MAR



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Volume 8, Spring 2025

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Editors' Note

We welcome you to this eighth volume of the Muhlenberg Academic Review! The MAR board is honored and delighted to present this journal to you as a product of the Gamma Iota chapter of the Sigma Tau Delta intercollegiate English honor society. This journal would not have been possible without the help of a wide array of people deserving of recognition: Editors-in-Chief Emma McKinley, Amy Swartz, and Dan Gullick, senior editors Anna Item & Alexandra Downey, Layout Editors/Webmasters Emily Nally, Molly Herron, and Arwen Lutwyche, and our intern and Managing Editor Gabi Levinger-Louie. Our sincerest gratitude is also with the student contributors to this journal: everyone who submitted a piece, our contributing editors who vetted every piece sent to us, and our copy editors who edited every piece featured in this journal. We also want to thank our faculty advisor Linda Miller for all of her support and hard work, all of which we are extremely grateful for.

This year, we were incredibly fortunate to have received essays from a vast array of disciplines. Included in this journal, you will find essays situated within disciplines including philosophy, sociology, mathematics, psychology, and more. Each essay selected went through multiple rounds of editing, beginning with our contributing editors providing feedback on all submissions. Based on their feedback along with our own readings of the pieces, we were able to select our ten essays for publication. After essays were selected, our copy editors worked closely with the writers to polish up the essays for publication. We see each of these essays as portraying the interdisciplinary nature of Muhlenberg's curriculum while emphasizing the strengths of writing across the curriculum.

These essays were carefully chosen not only for their incredible prose, but for their broad scope of unique topics and fresh perspectives. In this collection, you will find thoughtful rhetoric on queerness in the American South, the ethicality of neuroscience as a means for qualifying legal insanity, a consideration of nationalism through a feminist-lens, and a research project combining both math and history to analyze unequal window placements on a historic Italian building. All of these pieces—and their equally commendable counterparts included in this edition—demonstrate the creativity and intelligence happening all across Muhlenberg's campus. We commend these writers for their outstanding work, and thank them for being willing to share it with us.

Thank you for your support of this journal and your support of everyone who worked extremely hard to create this. We hope you enjoy this year's volume of the *Muhlenberg Academic Review*.

Cheers,
Dan Gullick, Emma McKinley & Amy Swartz
Co-Editors-in-Chief of the *Muhlenberg Academic Review*

With special thanks to
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This is a reminder to Muhlenberg undergrads that this journal is meant to showcase your work. If you would like to submit an essay or other piece of academic writing to the journal, deadlines occur in February of the Spring semester. For more specifics and submission guidelines, please visit our website at mar.bergbuilds.domains.

The editorial board has chosen, in support of the journal's interdisciplinary nature, to translate the formatting and citation styles used by the authors as best as possible into the magazine without alteration to editorial consistency.

We have marked each piece according to its citation style.

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Love Thy Neighbor, Y'all:
The Intersectionality of Queerness and Religion in the American South

Emma Teske
Class of 2025

Abstract:

This paper dives into the complex and often contradictory intersection of queerness and religion in the American South, challenging dominant narratives that portray the region solely as a place of intolerance. Drawing from scholarly works by Bernadette Barton, Paul Harvey, John B. Boles, and others, this paper examines how the history of evangelical Christianity has shaped Southern culture and contributed to the marginalization of LGBTQ+ individuals. Understanding this history highlights the vibrance and resilience of queer communities (especially those of color) that have long existed within this region despite systemic barriers. By identifying the roots of Southern religious ideology, unpacking its racialized and gendered hierarchies, and showcasing lived experiences of queer Southerners, this essay reveals a rich but often overlooked history of resistance, community-building, and the reclaiming of space. Ultimately, it argues for a more nuanced understanding of Southern identity where queerness and faith are not mutually exclusive but deeply intertwined in the ongoing fight for inclusion and visibility.

Religion in the American South has seeped into so many aspects of the lives of people living there. In Bernadette Barton's article titled *"Abomination"-- Life as a Bible Belt Gay*, she elaborates on the extent of this, "In the Bible Belt, Christianity is not confined to Sunday worship. Christian crosses, messages, paraphernalia, music, news, and attitudes permeate everyday settings" (Barton). Because of this, views towards those who do not find themselves in the confines outlined by Christian Southerners are very strong and prominent. Specifically, views targeting homosexuality and same-sex love. Many individuals from all across the South from various walks of life discuss how these harmful views have caused, for some of them, a lifetime of pain and rejection from the very place they should call home. So many queer people have lived their entire lives attending a church that preaches that they should be dead, how does this affect these individuals going forward in their lives? Though, what is often misunderstood about the South, is the deep history of Queerness that has roots in their very soil. For decades, the South has been a place full of active and vibrant Queer communities who lack the resources and platforms to become well-known in their area. Despite the ample narratives that "outline" the American South as a place of religious intolerance to the LGBTQ+ community, this orthodoxy is not the actual, lived experience of the individuals who inhabit these areas, and their rich cultures and communities are not articulated on a national scale.

Paul Harvey discusses at length in his article *Race, Culture, and Religion in the American South*, how a dominant evangelical religion took over the South and in turn influenced the entire region's culture, views, and political ideologies. He begins the article by stating, "In no other widely dispersed region, save for the Mormon regions of the Rocky Mountain West, does one family of religious belief and expression hold such sway over so many people and throughout such a large area. The biracial nature of evangelicalism in the South, as well, lends it a distinctive history and culture that alternately puzzles, repulses, and fascinates outsiders" (Harvey). The history behind religion and Christianity in the South has been developing since the United States was formed. What was once a place of religious prosperity and a land that many relocated to in hopes of more freedom and space from the North, began to take a sharp change during the Slavery Era leading up to the Civil War. Within the Southern community during this time, there were some that advocated for the emancipation of slaves, and the opportunity for them to share the gospel. But their congregations became more systemic and the white Christians in power strived for expansion and control. Harvey writes how, "It quickly became evident that whites valued the blossoming of their evangelical institutions and would make the necessary moral accommodations to align southern religious institutions with slave owning" (Harvey).

The idea of redemption became the driving force for many evangelical preachers to expand their beliefs and push their viewpoints onto others all in the name of salvation. The vast majority of Southern occupants who were affiliated and regularly practiced these beliefs were white, and this caused a stark racial divide within the religion of the region, in addition to the already present Civil Rights racial divide. Though, this divide allowed many previously enslaved African Americans who were attending these white churches where white pastors preached the strict teaching of "obey thy master," to be able to disassociate from these congregations and form their own spaces of worship that were inclusive and safe for the Black community. According to Harvey, "Only a decade after the war, hardly any black parishioners still worshiped in the historically white southern churches. Through the last part of the 19th-century black church membership grew rapidly. By the 1906 religious census, the National Baptist Convention claimed more than two million communicants, or over 61 percent of black churchgoers" (Harvey). Even when looking at present-day society, most of Southern culture from an outsider's perspective remains a place of racism and hate. But this narrative is incredibly harmful to the majority of individuals to whom these negative notions don't apply. It is important to understand that when it comes to Queer culture and history in the South, that there would be nothing without the contributions and years of fighting for justice and equality by Queer people of color. Race is always something that needs to be taken into account because of so many years of *White* Queer Activism. Approaching this issue without having inclusivity at the forefront is a recipe for exclusion and misrepresentation.

As evangelical Christianity continued to rise throughout the South, Queer individuals were predisposed to a lifetime of shame and rejection from their community. But where did this predisposition come from? This question can be explored when looking at the history of the formation of certain denominations that became the primary form of worship in the 1680s. The two predominant denominations were the Presbyterians and the Baptists. The creation of these two Christian sects quickly began to show the striking divide between individuals in the area. John B. Boles articulates this in his article, *The Southern Way of Religion*, "Unlike the Presbyterians who insisted on educated ministers and organized themselves hierarchically in presbyteries and synods, the Baptists utilized spirit-filled, often unpaid ministers who were at best educated only in a rudimentary sense, and the Baptists made much of the complete autonomy of individual churches (although they did organize regionally into loose associations). These veritable folk ministers were extremely effective salesmen for their faith…" (Boles). These were the men that led their body of worshipers into a world of hatred and intolerance towards others who did not praise and practice the exact way that they did. In a way, it became a

competition amongst these people, and Boles goes on to describe how these ideals began, "Spreading like an epidemic, highly emotional responses to the perceived work of God became a self-fulfilling demonstration of the validity of the religious interpretation of events" (Boles). Today, the Baptist denomination is one of the most prevalent denominations throughout the region, and is one of the strongest to condemn homosexuality. Understanding that these very first ministers were uneducated and essentially "selling" their religion to the masses allows people to begin deconstructing their ideas of "Southern beliefs." It also helps to understand that the motives behind these ministers became very quickly skewed for personal gain. The American Dream was to obtain power through vicious speech and highly emotional physicalities, which these ministers achieved through their sermons. For instance, Boles writes that, "The point of the sermon was not to advance a set of doctrinal propositions but to convict and convert. The vocabulary, the delivery, the imagery of the sermon and the entire worship service was directed to that one end" (Boles).

Bernadette Barton in her article, *1CROSS + 3NAILS = 4GVN: Compulsory Christianity and Homosexuality in the Bible Belt Panopticon*, elaborates on the hierarchy that has formed within the Southern Church setting because of this "innate" power that ministers hold.Barton writes that, "God is on top, followed by religious leaders, then husbands and fathers. In her article 'Gracious Submission: Southern Baptist Fundamentalists and Women,' Susan Shaw (2008) succinctly observed that 'husbands rule their wives' (65). Members of each group are expected to submit to those above them, and to exert dominion over those below. Those in authority are automatically 'right' in their ideas about the social world, because they are closer to God" (74). These men who believe they are "closer to God'' are then able to interpret the Bible and biblical tellings in any way that backs up their agenda. This can mean either misinterpreting the lessons or reading into it very literally and allowing no wiggle room. John B. Boles gives an example of this in regard to the justification from the South during the start of the Civil War, "White Christians came to argue that the South was the most Christian portion of the nation, that it was the only region that interpreted the Bible literally, and that Christians had an obligation to support secession in part to save the South from the corrupting, even blasphemous influences of the North. Southern churches became primary defenders of the Confederacy, confident of victory" (Boles). This hierarchy is then able to marginalize mass groups of people and justify it "in the name of God," just as they did in justifying slavery. Many Queer people in the South are shunned and exiled by their family, friends, and community and this gives many no other option besides moving to a different region of the country that is more accepting. This escape is not plausible for all though. Due to lack of resources, funding, and education, Queer people often

don't have a way out of these situations and are forced to remain in toxic, unhealthy settings. "There is a mythology to southern queerness, one that pushes small town gays to find acceptance outside the countryside closet, that is genuinely harmful to queer people outside of central cities like New York, Chicago, or Los Angeles" (Johansen 4).

What is even more harmful to the Southern Queer community is the idea that the South only contains horrible people who are homophobic,prejudiced, and that there is no safe space for an LGBTQ+ member to live. While this is not true, it does present a dichotomy. How could there be sanctuaries for Queer folks in the region of intolerance?

> "The Bible Belt is a diverse region that includes large cities, small towns, and rural areas. A variety of racial and ethnic groups populate the region, as well as a range of religious denominations. For instance, a visitor finds Catholic churches and Jewish synagogues in Kentucky. At the same time, Protestant Christian fundamentalism overshadows other forms of religious expression in the Bible Belt" (Barton).

Being Southern and being Queer are NOT mutually exclusive. A person can fall into both categories and both influences can flow together. This intersection is proof that a vibrant Southern-Queer culture does exist and gives a home to many people who are otherwise ostracized. The assumption that the South is solely a place that harbors homophobia, sexism, and racism erases all of the Queer People of Color trailblazers that paved the way for many movements and actions to take place.

Barton describes living in the Bible Belt as a panopticon, which is an institution that is focused on one person controlling people and holding them in "prison-like cells." Even if this is metaphorical, the analogy of religion in the South having a prison-like hold over its inhabitants gives insight into the trapped and unable-to-get-out feeling that many experience. The South proves different from other regions because of this strong influence that often dictates one's feelings towards others or another group of people. With a dominant religion being at the forefront of this large geographical area, it brings into account the struggles of people who don't identify with this religion. How are they supposed to be accepted into an area that actively rejected their presence? It would make sense for this struggle to be amplified if there was only a small amount of Queer people living in the South, but what is not readily known, is the true Queer vibrancy that the South possesses. For example, "The South is full of our queerness—35 percent of the LGBTQ

population in the U.S. lives here (the Northeast is home to only 19 percent). In the Deep South—Alabama, Mississippi, Florida, and Louisiana—almost 40 percent of us identify as people of color; In Texas that figure is over 50 percent" (Pratt).

A speech given by a writer, activist, and lesbian from North Carolina by the name of Minnie Bruce Pratt that was presented at the Southeastern Women's Studies Conference which was held in Oxford, Mississippi in March of 2019 highlights her perspective and shows a firsthand account and experience of someone who identifies on the LGBTQ+ spectrum while also living and developing as a person in the South. Many issues arose for Pratt because of these circumstances, but she has been able to rise above the challenges to illuminate her voice for people all around the nation to hear. She also speaks on what would happen following a person's coming out, especially someone coming out in a state that has no laws or regulations to protect them:

> "We have power in our numbers—and we need that. According to a study published by the UCLA School of Law, compared to other U.S. regions we queer Southerners are 'more likely to lack employment protections, earn less than $24,000 a year, and be unable to afford food or healthcare.' We are living through a terrible period, when the voices of the unashamed racists, woman-haters and queer-bashers of my segregated childhood are broadcast from the highest public offices in the land" (Pratt).

The author lost custody of both her children and in many other cases, people can lose their jobs, their access to medical care, or their support system. These aspects show the extreme extent to which many Queer individuals are likely to be forced to face during their time on Earth, because of the lack of institutionalized protection.

Mary L. Gray in her ethnography titled, *Out in the Country: Youth, Media, and Queer Visibility in Rural America*, focuses on the lives and experiences of queer youth living in rural parts of America. Gray specifically follows the youth who reside in small towns across Kentucky and the Appalachians. Through direct conversations, she gained an incredibly clear picture of what people identifying with the LGBTQ+ community must encounter day to day. These small towns, like Berea, Kentucky, as Gray mentions, are home to spirited queer-identifying people,who despite negative influences around them, have been able to find community and support. Though, nationally, these towns are often overlooked and not given large enough resources in order to make long-lasting changes within their communities:

> "They battled to change the rules of rural social order that defined gay people as out of place and LGBT-identifying youth as victims of nefarious urban sprawl seeping through the television set. Instead, they argued, LGBT individuals deserved acknowledgment and justice as local family members and, thus, recognition as integral community constituents. These crusaders were creative forces in the fight to redefine LGBT youth as "family," but they had considerably less power to enact their definitions on the rule of law" (Gray 40).

Today, there is work across the nation being done to create sustainable action within the LGBTQ+ community, like laws protecting LGBTQ+ students from being discriminated against based on their orientation and self-identification:

> "Detailed safeguards exist in California, Iowa, Maryland, New Jersey, New York, Vermont and a growing number of other states. Laws in all of these states require local school boards to enact antiharassment policies that specifically include sexual orientation and gender identity/expression. The policies must allow for complaints and investigations, impose consequences for violations and protect students who report harassment from retaliation. Schools must also make sure students learn about these policies" (Lambda Legal).

While these states listed are not necessarily a part of what is considered the South, these legal actions, regardless of where they are, are a step in the right direction and can help push other states to follow in their footsteps. A southern state that is heading in this direction in 2022 is Georgia, which just went into a run-off election for senator and the results will directly impact the LGBTQ+ youth residing there. For instance, "The results of the midterm elections will determine control of the U.S. Senate and whether pro-equality measures, supported by an overwhelming majority of Americans, will move forward. Georgia's LGBTQ and ally voters will help decide if the Senate will vote to codify marriage equality for same-sex couples and couples of different races, secure protections against discrimination in The Equality Act, and pass federal voting rights protections" (GLAAD). This is the first step of many that needs to be taken across all southern states in order to begin securing the rights and safety of LGBTQ+ individuals.

What is not readily known to much of the country is the ever-expansive list

of Gay Affirming churches across the South. Various denominations across many different sects have released statements asserting their alliance with the LGBTQ+ community. These denominations include Catholics, Baptists, Presbyterians, Methodists, Lutherans, and Quakers, to only name a few. These churches often understand the hesitation and speculation that comes from Queer individuals because of the hateful rhetoric that has been pushed by so many places of worship in condemning homosexuality. Dignity USA, a Catholic church located in Dunkirk, Maryland (a state that many consider to be a part of the South) released a statement saying,

> "DIGNITY is organized to unite gay, lesbian, bisexual and transgender Catholics, as well as our families, friends and loved ones in order to develop leadership, and be an instrument through which we may be heard by and promote reform in the Church. To be such an organization, we accept our responsibilities to the Church, to our Catholic heritage, to society, and to individual gay, lesbian, bisexual and transgender Catholics. We work for the development of sexual theology leading to the reform of its teachings and practices regarding human sexuality, and for the acceptance of gay, lesbian, bisexual and transgender peoples as full and equal members of the one Christ" (Gaychurch.org).

This statement alone speaks volumes for the congregations of people across the South as these parishioners are striving to reform the church and expand the knowledge within the church of the ever-growing world around them. Often, these churches also understand that the world has developed in so many different ways following the writings of the Bible, and the statements within this book can be reinterpreted and re-understood in the modern context. Churches like The Alliance of Baptists (North Carolina), AGAPE Fellowship (Georgia), Northminster Presbyterian Church (Tennessee), and many others are all redefining what it means to be a Christian in the South and are slowly opening the doors to Queer individuals across the region so that they can find acceptance and redo their experience in the church.

The 21st century has been two decades of growth and action taken across the United States. Queer individuals are finding and reclaiming their place in the American South day by day. Whether that be organizing entire Pride Festivals within Southern communities, or proudly walking into a church holding your same-sex partner's hand. These are only a few of the ways that the LGBTQ+ community is taking back what was always theirs to have. Queer people deserve to have their stories and experiences heard because they are so often left out of the national narrative.

Denying the presence of Queerness, specifically in the South, is denying the work, sweat, and blood of millions of Americans who worked to get this country where it is today. Southern religion has tried to denounce and exile Queer people from their congregations for centuries, but with the rising resilience of Queerness, these spaces are being restored as well. Southern Queerness is only on the uphill path, as more allied candidates are elected into office. This means more permanent and protective legislative changes can occur to ensure the prosperity of LGBTQ+ people in this region. Love thy neighbor, y'all: Respect others, spread love, and remember that regardless of what you believe, we are all humans living together in this colorful world.

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Taming the Rhinoceros:
A Gestural, Shape-Based Approach to Song Analysis and Compositional Style in Pop-Rock Guitar Music

Daisy Cunningham
Class of 2025

Abstract:

For this analysis of "Rhinoceros" (1991) by The Smashing Pumpkins, a Western music notational analysis was juxtaposed with a corporeal, gestural analysis to demonstrate the shortcomings of the Western music theory lens in relation to analyzing pop-rock guitar music. A couple of rhythm guitar riffs from "Rhinoceros" (1991) were analyzed that demonstrated gestural components of composition style that cannot be understood from a notational standpoint. Certain aspects of modulation, including the chromatic mediant modulation of E Mixolydian to G major, were examined in relation to fretboard orientation; these findings reflected and expanded upon previous pop-rock song analysis theory. Additionally, the fretboard location of the palette of pitches used in the song were analyzed in terms of their physical spacing. This research calls for a more well-rounded understanding of pop-rock song analysis that considers and gives merit to corporeal and experiential elements of instrument playing, which informs both performance and composition.

The guitar is a unique instrument in that it draws a large amateur playing pool. This is to say that many guitar players do not take the Western classical route; rather than learning to read music or even tablature, many take advantage of YouTube guitar tutorials or learn a basic chord structure from a friend. Whether this is due to the glory associated with being a rockstar or the promise of being able to play thousands of songs with just four chords, the intriguing aspect of this, I think, is the amateur guitarist's understanding of what they are learning to play. The word amateur can evoke a negative connotation, however, here it will be used as a neutral term to describe guitarists who pick up the guitar on their own, without much glimpse into the world of Western music theory or music reading. As an amateur guitarist myself, I was able to recognize a stark contrast between my understanding of the way I play guitar and the way I play the piano, in which I was classically trained. Even with my Western classical background, when I first picked up the guitar seven years ago, I found that I was not thinking in terms of scales, modes, or even I-iii-IV-V G major chord progressions, but rather, in the physical shapes my left hand made on the fretboard.

I want to challenge the legitimacy of one's understanding of the instruments they play. An amateur guitarist might have a complete experiential/kinesthetic understanding of how they know their instrument, but still not be considered a "good" guitarist. When there is already a world of formal notation in which people and institutions place so much value, it is difficult to break out of that and see merit in one's own understanding. Kinesthetic shapes and experiential instrument playing are not frequently given merit in the Western music theory world, which I hope to accomplish in my analysis.

THE CORPOREAL EXPERIENCE OF INSTRUMENT PLAYING AND PERFORMANCE GESTURE

In her gestural analysis of Tōru Takemitsu's Rain Tree Sketch II, Jocelyn Ho cites the work of movement theorist Rudolf Laban, specifically his concepts of effort and shape (Ho, 3.1). One of the intriguing aspects of Laban's descriptions that Ho draws upon is that he imagined gestures to be "bodily tensions combined with intellectual and feeling excitations" (Ho, 3.1). Ho highlights his distinct choice of the word "excitations;" the word implies an ambiguous energy within the body that occurs alongside the physical feeling of movement that does not have ties to emotion (Ho, 3.1). The significance of this separation is that it bolsters the idea that gestures are entities worth analyzing in isolation. Kinesthetic experiences are often overlooked in favor of a more Western theory/notation-based approach in music, which leaves out a world of gestural understandings of music that instrumentalists

experience. Although Laban's ideas were originally catered to dance, his conceptualization of movement free of emotional associations affords us the language to build a gestural framework for understanding music in a new way. In terms of performance gesture and its relation to music analysis, Ho advocates for kinesthetic experiences of playing to be factored into compositional analysis as well as song analysis. Ho notes that "traditionally music theorists have embraced a semiotic approach to musical gestures, but the emphasis on signified content of emotions, styles, and topics leaves many gestures by the analytical wayside" (Ho, 2.1). Rather than focusing on analyses that involve the emotional, tonal, or stylistic implications of a piece of music, she calls for an approach that allows the physical movement to be looked at by itself, and as it is. The merit this has in the world of music analysis is that the notes on the page, or the way something sounds, does not tell the full story of a piece of music. To zoom out even further, notation and listening also cannot fully encapsulate the compositional style of a composer, or the experience of playing any given instrument in general. Ho cites Elisabeth Le Guin's analysis of "Fuori Catalogo," in which Le Guin highlights two passages for their similarity in how they "feel under the hand, even though they look different in the score, thereby constructing a new thematic parameter of kinesthetic identification" (Le Guin, 31). Ho argues that leaving out the physical aspects of a composer's style creates a gap in understanding of their whole compositional world.

LEFT-HAND GUITAR CHORD SHAPE PATTERNS IN RELATION TO FRETBOARD ORIENTATION
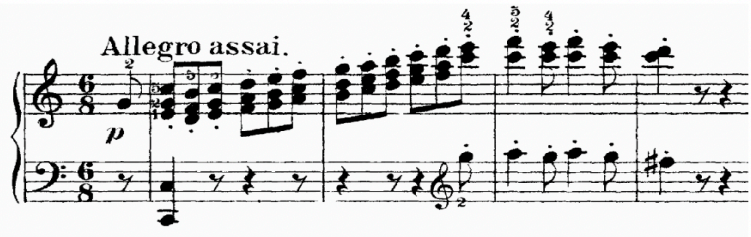
Another aspect in which guitar pieces function in the world of composition and performance, for fear of being too obvious, is the physical orientation of the six-string fretboard. Timothy Koozin discusses the patterns of pop-rock music and their relation to the fretboard design in his article, Guitar Voicing in Pop-Rock Music: A Performance-Based Analytical Approach (2011). He discusses the left-hand shape of the standard barre chord and how the physical shape of the fretboard informs the types of chords and notes a guitarist can feasibly play, and in turn, how a guitarist composes. For example, one would not attempt Chopin's "Winter Wind" piano étude on the guitar; it fits the piano and practically no other instrument because of how it caters to the physical orientation of the piano keys (performance video here: "Winter Wind" Performance at 0:31). Koozin also gives legitimacy to the idea of embodied performance gestures, and asserts that "guitar riffs comprise embodied musical actions we understand at a basic categorical level of cognition" (Koozin , 7). This, along with the way it sounds, differentiates the playing experience from one instrument to the next, and there are many other examples in which a piece can

only be practically performed on a certain instrument. A guitarist's understanding of physical space and shapes will be unique to that instrument. Again, the guitar shapes at our disposal from pieces we learn to play are added to our "toolbox" of what we can play and how we understand guitar. Next time you see a chord you learn in another song, you aren't thinking, "oh, that's an octave with a fifth in between," or even, "that's a power chord." The average amateur guitarist might be thinking, "oh, that's the basis for every Green Day song I've ever played."

PHYSICAL SHAPES IN MUSIC AS A COMPOSITIONAL STRATEGY

Thinking about physical shapes from a compositional standpoint is not a new concept; for example, see the excerpt below from Beethoven's piano sonata, Op. 2, No. 3, Mvt. 3:

Example 2: Excerpt from Beethoven, Op. 2, No. 3, Mvt. 3



Above, one of the first observations a pianist might make regarding this excerpt is that the right hand progression in measures 1-2 involves a repetition of the hand shape with a 1-2-5 fingering as indicated. One can gather from this passage that Beethoven was not thinking of the notes separately from their corresponding hand shapes; the probability that he did not consider the fingering in his compositional process is low, judging by the fact that the shape occurs eleven times in a row. Additionally, there is virtually no way to comfortably and quickly play this (Allegro assai, as written) with any other hand shape. This suggests that composers often think of kinesthetic experiences of a piece, and not solely in terms of the notes on the page.
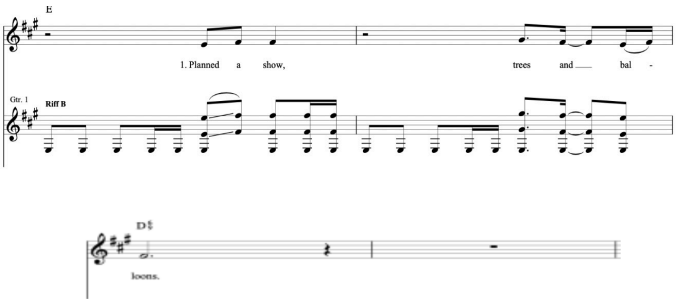
Clearly, there is a whole experiential world of guitar playing that lies beyond Western notation. Kinesthetic experiences of guitar playing and the left-hand "shapes" a guitarist makes on the strings inform the melodic and compositional styles of the instrument, for which there is little framework to analyze outside of a gestural approach. In order to examine a specific example of the kinesthetic/experiential guitar playing and compositional style, I will be analyzing the song "Rhi-
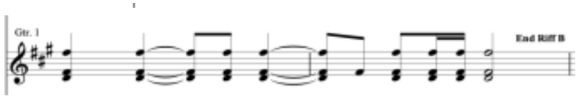
noceros" (1991) by the alternative rock band, The Smashing Pumpkins. A lot of my guitar playing experience can be attributed to learning, playing, and composing "rip-offs" of The Smashing Pumpkins' discography. By learning and playing, my own compositional style pulls from their patterns of physical gesture and melodic structures. They compose and create music in a guitar-centric manner, which will be touched upon later in more detail. The two ways in which "Rhinoceros" will be analyzed will include a Western theory/notation-based approach, followed by a gestural and fretboard orientation approach. Through juxtaposing these approaches, I intend to demonstrate how a Western theory/notation-based approach misses out on key aspects that a guitar player experiences when performing the piece. With this, I hope to shed light on a different way of understanding one's instrument, especially in the case of amateur guitar players who may only have a shape-based, but still legitimate, understanding of the guitar.

GUITAR-CENTRIC COMPOSITION: TWO APPROACHES TO ANALYZING "RHINOCEROS"

In order to demonstrate some of the shortcomings of analyzing a guitar piece solely through Western notation, we first need to explore a notation-based analysis of "Rhinoceros" (the music video can be found here; I will include timestamps of the relevant excerpts: "Rhinoceros" Official Music Video). Although there is more than one guitar part written for this song, I will not be looking at the single-line melodies from the lead guitar, simply because my shape-based approach is more relevant to chords; instead, I analyze excerpts from the second guitar part, or rhythm guitar chords. The first excerpt that will be examined is the rhythm guitar riff that informs the vocal melody of the verses (0:40-0:54). This melody repeats throughout the verse.

Example 3: Notated Verse Guitar Riff in "Rhinoceros" (With Vocal Melody)
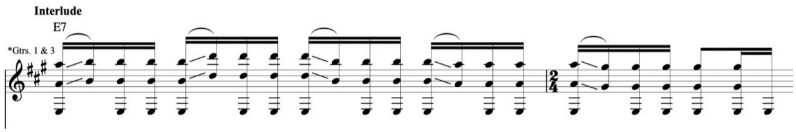




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Here, the notated key signature that we are playing is A major; however, if we listen for the tonal center of the piece, we find that E is the tonic, or key center, (in solfège, do) which would make comprise an E Mixolydian mode (this accounts for the D♮ in the third and fourth measures above). The "lowered seventh" scale degree of the mixolydian mode (when compared to the major scale) is seen/heard in the whole-step motion (te-do), which is different from the half step sequence normally found in major keys (ti-do). Additionally, using E as a tonal center is perfectly suited for the guitar in that the outermost strings are both E (separated by A, D, G, and B). Another aspect of this riff to note is the use of E octaves; until the D♮ is added in the third measure above, the riff line remains ambiguous in tonality, but decidedly sounds like E major. The lack of a third, or even a fifth in the octave chords, which would give context to the key signature and provide more of a "filler," allows for a unique voice-like melody in lieu of a standard four–or three–chord progression. It is also worth noting that the guitar riff directly correlates with the vocal melody line, which hints at a compositional strategy that has guitar and voice working in tandem, rather than a main vocal part with guitar chords in the background.

The verse riff is interrupted by an interlude, which also repeats throughout the song, first appearing at the timestamp 1:07-1:12 (and then again until 1:21).

Example 4: Notated Interlude Guitar Riff in "Rhinoceros"
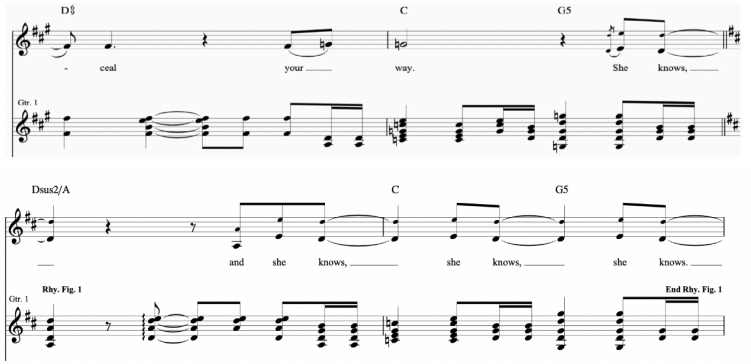


One of the few advantages of reading notated guitar music, including tablature (which refers to writing the fret number on its associated string), is that it is easy to see what the rhythm of the strumming looks like—and, the 4/4 to 2/4 time change is laid out for us on the page.

The third rhythm guitar component of "Rhinoceros" I analyze is the guitar riff that is played during the chorus, first heard from 1:42-1:50 and repeats through-

out the rest of the chorus. Included below is the measure before the chorus begins to properly demonstrate the transition and its significance.

Example 5: Notated Chorus Guitar Riff in "Rhinoceros"

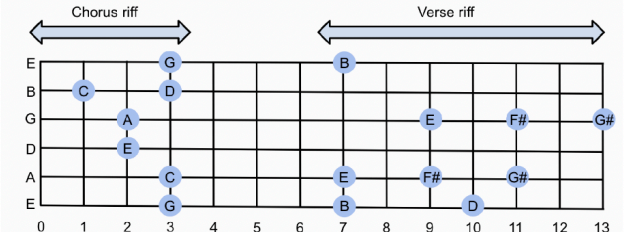


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The intriguing part of this excerpt lies in the tonal shift from E Mixolydian to D major, which, after considering the tonal center of G in the vocal melody, along with the C–G–D guitar chord progression, actually alludes to G major. From a purely notational standpoint, this modulation is slightly unusual, though not unheard of.

To tie the fretboard orientation into the consideration of all this, we first need to understand the physical space of the strings and the relevant notes on the fretboard. Example 6, below, is a visual representation of the six-string fretboard, with the bottom E string being the lowest in pitch and the top E being the highest in pitch. The 0 represents the space closest to the headstock and tuning pegs (top of the guitar), while the 13th fret is closer to the soundboard (where you pick/strum the strings). The placement of the blue dots is slightly misleading; unlike a viola where you must place your fingers on a precise line to achieve proper intonation, guitarists have more leeway in that their fingers can be placed anywhere in between the fret lines and still stay in tune. For the purpose of keeping the fretboard coordinates easy to follow in the example below, the notes are seen right on the fret line, when realistically, a second fret note would be played in the space between the first and second frets.
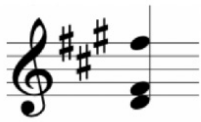
Example 6: Guitar Fretboard Orientation/The Palette of Pitches in "Rhinoceros" (Standard Tuning)



The two sections above denote the primary spaces on the fretboard that are played throughout the verse and chorus of the song. Out of 78 possible fretboard coordinates, only 16 are employed consistently throughout the song (the exception of this rule being the interlude riff, which occurs high up on the fretboard).

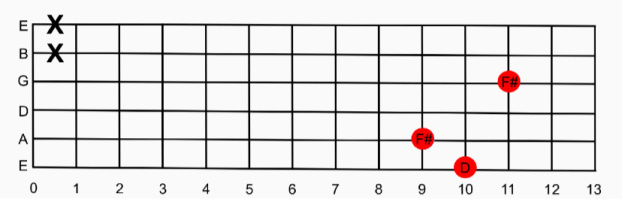
From here, we can backtrack to the song's main key of E Mixolydian. The D♮(in solfege, te) that appears within the mode also happens to be one of the open strings on the guitar, which hints at an intentional compositional strategy where the string orientation is taken into account. In the verse riff, notated previously on the treble clef, the D and F♯ octave power chord is unique because it establishes a major third relationship rather than sticking to the root and the fifth. However, its alluring characteristics do not end there. The shape of the chord itself is a notable commonality in the composition of many Smashing Pumpkins songs, so much so that my guitar teacher refers to it as the "Smashing Pumpkins Chord." It is found in "Rhinoceros" in the verse riff we looked at, and is notated like this on the treble clef and then on the fretboard from that excerpt:

Example 7: Notated "Smashing Pumpkins Chord" from "Rhinoceros"



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Example 8: Fretboard Visualization of the "Smashing Pumpkins Chord" from "Rhinoceros"



Above, the strings marked with "X" symbols function as muted strings. This means that the E and B strings are not meant to be played in that particular chord, so the guitarist must either mute the string by lightly touching the strings without pressing down, or to avoid the strings when strumming. In this case, if the muted strings were to accidentally sound, it would not be the end of the world; the B, D, and F♯ act as a B minor triad, while the E adds a welcome dissonance and mood. Although it is true that the chord shown above can be played in many different locations on the fretboard, after painstakingly watching videos of the band's main composer, Billy Corgan, playing the verse riff live, it is clear that he is starting with the F♯ octave shape from the rest of the riff and adding on the D on the E string with his second finger (example: Billy Corgan Playing "Rhinoceros" Live at 0:36-0:41). Additionally, this is the most pragmatic way to play it in the context of the rest of the piece, as the D on the E string fits comfortably between fingers 1 and 3 on the F♯ octave notes. The chord itself is a good example of using the fretboard orientation to the guitarist's advantage.

Video 1: "Smashing Pumpkins Chord" Gesture in "Rhinoceros"
"Smashing Pumpkins Chord" in "Rhinoceros" (1991)

The limitation of notating this chord on the treble clef, or even in tablature, is that it does not encapsulate the whole story of this chord; on the fretboard, it appears in quite a few variations in songs like "Tristessa" (1991):

Video 2: "Smashing Pumpkins Chord" Gesture in "Tristessa"
"Smashing Pumpkins Chord" in "Tristessa" (1991)

To drive the point home, it appears in two places in "Cherub Rock" (1993) as well:

Video 3: "Smashing Pumpkins Chord" Gesture in "Cherub

Rock”

"Smashing Pumpkins Chord" in "Cherub Rock" (1993)

Because the chord reappears in more than one location on the fretboard, and even in the same position when the guitar is tuned to a different standard, its character cannot be defined by treble clef notation or even tablature; it is a hand shape at its core. The chord is also characterized by the addition of the lower E string note (or other tone if there is drop D tuning, which alters standard tuning by changing the lowest open E string to D), usually performed with the second finger. This indicates that the chord manifests as a physical gesture as well as a hand shape, because time and time again, it begins as an octave and then adds the E string note with the second finger. This is demonstrative of why aspects of kinesthetic instrumental playing are key; without being able to understand this corporeal feature of the chord, one would miss out on an integral piece of the band’s unique compositional style. As emphasized by Ho, “attention to kinesthesia” should be as legitimate in song analysis as any other approach (p. 2.4).

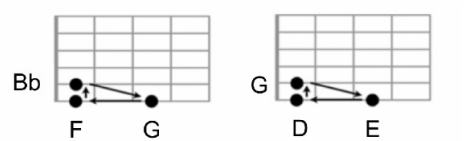
Aside from classical guitar, most guitarists want to play pop-rock music, which almost always entails learning chord progressions (lead guitar solos and riffs, of course, are often single-line melodies and are not the focus here). This means that there is a more complex translation that must occur from the treble clef to the fretboard: the first is determining which notes are being played; the second is determining which strings they are on; and lastly, determining which fingers must be used. This makes the treble clef notation a convoluted method for guitar chord sight reading or transcribing pop-rock songs. Furthermore, it provides another barrier for amateur guitar players from the oftentimes elitist world of Western music theory and notation.

The final riff to be looked at from a fretboard and corporeal perspective is the chorus riff, and in particular, the shift from the verse riff to the chorus riff. If you refer back to Example 3, you will recall that the verse riff is in the E Mixolydian mode, while the chorus riff is arguably representative of a G major chord progression. Although not unheard of, it is unique because instead of calling upon E minor, the relative key of G major, we are in E Mixolydian, which includes the major third G♯. This modulation is demystified when you consider fretboard orientation and the advantages of utilizing the open strings of the guitar.

To further contextualize the importance of fretboard orientation in analyzing pop-rock guitar songs, I again draw from Koozin’s article, which touches on some related points. Koozin analyzes a simple progression from The Kinks’ “All Day And All Of The Night” (1964), featuring the power chords of F, B♭, and G, where G is

the tonic (Koozin, 5). The use of the G power chord is unique because the notes in the G major triad, G, B, and D, are not all shared in B♭ and F major. Firstly, in G major, F is sharp, so the F♮ power chord is notable. The whole step interval between F♮ and G, the tonic, provides a mixolydian modal context within the riff. And even though power chords only employ the tonic and the fifth, the major chord implication is present, which makes the B♮ in the G major triad clash with the B♭ in the B♭ power chord. This "rendering of the major triad voicings that comfortably fit a single location on the fretboard suggests a correspondence between fretboard design and idiomatic patterns of blues-rock guitar music that often feature chromatic third-related modal colorations and subdominant-driven harmony" (Koozin, 3). The "chromatic third-related modal coloration" in the Kinks example is the switch from B♮ in the G major chord back to B♭ in the tonic major chord. Here, B and B♭, as well as F and F♯, act as the chromatic mediants between the scales. The distance between G and B♭ also happens to be two and a half steps apart, or a minor third apart. Koozin's explanation for this phenomenon in the Kinks song is an observation of physical fretboard space; the F, B♭, and G power chords can all be easily accessed because the F-G sequence is within a two-fret distance from one another, while the F-B♭ sequence only requires you to move the power chord shape one string over (this also accounts for Koozin's assertions about subdominant-driven harmony; you only have to move over one string, which spans the distance of a fourth). To tie this correspondence to "Rhinoceros," we look at the chromatic mediant of E Mixolydian to G major, which is the switch from G♯ to G♮. The space between G major and E Mixolydian is a minor third apart, like the Kinks song, and uses a mixolydian mode as well, with the D♮ to E shift (D♮ is employed in Example 7). If we were to compare these notes in relation to each other on the fretboard, they would manifest in the same triangular shape that the Kinks progression does:

Example 9: "All Day And All Of The Night" vs. "Rhinoceros" Fretboard Orientation



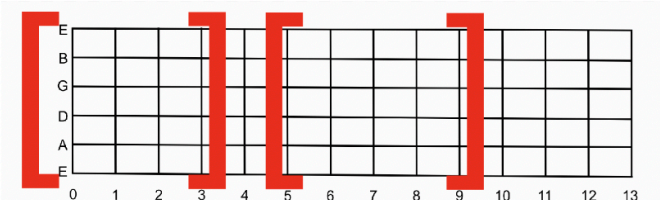
Altered image from Koozin, Example 2 (left) with transposition for "Rhinoceros" (right) But, although Koozin's reference from The Kinks' song deals with a convenient triangle-shaped spatial difference between the power chord formation, the fretboard orientation and its relation to E Mixolydian and G major apply to the

strings themselves. What this commonality can tell us, however, is that conveniently accessible fretboard shapes inform the melodic world of guitar composition, which helps to explain why they repeat themselves in pop-rock guitar music.

The standard tuning of the six-string guitar is another limitation, or at least a consideration, of idiomatic guitar playing. Enter Koozin's interpretation of open string chords and the guitar player's dilemma: "While guitarists might make an effort to avoid accidental noise from open strings in cleanly changing from one desired chord to another, the sound of open strings is nonetheless a marked signifier identifying idiomatic connection to the roots of guitar playing" (Koozin, 12). Whether a guitarist/composer decides to fight against the orientation of the strings is up to themselves; some workarounds include using non-standard tuning, barring chords to change those natural open strings, muting strings in chords, or meticulously picking the desired notes by themselves. All of these bear complications to the guitarist; there is the ever-present risk of strumming an unwanted open string, creating unintentional dissonance, and when chords are barred, they lose some of their acoustic resonance. Koozin refers to the tuning of the guitar in any particular song as a "grounding barre," which informs the guidelines of which the guitarist can work with or against. He also argues that "whether the grounding barre provides a source for consonant chord tones or for dissonances outside the prevailing harmony, is directly related to a guitarist's practical strategies in playing and embellishing chords and may have gestural significance in shaping expressive allusions to control and freedom" (Koozin, 12). This relates to the compositional aspect as well, in which an amateur guitarist might choose to work more in the parameters that the strings allow for simplicity's sake. However, it does not imply that using the string orientation to their advantage is a lesser form of composition, but that their experience as an amateur guitarist and building upon songs that use the fretboard advantageously informs the way in which they compose. Therefore, as Koozin recognizes, a key component of pop-rock guitar song analysis is the negotiation between the guitarist and the standard tuning's open strings.

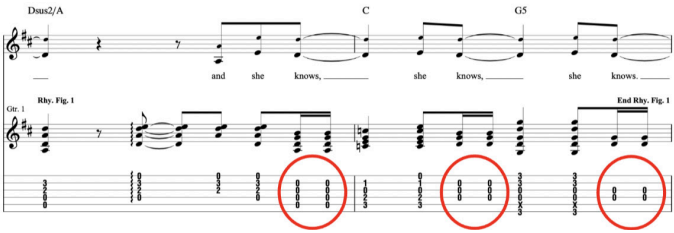
Now we return to the E Mixolydian-to-G major modulation (and then back to E) in "Rhinoceros." The standard tuning for guitar, as notated in Example 6, includes the strings E-A-D-G-B-E, in order from lowest pitch to highest. The outermost E strings count as one doubled pitch, of course, which leaves us five open string pitches to consider. Keeping those in mind, it is notable as well that two of the most common fretboard chord configurations and their corresponding locations lie in frets 1-3 with the G major progression and from frets 5-9 with the E pentatonic box, which is exactly where the modulation takes place in "Rhinoceros."

Example 10: Two common fretboard progression locations



These two locations are commonly used because the notes on the fretboard are conveniently accessible and close together, which adds context to the E octave verse riff to C-G-D progression at the bottom of the fretboard in "Rhinoceros." The other practical reason to play in these confinements is that both E and G are two of the open strings, meaning their chord progressions use the natural acoustic setup to their advantage. As noted by Koozin above, the guitarist is always negotiating with the open string orientation (p.12). Recalling once more the E Mixolydian–G major modulation, it is important to pick out the common tones in each scale. They are as follows: E, F♯, A, B, and D. Discounting F♯, it is no coincidence that the rest of these tones happen to be open strings on the guitar. And, since there are two E strings, both scales share five out of six open strings as common tones. Therefore, the decision to use both E Mixolydian and G major in the same song is quite unsurprising from a fretboard and string perspective, and, it becomes clear that The Smashing Pumpkins' composition style reflects a strategy that works in tandem with the open strings, rather than fighting against it ("Rhinoceros" is merely one example of the string-centric composition of their other songs). This is also demonstrated in the chorus riff, which, when notated in tablature, allows us to see the use of open string strumming that acts as a transition between chords:

Example 11: Open String Filler Chords in the "Rhinoceros" Chorus Guitar Riff



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These transition chords are consonant because of the keys in which "Rhinoc-

eros" resides; if band members Billy Corgan and James Iha chose to fight against the open strings in their composition of the song, the open strumming would be more dissonant. This demonstrates a sense of freedom on the strings and leaves room for strumming a wrong note without fear of dissonance, as opposed to employing a riskier method that requires more control of the fretboard.

FINAL THOUGHTS

To analyze a pop-rock guitar song purely from a treble clef notation or tablature perspective does a grave disservice to the composer and the guitarist alike. Without giving merit to gesture, the octave shape with the added root in the lower E string movement I call "The Smashing Pumpkins Chord" is overlooked completely, which misses out on a key pillar of the band's compositional style. Without understanding the physical affordances of the fretboard and the orientation of the open strings in relation to the notes being played, one cannot fathom the extent of the performance and whether the guitarist is exercising control or freedom more. Additionally, without noting the "grounding barre" and how the notes fight or indulge those notes, one cannot understand the acoustic resonance aspect, either. The difficulty in translating the treble clef notes to the fretboard was addressed as well, which again, provides a barrier for musicians who do not have the background to be able to map that out. These are just a couple of the missing details that a notation-based analysis cannot express, which prevent the musician from fully conceptualizing a song.

As this relates to the amateur guitarist, the player who may not read Western notation but picks up patterns of corporeal gestures and their own grasp of the fretboard and its affordances in the songs they learn, they know to analyze songs in this way. Their understanding of the guitar falls more on the aforementioned spectrum of freedom and control of the open strings and the fretboard; does the song use the physical features of the guitar to its advantage, or fight against it? Which corporeal chord shapes emerge that can be added to their lexicon of understanding? These are the questions that they might subconsciously ask while playing. To reiterate, this kinesthetic and fretboard-centric conceptualization should not be considered less legitimate than a Western music theory-based understanding of the instrument. In academia, the corporeal and gestural approach to understanding pieces of music is often overlooked, which creates many gaps in understanding of how a composer works in tandem or against the guitar's orientation. Looking ahead, it is my hope that more weight will be given to this kind of gestural and performance-based analyses of music. With the physical orientation of the instrument as well as gestural aspects of the piece considered, a more well-rounded understanding of any given

pop-rock guitar song can be better achieved.

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The Relationship Between Social Media Use and Mental Health:
The Involvement of Approval Anxiety as a Variable

Talia Lum
Class of 2025

Abstract:

The current study aimed to characterize the relationship between the following variables: gender identity, active vs. passive social media use (SMU), and approval anxiety. Active SMU can be defined as creating and interacting with content, whereas passive SMU is limited to consuming content. Researchers sought out participants who were eighteen years of age and older and prompted them to complete a survey which included questions linking their personal SMU and their mental health. Correlation tests, regression tests, and t-tests were run to determine whether or not the aforementioned variables were significantly correlated. Researchers found that active SMU and general anxiety were significantly correlated, as were active SMU and depression. Passive SMU was not significantly correlated with either general anxiety or depression. A regression test was conducted between approval anxiety and general anxiety and results were significant. The regression test between approval anxiety and active SMU also led to significant results, as did the test between approval anxiety and passive SMU. The test between active SMU and general anxiety yielded significant results; however, the test between passive SMU and anxiety did not. A t-test comparing gender for reported approval anxiety levels found that female participants reported significantly higher levels of approval anxiety than men did. These findings contribute to our understanding of the impact of social media on mental wellbeing by suggesting a correlation between active social media use, gender, and anxiety.

MLA Style

Over the past decade, the presence of social media in many peoples' day-to-day lives has increased drastically. Social media platforms, apps, or websites that allow for social connection, such as Instagram, Facebook, and TikTok, are used to stay in touch with friends and family, to create and share content, to consume content, to procrastinate or distract, for self-expression, and many other reasons. As social media usage becomes more normalized and integrated into our lives, social media dependencies and addictions pose a threat to society and mental well-being. Mental well-being is the status of one's emotional and psychological health; social media can be damaging to one's mental well-being for a number of physical, emotional, and psychological reasons.

It is important to acknowledge that social media can also be beneficial. Social media can allow people to stay connected with their loved ones, and may have been especially beneficial during COVID-19 quarantines in 2020. In order to measure the positive and negative impacts of social media, it is necessary to gather data about other variables related to social media usage; factors such as motivation for using social media, platforms used, amount of time spent on each platform, and activities being done on social media, can all impact the way that social media influences one's mental health. Additionally, social media can alter the relationship one has with their friends and family and the way that one perceives themselves and others. Given the nuances involved in both motivation for using social media and the benefits/detriments of using social media, data-informed understanding of the roles it plays in our lives and on our mental health are essential.

There has been substantial research done surrounding the effects of social media on mental health, particularly anxiety as a component of mental health. Hughes (2018) conducted survey research investigating the amount of time spent on social media daily, amount of social media platforms used daily, and used a Facebook intensity scale and age as independent variables. This survey link was posted on Facebook as well as emailed to the researchers' acquaintances to begin a "snowball effect." The specific anxiety scale used measured situation anxiety, subjective experience of anxious affect, and proneness to autonomic arousal. This study found, through multiple linear regression tests, that the amount of social media platforms that a participant was using significantly predicted anxiety scores (Beta = .31, p = .017, 95% CI = .35, 3.47).

Similarly, Aydogan & Buyukyilmaz (2017) utilized a questionnaire surveying 1,743 students, hoping to draw conclusions about the impact of social media on adolescents' perceived stress and anxiety. The Continuous Anxiety Index (Spielberger et al., 1970) was used to ask questions regarding the participants' perceived anxiety levels. Questions were also asked about the duration and frequency of the

participants' social media use. The researchers performed confirmatory factor analyses, as well as regression analyses, and were able to confirm at least two of their hypotheses: 1) As the duration of using social media sites increases, the level of anxiety increases. 2) As the average time spent in using social media increases, the level of anxiety increases.

Specifically focusing on the effects of social media on anxiety during and because of the COVID-19 pandemic, Widiyanto et al. (2020), conducted a cross section study by administering an online questionnaire to 430 students from multiple universities in Indonesia. The researchers measured anxiety by using a generalization disorder scale (GAD7) (Xu dan Chen, 2018), which consists of 7 symptoms. Participants were asked about the frequency with which they experience specific anxiety symptoms, along with questions regarding online exposure to COVID-19 news and information on social media sites. After gathering data, researchers completed multiple bivariate analyses and were able to draw conclusions based on their hypotheses: anxiety disorders increase in students aged ≥20 years (OR=0.40; CI 95%=0.26 to 0.60; p<0.001), red zone (OR=1.59; CI 95%=1.05 to 2.40; p=0.027), Large-scale Social Restriction (OR=1.89; CI 95%=1.17 to 2.63; p=0.031), and high social media exposure (OR=1.64; CI 95%=1.18 to 3.40; p=0.008). Based on the findings of this study, as well as the two aforementioned, it is evident that social media and anxiety are intertwined and have some significant relationship. However, it is crucial to examine any possible mediating or moderating variables in the relationship between social media and mental health.

Sezgin & Uzun (2023) conducted a study on the role of "social approval need" in the relationship between social media addiction and social appearance anxiety. The researchers sent out an online Google Form to 302 students, and they collected data by using the Need for Social Approval Scale (NfSAS) by Karaşar and Öğülmüş (2016), as well as other scales regarding social media addiction and appearance. The NfSAS asked questions relating to sensitivity to others' judgments, social withdrawal, and leaving a positive impression. The researchers ran correlation tests on the data that they gathered and found that there was a positive and significant relation between social appearance anxiety and social media addiction (r=.396, p<0.01), a positive and significant relation between social appearance anxiety and the social approval need (r=.714, p<0.01), and a positive and significant relation between the social approval need and social media addiction (r=.453, p<0.01). These findings suggest that the variable social approval need mediates the relationship between social appearance anxiety and social media addiction.

Another study that examined appearance occupation was conducted by Hawes, Zimmer-Gembeck, and Campbell (2020). The researchers specifically ex-

amined appearance rejection sensitivity and appearance anxiety in relation to social media engagement. In order to find a hypothetical relationship between these variables, the researchers conducted a 45 minute paper or online survey with 736 participants between the ages of 12 and 25. Most survey questions were related to appearance-related social media preoccupation, timing/intensity/types of social media use, social anxiety, and appearance sensitivity. Having gathered data, the researchers conducted both Pearson correlations and regression analyses to prove or disprove their hypotheses. Key findings include maladaptive social use being significantly associated with appearance anxiety ($\beta = .42$, $p<.01$) and time spent on social media ($\beta = .09$, $p<.05$), and maladaptive social media use ($\beta = .45$, $p<.01$) being significantly associated with appearance rejection sensitivity.

An additional study looked specifically at body image through the lens of approval when posting on Instagram. Kamijo & Asano (2024) developed a scale to measure the specific variable of "A Need for Approval Scale on Instagram Posting," but additional scales were also used to measure psychological distress and concerns regarding body shape. This online survey was administered to 154 female participants, with an average age of 19.32. Upon completion of data collection, the researchers conducted an exploratory factor analysis and concluded that praise-seeking when posting on Instagram increased body image concerns and decreased mental health, and women who were able to edit their photos before posting them experienced a decline in mood and an increase in anxiety. While this study, and the two described immediately prior, discuss social media in relation to variables such as general approval, rejection, and appearance, there was little published research regarding the impacts of active vs. passive social media use in relation to approval anxiety when using social media. It is valuable to examine the way people are using and engaging with social media, because this is a factor that the experienced levels of approval anxiety may depend upon. Additionally, gender is a topic that was only briefly analyzed in relation to the findings of approval anxiety, or the equivalent in the existing studies. The current study aims to address these gaps in the pre-existing published literature.

In the current study, we aimed to investigate the relationship between social media usage and well-being. We sought out 178 participants who were eighteen years of age and older and had them complete a survey, answering questions about their personal social media use (SMU) and its relation to their mental health. The survey inquires about active vs. passive time spent on social media, approval anxiety, and gender identity. Data analysis will permit us to draw conclusions about the relationship between SMU and well-being, such as which certain platforms or which certain online behaviors may be correlated with mental health issues. The hypoth-

esized results of this study include passive SMU being more significantly correlated to anxiety as a mental health issue than active SMU, approval anxiety serving as a mediator between active SMU and anxiety as a mental health issue, as well as there being gender differences in the levels of experienced approval anxiety.

METHOD

Participants

Total participants: 178

Age:

	N	Range	Minimum	Maximum	Mean
Age in years	129	62	18	80	28.91

Age in Years	30 years and younger	31 years and older	No age provided
Number of Participants	88 participants	41 participants	49 participants

Gender Identity:

	Frequency	Percent	Valid Percent
Male	46	25.8%	32.4%
Female	90	50.6%	63.4%
Non-binary/third gender	5	2.8%	3.5%
Prefer not to say	1	0.6%	0.7%
Total	142	79.8%	100%

Number of participants who did not answer this question: 39%

Mean: 1.725

SD: .5605

Sexual Orientation:

	Frequency	Percent	Valid Percent
Heterosexual or straight	115	64.6%	81.0%
Gay or lesbian	3	1.7%	2.1%
Bisexual	18	10.1%	12.7%
Not listed	6	3.4%	4.2%
Total	142	79.8%	100%
Missing from System	36	20.2%	

Mean: 1.401

SD: .8675

College Enrollment:

	Frequency	Percent	Valid Percent
No	55	30.9%	38.7%
Yes	87	48.9%	61.3%
Total	142	79.8%	100%
Missing from System	36	20.2%	

Mean: 1.61

SD: .489

Highest Level of Education:

	Frequency	Percent
Less than HS	1	0.6%
HS graduate	26	14.6%
Some College	60	33.7%
2 year degree	8	4.5%
4 year degree	31	17.4%
Professional degree	10	5.6%
Doctorate	6	3.4%
Total	142	79.8%
Missing from System	36	20.2%

Mean: 3.68

SD: 1.417

Disability Status:

	Frequency	Percent	Valid Percent
Yes	19	10.7%	13.4%
No	123	69.1%	86.6%
Total	142	79.8%	100%
Missing from System	36	20.2%	

Mean: 1.87

SD: .342

Ethnicity:

	Caucasian	Hispanic or Latino	Black or African American	Asian	Native American or Alaska Native	Native Hawaiian or Pacific Islander	Other
Valid	97	30	11	10	2	0	5
Percent	54.5%	16.9%	6.2%	5.6%	1.1%	0%	
Missing System	81	148	167	168	176	178	5

MATERIALS

Approval Anxiety, Digital Stress Scale. Through our survey, we collected information about approval anxiety experienced by our participants in regards to their social media interactions. We selected subscales from the digital stress scale (Hall, Steele, Christofferson, & Mihailova (2021)). The subscale of interest for this study was approval anxiety. The measure of approval anxiety consisted of six items. An example item is: "I feel nervous after I share a post or photo to see how others will respond to it." Participants indicated the extent to which they endorsed each statement by using a five-point frequency scale (1 = Never, 5 = Always). After reverse coding the appropriate items, the scale was created by averaging across items. The internal consistency of the scale for our sample was high (alpha = .92).

Active and passive SMU. We included a section in the survey to measure active and passive SMU. We used a five-point Likert scale, ranging from never to very frequently. We included 10 items to evaluate engagement with social media. Items associated with passive SMU included "browsing the newsfeed (without liking or commenting)," "looking through friends' profiles or posts," and "checking to see what someone is up to." Items associated with active SMU included "posting status updates," "commenting (on statuses, posts, pictures, etc.)," "chatting within apps," "creating or RSVPing to events," "posting photos/videos," and "browsing the newsfeed actively (liking and commenting)." The subscale of Active and Passive social media usage consisted of 10 items. The Cronbach Alpha was calculated for the active items and passive items separately. There were 7 items that measured active SMU (alpha = .772). Only 2 out of 3 items that measured passive SMU were considered to improve Cronbach's Alpha for that subscale, where alpha = .686.

PROCEDURE

Participants were introduced to a link for an online survey, and consent was sought with a statement concerning the purpose of the survey, followed by information regarding the confidentiality of participation and voluntariness of participating in the study. It mentioned that this study dealt with social media usage and related it to potential effects on emotional well-being, with a special focus on active vs. passive social media engagement. Upon informed consent, respondents were first asked if they used social media. Respondents answering "no" were immediately screened out of the survey. Using social media constituted the eligibility for this study. Respondents answering "yes" moved directly to the main survey with the following structured categories. First, participants completed the SMU Scale, which measured their overall SMU. After this, they were exposed to items designed to measure active vs. passive engagement. Participants were then asked to complete the section

of the survey about motivational use and reasons for SMU. Participants responded to items adapted from the Social Network Site Older Adults Measure in assessing motivations such as social connection and information seeking. The participants were then asked about the effects on mental well-being. Respondents completed items assessing both the positive and negative impact of social media on their mental well-being. Participants were asked to respond to items from the Digital Stress Scale regarding digital stress factors of approval anxiety, "FOMO," connection overload, and online vigilance. Participants were then asked to complete the section on depression and anxiety symptoms, in which the "Depression, Anxiety, and Stress Scale" was used to obtain a global measure of participants' mental health symptoms at baseline. We then had the participants look at their demographics. Participants completed an open-ended questionnaire that asked for their age, sex identity, sexuality, highest level of education attained, whether they have been diagnosed with a disability, and which ethnicity they identify as. Following the survey, participants were directed to a debriefing page. The purpose of the study was discussed in a debriefing statement that detailed the differential effects between active versus passive SMU on well-being, and specifically what this study could add to the current research on SMU.

RESULTS

Hypothesis 1: Passive SMU is more strongly related to anxiety than active SMU is. To test this hypothesis, a correlation analysis was conducted to examine the associations among these variables. A correlation test shows the strength and direction of the relationship between two variables. Active SMU was significantly, positively correlated with anxiety ($r(139)=.192, p=.023$). No significant correlations were found between passive SMU and anxiety ($r(139)=.139, p=.099$).

Hypothesis 2: Approval anxiety will act as a mediator between active SMU and anxiety as a mental health issue. Mediation is characterized by a third variable affecting the relationship between two existing variables. To test this, we did a series of linear regression analysis. This test is done to predict the value of the dependent variable based on the independent variable and to describe the relationship between the variables. Mediation analysis uses regression to find the variable that is impacting the relationship between the two variables. It was found that active SMU significantly predicted approval anxiety ($\beta=.34$, $p=<.001$). It was found that approval anxiety significantly predicted anxiety as a mental health issue ($\beta=.38$, $p=<.001$). It was also found that active SMU significantly predicted anxiety as a mental health issue ($\beta=.19$, $p=.023$).

Hypothesis 3: There will be gender differences in levels of experienced ap-

proval anxiety. To test this, we conducted an independent t-test. This was done to determine whether or not the difference in means between two groups is significant. Results of independent samples' t-test indicated that participants who identified as female (M=2.33) reported significantly higher rates of approval anxiety than participants who identified as male (M=1.64, SD=.80, t(113.21) = -4.31, p<.001).

DISCUSSION

Through testing the first hypothesis, it was found that passive SMU was not strongly correlated to anxiety, but active SMU was. This was contrary to prior research, and disproved our hypothesis. We drew this conclusion by examining the p-values of each relationship. The p-value of the correlation between passive SMU and anxiety was not significant, whereas the p-value of the correlation between active SMU and anxiety was significant. This first hypothesis theorized that passively consuming media would be more harmful for mental health, specifically feelings of anxiety, however, the results show that actively using social media, like creating content and engaging with others on social media platforms, was more significantly associated with anxiety than passive use was. This finding is valuable because researchers and psychologists can provide public health advice surrounding the type of SMU and its specific effects. The second hypothesis found that approval anxiety acts as a mediator between active SMU and mental health issues, specifically anxiety. Thus, active SMU influences anxiety levels through approval anxiety. This finding implies that active SMU impacts approval anxiety, which then impacts anxiety as a mental health issue. We drew this conclusion by performing multiple linear regression tests and the p-values that were calculated were all found to be significant. Our most significant finding relating to this hypothesis was that approval anxiety significantly predicted anxiety as a mental health issue. This finding is relevant because it pinpoints one of the specific reasons through which social media is harming individuals' mental health. The third hypothesis found that there were gender differences in the level of approval anxiety experienced. After completing the independent t-test, we concluded that female participants reported significantly higher levels of experienced approval anxiety than male participants. This implies that approval anxiety is a stronger mediator for females than males in the relationship between active SMU and anxiety. This finding is useful because it may help researchers and psychologists understand how gender and social media relate to mental health, and thus provide the public with more thorough recommendations regarding SMU.

With the completion of this study comes further opportunities for research. Having drawn the conclusions that we did, one could now complete further studies that are more specific and that target certain findings. Knowing that active SMU

is more strongly correlated with anxiety than passive SMU is, further research may want to break down the specific criteria for active SMU and their specific effects; for example, liking and commenting on posts may have a different effect than creating and posting content. Additionally, further research may be able to identify differences between posting content where followers or the public can like and comment on it, and posting content where there is *not* the capability to see the number of likes or read the comments on the post. Now being aware that approval anxiety mediates the relationship between active SMU and anxiety, public health and psychology clinicians and scholars can target this specific variable in further research, rather than anxiety in general. Research may also need to be done to identify other mediating variables in this relationship, and also to determine whether or not these variables mediate the relationship between active SMU and depression, or other mental health diagnoses. Specifically in relation to this study's findings about gender, further research must be done regarding non-binary individuals and approval anxiety, as most of this study's findings surrounded female and male participants. It may also be important to research if males are experiencing lower levels of approval anxiety because they are less likely to be active social media users than females are.

Limitations of this study include concern surrounding the diversity of the sample size used. The participant pool consisted mostly of participants currently in college, and thus mostly participants who were 22 and below and have received some level of college education. Individuals who are less comfortable using social media, oftentimes older adults, may have been deterred from completing our survey because it was online, thus limiting our participant pool to younger participants. Similarly, participants had to have access to technology, or use the research team's technological device. The participant pool was limited to Muhlenberg College community members and those who are friends with, and/or family members of, one of the researchers. An additional limitation is that because the majority of participants identified themselves as female or male, we could not run any statistical analyses on those who identified as "Non-binary/prefer not to say." Because our study was a self-report-style survey, certain biases may have been involved in the participants' responses. Self-serving bias may have caused participants to report dishonestly as a means of preserving their self-esteem or a certain perception of themself. Social desirability bias may have caused participants to portray themselves in a positive light, rather than in honesty, due to an internal, and sometimes subconscious, need to be perceived by others in a certain way. Additionally, participants may have reported inaccurately due to misremembering or having trouble recollecting what the survey questions are asking. These biases may have impacted the accuracy of this study's results.

The research conducted and its findings contribute significantly to the existing literature surrounding social media and mental health. Approval anxiety is a variable that has not been studied extensively, but based on the conclusions drawn, is one with significance. Public health officials, researchers, and psychologists can utilize these findings in implementing strategies and policies that will help limit mental health issues as a result of SMU. Strategies should aim to target resilience-building and self-esteem, particularly for younger females, which, based on the conclusions this study pointed to, is a demographic at risk for social media-induced approval anxiety. By targeting the mediator variable in the relationship between active SMU and anxiety, researchers can limit the negative effects. Certain social media platforms, where the norm is to display an idealized version of oneself, may contribute more to higher levels of approval anxiety because of the vulnerability involved in opening oneself up to hypothetical criticism. While the platform may contribute to the level of approval anxiety felt, the status of the individual's emotional and psychological self-esteem and perception of themselves may have an equal contribution. Regardless, having explored approval anxiety as a variable in the relationship between SMU and mental health, it is inevitably a crucial component that must not be overlooked.

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English

Theory of Tutoring

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Class of 2026

Abstract:

My "Theory of Tutoring" was originally written as my final paper in the Writing Theory course. I propose the idea of embracing failure, not only as an inescapable within the writing process in general, but specifically within academia. As a student at Muhlenberg, the idea of failure or "being wrong" can be intimidating. While trying to establish ourselves and find our voice within the academic sphere, the idea of a misstep can be daunting. However, at the start of my experience being a writing tutor and considering writing theories, I began to notice a pattern of what appeared as the process of embracing our failures, leading to more abstract, cohesive, and intelligent ideas and written work. I decided to truly mull over this idea and consider it in conversation with the works of scholars that I had read over the semester in my aforementioned course. What resulted was my theory of tutoring, which takes my original proposition and considers how "embracing failure" is not a cut-and-dry idea and might work differently for different student scholars.

> *"Under certain circumstances, failing, losing, forgetting, unmaking, undoing, unbecoming, not knowing may in fact offer more creative, more cooperative, more surprising ways of being in the world" (Halberstam 2011, 2). And perhaps more surprising writing, more surprising forms, more surprising ideas.*
>
> – Stacy Waite (44)

My biggest flaw as a writer has always been getting too attached to an idea and refusing to let it go with the hopes that I can find some way to incorporate it into the piece. As writers, it is easy to fall victim to the fairytale that all of our ideas are the best ones, or if not the best ideas, believing that they are the best it's going to get for that project. Whether it be because you simply have nothing left to give at the moment, are running low on time, or are stubbornly stuck on an idea for a paper, failure is inescapable as a writer. However, instead of beating ourselves up for our shortcomings, might it be in our best interest to embrace the disconnect?

A couple of weeks ago, as many writing center employees are called to do, I was spending time with a friend when she asked me to help her work through a paper for her social psychology class. The assignment was to explain a podcast episode of *This American Life* through psychological phenomena. She had chosen one specific example that she was sure would suffice for the six phenomena minimum. Upon delving deeper into our make-shift session, it was clear that many other ideas and examples were floating around in her head. They had some real potential but were unable to be used because she had confined herself to just one. I eventually encouraged her to do some free-writing and rereading of the podcast transcript to see if there were more precise instances where the phenomena were displayed. Sure enough, she was able to locate other examples, and with some restructuring and brainstorming, let go of her loyalty to the one example. This allowed her explanations to be more connected and well-thought-out.

After congratulating myself for a job well done, I began to reflect on my recent reading of Stacey Waite's "How (And Why) to Write Queer," from their book *Teaching Queer: Radical Possibilities for Writing and Knowing*, and the emphasis that they place on uncertainty and questioning yourself. In their instructions for writing queer, Waite argues that writers should not "...become an authority on their subject" and not "...be faithful or loyal to institutions, disciplines, or persons to whom others say you must be speaking" (Waite, 45). In fact, throughout the piece, there is a recurring theme of questioning authority, who holds it, and whether writers themselves should ever be in a position of authority. Waite encourages nonmonogamy to ideas and the systems that encompass the people who have generated them.

By encouraging writers to refrain from rigid rules, thoughts, and morals, Waite proposes that we might not just make way for failure, but pave the way to learning from it and questioning the systems that might have failed us. They encourage us to "Get disorganized, make a mess." I interpret this to mean that Waite permits writers to fall outside the bounds of perfect. Writers can and should escape organized idealistic academia and head towards pragmatic queerness, which is bound to be riddled with mistakes because humans make mistakes. In connection with such a demand, I began to wonder what the implications are for encouraging failure in the writing center. What happens when we inspire writers to "make a mess" with their thoughts, writing, and revising?

All my experiences tutoring and being tutored, along with my reflection on Waite's work, led me to contend that the best tutoring happens when tutors encourage tutees to embrace their failures. When we encourage tutees to recognize that their writing has either failed conceptually, in terms of content, or regarding cohesiveness, we open up a conversation that mulls over original thought until it is complex and well-articulated. In sessions, tutors can provide writers with a space to eradicate choices stylistically or conceptually that are holding their work back and opt for the chance to fully flesh out their thoughts and opinions.

For the purposes of this paper, I will be defining failure in writing as insufficiently providing evidence for ideas, not explaining evidence in connection to the original thought, lack of cohesion, and inclusion of vague or not fully fleshed-out concepts. I will exclude from my definition of failure the use of improper grammar, the misuse or non-use of Standard Edited American English, inappropriate use of citation style, and lack of enhanced or elaborate vocabulary (this does not include the use of terminology needed in a specific discipline). I have decided to exclude these aspects as they depict an adherence to exclusionary ideals of academia more than they do an accurate representation of intelligence, skill level, and thought process. In "Should Writers Use They Own English?," Vershawn Ashanti Young, also known as ԁDr. ᴠVay, explains that "Standard language ideology is the belief that there is one set of dominant language rules that stem from a single dominant discourse (like standard English) that all writers and speakers of English must conform to in order to communicate effectively" (Young, 111). In this sense, standard English's place in discourse does nothing but exclude the voices of individuals who have been unjustly deemed unfit to participate in academia. It does little to consider that the skill level of a writer might not be connected to how well they can conform to dominant language standards.

I decided to confer with fellow training writing tutors, current writing center employees, and former tutees to ask them about their opinion on failure and its role

in the writing center. I wanted to know if they felt the very same, that failure was a tool to be wielded by tutors and tutees alike. That it could spark productive conversations, growth of thought, and enhance the written word. I provided them with the very same definition of failure that was previously mentioned.

In his opinion on the role of failure within the writing center, sophomore and training writing tutor Jem expressed "If a tutor is seeing something in the tutee's text that they aren't, it allows the tutee to apply more dimension to a topic that they thought they knew everything about and allows them to approach it from a different angle." Hearing Jem's words only made me more confident in my argument. He was saying exactly what I had proposed, that bringing a tutee's attention to a shortcoming of their writing could hone in on ways to complicate and explore it. In turn, the tutee gains more perspective. But then Jem gave a personal anecdote which made me question my original declaration:

> My writing assistant, basically he told me the total premise of my final paper was wrong and not connected to my original theory. Basically, he made me f**king cry. I had worked for a very long time on it and thought it had a point. It made me feel like I didn't belong in a writing class and couldn't complete college-level work. If I couldn't string together a paper in my first-year seminar, what could I do?

I found Jem's account highly intriguing and complicating to my argument. While various elements to it garner reflection, what I found most compelling is their use of the word "belong." Specifically, this interaction made them feel as though they did not belong, in not just a writing class but a college-level learning environment. Now, I have not read Jem's paper nor was I present for the particular session he is speaking of, so I cannot be sure as to how this criticism was delivered and whether or not it was warranted. However, what matters most is the impact that this interaction had on him. It became clear to me that acknowledging a tutee's failures, regardless of how that criticism is delivered, has the potential to leave lasting negative impacts, one of those being a sense of not belonging.

To further explore this effect, I turned to David Bartholomae's "Inventing the University," specifically his thoughts on establishing individual voice within discourse. Bartholomae contends that to develop authority within academic discourse, writers need to work against the grain of conventional language of discourse (Bartholomae). However, he also asserts that to gain footing within academia, mimicry of that language is a good place to start. So what happens when a writer's failure

is connected to, either at the beginner level, unsuccessful mimicry, or at the most advanced level, an inability to go against the grain of traditional discourse? It seems, from Jem's sentiment that an acknowledgment of such a failure, a failure made when they were starting to enter college-level discourse, avowal of his work shook his confidence. Luckily, this interaction did not deter Jem completely and he was able to reach out to his professor to visualize a more clear path forward. However, I couldn't help but think that for another individual this might've been an interaction that would've discouraged them completely.

So maybe the argument that encouraging tutees to embrace their failures was not so black and white. It might vary from writer to writer. It might also be heavily connected to that individual's openness to receiving criticism, and whether or not they see it as an opportunity to enhance their work or as a defamation of them as a writer. This idea became apparent in my discussions with Joy, a sophomore and current writing center employee. She expressed "There have been many times when tutees feel like it is a personal attack. I think it's because writing is so vulnerable. It affects me because then I feel like I cannot give genuine criticism." Joy also signaled to me that she most commonly experienced this with tutees when it was their first time visiting the writing center. So it seemed, with Bartholomae's idea of establishing voice in mind, drawing attention to failures might sometimes be unproductive for both tutor and tutee. When a writer is inexperienced or hasn't quite yet found their voice within discourse, highlighting their failures might cause them to question their identity within the institution. It might bring about insecurities in their ability to work their way up to original thought. This could possibly lead to neglecting to utilize the writing center altogether or create a sense of not belonging in academia, like in Jem's case.

However, it is unproductive to stray away from criticizing and providing suggestions for a tutee's work completely. What would be the purpose of sessions if we tutors did so? Instead of full-fledged acknowledgment of failures right off the bat, might a session require a prerequisite?

In the chapter "Courting Failure," Stacey Waite reflects on a time in which the failure of the available language to talk about writing sparked creative class conversation and ignited a new style of writing for one of their students. After a discussion that used parts of the body as metaphors for various elements of an essay, Waite was struck by the adaptations made in one student's "body paragraph":

> I notice the ways Bracken embodies herself as a writer of the piece, talking explicitly about being a writer, about the body (her hands) moving in knowing fashion without questioning. Brack-

> en's embodied writing enacts a kind of contradiction—a hand with a mind of its own, a hand bound to an act of expression that is not a question. (Waite, 65)

In this instance, true and productive change was made once Waite's student abandoned the language of conventional discourse and embraced her piece as if it were an extension of herself. She writes as though she is confident in her abilities and the information she has to share. With Waite's idea in mind, and a reflection on Gloria Anzaldúa's sentiment that "Until I can take pride in my language, I cannot take pride in myself," I now am able to recognize the power the ownership has when writers are attempting to embrace their failures (Anzaldúa, 59). If a tutee is truly connected to a piece of writing and sees that work as an extension of themselves, acknowledging that failure is difficult. It does not just tell the tutee that their work is not meeting certain standards, but that they are failing to meet the requirements of the discourse they are trying to be a part of.

So, while indeed it is beneficial to encourage tutees to embrace their failures in some instances, it is also imperative that tutors are aware of the tutee's confidence in their written voice. If a tutee takes pride in a piece of writing as an extension of their identity, it is imperative that the tutor is cautious of their delivery of criticism. It is necessary to bear in mind the writer's connection or lack thereof to the piece of writing. Yes, encouraging some tutees to embrace failure might spark productive conversations that develop complex thoughts. But for some tutees, it might cause them to shut down. Highlighting that a tutee is not yet established within their discourse had the potential to strike a personal chord, signaling to the tutee a failure of identity rather than a failure of writing. In order to be aware of such sensitivities, sessions might include awareness of what the tutee is really connected to or proud of in their work and why. Such awareness might avoid a potential dissolving of writerly confidence.

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Philosophy

Neuroscience and the Ambiguity of Legal Insanity in Violent Criminals

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Abstract:

As neuroscience becomes more common in American criminal courtrooms, so has philosophical debate about its role in determining insanity in cases of violent crime. This essay argues that although modern neuroscientific tools reveal links between brain abnormalities and criminal behavior, modern neuroscience still falls short of meeting the legal standard necessary to establish insanity beyond a reasonable doubt, making the verdict of not guilty by reason of insanity theoretically unattainable. Though some cases have shown evidence that brain tumors are linked to pedophilic behavior, many offenders have no actual detectable brain abnormalities. This is further complicated by the legal standard for insanity, which relies on an individual's "substantial capacity" to understand their actions, a concept that neuroscience cannot yet reliably quantify or assess. Furthermore, neuroimaging data is interpreted subjectively, lacks incremental validity over traditional psychological assessments, and cannot determine mental state at the time of the crime. While neuroscience can support a meaningful understanding of criminal behavior, its use as evidence for legal insanity is ethically questionable. Therefore, this essay argues that neuroscience should be used to advance and refine, rather than justify, the current standards of the insanity defense to uphold the integrity of the justice system.

The intersection of neuroscience and the legal system has ignited an ongoing philosophical debate on insanity and culpability. In more recent years, the United States has seen an increase in violent offenders, such as murderers and rapists, turning to the insanity defense in court. A study reported in the 2019 edition of Annual Review of Criminology reported that, in recent years "...10-12% of all US murder trials and 25% death penalty trials" have included defendants attempting to lower their sentence/punishment as a result of neurological data which suggests that they were "insane" at the time of the crime (Greely & Farahany, 2019). According to this study, these percentages are the highest since 2005. This begs an important question: Can neuroscience help determine if a violent criminal has the right to use the insanity defense? While brain imaging and neuropsychology have shed light on the relationship between the brain and behavior, it can be argued that neuroscience, in its current state, cannot reliably determine if a defendant of a violent crime meets the criteria for the insanity defense. The justice system sets a high bar for proving insanity--one that neuroscience struggles to reach due to the limitations of neuroimaging, difficulties in determining one's moral understanding of a crime, and the fact that not all violent offenders exhibit brain abnormalities or mental illness. This is not to suggest that neuroscience has no place in the courtroom or that legal insanity is an inherently flawed concept. Rather, neuroscience should first be used to refine the conceptual and practical foundations of the insanity defense itself. Only then can we avoid eroding personal responsibility and the integrity of the justice system.

While various countries have different definitions of insanity, I will be focusing my attention on the American definition, which states that a judge can approve a verdict of insanity if it is proven that as "...a result of mental disease or defect he [or she] lacks substantial capacity either to appreciate the criminality/wrongfulness of his [or her] conduct or to conform his [or her] conduct to the requirements of the law" (MHA, 2020). Several questions arise from this definition. For instance, what qualifies as a "mental disease or defect?" What is the "substantial capacity" of an offender to "appreciate the criminality/wrongfulness" of their actions? And, more importantly, how exactly do we measure this "substantial capacity?" The difficulty in defining these concepts highlights a broader issue: the gap between scientific and legal understandings of mental capacity. While neuroscience focuses on probabilistic and statistical approaches to such a complex concept, the justice system hinges on proof "beyond a reasonable doubt" (Wex Definitions Team, 2020). This tension complicates the use of neuroscience in cases of the insanity defense, raising important questions about the validity and fairness of current methods and approaches.

In an attempt to answer these questions, proponents of the use of neuroscience in the courtroom often point to neuroimaging technologies, such as fMRI and

PET scans, as crucial pieces of information when determining legal insanity. Neuroimaging evidence is usually introduced in court to highlight brain abnormalities that may range from structural irregularities, damage, or alterations in connectivity between large-scale neuronal networks (Snyder & Bauer, 2019). Previous studies using structure-function mapping have shown that damage or abnormalities in certain parts of the brain may increase the likelihood of violent or "criminal" behaviors by eroding moral understanding and self-control in the individual with these conditions (Greely & Farahany, 2019). For instance, many murderers have "...reduced activity in brain areas including lateral and medial prefrontal cortex…as well as medial temporal regions…including the amygdala," which are areas associated with impulse control, decision-making, and moral reasoning (Turner et al., 2021). Reduced activity and damage to these areas are also associated with the development of multiple mental illnesses, such as anxiety, depression, and schizophrenia (Turner et al., 2021). Many murderers, especially mass murderers, have been shown to have reduced activity in these areas. Take, for example, Kip Kinkel, who in 1998 killed both of his parents before opening fire in his school, killing two students and injuring five more, and was later diagnosed with paranoid schizophrenia in prison (Swanson, 2000). Similar evidence has been found for sex crimes. One commonly referred to example in the neuroscientific community is that of a man dubbed "Mr. Oft," who, after developing a right orbitofrontal brain tumor, suddenly developed pedophilic tendencies, which then just as abruptly ended once the tumor was removed (Burns & Swerdlow, 2024). Overwhelmed by disgust over his thoughts, the man became severely depressed and considered suicide until discovering that these desires were considered a possible result of his tumor, which developed in a location his brain long associated with sexual desire and behavior (Bruns & Swerdlow, 2003). Such examples highlight the benefits of including neuroimaging when determining the insanity defense. Imaging gives the judge and jury an understanding of the correlations between brain structures and criminal behavior, possibly providing explanations for actions that may otherwise seem incomprehensible.

This being said, there are critical limitations to relying on such technologies and assessments to determine insanity. For one, not all violent offenders exhibit any neurological damage or mental illness. In a study conducted on 31 U.S. individuals awaiting trial, 64.5% had abnormalities in their temporal lobe, while 29% had damage to their frontal lobe (Blake et al., 1995). The statistics are even lower for mental illness, with only 9% of murderers being diagnosed with mood disorders, 23% with personality disorders, and 10% with bipolar disorder or schizophrenia (though this jumps to 33% for mass shooters) (Almomen et al., 2022). Some examples of violent offenders without mental illness in recent years are Omar Mateen,

who killed 49 people in an Orlando nightclub, and Stephen Paddock, who killed 58 concertgoers in Las Vegas. Neither individual had any apparent serious mental illness or brain damage before or after the crime was committed (Carey, 2017). This is true for sex crimes, as well. Taking the example of pedophilia, while cases like "Mr. Oft" as previously mentioned certainly exist, it still holds that "..no causative factor of pedophilia has yet been pinpointed," and "...the role of alterations in brain structures that are crucial in the development of sexual behavior has not yet been systematically studied in pedophilic subjects" (Schilitz et al., 2007).

This overall lack of understanding raises many ethical questions when considering the insanity defense. If an exact cause of such behavior cannot be pinpointed, then this makes pointing to a "mental disease or defect" in court incredibly difficult or nearly impossible. If the root of certain behaviors cannot be found, then attributing them to "mental disease or defect" becomes subjective and inconsistent. This uncertainty ultimately undermines the reliability of the insanity defense, as identifying an important criterion–the identification of mental impairment–is left open to interpretation, or simply not present in the defense at all. This has many implications for the justice system. Take, for example, two individuals convicted of pedophilia: one is granted a reduced sentence due to the admission of neurological evidence showing a tumor in an area associated with sexual deviancy, while the other receives no such consideration because no neurological abnormalities are detected. If they are both found guilty of pedophilia, should their punishment hinge solely on neurological evidence? Such disparities raise important questions relating to equality and fairness in sentencing, as they suggest that those with identifiable brain abnormalities may be treated more leniently than those whose conditions are unidentifiable or invisible. The same goes for any other violent crime, such as murder and assault. Should a person with diminished prefrontal cortex activity, an area associated with impulse control, receive a lesser or different sentence than someone with no visible abnormalities?

What about cases in which there is clear damage or abnormality in the offender's brain that correlate to the behavior the offender exhibited at the time of the crime? Is this data still not important to bring into evidence for the insanity defense? Such questions lead to discussions of the many limitations of neuroimaging itself. One important aspect of neuroimaging to consider is that it is "...prone to cognitive biases, showing a high level of subjective interpretation associated with its findings" (Vitacco et al., 2024). In a courtroom, this means undermining the reliability of the evidence, and because "beyond a reasonable doubt is the legal burden of proof required to affirm a conviction" (Wex Definitions Team, 2020), subjectivity makes it difficult for the judge and jury to reach a unanimous decision.

Furthermore, neuroimaging lacks incremental validity, or "...the degree to which the instrument provided measures that were more valid than alternative measures of the same variable" over other methods of determining insanity, such as psychological and clinical assessments/interviews (Haynes & Lench, 2003). In a court of law, this is often forgotten, with neuroimaging placed on a higher pedestal than other methods due to its perceived objectivity (Canli & Amin, 2010; Farah, 2010). To the untrained eyes of judge and jury, it can be easily forgotten that these images "...represent statistical inferences, rather than absolute truths" (Canli & Amin, 2010; Farah, 2010). A brain scan showing reduced activity in the prefrontal cortex, for example, may suggest a predisposition to impulsive behavior, but it cannot definitively determine a causal link between brain and behavior.

Lastly, brain scans and similar methods typically occur before or after a crime was committed, as it is highly unlikely that an offender committed an offense while being scanned. This makes determining the mental state of the offender at the time of the crime seemingly impossible. In other words, how can a jury pass judgment on a defendant if the jury has no way to determine whether the defendant was "out of their mind" at the time of the offense? This is further complicated by neuroplasticity, which is "...the ability of the nervous system to change its activity in response to intrinsic or extrinsic stimuli by reorganizing its structure, functions, or connections" (Puderbaugh and Emmady, 2024). In other words, the brain is not static–the brain you see in an fMRI scan is not the same brain it was yesterday or the day before that. Therefore, it is arguably impossible to say that a brain scanned after a crime is the same brain as the one present when the crime was committed. If this is the case, then what exactly is neuroimaging evidence supporting in court? While it can show abnormalities or patterns of connectivity associated with criminal behavior, it cannot definitively demonstrate if those features contributed to the offender's actions at the time of the offense. If the brain is dynamic, then using an image of brain activity during a past event is speculative at best, and speculation is not enough to meet the expectations of the insanity defense.

A common response to this is that neuroscience is just one piece of the puzzle. It is very unlikely that just neuroscientific evidence would be used in court to support a defense. Psychological evaluations, historical accounts, and physical and circumstantial evidence are often included when determining insanity. Such tests focus on behavior and clinical history to diagnose possible illnesses or impairments and allow professionals to determine if the offender has a clear understanding of their actions (McDonald and Hanson, 2024). Neuroscience is meant to act as a support, not the true and only determining factor. While this is certainly true, what makes any of these other methods any more reliable than neuroscientific data

when determining insanity? The biggest concern is that the results of these tests are subjective, similar to how subjective brain scans are. One forensic psychologist may perceive the results of an interview in a way that is often not the same way another may have. This is because "Different experts may provide varying opinions on a defendant's sanity, making it challenging to arrive at a fair and consistent verdict" (Jakuback, 2023). This consistency is critical in a court of law, as the insanity defense can only be used if it can be proven beyond a reasonable doubt that the defendant meets the proper criterion for insanity (Wex Definitions Team, 2020). Without a more objective method of determining a defendant's understanding of their actions and their implications, psychological assessments fall short of providing definitive evidence in court, just as neuroimaging does. Consequently, no single method, neuroscientific or otherwise, can definitively determine insanity because the very criteria for insanity remain uncertain and ambiguous.

This brings me to the discussion of an offender's "substantial capacity" to understand what they have done is wrong, or conform their behavior to the requirements of the law. While cases like "Mr. Oft" show how neurological damage or deficits may result in diminished control and a propensity for violence, they do not address how this capacity can be examined in a court of law. A capacity for one's understanding or their "ability to conduct or conform" is not quantifiable or tangible like the activity apparent on a brain scan or a measure of Hertz from an EEG. While one could argue that this capacity is determined by the damage to the frontal lobe or amygdala, which is associated with decreased impulse control, decision-making, and moral reasoning, as I mentioned earlier, this line of reasoning is still insufficient to meet the criterion for insanity properly. Damage does not inherently mean that an offender could not distinguish between wrong and right when the crime was committed, or that they were unable to conform themselves to the standards of the law. It merely proves that the offender may have increased aggression due to brain abnormalities, ultimately falling short of proving beyond a reasonable doubt that an offender is legally insane.

In essence, while neuroscience appears to be a promising aid to the insanity defense in the court of law, it cannot support the definition of insanity in its current state. By deepening our understanding of how the brain influences our behavior, neuroscience can help shape policies that balance justice and the evolving world of neuroscience. It is only then that we can properly integrate neuroscience into courtrooms without undermining the integrity of the legal system, allowing us to properly use the insanity defense when delivering justice.

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Dads and Being Dudes:
The Relationship Between Expectations of Fatherhood and Masculinity in American Sitcoms

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Abstract:

Family has long been at the center of television situational comedies ("sitcoms"), and in alignment with the patriarchal standards of American nuclear families, the father was placed as the head of that household. However, as gender roles in real-life America changed as a result of post-war and contemporary societal structures, so too did the characterization of dads on screen. Using *Father Knows Best* (1949-1960), *The Simpsons* (1989-present), and *Modern Family* (2009-2020) as case studies, this paper examines how the role of the father in past and present family television is reflective of traditional masculinity (often referred to as "toxic masculinity"), and how the pressures of manhood are passed down generationally to their children. While American society has continued to break down historical gender roles within the household, the sitcoms analyzed prove that the perfection expectations of fatherhood are dictated by one's own experiences of being fathered, leading to slow progression. When being a "good man" is directly tied to being a "good father", and being a "good father" is directly tied to making a "good man" of their sons, the reproduction of traditionally-masculine father figures is seemingly unstoppable, and impacts the individual, their children, and the audiences who watch them from the comfort of their own homes.

Televisions, since their infancy, were placed at the center of the family living room, and the typical nuclear family of mom, dad, and two to three kids gathered around it every night for primetime viewing. Family was at the center of the sitcom genre, with characters and dynamics that mirrored those of its viewers. The father was often the center of these families, as fathers were consistently central to the American patriarchal society. This came, initially, from an absence: "After the prolonged absence of men in many households due to World War II [which ended just before the improvement of television broadcast capabilities that allowed for sitcoms], postwar popular discourse implored men to become involved fathers and take their rightful place as head of the family" (Patton 88). It was long believed that fathers should be leaders, both in the household and with their "contribution[s] to society," in order to "reclaim their manhood in the public sphere" (Patton 88). Fatherhood was, therefore, linked with "manhood" —that to be a proper man in society, one must also be a father, and a good one at that. However, as changes in American society led to the restructuring of societal gender roles and representations, as well as a reconsideration of the successful family unit, the role of the father in sitcoms changed too.

This paper examines the evolution of fatherhood, from Jim Anderson in Father Knows Best (1949-1960), to Homer Simpson in The Simpsons (1989-present), to Phil Dunphy in Modern Family (2009-2020), and how their representations translate to society. These characters not only historicize the values and expectations of fatherhood but also the stereotypical masculinity of male-identifying figures within America, culminating in the relationship between traditional masculinity and fatherhood.

Father Knows Best began on the radio in 1949 and transitioned to television in 1954, bouncing between CBS and NBC during its tenure. Episodes of the series consisted essentially of some "innocent foible and fumble of the children" (Butsch 442), with Jim Anderson, their father, serving as the adviser, teaching his children about life. To begin, it's difficult to move past the title of this program – fathers as the smartest, wisest, most superior members of the family. "Atop this [presentation of the nuclear family] was posited a patriarchy in which the father was portrayed as knowing, correct, and superior to his wife and children, a structure that worked to reinforce the prevalent sexual stereotypes" (Henry 88). However, while patriarchal masculinization was seen as aspirational for men at the time, the portrayal of the "family man" altered America's perception of manhood. "The private space of the home enabled men to negotiate alternative masculinities" (Patton 87). This negotiation of masculinity allowed fathers to spend time away from work in the home, showing more emotions, "without jeopardizing… one's masculinity" (Patton 88).

Yet, the belief in traditional masculinity as anti-femininity was still present; rather than taking on the traditional "domestic mother" roles of housekeeping, cooking, and nurturing, fatherhood would consist of "do-it-yourself household projects, hobbies, friendship, and having fun with one's children" (Patton 88).

As the show continued into the 1960s, the "family values" presented in Father Knows Best "came to predominate in the television sitcom, tempering even the image of fathers as breadwinners and certainly taming the earlier independence of television's domestic women" (Press 141). However, this representation of "the wise father figure [as] the household's authoritative center… symbolically preserved the patriarchal norm of the nuclear family" for many years to come (Feltmate and Brackett 545). Jim acted as a sort of "straight man" in the comedy of the show, both in his ability to maintain composure while others were acting foolishly, and also literally in his heterosexuality that was expected from the presentation of a nuclear family. While most of the audience's laughter was in response to the children's antics, Jim served as a peacemaker for his kids, who respected his opinion and authority within the house. Moreover, he served a similar role for society, giving advice to all people in his community, and teaching them life skills while his wife took the backseat ("Bud Takes Up the Dance").

A noticeable transition from Father Knows Best to The Simpsons occurs, consistently, in the title– The Simpsons, while still centering around a male protagonist, explicitly introduces the idea that the show is now about the entire family, not just the father. This comes with the introduction of the working-class male buffoon, who became the focal point of comedy for the series. "The few images of white working-class men available are generally, as in the past, those of buffoons" (Bettie 129). Much of this representation is a result of "some audiences [being] more uncomfortable with representations of working-class blacks (as potentially racist stereotypes) than they were with working-class whites who appear to be safer objects of class humor" (Bettie 148). Homer's portrayal as a buffoon "might be acceptable to viewers precisely because color and lower-class status are not conflated" (Bettie 148).

The Simpsons served as a sort of middle ground in the sitcom's progression toward modernity. "[T]hese shows are a revolt against the idealized images of domestic life portrayed by sitcoms like Leave It to Beaver or Father Knows Best. But, unlike many of their contemporaries, they have not attempted to reflect the changing family structure in America" (Henry 89). Rather, the show uses a traditional middle-class nuclear family to spotlight this conventionality more critically. The

Simpsons are "more representative of the American[1] family and more attuned to the realities of contemporary life. They live in a society 'loosed from its moorings,' full of corruption, voracious consumerism, and moral decay" (Henry 88). They're relatable, topical, and American.

"In [The Simpsons and similar sitcoms], the patriarchy is shattered, the universal authority and correctness of both the mother and the father is undermined, and the dominant values systems are rigorously questioned" (Henry 89). In stark contrast to Jim in Father Knows Best, Homer, often, does not "know best," if at all; he doesn't exist as the patriarchal moral ground on which society once stood. "Many people have criticized The Simpsons for its portrayal of the father as dumb, uneducated, weak in character, and morally unprincipled. Homer is all those things, but at least he is there. He fulfills the bare minimum of a father: he is present for his wife and above all his children" (Cantor 738). Here, the factors that make up a good father—and subsequently a good man–are more related to presence and care, rather than correctness. Homer is not the "ideal father" (Cantor 738), but nevertheless he does the best he can for his family.

Homer works hard at his blue-collar job– not with the intention to climb the corporate ladder, but rather to put his family's needs above his own. He works as much as he needs to and returns home to be present there as well. Homer, while being the subject of comedy, is still committed to teaching his children "valuable lessons" ("Bart the Genius"). But he is affectionate just as much as he's aggressive. His advising could be viewed more as disciplining, which involved more yelling than in Father Knows Best; Homer asserts his masculine-based strength and dominance over the family when he needs to.

Homer also potentially inhabits a form of masculinity that is seen as a "rejection of adulthood and the responsibilities associated with family life," seeing the breadwinning requirement of fatherhood as burdensome (Miller 8), whereas others see this loss of breadwinner status as anti-masculine. This introduces the idea that the progression of masculinity is passed down generationally, in both sitcom succession and the fictional bloodlines of the protagonists. "[T]he series depict a textually explicit struggle by the protagonists over the fact that the way they choose to be fathers and men differs considerably from the relationships modeled for them. Their fathers, and the attributes of masculinity hegemonic among their fathers' generation, are consistently opposed to the masculinities required of the protagonists" (Lotz 75). These characters, Homer included, act in limbo, acknowledging the outdated patriarchal requirements of the past, but struggling with how to move forward.

1 I refer to the fathers by their first names in this paper in order to differentiate them from the remainder of the characters, which were mostly family members that shared the same last names.

In Modern Family, Phil Dunphy very much exists in this gray area. He works as a real estate agent— quite literally selling domesticity— and tries to be overtly friendly toward his children. And yet, Phil finds himself still falling slightly into the archetype of a buffoon, while resenting his incapabilities that are incongruous with the masculinity presented before him. For example, in a plotline that involved Phil failing to change a smoke detector battery, he says to himself, "Changing the battery in a smoke detector is what they teach you in Man 101. So, of course, every time I hear that noise all I hear is, 'Beep beep! You're not a man! Beep beep! You're not a . . . '" ("Chirp"). This task is something that men are "supposed" to be able to handle, therefore in his eyes, he doesn't get to claim manhood "because he is not the way he has been trained to think men are supposed to be" (Lawford-Smith et al. 66). His masculine identity is caught up in the expectations of what he's expected to be.

Masculinity, still, is tied to fatherhood. While Phil does not display the common traits of manhood as he views it, he is neither portrayed as a traditionally strong, aggressive, anti-feminine figure. His desire to be a perfect father still aligns with that of sitcoms from all eras. "In their meditation on contemporary masculinity, the series depict being a father—and trying to be a good father—as a central component of how to be a man… Parental, if not paternal, duties—particularly the notion of providing for one's family—consistently emerge as the men's primary motivator" (Lotz 58). Phil is quite a bumbling father, and his fatherhood is mostly ineffective as a result. Family, both immediate and extended, is a large focus and is still a key motivator for him, even if he doesn't always succeed. Phil wants to be "the cool dad," which sometimes disrupts his ability to be fully respected as the authority figure he wants to and feels he's supposed to be ("Pilot"). Moreover, he tends to take a step back in disciplining, allowing his wife to take much of the lead. His lack of dominance and involvement, therefore, makes him appear less masculine.

The progression of masculinity and fatherhood in sitcoms seems to move quite slowly. Jim, Homer, and Phil all existed as leaders of their families, opposite to primarily stay-at-home mothers, and above their three children. The cause of this slow progression, however, seems to be the fact that the idea of perfection in fatherhood is based on each individual's experience with men in their own lives, and what they believe a father should be. Moreover, the role of the father in these shows centers a lot on their ability to make a "good man" out of their sons. However, shows like Modern Family did introduce disruptions to the nuclear family, which in turn altered the role of fatherhood, presenting a family of two fathers and their adopted daughter, and a second marriage that made one character a stepfather.

The three presentations of families in these sitcoms were mostly the same, yet as the shows progressed toward modernity, the ability for masculinity to be

negotiated and grappled with changed. Homer, for example, broke down the idea of perfection both in fatherhood and as a masculine trait, which was set for him by figures like Jim. Phil wasn't able to be as masculine as he thought he should be, but his fatherhood wasn't stripped away either. Presentations of alternative masculinity and fatherhood became more common, even though the standard of what they were "supposed" to be remained fairly conservative. As American society continues to break down the idea of traditional gender roles and family, the role of the father will be forced to change in tandem. That shift may only happen when the inherited understanding of masculinity is reconstructed, which, looking toward the future, seems to be progressing in family-centered sitcoms.

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Hidden Hierarchies in the Landscape Art of Edo Japan

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Abstract:

Art museums often feel like sanctuaries of timeless beauty, where history is distilled into serene visions of elegance and refinement. At first glance, it's unlikely that one would connect the complex cultural context of labor and resource cultivation to the creation of the masterpieces in the Philadelphia Museum of Art's Edo-period exhibit. While these works are captivating, they also obscure the cultural context of exploitation embedded in the transformation of nature and labor into symbols of elite power. It is thus crucial to examine how Edo-period Japanese art conceals the systems of labor and class dynamics tied to its creation. Drawing on Camille T. Dungy's critique of mediated nature and Adam Gopnik's concept of museums as mausoleums, I argue that Edo-period artworks sanitize and aestheticize nature, erasing the labor and environmental tolls that sustain their beauty. The depiction of pale, luminous skin throughout these works further reinforces class distinctions, tying aesthetic choices directly to labor and social hierarchies in the Edo period. Focusing on pieces such as *Kamo-gawa*, *Sumida-gawa*, and *Complete Picture of the Newly Opened Port of Yokohama* from the Philadelphia Museum of Art's Edo-period exhibit, this study argues that these idyllic scenes sanitize the harsh realities of rural labor.

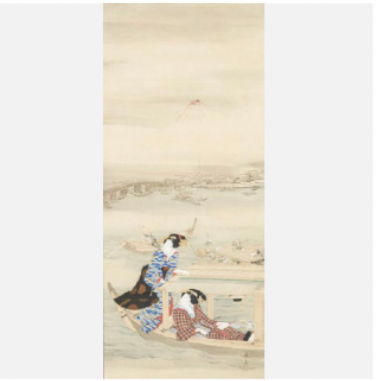
Art museums often feel like sanctuaries of timeless beauty, where history is distilled into serene visions of elegance and refinement. At first glance, it's unlikely that one would connect the complex cultural context of labor and resource cultivation to the creation of the masterpieces in the Philadelphia Museum of Art's Edo-period exhibit. While these works are captivating, they obscure the cultural context of exploitation embedded in the transformation of nature and labor into symbols of elite power. It is thus crucial to examine how Edo-period Japanese art conceals the systems of labor and class dynamics tied to its creation. Drawing on Camille T. Dungy's critique of mediated nature and Adam Gopnik's concept of museums as mausoleums, I argue that Edo-period artworks sanitize and aestheticize nature, erasing the labor and environmental tolls that sustain their beauty. The depiction of pale, luminous skin throughout these works further reinforces class distinctions, tying aesthetic choices directly to labor and social hierarchies in the Edo period.

KAMO-GAWA AND SUMIDA-GAWA

In the Philadelphia Museum of Art's Edo exhibit, Hishikawa Moronobu's scroll paintings, such as *Kamo-gawa* and *Sumida-gawa*, depict tranquil riverside scenes. These compositions feature figures engaged in daily activities: fishermen casting nets, women washing clothes, children playing by the water, colorfully designed kimonos, and a lightly outlined landscape rendered through neutral colors in the background. The delicate brushwork and harmonious color palettes of the ink and color on paper create an idyllic vision of rural life that feels deeply connected to nature. However, this serenity masks the labor and socio-economic realities that make the striking aspects of these landscapes.



Kamo-gawa
Teisai Hokuba, Japanese, 1771 -



Sumida-gawa
Teisai Hokuba, Japanese, 1771 - 1844



Sumida-gawa depicts figures engaged in activities that suggest an idealized version of rural life. The women's kimonos, with their convoluted designs, point to the labor of silk production while simultaneously obscuring its toll. Similarly, the children's carefree play in Tosa Mitsunori's artwork misrepresents the responsibilities and physical demands often placed on rural youth. These subtle visual cues invite the viewer to consider the unseen: the harsh labor that maintains these landscapes. The depiction of pale, luminous skin, particularly in women and children, underscores the aestheticized erasure of physical struggle. In Edo-period Japan, pale skin was not only a marker of beauty but also a symbol of class distinction, signifying those who could afford to avoid outdoor labor under the sun. The ideal of white skin has been prevalent in Japan since the Nara period (710–733), when women began using face powders to whiten their complexion. This practice became more ingrained in the beauty standards of the country during the Heian period (794–1185), as evidenced by classic works like *The Diary of Lady Murasaki* and *The Tale of Genji*, which emphasize the beauty of a fair complexion. During this time, a white skin tone also signified higher social status, education, and wealth, in contrast to darker skin, which was associated with outdoor labor. The preference for white skin continued into the Edo period (1603–1868), when it spread to the popular classes. Women focused on achieving a natural appearance, often applying and removing makeup repeatedly to create a translucent look, as described in the best-selling Japanese beauty book, or "Beauty Bible": *Miyako Fuzoku Kewai Den (Metropolitan Custom Makeup Book).*

By portraying figures with such features, Moronobu's works sanitize the realities of rural life. Whose hands maintain these lush routines consisting of silk, rice, and collagen for the skin? By omitting the rugged hands and weathered faces of laborers, Moronobu's scrolls construct a sanitized narrative of nature and society, privileging elite aesthetics while neglecting the class hierarchies and labor exploitation embedded in this landscape art. This idealization of pale skin thus becomes a

visual metaphor for the broader erasure of labor and hardship.

SILK AND NATURE'S EXPLOITATION

The production of silk, central to Edo-period culture, further exemplifies the hidden labor behind these serene landscapes. Silk's origin lies in the cultivation of mulberry trees and the rearing of silkworms, tasks performed largely by rural women under grueling conditions. These workers harvested leaves, nurtured silkworms, and manually wove threads into fabric. While the final product adorned the urban elite, the laborers themselves were relegated to invisibility, their efforts erased in the art that celebrated their output, according to *The Social Perception of Skin Color in Japan* by Hiroshi Wagatsuma.

Camille T. Dungy's critique of nature emphasizes how the beauty and elegance we associate with the natural world often obscure the labor-intensive processes required to sustain it. She argues that these processes are sanitized and replaced with symbols of purity and beauty. For example, while plum blossoms appear in Edo-period art as symbols of natural perfection, their cultivation required thorough care and pruning. This illustrates the ongoing negotiation between human intervention and natural processes. Similarly, in works like *Kamo-gawa* and *Sumida-gawa*, pale-skinned figures are depicted in refined, cultivated landscapes, symbolizing leisure and sophistication, while the grueling labor needed to maintain these picturesque settings is often erased. By aestheticizing these elements, such artworks transform the countryside into an idealized, utopian vision, again concealing the physical toil behind it.

Dungy's "Tales From a Black Girl on Fire, Or Why I Hate to Walk Outside and See Things Burning" explores how historical trauma shapes one's relationship with nature. Nature, for Dungy, is not a place of nostalgia or beauty but is deeply marked by the violent history of racial oppression. She reflects on her personal relationship with nature, noting that while she once cherished outdoor experiences, they are now clouded by anxiety due to the historical and racial context of the places she inhabits. Dungy writes, "I lived my personal experience of a community that was legally desegregated and essentially welcoming; but I also lived my mother's and grandparents' pre-civil rights era experience" (Dungy 29). This blending of personal and ancestral histories leads her to associate natural landscapes with past violence and racial terror, making nature feel charged with the "psychic, energetic" imprint of those events.

This concept of history shaping one's perception of the environment reflects how social class and skin color influenced how people engaged with nature in Edo-period Japan. In the Edo period, lighter skin was often depicted in art along-

side refined, cultivated landscapes, symbolizing wealth, leisure, and higher social status. In contrast, darker skin, which signified outdoor labor, was associated with more rural, harsh environments. In this landscape, nature can be seen as both a positive force, providing resources like rice used in the cosmetics that created the pale complexions Japanese women desired, and a harsh force, darkening the skin of those who worked outdoors, pushing them beyond the beauty standards of the time. For example, rice farming, which supplied the powder for whitening skin, required intense labor under the sun, leaving rural workers with tanned complexions that symbolized physical toil rather than refinement. This contrast is reflected in Teisai Hokuba's *Kamo-gawa*, where serene riverside scenes obscure the harsh realities of labor tied to both beauty and survival. These visual and cultural distinctions reflected broader societal views, where lighter skin symbolized education and nobility, while darker skin signified lower social class. Both Dungy's personal reflection and the historical Japanese context demonstrate how deeply human history, racial trauma, and social structures shape our perceptions of the natural world, turning it into something far more than just a neutral backdrop.

Dungy's fear of nature, particularly fire, is rooted in the violent history of slavery and racial violence, which has left a lasting impact on her perceptions. In both cases, cultural history profoundly influences how individuals interact with nature and landscapes overall.

THE ERASURE OF LABOR

While the landscapes in Edo-period art celebrate the harmony between humans and nature, they project this balance through a curated lens. As Andrew Gordon notes in *A Modern History of Japan: From Tokugawa Times to the Present*, silk production, an economic cornerstone of Edo Japan, was deeply exploitative. Rural workers' grueling efforts were overshadowed by the luxury enjoyed by the urban elite. In works like *Kamo-gawa*, this exploitation is invisible. The figures in these scenes appear to exist in effortless harmony with nature, perpetuating the myth that natural beauty and human life are inherently unburdened by hardship.

Edo period art was crafted to appeal to the tastes of urban elites, particularly the emerging merchant class, aligning with the cultural priorities of a growing commercialized society. According to *Art of the Pleasure Quarters and the Ukiyo-e Style* from The Metropolitan Museum of Art's Heilbrunn Timeline of Art History, artists produced works that reinforced socio-economic hierarchies, privileging the perspective of the urban elite over the lived experiences of rural laborers. Christine Guth, a renowned academic specializing in Asian design at the Royal College of Art and Victoria and Albert Museum, notes that by the Edo period, art patronage

and practice had expanded to all social classes, with most urban artists belonging to the shokunin class and working in established ateliers (Guth 7). These artistic strategies, which focused on beauty, pleasure, and status, invited urban viewers to admire nature while remaining oblivious to the exploitation and struggles of rural life, reinforcing socio-economic divisions and providing an escape for the elite.

COMPLETE PICTURE OF THE NEWLY OPENED PORT OF YOKOHAMA

A standout piece in the Edo exhibit, *Complete Picture of the Newly Opened Port of Yokohama*, captures the energy of a bustling harbor. The composition is filled with movement as ships crowd the docks and vibrant blues and greens evoke the sea and surrounding hills.



The Newly Opened Port of Yokohama near Kanagawa
Utagawa Sadahide, Japanese, c. 1807 - 1873

The omission of labor in this work parallels the strategies seen in Kamo-gawa and Sumida-gawa. This harbor scene celebrates economic vitality and cultural exchange while obscuring the labor and environmental tolls inherent in these processes. Dockworkers, sailors, and craftsmen are notably absent in the "Complete Picture", their contributions overshadowed by the merchants and picturesque scenery. The depiction of pale skin in the figures in the Newly Opened Port image continues the theme of separating labor from refinement, presenting a vision of global trade that prioritizes surface beauty over deeper realities.



Complete Picture of the Newly Opened Port of Yokohama

Utagawa Sadahide, Japanese, c. 1807 - 1873

The commodification of nature is further evident in the depiction of the harbor's surroundings. The hills and sea are rendered as backdrops to human activity, their value reduced to their role in enhancing the scene's visual appeal. As Dungy observes, when nature is mediated in this way, it becomes a tool for aesthetic and ideological control, detaching viewers from the environmental costs of economic expansion. In the case of Yokohama, this mediated landscape reinforces a vision of globalization that privileges surface beauty while concealing the human and ecological systems sustaining it.

TRANSNATIONAL OBSCURATION OF LABOR

By framing the harbor as a site of harmonious exchange, the artwork perpetuates a selective narrative that obscures the inequalities embedded in Japan's integration into global trade. This artistic strategy mirrors what Adam Gopnik describes in *The Mindful Museum*, where he notes that Western museums are shaped not only by the desire to preserve but also by the impulse to possess: "Perhaps the earliest model of the museum is that of the museum as a mausoleum: the museum as a repository, a holding place—a tomb if you like, but a tomb where the past and its taste remain preserved. This idea of the museum as a mausoleum, as a place where you go to see old things, and where you go to find yourself as an aesthete or a scholar, is a very powerful one" (Gopnik 10). This concept of the museum as a mausoleum is relevant

as both art and museums often mediate cultural narratives by preserving and presenting them in ways that obscure the lived realities of labor and exploitation. Just as museums can preserve artifacts while effacing their origins, the selective depiction of nature in art erases the labor and inequalities embedded within these seemingly peaceful scenes of experience.

Edo-period Japanese art, through its treatment of nature, society, labor, and class, reveals the power of aesthetic mediation to obscure exploitation. Works like *Kamo-gawa*, *Sumida-gawa*, and *Complete Picture of the Newly Opened Port of Yokohama* transform natural elements into symbols of harmony and refinement, erasing the labor and environmental tolls that sustain them. The consistent use of pale-skinned figures throughout these works underscores the socio-economic hierarchies and cultural ideals of the Edo period, visually separating the elite from the realities of physical toil. By drawing on Camille T. Dungy's critique of mediated nature and Adam Gopnik's concept of museums as mausoleums, these artworks invite viewers to admire their beauty while remaining blind to the systems of inequality they conceal. By interrogating these depictions, particularly the luminous figures and carefully curated landscapes of works like *Complete Picture of the Newly Opened Port of Yokohama*, we uncover the ways in which art mediates narratives of prosperity and progress, often obscuring the labor and socio-economic inequalities that sustain such depictions in landscape paintings.

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The Necessity of a Third Reading in Musical Arrangement

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Abstract:

In his essay "*Three Ways of Reading a Detective Story – or a Brahms Intermezzo*," Edward T. Cone builds an analogy between understanding music and literary mysteries. Cone claims that there are three ways of "reading" these works, each providing a different kind of interpretation and level of understanding. The first being surface level, the second being more deeply appreciated and understood, and finally, the third reading being a complete and complex interpretation of a piece. Edward T. Cone's theory of the three readings can be thoughtfully applied to the composition of an a cappella arrangement. When arranging, it is necessary to have an in-depth, "third reading" level grasp and understanding of the song being arranged. If an arranger did not have this degree of analysis prepared, they would be unable to create the score past the surface level of the melody and the chords that lie beneath. Using my own a cappella arrangement of a medley of Queen songs, I chart the process of creating an a cappella arrangement and analyze how this process requires Cone's "third reading," exploring how composition itself aids in the third reading comprehension of a piece of music as an analytical tool.

In his essay, Three Ways of Reading a Detective Story – or a Brahms Intermezzo, Edward T. Cone builds an analogy between understanding music and literary mysteries. Cone claims there are three chronological ways of "reading" these works, each providing a different kind of interpretation and level of understanding. The First Reading of a mystery or piece of music is a very literal or surface-level reading. This would be a straightforward understanding "based on total or partial ignorance of the events narrated" (Cone 556-557). The Second Reading would be more deeply appreciated by its listener/reader and is "controlled by consciousness," (Cone 557) as Cone describes. The Second Reading is a bridge between the First and Third Readings, a middle ground analysis between surface level and deep understanding. The Third Reading is "the ideal reading. It is the only one that fully accepts the story as a work of temporal art and tries to appreciate it as such. And when the Third Reading, in its turn, engenders an analysis, it is an analysis, not of an abstract structure or art-object, but of the concrete work of art itself" (Cone 559). The perspectives provided by each of the three readings offer something different.

From my own compositional experience, most a cappella ensembles rehearse and perform covers of songs whose arrangements are created by a volunteer within the group. Oftentimes those composers (like myself) will work mostly by ear, using recordings of the song to create arrangements, as well as any limited free sheet music that is available. This task creates a need for an in-depth, "Third Reading" level grasp and understanding of the song being arranged.

A listener can enjoy a piece of music they have never heard before – or a reader can enjoy a detective novel they have never read before – as they are experiencing it for the first time. They are experiencing the story being told at a surface-level, taking it in for enjoyment. The Second Reading will allow for the consumer to notice more specific details and dive deeper into the intricacies of the story or song, such as the piece's form and tonality, because they can pay less attention to the baseline plot development or melody. Finally, a third read allows those two focuses to work in tandem, letting the reader/listener concentrate on how the details of the piece fit in with the main melody.

Additionally, composition itself can serve as an analytical tool for fostering a deeper understanding of a piece of music. Arranging a song for a cappella is a form of composition – but rather than composing a piece from thin air, one composes a piece based off of the original recording and music heard on the radio, for example. By arranging a song for a cappella, the arranger is composing a new setting for that song, forcing them to be intentional in their listening or "read" of the song. Arranging requires knowing composition rules as well. Understanding appropriate voice leading and vocal ranges is vital since all of the backing is composed of voices

and will have to sing through a wide range of chords. Chord building is also key, and with that comes a need for knowledge of chord inversions, modulations, and chord progressions. Knowledge of song structure and form is imperative to ensure the arranger is keeping the correct formation of the song. Forms are the organized structures that are used to position a piece's musical phrases. In his essay, Cone says that, "Composers play with the resulting ambiguities, and one of the great joys of the Third Hearing is to become fully aware of them" (Cone 565). The active listener, engaging in their Third Reading, will find a thrill in the uncertainty of a piece, and because of their understanding of those ambiguities, can choose how to interpret them in their own way while arranging. The goal is to be aware of and appreciate, literally, how the song works. Through composition, this is done by deconstructing the entire song just to build it back up again as a new setting. Delving into composition can be a part of the analysis developed by the Third Reading of a piece. As the subject listens intentionally to compose a new arrangement, they are actively gaining more knowledge of the song.

A cappella arrangements are created essentially by stripping apart songs and rebuilding them. To do this, the composer must have a third reading level understanding of the song they are arranging. In my own process of arranging songs, once I feel that I am as familiar as I can be with the music, I begin with transcribing the solo line. I then work through identifying the chords, adding them to the composition through an online musical notation software called Noteflight. These steps determining the solo melody line and the chords could be considered a Second Reading in the arrangement process. The additions of the solo line and chords are the specific details I previously mentioned that peek through behind the standard story and/or melody. The composer is moving back and forth between their arrangement and the original score at this point, heavily referencing the music. The need for a "Third Reading" analysis level comes in next, when the arranger has to then implement creative ways to create the accompaniment and backup.

A cappella has no instruments; all of the accompaniment is created through vocal lines and a beatbox. Therefore, there is more to these arrangements than simply transcribing the original music, which would not be suitable for vocal backing – the arranger must reimagine every aspect of the song. This reconceptualization means stylistically being able to create new rhythmic lines that, when put together, will somewhat match the sound of the recorded accompaniment. There has to be a confident familiarity with the song to be able to do this. If an arranger did not have a Third Reading level of analysis prepared, they would be unable to create the score past the surface level of the melody and the chords that lie beneath. There would be no clear vocal accompaniment that displayed a similarity to the original recording

that the arranger is working and pulling inspiration from. There is, of course, room for interpretation on the side of the arranger while still ensuring that the integrity of the original song is apparent. All of these necessary steps and details call for an in-depth understanding of a song that can only be developed from a Third Reading of the piece of music.

I will use one of my own arrangements as an example of the necessity of a Third Reading understanding when composing. This semester, I began arranging a medley of four Queen songs – "Somebody to Love," "Killer Queen," "Fat Bottomed Girls," and "Crazy Little Thing Called Love." I began this process knowing that I wanted to arrange a Queen medley, but not knowing which songs I wanted to include. I listened through a bunch, considering which would fit well together, which were diverse enough to be included in the same medley, and which sections of songs I would plan to include if they were chosen. After choosing the songs and the sections I would use, I looked at the key signatures. The original key signatures of these songs were A-flat major, E-flat major, D major, and C major, respectively. However, to ensure they would be able to flow together, I had to transpose two of the keys: "Fat Bottomed Girls" from D major to E-flat major and "Crazy Little Thing Called Love" from C major to D-flat major. If I had kept the original key signatures, the changes in tonality, known as modulations,would not have been as smooth. Key signatures must be modulated to closely related keys to preserve the tonality that has been established. If they modulate to a more obscure key, the music can become clashing and unsatisfying. Since Queen is a global sensation, I was able to easily find sheet music available for all four of these songs that provided me with the solo lines as well as the chords for the accompaniment. My next step was to input the solo lines into Noteflight, also making sure I input them transposed with the updated key signatures. A Second Reading understanding of the piece is needed for this step. Familiarity and understanding of a piece that is just past the baseline will allow a musician to organize their arrangement in this way. I consider these steps as preliminary – the tasks that have to be completed before moving forward.

The next steps in an a cappella arrangement are where the Third Reading comes into play. To understand the Third Reading, I will focus specifically on the section of "Killer Queen." To add the vocal accompaniment, the first thing I did was analyze the song, without even trying to get anything on paper yet. Essentially, I tuned out Freddie Mercury. I had heard this song a million times before, and what I needed to really hear was what was happening in the background; these are the aspects of the song that add so much with the least amount of recognition. When I had listened a few times, I began to jot down things I noticed: the amount of staccato (short and disconnected notes) in the guitar, the piano bass line, and the backup

vocals on "ooh." With the sheet music I found available, I organized the chords into Noteflight as a preliminary guide for myself to then add more musicality to later. When I had organized the chords and voiced them in a way that made sense, I went back to consider things more stylistically. For instance, I have found that lots of staccato beats can be tricky in a cappella arrangements. In an arrangement of "Bad Self Portraits" by Lake Street Dive I composed for my group, I wanted lots of punchy staccato. When performed, however, this turned out to be more difficult than anticipated, making us frequently go off pitch. So, I was wary of including staccato despite there being a fair amount in "Killer Queen,". The human voice cannot tune in the way a fretted guitar being plucked can. Ultimately, I weaved staccato in and out of the accompaniment so that there would still be that iconic sound while giving us the time to find the correct pitch if that became an issue. I also included a legato (smoothly and fully sung notes) bass line underneath the rest of the ensemble to provide a confident foundation that would also match the original accompaniment in the recording. Often, bass lines serve as tuning referents for singers, making it doubly important to create a solid bass foundation in an a cappella arrangement. Following the original recording, I included a trio of voices to add to Queen's backup vocals on top of this. To be able to arrange these parts, I needed to have a deep understanding of "Killer Queen" that surpassed enjoying listening to it on the radio, or even singing it myself. I needed to be able to analyze past the solo line and focus on the accompaniment and ambient background. I also needed to ensure that while attempting to create a sound that mimicked the original, I was also creating vocal lines that could realistically be sung (and sung well) by the a cappella group. Reimagining the original piece into a new arrangement is challenging enough, but ensuring the piece can be executed well in performance is another major aspect that must be considered in the arrangement process.

Edward T. Cone's theory of the Three Readings can be thoughtfully applied to the composition of an a cappella arrangement. In his claim, Cone says that a Third Reading provides an ability to analyze the structural level of a piece, one that can see and appreciate the intricacies and details of a piece while still acknowledging and processing that main story, or melody, of it. Cone compares processing music to reading a detective novel in a way that a consumer will understand it. To compose an a cappella arrangement of a pre-existing song, one must have a Third Reading level of understanding. Creating an a cappella arrangement requires an intense familiarity with the song that comes with a Third Reading. Arranging is not just about how the composer captures the song when moved to an all-vocal ensemble, but also how the composer reimagines the piece in a way that leverages the talents and utilizes the skills of the group. Composition itself can be used as a form of analysis

and deepening one's understanding of a song. Therefore, composing can aid in the Third Reading comprehension of a piece of music as an analytical tool.

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Area of Study

A Feminist Critique on Nationalism:
Varied and Vulnerable

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Abstract:

Traditional discourse on nationalism is often presented through a patriarchal lens. Through an analysis of existing literature from feminist scholars on nationalism, I aim to articulate the relationship between geographic boundary construction and sex-based distinctions of national identity and "civic duty". My analysis focuses on the role of national identity for female-identifying citizens of Ukraine and how such action differs greatly from the way in which national pride is expected of male-identifying members of Ukrainian society. Additionally, I discuss the shift of sex-based expectations of an individual's expression of national identity in times of war and conflict through the lens of "national heterosexuality", identifying ties between the nuclear family and perceived national pride. For female-identifying individuals, their commitment to their nation is often tied to the reproduction of future citizens. However, in times of war, such as the case for Ukraine, female-identifying citizens' expectations as "nurturers" and "healers" continue through an altered political context in their care for members of the military as a demonstration of "civic duty". My analysis concludes that a perception of oneness amongst members of a nation is incomplete without the recognition of the historical exclusion of female-identifying individuals in traditional discourse and conceptualization of nationalism.

Discourse on nationalism serves as a reproduction of our society's patriarchal structure. Nationalism is typically framed through elements such as belonging, unity, and identity. When taking a deeper look into what nationalism can entail, are there other factors, outside of nationalism, that contribute to personal characteristics such as these? Feminist critiques on nationalism attempt to answer this question through a lens of deconstructing the influence of the patriarchy on nationalistic practices and discussion. I will apply this to an analysis of nationalism within Ukraine, a country that has a wealth of literature written on its nationalist policies in and outside of wartime. The majority of the writing on nationalism in Ukraine follows the traditional, masculine definition of nationalism. However, feminist critiques of nationalism are not all equal. One feminist scholar does not see the patriarchal structure of nationalism in the same way as the person next to them, and this is reflected in the language choices within their writing. Even in attempts to break away from the dominant narrative of nationalism, internal biases and instilled frames of reference display a sense of irony in which masculinity continues to influence certain feminist critiques and traditional literature alike. Through my writing, I aim to reconfigure how nationalism is defined through a critical feminist lens. I will do so with the recognition of how this lens can alter how we view nationalism and the individuals who exist within the boundaries of such nations.

Civic duty, serving as an active citizen within one's nation, can be defined differently depending on the surrounding context, both in terms of one's environment and identities. Citizen loyalty is described as a combination of citizen obedience, sense of civic duty, and willingness to sacrifice for the state (Shulman and Bloom 2014, 355). Under the typical strain of nationalism, there is an inherent requirement to protect the citizens of a nation from foreign threats. This is perceived to require a military presence from citizens willing to fight and die for the nation they are representing (Shulman and Bloom 2014, 364). There is an emphasis on returning to the unity of a nation whose central cause is continuing this narrative (Anderson 201,192). Can citizen loyalty occur outside of these conditions? We see this as the case for women, whose expectations for civic duty do not fall under the patriarchally-driven dialogue I outlined above. A study that focuses on Ukrainian nationalism ties national pride and national autonomy to a willingness to defend Ukraine. The author states that "the more proud a respondent, the more likely he or she is to fight" (Shulman and Bloom 2014, 376). In this study, no mention of gendered distinctions of nationalism is made, ignoring the differences in expectations for women within the context of war. Similar sentiments were expressed about Ukraine close to twenty years ago, in 2003, when Ukraine was seen as increasingly authoritarian while civil society's activism continued to grow (Åslund 2003, 107). Is

success in a time of conflict possible when the cost is human life? (Hoffman 2022, 91). While this may seem drastic, efforts to maintain national unity and prioritize national interests remain high on the list of priorities for those holding political power (Yazici 2019, 147). National interests–continuing to hold ownership over defined, yet somewhat shifting boundaries–are often used as justification for the dehumanization and pain inflicted on the nation's people.

This act of dehumanization that categorizes the nation as 'one', without differentiation for the individuals that exist within its framework, highlights the connection between one's willingness to fight in their nation's war and their level of personal emphasis on civic duty. However, this mindset does not take into account women's broadly perceived role in nationalist spaces. Traditional scholars on nationalism highlight that individuals must feel a personal connection to the government that they are obeying, as well as the country that they are sacrificing their freedom and responsibilities for (Shulman and Bloom 2014,359). Successful nationalism is often displayed through mutual trust between the people and the state, willing to support not only those in their immediate circles but also those whose main point of connection is their belonging to the nation (Scruton 1999, 287 as cited in Shulman and Bloom 2014, 359). This is also how conflicts are framed to continue and grow, based on the representation of those who have been previously impacted by acts of protest or feel a sense of camaraderie with those currently or previously associated with efforts to defend and alter nationalism (Tarrow 1989, 223 as cited in Beissinger 2005, 268). While a willingness to fight in war serves as the most well-known frame of reference for demonstrating civic duty, this does not include the perception of women in periods of war. Even though war goes against the narrative of "femininity", women continue to be presented in these spaces as healers or nurturers that go against what is seen as their "natural" course of action (Anderson 2011, 195).

We can see the impact of gender distinctions in nationalist ideals in the literature on the contact line in Ukraine. This contact line is crafted with the intention of minimizing violence, while simultaneously dividing areas that were once seen as unified, both socially and politically (Von Löwis and Sasse 2021, 210). Inclusion and exclusion are not solely occurrences for those outside of the nation but also vary for the people within those defined borders. The contact line serves as an internal method of inclusion and exclusion within Ukraine's borders. In the realm of unification, gender is often seen as having little to no impact on the frequency of crossing the contact line as well as responses on opinions regarding moving forward with Ukraine's border construction (Von Löwis and Sasse 2021, 237). On the contrary, the same analysis alters their language choices in their interviews with men and women in Ukraine. This behavior, likely to be in a subconscious manner, can be

seen in traditional written work on nationalism, but also within feminist critiques on nationalism. Even when conscious efforts are made to highlight and recognize the role of women in nationalism, "scripts in which these roles are embedded are written primarily by men, for men, and about men, and that women are, by design, supporting actors whose roles reflect masculinist notions of femininity and of women's proper 'place'" (Nagel 2005, 112). The roles taken by women in spheres of nationalism are often depicted as inherent or inevitable, representing a basis in societal norms that operate upon gendered hierarchies.

The concept of homogenized "womanhood" transfers what is deemed to be a unified take on nationalism to a unified "woman's view" of the nation (Ranchod-Nilsson and Tétreault 2017, 7). Scholarship on nationalism is typically framed either as "gender deficient", without any regard to gender as a variable in national involvement, or feminist scholarship that recognizes gendered distinctions in nationalist identities. However, a large portion of the feminist critiques on nationalism continue the traditional methods of defining such political and social entities with the labeling under women instead of men (Ranchod-Nilsson and Tétreault 2017, 10).

Literary analysis on the contact line in Eastern Ukraine fails to mention the social and political boundaries that already exist on the premise of gender. Interviews on the contact line and the sense of safety it provides do not take into account gender distinctions, specifically the safety concerns that are already a part of many women's everyday experiences, even outside of times of conflict or war. Other factors, such as violence against women in and outside of a war context, come into play in determining what constitutes safety. Language becomes incredibly important when making such observations. It is reported that "people feel like 'strangers' or 'the other' no matter where they are" in Ukraine (Von Löwis and Sasse 2021, 226). This is a place of intersection between Ukrainian and female identities when viewing such information through a feminist lens. Using the word "people" to describe those living in the nation of Ukraine, without any further explanation of who constitutes this group (in terms of race, gender, class, etc.), seemingly eliminates the existence of other crucial identities outside of nationhood. The language utilized in this piece that does contain further gender distinctions continues to portray a dominant, masculine narrative. The interviews with women living in Ukraine tended to use submissive language, such as describing routine checks at the contact line as "humiliating" (Von Löwis and Sasse 2021, 226), while the narrative displayed for men does not contain any imagery-based vocabulary.

A differentiation in language choices represents an element of the efforts of power and dominance through the maintenance of masculinity. One way that

this occurs is through violence against women as a means of asserting power (Ranchod-Nilsson and Tétreault 2017, 1). Violence is not necessarily physical and can subsequently be wrapped into the way women are objectified during times of war. War propaganda imagery often places women's bodies at the center, further separating feminine sexuality and aggressive masculinity through a symbolic link between the female body and nationhood (Anderson 2011, 197). It is commonplace to see national characteristics, both present and past, articulated through a double-sided emphasis on unity and 'otherness' (Nagel 2005, 116). We see this in the way boundaries, including both tangible and intangible borders, construct a sense of differentiation that becomes a defining element of belonging (Von Löwis and Sasse 2021, 212). However, once the line between the battlefield and the home becomes blurred, it becomes much easier to lose sight of boundaries (Afshar 2003, 182). This follows the lack of accuracy in traditional literature on nationalism that views geographic boundaries as the determining factor in inclusion and exclusion, failing to recognize the similarities between nationalist boundary construction and gendered distinctions in the corresponding societies.

In traditional discourses on nationalism, boundaries are constructed between men and women only in terms of associating men with conflict and violence and women with peace. Instead, feminist critiques of nationalism frame women under the realm of resistance (Afshar 2003, 178). Tasks that are deemed as "feminine", illustrating a sense of support in times of war, contribute to an "enduring wartime picture of 'man does, woman is' (Afshar 2003, 179). While women's participation during times of war temporarily minimizes gender differences, this state of increased equality is rarely maintained or legitimized to the same degree that men's patriotism is emphasized (Afshar 2003, 180). Women hold a symbolic place in nationalist movements, ranging from an elevated figure in need of protection for their own and their nation's sake, to placement as "spoils of war" to further dehumanize their existence. Narratives of bravery and honor are typically limited to men, seen as courageous figures for both the nation they belong to and the women that exist within it (Nagel 2005, 112). The "masculine" war participation that returns to "feminine" expectations post-war illustrates the different criteria of belonging and civic duty for women, a concept that is lacking in the traditional discourse on nationalism and civic participation.

Sexuality and gender are connected in the realm of "national heterosexuality" and its ties to "true" citizenship. Specifically, the metaphor of the "national family" and the traditional, nuclear family unit can be paralleled as a means of minimizing national differences into a unified historical narrative (McClintock 1995, 357 as cited in Anderson 2011, 194). Gendered meanings within the scope of the nation

are few and far between, rarely moving past initial findings on nationalism to consider other aspects of one's identity, primarily gender and ethnicity (Ranchod-Nilsson and Tétreault 2017, 3). The repeated defining characteristics of femininity fall towards a realm of sexual objectification as an aspect of civic duty (Anderson 2011, 198). Gendered and sexualized images such as those of motherhood and seduction are prominent in the context of nation-building and are rarely strayed away from (Ranchod-Nilsson and Tétreault 2017, 15). Such imagery is shifted during wars, not removed. A return to the expectations of womanhood outside of a war context follows the societal constructions of femininity that individual women embody and contribute to nationalist symbolism.

Women are seen as responsible for creating national boundaries through the reproduction of future citizens, furthering both their own allegiance as well as the future trust of their children in the nation. During periods of mobilization, such as war invasions, women are relied on by nationalist movements. However, as discussed earlier, women are quickly pushed to the side when celebrating accomplishments or moments of success. When pushed to the outskirts of nationalist conversations, women continue to serve as national boundaries. The nation is given ownership over women's bodies, expected to have children, and eventually sacrifice them for the "national" cause, whether it is in alignment with their own interests or not. In this nature, mothers become both "the symbol of sorrow and suffering, and children the cause for sacrifice" (Afshar 2003, 183). Women are seen by traditionalists as physical embodiments of family and national honor, as well as representations of the nation's shame in times of failure (Nagel 2005, 122). The continuation of the nation is framed to preserve the existence of a homeland for future generations of citizens while simultaneously stripping these same individuals of their rights on and off the battlefields.

While women are often seen through the lens of their national identity, there are other existing areas of belonging that are present in their lives, specifically in terms of gender identity. When discussing nationalism, it is not uncommon to see correlations being made between national unity and a shared cultural background. On the contrary, this sense of oneness is somewhat artificial, made possible by leaders in power "inventing traditions" to foster a sense of national identity over other indicators of belonging (Shulman and Bloom 2014, 357). When analyzing the relationship between nationalism and Ukraine's citizens, it is typically believed that those who feel a sense of belonging within a cohesive group, such as the nation, will be more likely to sacrifice individual interests for the "greater good" of the collective (Shulman and Bloom 2014, 360). However, "if ethnic identity and ethnic group formation are rooted in nations of descent and familiality, then gender is nec-

essarily at their heart" (Ranchod-Nilsson and Tétreault 2017, 26). It is incomplete to reference the creation of groups without including the impact of gender identity on one's way of displaying and participating within a nationalist framework.

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The Ideal Viewing Point
Making Unequal Window Spacings on the Palazzo dell'Antella Appear Equal

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Abstract:

Located in the Piazza di Santa Croce in Florence, Italy, is the Palazzo Antella, a building whose windows are not equidistant from one another. Given the precedence of linear perspective in the Italian Renaissance, the architect likely intended a viewing point at which the windows would appear to be equidistant. Assuming the existence of such a point, strictly trigonometric techniques were initially implemented with the intent of determining an exact answer. After determining its mathematical impossibility, the focus was moved to a heuristic that would yield a viewing point at which the angles would be as close to each other as possible, both mathematically and in terms of observation with the naked eye. Statistical measures were then determined that would provide information about the relative equality of the set of the viewing angles to the spaces on the structure. Each statistical measure was optimized for the possible coordinates located in the Piazza to determine where one could stand to provide the most evenly spaced view of the structure. This paper will explain and explore how the ideal viewing point was located on the steps to the front entrance of the Basilica di Santa Croce di Firenze, the church which serves as the centerpiece of the Piazza. Thus, we can conclude that there was likely intentionality in the construction of the structure to be viewed from the steps of the Basilica.

INTRODUCTION



Figure 1: The facade of the Palazzo dell'Antella, the building located at addresses 20-26 Piazza di Santa Croce, Florence, Italy, which is the subject of study in this paper (Huber 2022).

In looking at Fig. 1, a casual observer may not notice any interesting properties of the pictured building (Huber). However, upon closer inspection, one may notice that the windows have a rather interesting spacing across the structure's facade. The windows on the left of the image are grouped closer together than the windows on the right. It would appear that the spaces increase in width as they move rightward across the building. This building is located at addresses 20 through 26 in the Piazza di Santa Croce in Florence, Italy. However, the structure itself is not the most noteworthy in the Piazza. The Piazza is more well-known for the seven-hundred-year-old Basilica di Santa Croce di Firenze, the largest Franciscan church in the world, which was constructed around the year 1492 (Italy Perfect). The surrounding structures were primarily constructed in subsequent centuries.

It is also worth noting that there was also a drastic shift in artistic expression during the Renaissance, especially throughout Italy. Shifting from the ultra-religious nature of the Middle Ages, in which importance in visual art was often demonstrated by size instead of depictions true to reality, the Renaissance brought the trend of linear perspective. Art using the technique of linear perspective aims to translate three-dimensional objects into two-dimensional space ("Linear Perspective of the Renaissance: What It Is, Which Artists Used It;" Stamper).

This combination of information then prompts the question: Is there a connection between linear perspective, the Basilica, and The Palazzo dell'Antella? Given the spacing of these windows, an observer might find a point where principles of linear perspective cause the spacings to appear equal.

MOTIVATION

A historical marker of the Renaissance, especially in Italy in the late fourteenth and fifteenth centuries, was the emergence of linear perspective. Filippo Brunelleschi began the formalization with technique following his use of a camera obscura:

> …rather than being of importance in itself, Brunelleschi's demonstration with his Florence Baptistery painting was intended to show how he created the image in a camera obscura (darkened room). Although the geometrical means to construct a perspective was not an outcome, the translation of that image into the painting revealed perspective's basic "rule": vanishing points for parallel, horizontal lines exist at eye level (Park 263-264).

In addition to providing foundational information for the linear perspective technique during this period, Brunelleschi is also well-known for the construction of the irregular octagonal dome located on the Santa Maria del Fiore, a feat of engineering and geometry of the era (Jones et al.).

Given the historical importance of linear perspective in the art and architecture of the Florentine Renaissance, we can then operate under the assumption that the unequal spacing of the windows may have been intentional. If this point where the windows appear equal does exist, then the artistic implications in its construction are already complete. With a structure built over 500 years ago, there is no easy or practical adjustment that can be made; therefore, the only remaining option is to guide the observer on where to place themself. Not only is that noteworthy from the aforementioned historical perspective, but it also has important mathematical and artistic implications (Stamper). From a mathematical perspective, finding a potential ideal viewing point could indicate a possible sense of intentionality with which the building was constructed. Moreover, this information may be useful to modern-day artists, such as photographers, who could create novel and aesthetically pleasing artwork.

RULING OUT AN EXACT SOLUTION

Given the more abstract and open-ended nature of the question driving this research, the initial development of the most effective methods was not immediately obvious. With a problem based in geometry, it is reasonable to expect that some sort of Euclidean solution may provide an exact solution. Additionally, determining a solution with less spaces would provide insight as to how the problem would expand moving forward. Please note that throughout this paper, a "space"

refers to the width between two windows or the distance between the end of the building and a window. Moreover, this paper will focus on the lower row of windows. However, the windows appear to be stacked directly on top of one another, and the problem will be interpreted as two-dimensional. Then, the problem can be set up as demonstrated in Fig. 2.

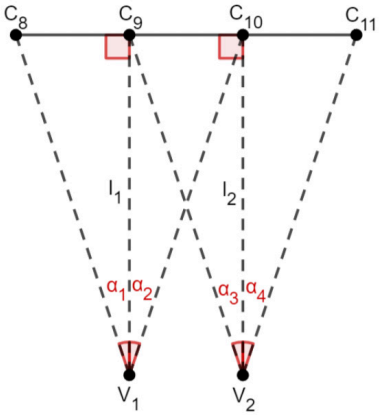


Figure 2: A two-dimentional rendering of a portion of the building façade used to demonstrate the impossibility of an exact solution. In this diagram, each point C_n represents the center of the n^{th} window from the left corner.

However, rather than investigating how a potential exact solution might be determined, it became apparent that we could instead prove that one does not exist. However, it may be the case that no exact solution could be proven. In the building's image in Fig. 1, consider the eighth, ninth, tenth, and eleventh windows from the left. Measuring the width of the three spaces formed by these windows, we can determine that they are all the same width. The methods by which these measurements were derived will be discussed in a subsequent section. Considering these windows, we can derive the diagram shown in Fig. 2.

Using some Euclidean geometry, we can demonstrate that given that line l_1 is perpendicular to segment $\overline{C_8C_{10}}$, the viewing angles α_1 and α_2 have the same measure if and only if line l_1 is the perpendicular bisector of line segment $\overline{C_8C_{10}}$. Note that we can assume that point C_9 is the midpoint of $\overline{C_8C_{10}}$. In the forward direction, we can use the angle-side-angle argument to demonstrate that $\Delta C_8C_9V_1 \cong \Delta C_{10}C_9V_1$, and thus that l_1 is the perpendicular bisector of $\overline{C_8C_{10}}$ (Carroll and Rykken 50-52). Similarly, in the reverse direction, we can use the side-angle-side argument to prove the same congruence and thus the equality of the viewing angles (Carroll and Rykken 24-25). The same argument can be used to

demonstrate that angles α_3 and α_4 have the same measure if and only if l_2 is the perpendicular bisector of $\overline{C_9C_{11}}$.

Thus, the viewing angles for the spaces $\overline{C_8C_9}$ and $\overline{C_9C_{10}}$ are equal if and only if the observer lies on l_1. Similarly, the viewing angles for the spaces $\overline{C_9C_{10}}$ and $\overline{C_{10}C_{11}}$ are equal if and only if the observer lies on l_2. Thus, for all three spaces to appear equal, the observer must lie on both lines l_1 and l_2. However, since both lines are perpendicular to the same line, they are parallel and thus do not intersect. Therefore, there is no singular point for which these three spaces appear equal. We can extend this result to assert that if there is no point at which these three spaces appear equal, there cannot be a point at which one could stand that would cause all twelve spaces to appear equal. This justifies our turn to a heuristic approach.

METHODS IMPLEMENTATION

Before discussing the approaches applied, it is important to discuss the methods by which measurements and baseline data were obtained. Because traveling to the Piazza di Santa Croce in Florence whenever new data is required is neither cost-efficient nor practical, we turn to a more accessible method available online. The project Florence As It Was is a digital archive that makes the city's historical sites accessible to researchers and admirers globally ("Florence as It Was").

These resources include a point-cloud model, which plots various dots according to a coordinate system to essentially create a three-dimensional system of pixels. Within these models, one can use tools to measure approximate distances between points or angles between lines formed by the points, among other measurements. Thus, to determine the width of the spaces on the facade of the building, from window center to window center, one can use these tools to record a measurement. The disadvantage of this system is the lack of precision. While it is more practical, the measurements obtained using this software are likely to have a margin of error. In some cases, this margin nears a decimeter due to the lack of a point in the point cloud in the exact location from which a measurement needs to be taken. Thus, there are baseline measurements that can be used in the primary methods of research. A screen capture of the point-cloud model is included in Fig. 3.



Figure 3: A screen capture of the Piazza di Santa Croce point cloud model ("Florence as It Was" n.d.).

In determining a heuristic approach, it is required that some measure of equality be defined. If the given spaces present on the structure are of specific widths, the objective would be to locate the point at which the viewing angles for each gap are the "most equal." The criterion could then be maximized or minimized depending on its relationship to the overall equality of the viewing angles.

In investigating pre-established statistical measures of spread, the starting point was the standard deviation of the set of the 12 given viewing angles from a given point. However, due to the issue of magnitude, attempting to minimize the standard deviation of the population of viewing angles over the given area of the Piazza would result in a minimum as close to the facade of the building as possible, where each of the viewing angles is nearly zero.

As such, a measure that could provide a result would need to measure the spread of each set of twelve viewing angles while having a component that adjusts to account for the difference in magnitude depending upon the given location. We will implement two primary strategies in selecting these measures: calculating a measure that contains common measures of spread and centrality, focusing solely on the maximum and minimum values of the set, and a combination of both. The advantages and drawbacks of each will be discussed as those measures are presented.

The first statistical measure used is the mean-adjusted range, which is a result of the first strategy mentioned above. This statistic is calculated by simply dividing the range of the twelve angle measures by the mean of the same population. This measure incorporates the measure of equality in the form of the range, as it

measures the furthest discrepancy between any two of the viewing angles; it then adjusts for magnitude by dividing by the mean. Division by the mean ensures that viewing positions closer to the building are not significantly smaller as a result of their proximity to zero. While this considers both equality and magnitude, it does not account for the measures of all angles in the population nor a direct adjustment of the measure of spread.

The second statistical measure utilized is the maximum-minimum percent difference. Implementing principles quite similar to the first statistical measure, the percent difference between the minimum and maximum angles takes into account a measure of equality by including the largest discrepancy between any two angles in the given set. It then adjusts for magnitude by including the mean of the two values in the denominator. Overall, it is a similar measure to the mean-adjusted range. However, it implements the second presented strategy more than the first, as the maximum and minimum are the only two values that provide data points for the mean. However, as a measure, it would be less affected by a skew in a given set of twelve angles due to its ignorance of the ten middle values.

The final statistical measure employed to analyze the angle measurements is the ideal angle percent difference, which employs a combination of both aforementioned strategies. This measure calculates the average percent difference between each calculated angle and the overall angle of the building divided by the number of spaces. In employing this "optimal" measurement, it allows the percent differences to be compared to a more baseline measurement in lieu of other values in the data set. The largest disadvantage of this measure comes from the nature of the building itself. Due to the series of adjacent and equal spaces, there will always be a baseline level of discrepancy in the percent differences.

Each of the statistical measures were utilized in two methods to determine an ideal viewing point. In order to employ these methods, a Microsoft Excel spreadsheet was developed with an input of coordinates in the Piazza and outputs of each of the statistical measures. A screen capture of the spreadsheet can be found in Fig. 4.

1										
2		**Distance Measurements (m)**		**Angle Measurements**	rad	°	% Diff from Ideal Angle	**Statistical Measures**		
3		b	30							
4		s_0	30	θ_0	0.785	45.000		Mean Angle (rad)	0.026014228	
5		s_1	1.78	θ_1	0.029	1.650	10.17807082	Mean Angle (°)	1.490505498	
6		s_2	1.84	θ_2	0.028	1.606	7.477922372			
7		s_3	1.91	θ_3	0.027	1.567	5.007338895	Standard Deviation (rad)	0.00260	
8		s_4	1.91	θ_4	0.026	1.472	1.267344902	Standard Deviation (°)	0.14885	
9		s_5	2.05	θ_5	0.026	1.481	0.630162184			
10		s_6	2.32	θ_6	0.027	1.563	4.734846484	Range (rad)	0.008456922	
11		s_7	2.76	θ_7	0.030	1.716	14.07644167	Range (°)	0.484545962	
12		s_8	2.76	θ_8	0.028	1.576	5.57444251			
13		s_9	2.76	θ_9	0.025	1.450	2.744969437	% Max-Min Difference (rad)	32.87	
14		s_{10}	2.76	θ_{10}	0.023	1.337	10.84651101	% Max-Min Difference (°)	32.87	
15		s_{11}	2.76	θ_{11}	0.022	1.236	18.70314393			
16		s_{12}	2.98	θ_{12}	0.021	1.232	19.01805184	Range / Mean (rad)	0.325	
17		Sum	28.59					Range / Mean (°)	0.325	
18		Est. Sum	28.95	Ideal Angle	0.026	1.491				
19								Avg. % Diff. from Ideal Angle	8.35	
20										

Figure 4: A screen capture of the spreadsheet used to calculate the described statistical measures. This screen capture shows the data associated with the coordinates $b = 30$ *and* $s_0 = 30$.

In this spreadsheet, one can input the distance back from the facade of the building b, and the distance to the side of the leftmost point of the building, s_0, and receive outputs of information throughout the rest of the spreadsheet. The variable labels and corresponding inputs are highlighted in dark gray on the spreadsheet. The calculations are also based on variables for the widths of each space, as measured from window center to window center, which are represented by the variables $(s_1,\ s_2,\ s_3,\ldots,\ s_{12})$. However, in this paper, these values will remain constant; they have only been left as variables should more accurate measurement data be obtained. Note that the label for θ_0 is in light gray; this shading indicates that it is not a viewing angle of a complete space. It is instead a viewing angle for the distance between the east end of the facade and the center of the eastmost window.

The statistical measurements are then calculated as follows: Firstly, based on the distance measurements, we can calculate the viewing angle for each space (again, from window center to window center) using trigonometry. This process is done by calculating each angle based on the right triangle, whose legs are formed by the sum of the widths of the spaces and by the perpendicular distance back from the facade. Based on these triangles, we can trigonometrically calculate the values for θ_1, $\theta_1 + \theta_2$, $\theta_1 + \theta_2 + \theta_3$,...,$\theta_1 + \theta_2 + \theta_3 + \theta_4 + \theta_5 + \theta_6 + \theta_7 + \theta_8 + \theta_9 + \theta_{10} + \theta_{11} + \theta_{12}$. We can then subtract to calculate the value of each angle. The formulae in the spreadsheet are then as follows:

$$\theta_1 = \arctan\left(\frac{s_0+s_1}{b}\right) - \arctan\left(\frac{s_0}{b}\right)$$

$$\theta_2 = \arctan\left(\frac{s_0+s_1+s_2}{b}\right) - \arctan\left(\frac{s_0+s_1}{b}\right)$$

$$\theta_3 = \arctan\left(\frac{s_0+s_1+s_2+s_3}{b}\right) - \arctan\left(\frac{s_0+s_1+s_2}{b}\right)$$

$$\theta_4 = \arctan\left(\frac{s_0+s_1+s_2+s_3+s_4}{b}\right) - \arctan\left(\frac{s_0+s_1+s_2+s_3}{b}\right)$$

$$\vdots$$

$$\theta_{10} = \arctan\left(\frac{s_0+s_1+\ldots+s_9+s_{10}}{b}\right) - \arctan\left(\frac{s_0+s_1+\ldots+s_8+s_9}{b}\right)$$

$$\theta_{11} = \arctan\left(\frac{s_0+s_1+\ldots+s_{10}+s_{11}}{b}\right) - \arctan\left(\frac{s_0+s_1+\ldots+s_9+s_{10}}{b}\right).$$

We can then calculate the ideal angle by determining the viewing angle of all the spaces as a whole and dividing it by the total number of spaces, which in this case is 12. The percent difference from the ideal angle is then calculated for each angle using the standard percent difference formula, and the average is determined via the Excel function of the same name. Lastly, each statistical measure described above is calculated using Excel formulae.

Two methods can be employed from these calculated data: one computational and one visual. The computational method, as outlined by Hillier and Lieberman, utilizes the Excel Solver to optimize each of the statistical measures by inputting constraints based on the physical dimensions of the Piazza itself (Hillier and Lieberman).

In the Set Objective field, the cell corresponding to the above criterion to be optimized is input. For all of the previously described statistical measures, the Min function is selected to minimize the value, as they each relate to a measure of spread. Then, in the By Changing Variable Cells section, the range of two cells corresponding to the aforementioned b and s_0 variables are input. Following this, in the Subject to the Constraints section, constraints that correspond to the dimensions of the Piazza are input. For the length backward into the Piazza, as represented by the variable b, the corresponding cell is utilized to ensure that it falls between 5 meters and 77 meters, the former measurement accounting for the overhang on the building and the latter accounting for the opposite north side of the Piazza. Following that, the distance is then constrained to the side from the left corner such that s_0 is positive to ensure that the coordinate in question is not in front of the facade, and s_0 is constrained to be less than 66 so the ideal point is not located within the namesake church of the Piazza. Finally, the Make Unconstrained Variables Non-Negative box is left unchecked, and the GRG Nonlinear method is

selected under the Select a Solving Method menu. After selecting solve, the Solver calculates the values of b and s_0, which minimizes the selected statistic.

In addition to the optimization to find a viewing point from which to observe the structure, the already existing spreadsheet can be used to develop a simple heatmap visualization that can illustrate trends in these statistical measures over the complete area of the Piazza. This visualization uses conditional formatting in Excel to assign each cell a color based on its value; in the subsequent examples, cells are shaded greener when a value is lower, purple when a value is higher, and bluer when it lies somewhere in between. In these examples, the goal is to minimize the test statistic; cells with a lighter color are more optimal, and cells with a darker color are less optimal. The changes in color can form patterns that display the change in the statistic of choice over the entire space rather than determining a single optimal point. Lastly, a double border surrounds the coordinates nearest the optimal point, whose value is bolded. Not only can this provide mathematical insights, but it can also be used practically; if one is a tourist intending to stand at a specific point but cannot due to crowds, construction, or events, one can move to a more generalized area to observe more equal viewing angles.

To simplify the visualization, data points are spaced in increments of 10 meters on both the b- and s_0-axes with ranges corresponding to the dimension of the Piazza: $[0,80]$ for b and $[-20,70]$ for s_0. Note that these ranges exceed the true measure of the Piazza; they are rounded up to the nearest ten for purposes of the visualization. Moreover, it is important to note that on the b-axis, some of the range includes negative values. These values represent locations inside the Piazza, from which an observer could view the front facade of the building. These values can heuristically be determined to be nonoptimal, as a location in front of the facade will cause the space directly in front of the viewer to have a vastly larger viewing angle than the other spaces on the structure. The heat maps are included in Figs. 5, 7, and 9.

RESULTS

On a simple level, there are two forms of results: the optimal viewing points for each statistical criterion as determined by the Microsoft Excel Solver, and the heat map demonstrating the change of the measure across the complete space of the Piazza. Results will be discussed using both using the Excel Solver and the heat map for each statistical measure.

To begin, we can observe the results obtained from the mean-adjusted range, both from the Solver and from the heat map visualization. Given the restrictions placed on the calculator by the Solver, the coordinates that minimize

the mean-adjusted range are $(s_0 = 64.456,\ \ b = 36.484)$. The heat map for this statistic is consistent with the result, as the optimal coordinates rounded to the nearest ten are $(60,40)$. It is included in Fig. 5.

	South Piazza										
Church	(70,0)	(60,0)	(50,0)	(40,0)	(30,0)	(20,0)	(10,0)	Corner	(-10,0)	(-20,0)	(-30,0)
	0.252	0.278	0.309	0.428	0.630	0.937	1.384	1.365	1.117	1.530	(-30,10)
	0.244	0.268	0.295	0.335	0.464	0.602	0.669	0.545	0.601	0.914	(-30,20)
	0.232	0.252	0.274	0.297	0.325	0.355	0.374	0.352	0.501	0.717	(-30,30)
	0.243	**0.233**	0.248	0.263	0.276	0.282	0.271	0.343	0.463	0.639	(-30,40)
	0.255	0.250	0.245	0.244	0.248	0.261	0.298	0.370	0.445	0.596	(-30,50)
	0.268	0.265	0.264	0.267	0.273	0.293	0.334	0.384	0.436	0.570	(-30,60)
	0.279	0.279	0.280	0.284	0.299	0.323	0.355	0.391	0.453	0.553	(-30,70)
	0.290	0.292	0.298	0.308	0.323	0.343	0.368	0.396	0.465	0.542	(-30,80)
	North Piazza										

Figure 5: A heat map of the mean-adjusted range of the angle measures. The measure is equal when measured in both degrees and radians. All coordinates are measured in meters.

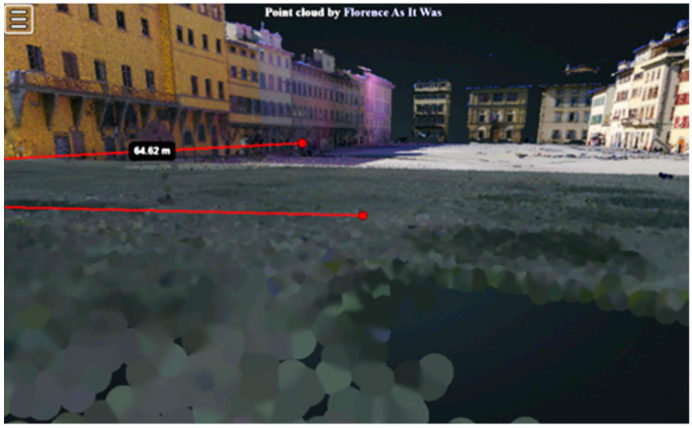


Figure 6: A view of the building from the optimal coordinates $(s_0 = 64.456,\ \ b = 36.484)$ *in the Piazza as generated in the Florence as It Was point cloud model ("Florence as It Was" n.d.).*

This heat map also demonstrates that, in general terms, more central positions in the b-direction and more eastern positions in the s_0-direction are favorable in making viewing angles appear more similar. The approximate rendering of the view of the building from the desired location can be found in Fig. 6. From a visual perspective, the exact distance of spacings is not immediately apparent to the naked eye. However, it is still possible to distinguish the delineation between window and structural spacing.

The results of the other two statistical measures can then be similarly analyzed. For the maximum-minimum percent difference, the optimally determined coordinates are $(s_0 = 65.957,\ \ b = 35.150)$, and the corresponding heat map and

perspective rendering are included in Figs. 7 and 8.

	South Piazza										
Church	(70,0)	(60,0)	(50,0)	(40,0)	(30,0)	(20,0)	(10,0)	Corner	(-10,0)	(-20,0)	(-30,0)
	24.49	27.48	31.28	43.22	62.26	88.34	120.55	132.45	106.42	150.20	(-30,10)
	23.60	26.24	29.46	34.24	46.99	60.59	68.60	58.61	58.34	98.69	(-30,20)
	22.26	24.39	26.85	29.62	32.87	36.26	37.80	33.93	50.40	76.05	(-30,30)
	23.29	**22.27**	23.89	25.53	26.87	27.31	25.81	33.27	47.34	66.34	(-30,40)
	24.63	24.01	23.52	23.31	23.65	24.91	28.81	36.74	45.87	61.13	(-30,50)
	25.94	25.63	25.51	25.70	26.38	28.42	32.88	38.67	45.20	58.07	(-30,60)
	27.15	27.07	27.19	27.59	29.19	31.84	35.46	39.84	46.54	56.14	(-30,70)
	28.33	28.55	29.15	30.23	31.91	34.24	37.19	40.61	47.43	54.85	(-30,80)
	North Piazza										

Figure 7: A heat map of the maximum-minimum percent difference of the angle measures. The measure is equal when measured in both degrees and radians. All coordinates are mesured in meters.

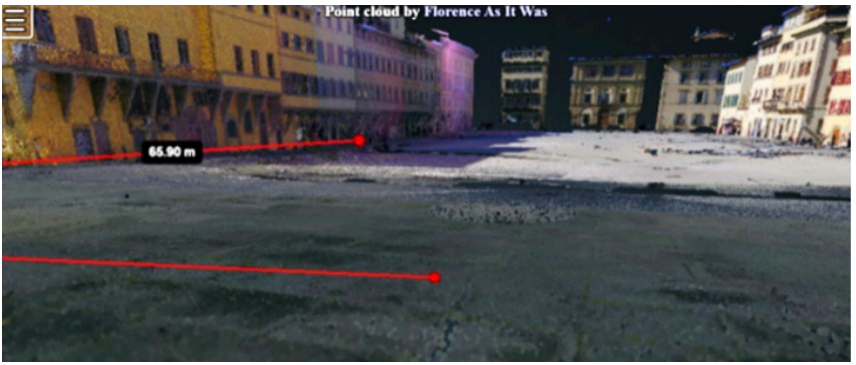


Figure 8: A view of the building from the optimal coordinates $(s_0 = 65.957, \quad b = 35.150)$ *in the Piazza as generated in the Florence as It Was point cloud model ("Florence as It Was" n.d.).*

The same visualizations can be generated as determined by the ideal angle percent difference, for which the optimal coordinates are $(s_0 = 66.000, \quad b = 29.147)$. It should be noted that this criterion was the only one of the three that produced an ideal coordinate on the boundary of the Piazza. The same two visualizations are provided in Figs. 9 and 10.

	South Piazza										
Church	(70,0)	(60,0)	(50,0)	(40,0)	(30,0)	(20,0)	(10,0)	Corner	(-10,0)	(-20,0)	(-30,0)
	5.26	6.34	8.29	11.17	16.04	23.59	34.75	43.83	30.84	59.46	(-30,10)
	5.14	5.78	7.26	9.26	12.25	15.92	18.85	16.13	15.16	35.40	(-30,20)
	5.27	**5.21**	5.93	7.11	8.35	9.23	8.71	7.78	13.98	26.85	(-30,30)
	5.58	5.38	5.21	5.39	5.63	5.63	6.55	8.81	15.31	23.17	(-30,40)
	6.07	5.83	5.74	5.78	5.98	6.52	7.81	11.20	15.97	21.30	(-30,50)
	6.92	6.68	6.58	6.69	7.16	8.12	10.09	12.94	16.41	20.23	(-30,60)
	7.84	7.75	7.82	8.15	8.87	10.07	11.80	14.03	16.73	19.57	(-30,70)
	8.93	8.97	9.19	9.65	10.41	11.51	12.98	14.82	16.95	19.14	(-30,80)
	North Piazza										

Figure 9: A heat map of the ideal angle percent difference of the angle measures. The measure is equal when measured in both degrees and radians. All coordinates are measured in meters.



Figure 10: A view of the building from the optimal coordinates $(s_0 = 66.000, \quad b = 29.147)$ *in the Piazza as generated in the Florence as It Was point cloud model ("Florence as It Was" n.d.).*

It is important to note that the three optimal coordinates, as determined by each of the statistical methods, are relatively similar, with a difference of less than 2 meters in the s_0-direction and 8 meters in the b-direction. In fact, if the Piazza is viewed from above, as in Fig. 11, the three optimal points are relatively close together.

Upon viewing the points from above, another trend becomes apparent. Each of the three ideal locations are located on the front steps of the Basilica di Santa Croce di Firenze, the central church of the Piazza, which extends to cover most of its eastern side. This discovery then prompts the inquiry of whether the structure was built with the centrality of the church in mind. While no known historical accounts of the motivation for the skewed distribution of window spacings exists, we can infer that creating it with the location of the church in mind is plausible based on our mathematical evidence.

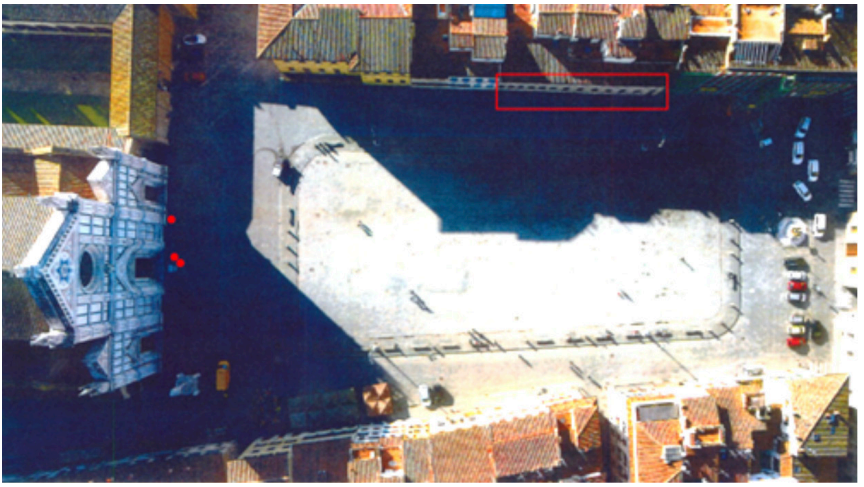


Figure 11: A bird's eye view of an approximation of the location of the optimal points as determined by each of the three statistical measures, each represented by a red X. The façade of the Pallazo dell'Antella is contained within the red box ("Florence as It Was" n.d.).

As mentioned in the Introduction, the location of the Basilica di Santa Croce di Firenze was originally determined in the thirteenth century, with the rest of the surrounding buildings primarily being constructed throughout the fifteenth and sixteenth centuries (Italy Perfect). Given the gap of several centuries, it can then be concluded that the structure in question was likely constructed after the construction of the church. Thus, it is plausible that the building was designed so that the ideal viewing point would be near the entrance of the church. This centrality could also serve as an architectural representation of the centrality of religion in daily life in Florence during that period. While no historical accounts can definitively confirm this theory, the mathematical analysis appears to support it.

FUTURE WORK

As already stated, the work of this building is, in a sense, already complete simply by virtue of being a structure that has existed for at least five centuries. However, future work does exist in the hypothetical, reverse version of this problem. Perhaps, given an overall building length and an ideal viewing point, one could determine spacings that would warrant equal viewing angles from the given point.

Investigation into this work using Microsoft Excel and some trigonometry has already begun. Using Excel formulae, one can use a given point and building

length to determine a viewing angle for the entire building facade. By dividing this angle by $n + 1$, where n represents the total number of intended spaces, we can determine the measure of the ideal angle can be used for each of the n central spaces. For the smaller spaces on both ends, we can use half this ideal angle measure. Then, the smallest space can be utilized to determine a maximum window size. Finally, the window width is used to calculate the width of the respective gaps, creating a spacing that yields equal viewing angles for each space on the building facade. A screen capture of this spreadsheet is included in Fig. 12.

	A	B	C	D	E	F	G	H	I
1									
2		Variables			Distances			Gap Distances	
3		b	42.18		s_0	0.94169		g_0	0.34169
4		l	33.10		s_1	1.94168		g_1	0.74168
5		d_c	67.15		s_2	2.02404		g_2	0.82404
6					s_3	2.11242		g_3	0.91242
7		Angles			s_4	2.20743		g_4	1.00743
8		γ	1.172532557		s_5	2.30974		g_5	1.10974
9		θ	0.162594598		s_6	2.42011		g_6	1.22011
10		α	1.009937959		s_7	2.53939		g_7	1.33939
11		θ_0,θ_{13}	0.006253638		s_8	2.66857		g_8	1.46857
12		$\theta_1,\theta_2,\ldots,\theta_{12}$	0.012507277		s_9	2.80876		g_9	1.60876
13					s_{10}	2.96126		g_{10}	1.76126
14		Maximum Window Width			s_{11}	3.12752		g_{11}	1.92752
15		1.88338366			s_{12}	3.30926		g_{12}	2.10926
16					s_{13}	1.72815		g_{13}	1.12815
17		Selected Window Width			Sum (l)	33.10			
18		1.2							
19									

Figure 12: A screen capture of the spreadsheet in which takes variable input of the building length and a selected point and provides the appropriate spacing to make the viewing angles equal.

Accounting for the window width in the observer's perception at the given point would make this process more comprehensive, as to ensure that all windows and gaps appear of equal size from the intended point of view. These criteria can also be implemented to evaluate the efficacy of already existing buildings, such as the one that initially warranted this paper.

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Daisy Cunningham '25 is a Music and Media & Communication double major from Narberth, PA. On campus, she is the president of A-Town Records, an accompanist for the musical improv group, a writing tutor, and a member of the Phi Beta Kappa Honor Society. Last summer, she conducted music theory research on corporeal song analysis with Dr. Paul Murphy. In her free time, she plays Smashing Pumpkins songs on guitar and has passionate discussions about Debussy.

Samantha Darr '26 is a Psychology major and Women and Gender Studies minor, and is a Dana Scholar. Samantha is a member of Psi Chi, Muhlenberg's chapter of the International Honor Society for Psychology, and has worked as a writing tutor at the Writing Center.

Harry Glickin '26 is a Media & Communication and English double major and a member of the RJ Fellows honors program. On campus, he is involved in WMUH, The Muhlenberg Weekly, The Muhlenberg AcaFellas, and Hillel, and serves as a Writing Tutor and Campus Tour Guide. Harry studied abroad in London during the Spring 2025 semester.

Alyssa Kaplan '25 is a Sociology major and a Dance minor. She holds leadership roles in the Muhlenberg Chaimonics, Education Collective, and Muhlenberg Dance Association. Alyssa is a Java Joe Barista and the Dean of Students Undergraduate Intern. She recently wrote an honors thesis focusing on the "safety" of incarcerated transgender individuals. After graduation, Alyssa will pursue a Master of Education in College Student Affairs Administration at the University of Georgia.

Talia Lum '25 is a Psychology major with minors in Public Health and Sustainability Studies. She is from Weston, Connecticut, and spent a semester studying child development while abroad in Denmark. She is a member of the Psychology Honors Society (Psi Chi), a member and previous executive board member of the national women's fraternity, Alpha Chi Omega, and an intern for the local non-profit organization, Camelot for Children. She is a research assistant for Dr. Stefanie Sinno

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Jason Rackas is a member of the class of 2026 with majors in both mathematics in Spanish. His research mainly focuses on applying different branches of mathematics in interdisciplinary contexts. He has held various positions in SGA, the MTA, and the Dana Scholars program.

Julia Sheridan is a junior Muhlenberg Scholar majoring in neuroscience and minoring in chemistry. She works in the Writing Center as a Writing Tutor and Mentor. She is also a member of Dr. de Wit's ecological neuroscience research lab and the treasurer of the Mental Health Peer Advocates club.

Emma Teske, class of 2025, is an Anthropology and Theatre double major. She is a Muhlenberg Scholar and a part of the Lambda Alpha Anthropology Honors Society. She is the former Mystagogue Chair for Alpha Chi Omega Fraternity and also works for the Theatre and Dance Department as a Front of House Manager and Box Office Assistant. She studied abroad in Arezzo, Italy at Accademia Dell'arte and has conducted both archeological and cultural anthropological research.

Leyla Tiryaki is a freshman studying biology and studio art as part of the Bio-Dental program between Muhlenberg and Penn Dental. She enjoys volunteering, traveling with friends, hiking, and jewelry making.



Featuring essays by

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