be observed. Erving Goffman utilized similar terms in his book *The Presentation of Self in Everyday Life (1956)*, where he presented the dramaturgical perspective in sociology which incorporates the metaphor of theater to explain social interactions. This analysis presented by Goffman is highly applicable to the observable behaviors occurring within restaurants. The terms "front stage" and "back stage" developed by Goffman refer specifically to different behaviors that individuals engage in every day. He argued that social life is a performance carried out by individuals, or teams of participants, which occur in three places: "front stage," "back stage," and "off stage." These settings not only provide context and shape the roles and "performances" in social interactions, but also influences behavior and overall performance. Goffman's perspective also considers that social interactions are influenced by the time and place in which they occur and can be affected by the "audience" present for it. These performances are further shaped by values, beliefs, norms, or

common cultural practices of the social group and where the interaction occurs.

Front stage behavior, according to Goffman, occurs when individuals know that others are watching. This type of behavior reflects internalized norms and expectations, which are shaped by the setting, the role one plays in it, and by physical appearance. These performances are highly intentional, purposeful, and often become habitual over time. It is a "mask" individuals form of themselves as who they wish to be perceived as. The actions and verbal exchanges in these front stage performances follow familiar rules and expectations for a given setting. This is applicable to behaviors displayed by front of house workers in restaurants. They play a specific role in dealing with the public and clientele, often wearing a "mask" or putting on performances for those they are serving. They are aware of how others perceive them, and the expectations placed upon them, which influences their behavior. This impacts everything from the way they speak to how they dress themselves. By engaging in this performance-like behavior, workers can shape how others view them, and what is expected of them.

Back stage behavior differs because individuals are free of the expectations and norms which dictate front stage behavior. Goffman describes back stage behaviors as being similar to those exhibited in "employee only" areas or back of the house. This is because workers are behind the scenes and are therefore not subjected to the same expectations placed upon front of house workers. People are typically more relaxed and comfortable when being backstage. They let their guard down and reflect a more uninhibited version of the self. In restaurants there is typically less formality in the back of house, which can be seen in workers' behaviors, social interactions, and even how they dress or carry themselves. While these individuals are still aware of the norms and expectations placed upon them, they are able to behave more freely. This freedom, however, can lead to deviant behaviors and different treatment between front of house and back of house employees.

The expectations for front and back stage conduct differs significantly and can lead to confusion, and even controversial treatment amongst the staff. Corrective sanctioning tends to be done in the back stage in order to maintain the image of a united front. This means staff will be subjected to more strict forms of discipline and are treated with less respect or formality. Team members backstage, or back of house, are unconvinced that they are valued players, as exemplified in interviews (Rau, 2020). Due to this difference in treatment, employees can feel undervalued. This can impact morale in forthcoming performances and cause them to engage in defensive practices

in order to protect themselves. Restaurants are composed of individuals of differing status levels who are expected to cooperate despite being thrown together in order to reach a goal and comply with management demands. Typically, individuals who are dissimilar in important respects maintain social distance from each other in environments of enforced familiarity, which can lengthen the divide between front stage and back stage workers. Through their performances and the structuring of the space, workers' behaviors and senses of self are impacted by their roles in the restaurant environment.

Methods

This study examines both the physical and social structures of two restaurants, as well as employees' social behaviors in order to understand how these elements affect the identities, interpersonal relationships, and communication of staff. This was accomplished via a grounded theory approach, accounting for emergent patterns or observations (Glaser and Strauss, 1999). The data was collected in the greater Kansas City area. Utilizing an ethnographic methodology, this study explored micro-level exchanges and adaptations within restaurants. In observing the kitchen and dining room areas of two restaurants operating under the same company, a total of four notes of social exchanges were taken. This was done during the same window of operation at each of the two sites.

The name of the company has been changed in order to protect the identities of participants. In this paper the two restaurants will be referred to as *Midwestern Market*. *Midwestern Market* is a moderately priced restaurant group that caters to the needs of many types of clientele. Not only do some of the locations boast drive-thrus, quick carry-out orders, and catering for all ages, they also provide a sit-down environment for local business executives to hold meetings. Meals here can range from quick coffee and pastries, to full sit-down meals with alcohol. Each restaurant location was in a different socio-economic demographic area in the greater Kansas City area, allowing for greater diversity in both worker and clientele demographics.

Each location had different floor plans. Despite having expansive kitchens and dining areas, the staffing remained fairly consistent in terms of size and distribution. At each observation site there were typically at least three to five front of house employees, three to ten kitchen employees, and four to ten bakers. There were also one or two managers on site at all times. The owners of the company were seemingly uninvolved with daily operations. Gender composition differed across locations. While some were primarily staffed by men, others had greater gender parity. The common

factor observed between location was the clear distinction and racial composition between front and back of house. Whereas the front of house was mostly composed of white individuals, the kitchen staff was composed of ethnic minority members with limited English. Front of house management was notably composed of white individuals for both sites.

I was able to perform ethnographic observations in these restaurants by contacting management and receiving authorization to observe daily operations. While observation of the kitchen, or "back of the house," proved challenging due to the busy nature of restaurants, I accumulated substantial data over the several hours I was allowed access. I also arranged interviews with members of both front and back of house, after reassuring them of their anonymity. The interviews took place with individual staff members outside of observation hours via video call to ensure safe social distancing and privacy.

The data generated provided many examples of correlations between the establishments that can be applied to social theory, and illustrates the power and change exerted by the industry upon its laborers. The samples being observed consisted of front of house staff (servers and hosts) and back of house staff (cooks, bakers, and dishwashers). The study focused on tracking, recording, and comparing observable behaviors (e.g. verbal communication, verbal aggression, body language). In analyzing these observable behaviors and recording their frequency conclusions can be drawn about social exchanges, and the implications they have for the work staff.

Upon the conclusion of my data collection and fieldwork, I applied open and axial coding categories. This coding method allowed for the connection of employee exhibited behaviors (discourse such as complaining, gossiping, joking, etc.) and the occupation of space (divided into categories based upon department and work), thus allowing for expanded exploration of the link between restaurants and their impact upon employee dynamics and identities.

Findings: Two Locations, One Company [1]
Racial and Gender Demographics of Employees
<div style="text-align:center">Site 1: College Town</div>

Front of house workers at this location were primarily women, with one male barista and one male counter worker. The back of the house contained greater employee diversity, while still being composed primarily of women. Three bakers were white, 1. The findings of this study have been broken down by location to ensure organization and easily comparable data. All participant names have been changed to pseudonyms in order to protect their identities.

while one appeared to be of Latino descent. The managers of cakes and pastries were two white women. The kitchen staff numbered six at the busiest point in observation: two Latina women prep cooks, one white male prep cook, and three male line cooks who were white, Latino, and Black.

Site 2: Suburban Living

This site had the largest staffing of the two sites. The front of house staff numbered approximately ten to fifteen workers, all white except for one Asian man and one Latina woman. The bakery staff was composed of eight women and one man, all of Latino descent. This trend continued with the kitchen employees, which was made up of seven Latina women and two men, who were Latino and Black. It was surprising to see women representation among the back of house staff in these establishments, as it is a predominantly male field. There was a greater age variation at this location, potentially contributing to the differences in communication. The site manager and the three assistant managers were white, but the bakery was managed by two Latina women, and the kitchen by an older Black man.

Spatial Organization

Site 1: College Town

This location was surprising, both in space and structure. Initial observation revealed the dining room to be split level, with the kitchen and back of house area sublevel from the main floor. This location had three floors, which is uncommon. The main floor held the front counter, where customers entered and placed orders or bought pastries, and a second counter that was designated for order pickup. It also had a large semi-casual dining area. There was not a large overlap between front of house and back of house staff at this location, which could be due to the size of the space or staff layout. Staffing appeared small for a space of that size, with employees clustered mostly by department. The front of house staff at this observation site numbered five to six employees consistently.

The kitchen or line area connected to the main level via a window to pass food through. The kitchen space was mostly a long and rectangular area, with employees from both the kitchen and the bakery sharing common prep space. The bakers were generous in sharing their limited space with other departments. During the observation it became evident that the staffing of this location seemed sparse for the size of the building. Employees were significantly spread out, with plenty of space aside from a few cramped areas in the kitchen.

Site 2: Suburban Living

With only one level, space was highly limited at this location, which

was a stark contrast to the first site. This location had a large counter area with significantly reduced space. Behind the counter there was an open kitchen space where the bakers worked on a large wooden table. Open kitchens provided a very different layout for this staff, as they were constantly occupying each other's workspace. The kitchen and bakers shared everything at this location. Everyone seemed to be piled on top of each other, and there were no distinct areas or separations of departments.

There was a patio off the dining area which was done as part of a renovation in hopes of adding more dining and seating space. Due to the small size of the restaurant, front of house workers were constantly in each other's space, oftentimes working around each other. There seemed to be no semblance of organization and as business began to increase, employees occupied what space they could. Breaks were taken by back of house staff sitting on milk crates, huddled in corners of the restaurant, while front of house employees found a table to sit. The limited space also meant managers at this location occupied the same spaces as their employees.

Social Exchanges among Front and Back of House
Site 1: College Town

One of the most striking things about this observation was the quiet atmosphere that permeated it. While exchanges occurred between employees, many of the staff kept to themselves or worked quietly. When exchanges did occur, they were brief and mostly positive in nature. Front of house employees mingled casually with each other during down time and despite their willingness to talk to each other, I never witnessed any chatting between the front of house and back of house employees. This included breaks, when back of house workers would go into the dining room to eat without interacting before heading back to work. The fact that departments are fairly separated within this location potentially, contributed to the lack of familiarity between employees. Additionally, there was also an obvious language barrier between some workers, which was likely another contributing factor to the limited exchanges.

The tone of this restaurant was set by the presence of the managers, Julie and Matt. They worked alongside their staff, and took care to ensure not only efficiency, but understanding and respect for their staff as well. While their interactions were somewhat limited, it was clear that employees were comfortable within their roles. At one point during this observation, the managers approached one of the Spanish-speaking line cooks and asked him to stay late. While it initially seemed he was annoyed or possibly did not understand, they continued to work with him until a solution was reached.

Site 2: Suburban Living

This location was significantly livelier. Due to the limited space and high volume, employees from every department were thrust together. Despite this, limited interaction occurred between front and back of house employees. The ones who did cross the departmental divides all spoke English and could communicate easily. Similarly to the observations of the first site, front and back of house had very little overlap. The distinction at this location was the willingness of the bakery and kitchen departments to communicate. There seemed to be a greater disconnect between workers at this location, in general, despite their proximity. This could be due to management style, employee demographics, language barriers, or spatial organization.

The Suburban Living location was also utilized for pilot interviews, which revealed the differences in perceptions of each department. They were conducted with Heather, a front of house shift manager, and Miguel, one of the line cooks. When Heather was asked about interdepartmental communication, she indicated that "the different departments have different standards, the cooks and some bakers are always late, but we try to be harder and more on top of counter staff." This further illustrated the difference in standards when communicating or handling front of house versus back of house staff. She believed that the biggest issue in the restaurant was communication, whether that be someone not telling her they did not get a shift covered, or a kitchen manager not being told about a large order that would impact the business.

At one point, Miguel, mentioned how "cliquish" the workers could be, which was reinforced by the communication witnessed. In fact, Miguel informed me that his coworkers were "pissing him off again as usual." This was because someone "doesn't want me prepping because she thinks I don't know what to do even though I been back here longer than her." He indicated that this coworker told their manager she would rather have one of the other line cooks prepping in the back because she "knows more." This type of tension and perceived disrespect also occurred in exchanges between managers and employees. When I spoke to Miguel about his experiences working in the restaurant, he felt his work was not appreciated as back of house staff. He believed the biggest problem was that people were not properly or fairly compensated for their work. He stated: "I just feel like people don't understand how I feel when people don't feel that I'm working. Grandpa appreciates me but everyone else sees what they want to see. They see me walking around and see I'm not working, and they don't see or don't realize how much I do for everyone there."

He also commented on the fact that workers would adopt the way

managers treated employees. Miguel informed me that when his peers saw the managers bossing him around, they, too, felt that they could treat him in a similar manner. He perceived dishwashers as being treated the worst-- constantly belittled and underappreciated. Miguel also indicated that the way in which people treated each other impacted the morale of the entire staff. If one person exposed the rest of the staff to their bad attitude or negativity, they brought everyone down with them.

Discussion

In this study, space played a key role in the way restaurants organized their employees and, as a result, how employees interact with one another. The larger the space, the less communication occurred between hosts, servers, managers, cooks, and dishwashers. The restaurant that boasted more space allowed workers to find privacy and do their work independently. Comparatively, the smaller site required individuals to share space, which seemed to produce greater conflict. The construction of space seemed to have more of an impact upon interdepartmental exchanges, rather than departmental. All the spaces showed a disconnect between cross-departmental communication on some level, regardless of whether they worked alongside each other or on the other side of the restaurant.

Restaurant design contributed to social segmentation between front and back of house. These terms reflect more than just architectural design. It impacted how different employees interact with each other, whom they interacted with (e.g. management, servers, hosts, cooks, etc.) and how. It was evident from my findings that front and back of house employees seemed to isolate themselves, as illustrated by how and where back of house chose to take their breaks. This could be due to the staff's comfort level in entering another "domain," or it could be spatially related, as the dining areas can accommodate more employees. Either way, there was a trend of back of house employees taking breaks huddled in the back, while front of house sat out comfortably in the dining areas. This segregation was also evident in the social exchanges between departments. The language barriers hindered much camaraderie and understanding that could have been developed amongst the staff. This seemingly increased feelings of alienation or inferiority for back of house workers. These barriers also appeared to confuse employees, as my interview with Miguel illustrated. Back of house workers were not often clear on why they are treated differently or held to different standards.

The findings in this study were substantiated by Goffman's dramaturgical analysis. The assertion that individuals behave differently

"front stage" versus "back stage" is easily seen in the behavior exhibited by the staff. The behavior displayed by front of house employees, for example, reflected the expectations placed upon them as customer service workers. Their social interactions were more formal, shaped by their setting and "audience." Their interactions were more purposeful in their endeavor to be perceived as accommodating and efficient. This impacted everything from their manner of speech to how they dressed. The adopted behaviors become a "mask." This was especially evident as workers immediately became more casual and relaxed upon shifting from front to back of house.

The behavior exhibited "back stage" was substantially more casual, despite site two having an open kitchen where staff could be observed and heard by customers. The "performance" observed supported Goffman's theory that back stage behavior differs because it is free of the expectations and norms that dictate front stage interactions. Their behavior was not inhibited by the need to keep up a performance, and workers were able to let their guard down. Expectations for dress code and social interactions were lessened, which starkly contrasted to front of house expectations. This could be clearly seen in my interview with Miguel, who spoke quite casually with me. Heather, on the other hand, seemed much more positive about working in front of house and spoke in a more formal manner. She appeared more concerned with her answers and how the restaurant could be perceived. This stark difference in behavior was additionally highlighted by the way front and back of house employees interacted.

Back of house workers behaved very casually around each other, often falling into cliques. This, however, created tension between workers. The casual nature of their behavior resulted in instances of disrespect between both managers and coworkers. Management typically performed corrective sanctioning in back of house, in order to maintain a united image, making back of house workers more susceptible to feeling undervalued. The supervisors also spoke more harshly and in more raised tones with back of house staff when compared to front of house, which only added to the divide between departments. Managers often exhibited spatial and social control over their staff by organizing them between front and back of house and engaging in differing social exchanges. Ultimately, this difference in treatment, the structuring of space, and performances enacted by employees played a large role in the restaurants' environments.

This research provided a rich set of data with a representative sample, aided by my ability to act as a participant, rather than full observer. I gained extensive knowledge from my connections at each location, which gave me a nuanced understanding of the environments. The most difficult aspect

of conducting this research project was not understanding the full scope of my undertaking. The data I collected was much more detailed than I had anticipated. I also recognize that my past involvement in the restaurant industry, as well as with this company, could carry an observer bias. I strove to be as objective as possible, however, logging every communication I shared and operationalizing data to quantify it. My understanding and involvement in the industry, in fact, gave me the credibility to observe freely and relatively undisturbed. By doing this, I was able to gain truly candid and honest responses from my participants without fear they would alter their responses due to apprehension or mistrust.

Conclusion

This research project employed the use of ethnographic observation to collect qualitative data from two separate restaurant locations operating under the same company. I argue that the spatial and social organization of restaurants have a lasting impact upon the behaviors and identities of those working within them. Workers, for example, are organized and occupy space within a restaurant in ways that impact their identities and relationships.

A workspace has the power to influence the behaviors and identities of its inhabitants. Space, organization, and exchanges are rarely considered by managerial staff; however, they are highly impactful on employees' job satisfaction and productivity. By examining two separate restaurant locations and managerial styles it was revealed that organization, space, and exchanges can also be used as social control over employees. These exchanges and organizations can become manipulative and exploitative in nature, putting restaurant staff under further duress. Direct and indirect meanings or messages imbued by management, or individuals in power, can have a lasting impact.

The findings of this study contain relevance for workplace environments within and outside of the restaurant industry. They illustrated the impact managerial presence can have upon workers. The organizational space of restaurants is fluid and often changes dependent upon those who occupy the space. In understanding the role that space and organization play in social exchanges or discourse between workers, management may be better equipped to create a less divided work environment. This research supports that managers play a critical role in the behaviors and attitudes of their staff. This could indicate that it is not always the space that is to blame for the changes in behavior, but rather those occupying them. Ultimately, it is clear these spaces become a social product that becomes imbued with meaning by those who are occupying it. If we recognize that these concepts provide

valuable insight to the, oftentimes, deviant behavior occurring in restaurants, then the experiences of countless individuals could be improved.
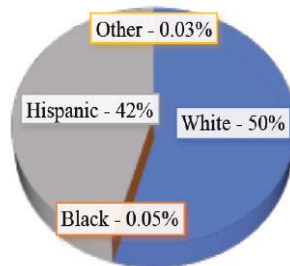
Tables & Figures

Demographics of Locations
Demographics of restaurant employees at locations 1 and 2

	White	Black	Hispanic	Other
Gender				
Male	10	2	4	1
Female	18	1	9	1
Age				
18-29	14	1	7	2
30-49	8	0	9	0
50-64	3	2	6	0
65+	3	0	1	0
Total	28	3	23	2

Table 1. Ethnicity, genders, and ages of all restaurant employees during observation.

EMPLOYEE DEMOGRAPHICS BY ETHNICITY

Figure 1. Employee ethnic demographic data translated to percentages
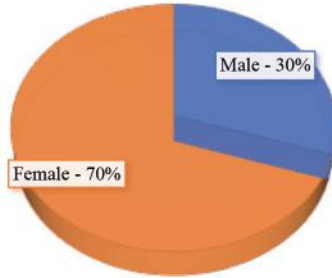
EMPLOYEE DEMOGRAPHICS BY GENDER

Male - 30%

Female - 70%

Figure 2. Employee gender demographic data translated to percentages.

EMPLOYEE DEMOGRAPHICS BY AGE

65+ .7%

50-64 20%

18-29 43%

30-49 30%

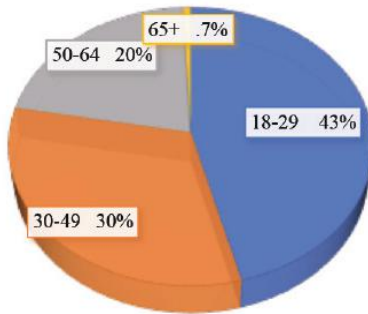**Figure 3.** Employee age demographic data translated into percentages.

Open Codes	Properties	Examples of Participants' words or behavior
Feelings of Inadequacy & Ostracization	Not feeling like a member of the group Not feeling valued Not being included in discussions	"People don't feel that I'm working" "They don't see how much I do" "People get paid less to do more work" "I was definitely treated differently" "When he yells, it hurts"
Receiving a Verbal Warning or Discouragement	Harsh or strict tones Raised voices Tense body language Defensiveness	"Different departments have different standards" "Manager yells at me" Workers ignoring management when being reprimanded Management shouting at employees during peak business Employees complaining about one another
Group Division	Harsh or strict tones Raised voices Tense body language Defensiveness	"When we ask them to do the slightest thing, they complain about it" "Told her to speak more English" Very little communication between departments
Division of Space	Interactions between front and back of house employees Where employees congregate How people communicate between departments	"Sometimes hard to communicate with other departments" "Operate like separate entities" Lack of communication

Group Cohesiveness	Communication and employing teamwork Positive interactions between employees	"They are what makes this job so great" High level of social inter-action and communication Offering to help with tasks
Working in a Positive Environment	Feeling like they fit in Happy with their work Feeling appreciated	Laughter and joking between coworkers Smiling Relaxed atmosphere
Receiving Verbal Encouragement	Verbal praise for work Positive interactions based around job performance	"We have a great team" "Those look beautiful" "Thank you!" Employees thanking one another

Table 2. Open coding table of observed behaviors and participants' words for analysis of qualitative data.

Open Codes	Axial Codes	Selective Code
Feeling inadequate; not feeling appreciated; not feeling like a member of the group; not being included, defensiveness, language barriers, divisive	Blaming coworkers or employers for failures Verbalizing negativity Counterproductivity	Working in a restaurant can impact identities and social interactions of employees through organization and the occupation of space
Group division, unwillingness to work together, difficulty communicating, tense body language and speech, discouragement, occupying different spaces	Low group morale Low productivity Low job satisfaction Heightened tension Low self-esteem	
Cohesiveness, teamwork, positive environment, verbal encouragement, feeling motivated	Wanting a meaningful experience from work High levels of communication High productivity Positive attitudes	
Feeling fulfilled, productive, valued, understood, being cared for as a person, working in a good environment.	High self esteem High motivation levels Seeking validation High levels of communication	

Table 3. Axial coding table to organize code and draw connections.

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AUTHOR BIOGRAPHIES

Karah Chappel (she/her) is pursuing a bachelor's of arts degree in music therapy. She is currently conducting a second study to explore the education and work histories of board-certified music therapists who work in trauma care in the US. She hopes to work in trauma recovery related to the criminal justice system, whether that be survivors of crime, offenders, or law enforcement personnel. Karah wrote "Exploration of the Referral Process of Social Work Within a Policing Structure" for her Senior Honors Thesis. She appreciates the mentorship of Dr. Dawn Iwamasa in all her research as well as Debbie Brooks, JD, whose insight and guidance was invaluable. This paper was co-mentored by Dr. Iwamasa, MT-BC, CCLS, PhD of the Music Therapy department, and Dr. Ken Novak, PhD of the Criminal Justice & Criminology department. Karah loves the connections between mind and body when healing from trauma and using her CJC coursework and knowledge to help clients further is the cherry on top!

Robin Conrad (she/her) is pursuing a bachelor's of arts degree in biology. She is working towards getting accepted into a top physical therapy program and aspires to become a physical therapist. She wrote "The Many Names of Post-Traumatic Stress Disorder: How They Have Improved and How They Can Continue to Improve" for English Honors 225, taught by Dr. Henrietta Rix Wood. She greatly appreciates Dr. Wood's advice and mentorship in writing this paper. In relation to her research, she feels it is important to state that she wrote her paper with the utmost respect and support for people who have suffered from PTSD. She hopes her discussion of this topic was inclusive and respectful of all perspectives.

Lauren Cooper (she/her) is pursuing a bachelor's of science in biology. She is working on designing and optimizing a histocompatibility assay for pre-transplant patients, and she hopes to work in a clinical research laboratory after graduation. She greatly enjoys research and hopes to be accepted into UMKC's Anesthesiologist Assistant program next cycle. She wrote "The Neuropathological Analysis of Sport and Blast TBIs" for Biology 498WI Critical Analysis of Biological Issues, taught by Dr. Chi-Ming Huang. She greatly appreciates the mentorship of Dr. Lee Likins; the knowledge and perspective he bestowed upon her was truly invaluable.

Anuhya Dayal (she/her) is pursuing a bachelor's of arts in biology and a medical degree. She is working on a research article about various MRI field strengths and imaging techniques, as well as continuing in her medical education. She is a strong advocate for vaccination and has been volunteering to administer vaccines in the Kansas City area. She hopes to match into a good residency program, practice as a humble, respectful physician, and continue either clinical or basic science research as well. She wrote "From MMR to COVID-19: A Study of Vaccination Perception Over Time and the Modern Effects of Social Media" for English Honors 225, taught by Dr. Henrietta Rix Wood. She greatly appreciates the mentorship and guidance of Dr. Wood throughout the entire writing, editing, and submission process. She thanks Dr. Wood, and the rest of her class, for the help and support she received while writing this article. She hopes that the community can work toward increasing medical literacy and education programs, as to promote public health and saftey policies of the future.

Denise Dean (she/her) is pursuing a bachelor's degree of health science with a minor in public health. She hopes to work towards national and global health equity with a focus on low-income countries. Ultimately, she would like to work at the United Nations or World Health Organization. She did not write "Associations of Environmental Factors and Physical Activity Behaviors: A Photo Analysis" for a particular class, but wrote it to deepen her understanding of research methods and writing. However, the data she used was collected from two semesters of Principles of Public Health, taught by Dr. Joseph Lightner. She is beyond thankful for the mentorship of Dr. Lightner and Dr. Amanda Grimes. She is driven by her personal experiences with health inequity and is honored to have the opportunities to research her passions in hopes of making a difference.

Brooke Friday (she/her) graduated with a bachelor's of science degree in biology and a minor in chemistry in May 2021. She is a term 1 medical student at St. George's University School of Medicine in Grenada, West Indies and is trying to get acclimated to medical school and a new country. She hopes to continue giving back to her community by volunteering. She also hopes to become a surgeon and work in underserved areas and free clinics. She wrote "The Neuropathological Analysis of Sport and Blast TBIs" for Biology 498WI Critical Analysis of Biological Issues, taught by Dr. Chi-Ming Huang. Her inspiration and mentor is her family physician, as she has always been so supportive of Brooke's aspirations and has been there every step of the

way. Brooke has found a mentor at her medical school who is doing further research on TBIs and brain injuries, so she is excited to continue researching this subject.

Dominic Guillen (he/him) graduated with a bachelor's in science in mathematics and statistics in May 2021. He is working on improving his programming skills. He hopes to do the best he can to benefit his community. He wrote "A Simpler Annuity" for Math 464 WI History of Mathematics, taught by Dr. Richard Delaware. He greatly appreciates the mentorship of Dr. Delaware, particularly throughout the revision process. Without him and his assistance, he would not have had the impetus to write this essay or to even consider submitting it to Lucerna.

Ellie Jackson (she/her) is pursuing a degree in political science. She is finishing her final year of undergraduate studies, and she hopes to have a positive impact on her community and people around her in the future. She wrote "Iran: Analyzing the Dominant Coalition of an Authoritarian Regime" for Political Science 425WI, taught by Dr. Mona Lyne. She's grateful to have had many great mentors who have helped her with her education and career. There is not one person in particular who stands out above the others, but the best mentors for her have always been the ones who asked questions that made her think differently about her approach or about a particular topic. Asking really good questions is just as much a part of mentorship as giving advice.

Niki Joshi (she/her) is pursuing a degree in history and English as well as a minor in film studies. She is working on her senior thesis for history, which examines the correlation between public response and political reform during the 1966 Bihar Famine and India's Green Revolution. She hopes to continue her study and research of South Asian languages, history, and politics through a graduate program. She wrote, "Reconciling Two Identities" for English 441: Girls and Print Culture taught by Dr. Jane Greer. She appreciates Dr. Greer's flexibility, patience, and comprehensive feedback on this project. Additionally, she appreciates the encouragement and support she's received from my advisors, family, and friends. She appreciates this opportunity to contribute to the scholarly discourse surrounding the Indian diaspora and South Asian identity.

Kai Milanovich (they/them) graduated from the dual degree program with two Bachelors of Arts in philosophy and music, as well as minors in bioethics

and medical humanities. They are currently working in a local domestic violence shelter and applying to graduate programs in philosophy and bioethics. In the meantime, they have been writing more philosophy papers and working as an anonymous referee for a few undergraduate philosophy journals. They hope to continue doing research and teaching in philosophy, particularly in bioethics and epistemology. They wrote, "Performing Escape: Imagining Future with Plato's Symposium" for a queer theory course in the English department, taught by Dr. Crystal Doss. They'd like to thank Dr. Gwen Nally from the Philosophy Department at UMKC for being a tremendous advocate, always being attentive to the forms of support they have needed, and always encouraging research interests to be pushed further

Carson Rau (she/her) graduated with a degree in sociology with an emphasis on cultural anthropology as well as a minor in psychology in May 2021. She is working as a Menu Specialist for a tech company called ChowNow. She attended culinary school and has a background in restaurants and is currently getting more insight into the technological aspects of this field. Her aspirations are to continue growing her skills and analytical mind to hopefully conduct research and further utilize her educational background. She wrote "Spatial and Social Organization in Restaurants: The Dynamics of Cooperation and Contention" for the Sociology Capstone Senior Seminar course taught by Dr. Ann Wood. She greatly appreciates the mentorship of Dr. Michelle H. Smirnova and Dr. Jennifer Huberman. Dr. Smirnova was a fantastic resource who gave her a lot of crucial feedback, and Dr. Huberman's classes inspired her to take an ethnographic approach to this research which enhanced it greatly. As a person who has worked in restaurant environments, Carson was able to explore perspectives regarding how the industry interacts with and affects its workers. She hopes that one day, recognizing and discussing these issues may benefit the workers in a brutal industry, and further illustrate the many underlying problems that exist within it.

Lauren Textor (she/her) is pursuing a bachelor's degree in English with a minor in sociology. She hopes to move into the public service sector after graduating and continue writing in some capacity. She also hopes to attend graduate school and continue exploring social issues. She wrote "The Necessity of Art Programming in Restructuring the Prison System" for Discourse H300, taught by Dr. Henrietta Rix Wood. She would like to thank Dr. Wood for helping her with the editing process of this paper, Dr. Stephen Christ for inspiring her in sociology courses, and Jasmine Canady for supporting her throughout this process. She would also like to recognize

all of the incarcerated people who deserve our support, our understanding, and our best efforts at programming (fine arts or otherwise). She thanks her interviewees (Dave Ranney, Sharon Sullivan, Wendy Jason, Holly Chavez, Leigh Lynch, Sydney Harvey, and Kristen Schodorf) for their contributions to her understanding of the prison system. As a first-generation college student, she values and thanks her support system that helped her edit the paper, in particular Dr. Wood and Tejaswi Shrestha. .

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