

inquiero

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UAB'S UNDERGRADUATE RESEARCH JOURNAL



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Founded and staffed by undergraduate students at the University of Alabama at Birmingham, *Inquiero* is an annual research journal produced as an outlet for the publication of undergraduate research. UAB is an excellent undergraduate research university, and with the addition of a journal such as *Inquiero* in which to publish their findings, the package is complete. Any undergraduate student at UAB, as well as any student participating in a summer program at the university, is eligible to submit research. The rights to every paper published in *Inquiero* are retained by the author, leaving each individual free to submit to and publish in a larger national journal or magazine. Students are invited to submit research papers, short reports derived from posters, or research narratives throughout the year.

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Letter from the Advisors

We have remarkably talented undergraduate students here at UAB on the cutting edge of their fields pursuing research and creative activities. We need to share their discoveries, creations, and advancements with the rest of the world! UAB's very own undergraduate research journal, *Inquiro*, helps make that possible.

After a short hiatus, *Inquiro* is back with outstanding articles by our engaged undergraduate students highlighting their successes in research and advances in knowledge. *Inquiro* is now a partnership and collaborative effort between the UAB Honors College and the UAB Office of Service Learning and Undergraduate Research. The joint effort has led to the recruitment of an exceptionally dedicated group of new editors and staff to revive this invaluable opportunity for our undergraduate students. We are especially grateful to the current edition's Co-Editors-in-Chief Karim Mikhail and Craig Peters who have devoted long hours to rebuilding the journal with an organized structure, and updated review and publication processes. They have also implemented an important new objective of *Inquiro* — a commitment to publish research articles in more disciplines, and to include not only the sciences, but to expand into the arts, humanities, and more. That effort shines in this current edition. Their unwavering dedication and commitment have been instrumental in the successful revitalization of *Inquiro*.

We welcome you to this current issue of *Inquiro*! Please take a moment to reflect on the tremendous research successes of our students.

Mark O. Bevensee, PhD, Assistant Dean, Honors College & Science and Technology Honors Program

Gareth Jones, MA, Director, Office of Service Learning and Undergraduate Research

Letter from the Editors

Science is all around us. It fills our classrooms, our labs, the spaces we dine, and even the rooms where our nation's policies are forged. For the scientific spark to become aflame, what's required – at the most fundamental level – is a question and the imperishable curiosity to chase it. How does ligand X modulate the activity of transcription factor Y? How are the limitations of our nation's justice system rooted in a history of structural inequality? How can we capture the emotional dimensions of a cancer diagnosis using film? Each of these questions is rooted in science and deserving of equal praise.

With the rise of artificial intelligence, computers are achieving proficiency within narrow domains at a pace faster than any human will be able to sustain. Indeed, the once-prized ambition of becoming a specialist is losing its draw. Increasingly, what will define our scientific contributions in an era of human-computer symbiosis will be that which makes us uniquely human: the ability to connect the dots across disciplines, finding solutions in one discipline to problems in another. Multidisciplinary research represents the future of human innovation. The challenge, then, for future scientists is to become multidisciplinary thinkers themselves. But that's merely one piece of the puzzle. Because if we fail to communicate our science well, then what can the public do with it?

The COVID-19 pandemic has done well to teach us the power of effective science communication. As a nation, we witnessed inaccurate information surrounding vaccines and viral epidemiology result in the loss of lives. Equally, we saw the power of leveraging multimodal techniques in science communication. Scientists took to social media platforms such as TikTok and Twitter and used their platform to extend accurate information to millions. Physicians created health education videos on YouTube to ensure that medicine was impactful not only in the laboratory space, but also in the public space. Perhaps most excitingly, students – even younger than you and me – demonstrated a powerful fusion of scientific thinking and digital creativity as they embarked on a mission to educate their peers and communities. What can we learn from all this? That the best scientists of the 21st century will not only commit their heart and soul toward the pursuit of cross-disciplinary science, but they will work just as hard to communicate their science in ways that make sense for a 21st century audience.

Unfortunately, COVID-19 also taught us a graver lesson: science benefits society unequally, skewed by the lines of race, ethnicity, and socioeconomic status. If we hope for science to serve an increasingly diverse society, then our research spaces must reflect the diversity of that society. As the future scientists of America, we must grapple with our nation's history, consider how this history has produced generational inequities that disempower minority communities from pursuing science, and put in the work – the real work – to dismantle skewed representation in the research workforce. The days where we judge a scientist's merit by their h-index must be put behind us. In this burgeoning era of research, we must raise the bar: demanding scientists to not only produce innovative research, but to mentor, educate, and serve. These pillars of interdisciplinary collaboration, strong science communication, and a commitment to equity are precisely what make UAB such a powerful research institution. As chief editors, Craig and I have sought to stamp these principles into the fabric of *Inquiro*.

Letter from the Editors

In the summer before my freshman year at UAB, my research journey began. I attribute my early research exposure to the passion for mentorship that is common among many of UAB's world-class scientists. From those first experiences researching brain cancer pathogenesis, I developed a passion for innovation within the healthcare space. As my interests matured, I transitioned to researching Alzheimer's disease, basic neural circuitry, and now health education surrounding cancer in the Middle East. While our curiosities are ever-changing, I learned that the constant intellectual stimulus of science is constant. No matter what you do, science liberates you from the confines of practice and invites you to channel creativity in your work. This liberty excites me deeply, so I joined *Inquiro* to share my passion and empower others in their research pursuits.

Craig's experience followed a different trajectory. Amid the pandemic, trying to navigate his freshman year of college, he was lucky enough to have the opportunity to take an in-person, hands-on molecular genetics class that first exposed him to scientific research. By presenting at the UAB Expo online later that semester, he learned about the importance of properly communicating his research to a public audience and making it digestible. He was immediately fascinated with the scientific process and quickly discovered the extent to which research was being conducted at UAB, particularly the many opportunities for undergraduate students to participate. It wasn't until his sophomore year that he deeply involved himself with research, when he found a lab that sought to understand the basic molecular mechanisms of how brains mature during postnatal development. During his research experience, he learned that science remains filled with uncertainty and that basic research is a crucial component of any science field. His growing passion for basic research as well as his exposure to the importance of properly communicating findings prompted him to join *Inquiro*. He sought more opportunities to discover what research was being conducted on campus as well as promote diverse fields ranging from the humanities to the hard-core sciences.

Over the past year, Craig and I have sought to make *Inquiro* more multidisciplinary, accessible, and inviting for diverse communities. We increased the number of student Editorial Board members and made it a priority to recruit members across the breadth of UAB's academic disciplines. Likewise, our faculty reviewers represent diversity in interest and experience, ensuring this edition of *Inquiro* is suitable for readers of all backgrounds. Further, this year's submissions achieved the greatest diversity, both in discipline and format, that *Inquiro* has seen; you will find engineering, political science, psychology, physics, film, and even research narratives within this edition. Finally, we worked with students and faculty to ensure that submissions minimized discipline-specific jargon and were appropriate for broad audiences while not compromising on the rigor that has always defined *Inquiro*. We are honored for you to be the judge of how well we delivered on these promises.

Coming out of a period where *Inquiro* was dormant, we certainly faced challenges along the way. Securing entirely new faculty reviewers and student reviewers while building the journal's workflow from the ground up posed immense limitations in time and energy; naturally, we made errors along the way.

Letter from the Editors

Yet, the continuous support from Dr. Bevensee and Mr. Jones – our faculty advisors – as well as the Honors College and Office of Service Learning and Undergraduate Research cannot be overstated and was instrumental in finalizing this edition. Further, many thanks are due to our wonderful team of editorial board members who tirelessly worked through revisions. They remained patient with Craig and I as we navigated the challenges of our position, and for that we are immensely grateful. Also, as Craig noted, “This latest issue of *Inquiro* would not be possible without acknowledging the tremendous efforts of UAB’s Web Designer, Ms. Carey Cauthen. She has been crucial for the development of this issue and we thank her for her patience and expertise throughout the entire process!” Finally, *Inquiro* would not exist without the ambitious, passionate, and tenacious UAB students that submit to the journal each year. The review process is extensive: requiring students to critically evaluate each word of their writing through two stages of revision. This year’s authors remained resilient throughout the process. Their final products capture the grit and talent that radiates throughout the UAB student community.

We hope you share our excitement for this eleventh volume of *Inquiro*. More importantly, we hope this volume represents the re-ignition of *Inquiro*’s flame, reviving the passion that persisted from *Inquiro*’s inception in 2007 until 2017. While this edition is shorter than *Inquiro* is accustomed to, we believe its breadth will capture your interest all the same. As you read through, grasp the excitement you experience and channel toward your own research endeavors at UAB. Few colleges offer their students the intellectual freedom in research that UAB affords us. Don’t waste it; make your mark.

Junior Co-Chief Editor, Karim Mikhail
2022-2023

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Science, Sleep, and Surprises: My Path to the Most Promising Scientist Award

Author: Cynthia Sanchez

Departments of Biomedical Sciences and Psychology

In Fall 2022, I was offered a once-in-a-lifetime opportunity that has made a great impact on my life. Dr. Kin, associate Dean of Jefferson State Community College at Pell City, reached out to me about the Bridges to Baccalaureate Research Training Program (BBRT). The NIH-funded program is the first of its kind that allows students to participate in biomedical science research at Jeff State and The University of Alabama at Birmingham (UAB). At first, I was hesitant to participate because I knew nothing about research, but Dr. Kin believed I was a strong applicant and encouraged me to apply. Out of a highly competitive group of applicants, I was shocked to have been one of four students chosen.

That year, Dr. Kin introduced me to the field of research. We began discussing research topics, attending journal club, and learning “wet lab” techniques. Then, it became time for our wings to fly and begin our research journey at UAB!

Summer 2023 was the start of my research internship at UAB as part of the Center for Community Outreach Development (CORD) program. Over the

span of 12 weeks, I was to integrate myself into research, mentoring, and career development. The goal was to conduct my own investigation and present those results in a research poster at the CORD Summer Science Closing Ceremony. So, I quickly got to work. Because of my interest in adolescent psychological research, I was placed in the lab of Dr. Sylvie Mrug and her amazing team. Dr. Mrug’s lab is conducting the Healthy Passages Study, which is a longitudinal study that focuses on the effect of early childhood stress on adult health. I quickly learned about recruiting participants, conducting interviews, and data management. What fascinated me most about this study was discovering these individuals in this study have been participating for approximately 20 years!

Specifically, Dr. Catheryn Orihuela served as an incredible mentor this summer, who enriched me with the knowledge to work on my specific research project. Together, with Dr. Mrug, Dr. Orihuela, and the rest of the research staff, I was able to tackle the rigorous process of composing a research project from start to finish. Choosing a topic to focus my research was a tough decision. After a

comprehensive review of the literature and available data from the study, I discovered that an important topic that deserves more attention is a focus on relationships between depression and sleep behaviors entitled “Relationships between Depression and Sleep Behaviors in Adults” (Sanchez, 2023). I focused on variables of depression, sleep problems (e.g. insomnia), sleep timing, and differences in sleep behaviors on weekends in 310 adults. One of the most challenging tasks in this process was learning how to prepare sleep timing for analyses and input data into a statistical program called SPSS. Once I mastered that step, I was then able to conduct bivariate correlational and descriptive analyses. I spent a lot of time analyzing the results and preparing my poster for presentation at the research ceremony. The last few weeks of wrapping up my project were demanding, but with Dr. Mrug's and Dr. Orihuela's mentorship, we were able to finalize the research poster. Results demonstrate that increases in depressive symptoms were related to more sleep problems, and overall later bedtimes and waketimes. These results suggest that adults who experience depressive symptoms are at risk for sleeping problems which could negatively impact their physical health.

At the end of the summer, I presented my research project at the CORD closing ceremony. I was incredibly nervous, but I tried my best to explain my research to the judges because I was so passionate about the subject. At the end of the ceremony, I was awarded the Most Promising Scientist Award! I was so honored to have received such an award for my first project! The experiences in Dr. Mrug's lab and positive interactions with my colleagues have taught me more than I ever imagined. In addition to conducting my own research, I never expected to be so deeply involved in a research study that I am certain will provide important results that will improve the health of future generations. The knowledge and experience I have gained will serve me immensely in my development in the future. I am

grateful to Dr. Wyss, the program director, for believing in undergraduate students and helping them achieve their goals. I would also like to thank Ms. Bulger, Dr. Kin, the Youth Development Lab, and all of my mentors for their continuous guidance and support. The CORD program has introduced me to the field of research and exposed me to the best team of mentors. I am excited to see what my future holds in scientific research.

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“A New Normal”: The Making of A Short Documentary on Childhood Cancer Survivorship

Authors: Britney Le and Victoria Sutton

Department of Biology (Le) and Department of Computer Science (Sutton)

Film Synopsis: As students in the University Honors Program, we began this film as a project for our Ethnographic Film-making seminar, instructed by Michele Foreman. The diagnosis of cancer, especially in children, is a life-altering experience with long-lasting effects. Even after the cancer is no longer detectable, the medical, financial, and social challenges faced by survivors are functionally significant, yet often neglected. Addressing this gap, our film, entitled “A New Normal,” uses vignettes from survivors and retrospectives from healthcare professionals to explore the unique challenges faced by childhood cancer patients as they progress through different stages of treatment, offering insight into the changes of childhood cancer treatment over time and the challenges that still lie ahead (Le & Sutton, 2022). The film aims to uncover the underexplored emotional experiences of childhood cancer survivors, which are frequently unacknowledged by the public and their social networks. Although resources and support groups for cancer survivors exist, their focus tends to be directed toward survivors of adult cancers, resulting in a paucity of attention and resources for survivors of childhood. By bringing attention to the challenges

encountered by childhood cancer survivors, our film seeks to raise awareness about the insufficient funding and resources for research in this area. “A New Normal” can be accessed publicly on Vimeo and the link to the film is included as reference for readers to watch.

Watch Film:

vimeo.com/mediastudies/ethnographic-filmmaking-2022

Prior Research

Before we began creating the film, we had to have a cohesive understanding of the current state of childhood cancer research and survivorship and the resources available for survivors. Although there have been significant strides in childhood cancer treatment protocols since the 1960s, standard treatments such as chemotherapy and radiation can impact survivors well throughout their lives. These late effects can affect every aspect of the body, causing damage to cognitive functioning, the central nervous system, organs, tissues, mobility, mental health, and more, while also increasing the risk for secondary or tertiary cancers (National Cancer Institute, 2022). Cancer treatment is especially more

difficult to tailor for children, as chemotherapy and radiation are more likely to cause delayed and disastrous harm to children's developing bodies (Couzin-Frankel, 2019). As we previously stated in Le & Sutton (2022), "Improving treatment and reducing late effects is entirely dependent on one thing: research. In spite of this, only 4% of NIH funding goes towards research for all childhood cancers combined, despite childhood cancer being the leading cause of death by disease in children" (National Pediatric Cancer Foundation, 2023).

Filmmaking Process

We wanted to approach the topic of childhood cancer survivorship through multiple lenses, requiring us to reach out and schedule multiple interviews with medical professionals, researchers, and survivors. We developed our own questions to ask each participant and collected raw footage throughout the first half of our semester. Following our initial interview filming, we used an online transcription system to create scripts of all of our interviews. We were then set with the task of pasting these various interviews together to create a cohesive and telling narrative that reflects our topic. Our goal was to first introduce the survivors and their experiences living with cancer and then transition into a broader message regarding the greater developments in childhood cancer research and the lingering problems that still affect both patients and the field. With this idea in mind, we spent hours reading, highlighting, and cutting all parts of our scripts to bring our message forward to our audience. Additionally, we incorporated archived film clips of cancer treatment from the 1940s to represent the history of cancer treatment. We also collaborated with Children's of Alabama's media team to include footage from inside the cancer clinics and aerial footage of Birmingham.

When we began the film, we had no experience using professional film equipment or editing software. Over the course of a semester, we had to learn how

to use a Canon XA50 Professional UHD 4K Camcorder, the accompanying tripod, an onboard and lavalier microphone, and Adobe Premiere Pro. The majority of what we learned was on the spot, often needing to adjust camera settings and angles depending on the lighting, time of day, weather, and characteristics of the physical location. Many of the technical challenges we faced during filming had to be corrected later on in the editing software, such as removing background noise related to a loud air conditioning unit in a conference room or color correcting footage due to inconsistent lighting and cloud movement. In addition, we had to find and insert B-roll clips to cover areas where it was noticeable that we had cut and spliced interview clips together so the viewer could stay emerged within the narrative. The majority of production time went into editing, sometimes even causing us to stay in the UAB media commons until midnight before we got to a good stopping point. Navigating these challenges and adapting on the go was paramount to our growth, and by the end of the semester, we were significantly more comfortable with the filmmaking process, equipment, and software compared to when we began this project.

Post-Film Experience

Alongside our fellow seminar classmates, our film was publicly premiered in the IMAX theater at the McWane Science Center. Despite our Spring semester coming to a close, this was just the beginning of all the other opportunities that opened up for us following this seminar. This past summer, our film was accepted into the Sidewalk Film Festival and was screened to film-enthusiasts of the Birmingham community. This past November, we presented our film to college honor students and faculty members from around the country at the National Collegiate Honors Conference in Dallas, Texas, spreading our message further and receiving meaningful feedback along the way. Our film-making passions also influenced us to work on another project through the Honors College

Presidential Honors Fellowship, focusing on cervical cancer prevention with Dr. Isabel Scarinci from the O'Neal Comprehensive Cancer Center. We worked with her over the summer to develop a PSA-type film that spreads awareness of an ongoing problem in our community. Despite being beyond what our declared majors required, we both found a purpose within the creative passion of film-making, and we hope to continue to give a voice to these unheard, yet important stories.

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Defibrillator



An Introduction to Electrical Systems and their Importance to Cardiac Resuscitation and Biomedical Innovation

Author: Noorullah Imran

Department of Biomedical Engineering

INTRODUCTION: There are more than 356,000 out-of-hospital cardiac arrests annually, or 1,000 daily, in the United States with nearly 90% of them being fatal.¹ These statistics paint a grim image when discussing common disorders of the heart, especially given the fact that most who die from cardiac arrest hardly ever show any warning signs beforehand. On the contrary, unlike other cardiac disorders, those that suffer from a cardiac arrest can restore function in their heart via a device that consists of an electrical system that every paramedic is trained to operate: a defibrillator. The survival rate of cardiac arrest victims that receive cardiopulmonary resuscitation (CPR) is about 9% and this statistic jumps to almost 38% for patients treated with an automated external defibrillator (AED).²

Cardiac Arrest

Although cardiac arrest is often confused with heart attacks, the two are quite different. Cardiac arrest is defined as the sudden loss of activity in the heart due to an irregular heartbeat while a heart attack results from a blockage in the heart that can alter the heart's activity and in turn lead to a cardiac arrest if not treated properly.³

Both conditions are life-threatening medical emergencies that require hospitalization; however, those that suffer a cardiac arrest can have their heart “jump-started” using a defibrillator. Whether it be through demonstrations, textbooks, or real-life scenarios, most are familiar with the procedure involved with reviving a patient using a defibrillator. Initially, the two paddles are pressed on the victim’s chest, followed by the charging of the device and the jolting of the body, but why does this mechanism revive a patient? Why does one need an electric shock to restore heart function and how did this feat of engineering come to be?

The Defibrillator

In the late 1800s, physiologists Jean-Louis Prevost and Frédéric Batelli, both from the University of Geneva, discovered when experimenting with dogs that electrical shocks induce ventricular fibrillation, an irregular heartbeat caused by the quivering of ventricles.⁴ This became the blueprint of what we know today as a defibrillator – a device that can reverse an irregular heartbeat and restore normal heart function. Today, defibrillators are an essential medical device for any paramedic or EMT to revive

one who has suffered a cardiac arrest. The electrical shock administered by the defibrillator causes all the muscles in the heart to contract, resulting in an effective reset in the blood flow of the heart. The pads of a defibrillator interact together to link an intricate electrical circuit that, when charged with electricity, can restore the normal blood flow of the heart to the rest of the body. Many of the basic electrical systems concepts can be applied to a device such as this. Before delving into the specifics of a defibrillator's electrical circuit, a few key laws, formulas, and components must be considered.

Electrical Circuits and its Components

The voltage from a battery, or a transformer, drives a *direct current* (DC) through a defibrillator circuit, leaving the charge to flow only in one direction while neither the current nor the voltage changes with time, unlike an *alternating circuit* (AC). *Current* (I), measured in *amps* or *amperes* (A), is any movement or flow of electrical charge while the voltage, measured in *volts* (V), is the electrical force that drives the current. *Resistance* (R), measured in *ohms* (Ω), is described as the measure that determines how much current can flow in a circuit with a given voltage.⁵ Ohms' law describes the relationship between these three quantities as

$$V = I \times R$$

and can be rearranged as

$$R = V/I \text{ and } I = V/R$$

to evaluate an unknown quantity whilst the other two are defined.

When considering *power* (P), measured in *watts* (W), in relationship to Ohm's law, it is defined as the product of the voltage between the ends of the battery and the current flowing through it. Thus,

$$P = V \times I$$

therefore using Ohm's Law ($V = I \times R$),

$$P = (I \times R) \times I = I^2 R$$

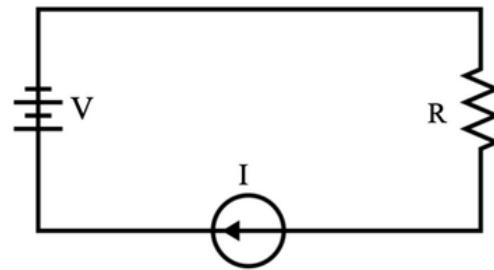


Figure 1: Ranging from the most intricate to the most basic electrical circuits, all circuits consist of a voltage source working in conjunction with other components such as a resistors.⁶

Inductors, measured in *henries* (H), and *capacitors*, measured in *farads* (F), are both electrical components that can act as energy banks, storing energy in either a magnetic or an electric field. Rectifiers are used to control the direction of the current flow to be able to charge storage components.⁵ These components come together to form a basic defibrillator circuit.

The Defibrillator Circuit

The defibrillator is an excellent example that unites many of the components discussed so far, detailing how they can be used in conjunction to serve such an important task. To increase the voltage of the circuit, a step-up transformer acts as a battery and brings the voltage to almost 10,000V, the required voltage to shock the heart. This voltage is then converted to DC using a rectifier, charging the capacitor before switching to the patient's end of the circuit. To ensure the heart receives the correct amount of electricity, current delivered to the patient's chest must be maintained for several milliseconds. This is made possible by incorporating a storage component, such as an inductor, into the patient circuit.⁵

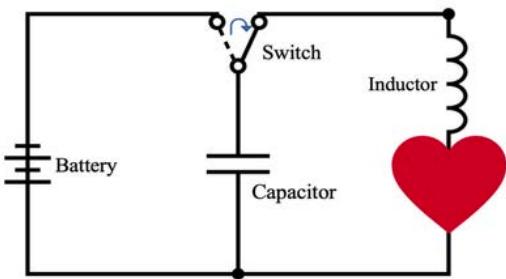


Figure 2: The defibrillator circuit that consists of a voltage source and a capacitor on the charging circuit and an inductor in the patient circuit.^{5,7}

Summary

Although many medical professionals shy away from the study of physics and engineering, the importance of a basic understanding of electrical circuits is essential for the daily lives of many hospitalists. Apart from the use of defibrillators in emergency medicine, other fields of medicine require a basic understanding of electricity. For example, neurosurgeons must be well versed in the electrical circuits of neurons in the brain to ensure the safety of the patients they operate on. As the medical field develops and new technologies are introduced for patient care, physicians must familiarize themselves with the ever-expanding realm of biomedical engineering. It is crucial for neurosurgeons and neuroscientists to be comfortable with the technology they are employing in their work, and it is equally important for them to understand how these technologies function. Medicine is always striving for innovation, and to ensure new technology can be used to the utmost care and safety, a basic understanding of electrical circuits is an essential part of anyone working in the medical field.

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A Cross-Cultural Examination of Gender Roles and Gender Hierarchy in Mosuo Matriarchy with Some Comparisons to Western Patriarchy

Author: Stephen Knight

Departments of History and Anthropology

Even cultures that are vastly different one from another have long touted similar themes and rules around gender. Those in power have used the existence of gendered behavior to enforce a hierarchy that is accepted as natural because of these consistent themes. Researchers can, in a way, test the theory of whether this hierarchy is natural or constructed by juxtaposing patriarchy with matriarchy and examining the similarities in gender roles and the differences in gender hierarchy. The Mosuo of China are one matriarchal culture that can be used in this crosscultural study. By comparing the cultural norms of Mosuo people to those of patriarchal cultures and even the Han ethnic majority of China, a researcher can imagine the difference between gender roles and hierarchy.

The Mosuo people are the only matriarchal culture in this study and will consequently be the most prominent. Therefore, it is important to offer some context as to who the Mosuo people are. This can be difficult since even naming the culture has proven challenging for researchers and the Chinese government.¹ Cai Hua referred to the Cuan people living in Lijiang and the bordering region of Sichuan

as Mo-So.² His work states that the term Mo-So was applied to multiple ethnic groups: Na, Naxi, NaRu, and Nahing.³ Among these, Cai Hua documents that the approximately 30,000 Mo-So living in Yongning and its surrounding regions referred to themselves as the Na.⁴ As of 2006, Chuan-Kang Shih documents that 11,278 of the 30,870 people living in the greater Yongning area identified as Mosuo.⁵ Prior to 1997, they had requested multiple times to be distinguished from the Naxi as a separate ethnic group, but this listing would require ratification from the government that had not yet been granted.⁶ This is despite the fact that Chinese natives could recognize Mosuo people at a distance by their clothing.⁷ Chuan-Kang Shih describes a conversation with a government official in 1987 where he was told that the Mosuo people would be unhappy if they were called by any term other than Mosuo, while Chinese officials would be equally dissatisfied if the Mosuo people were referred to in any piece of academic literature as anything other than Naxi. He also points out that the Mosuo people refer to themselves as Na people in their native language, Naru. They prefer that other ethnic

groups refer to them as Mosuo.⁸ The English pronunciation of Moso is closer to the Chinese word written in English most commonly as Mosuo. Therefore, Chuan-Kang elects to use the word Moso in his own writing.⁹ Since most resources written in or translated to the English language use the word Mosuo to describe these people, it is the term that will be used throughout this paper.

Information regarding Mosuo people is hard to come by, in the modern world. Cai Hua made a note of this in his research. Previous writers have described Mosuo culture from an ethnocentric point of view, going as far as mistaking the male chief of a Mosuo household for a husband.¹⁰ Cai noted in his work how Mosuo people were reluctant to work with anthropologists or journalists of any kind due to an attempt by China's Cultural Revolution to forcefully change Mosuo culture. To their understanding, this attack on their way of life occurred because of previously published, poorly conducted research.¹¹ Chuan-Kang Shih references this reluctance; however, his work focuses on a very different consequence of the literature mentioned by Cai Hua. Chuan-Kang states that the Mosuo people were humiliated when they learned that their visitors saw the Mosuo as an underdeveloped culture of which they could take advantage. While they had initially been proud of the growing interest in their culture, it became repellent to them.¹²

Cai Hua described the geographical isolation of Yongning early in his work. Before the 1970s, the trip to Lijiang from Yongning took ten days and was undertaken entirely by foot. A single road to the South connected Yongning to Ninglang but was almost never traveled. He knew of a bus that took that route, and yet the road received less traffic than a single vehicle a day. Cai described more neglected roads leading to cities like Yanyuan in the North and a road that was still under construction. This unfinished road was meant to take travelers West, to the shores of the Jirangsha River.¹³ The personal

account of a Mosuo woman also remarks how rare it was for the area to see visitors.¹⁴ The Himalayan mountains isolated the Mosuo. That is probably why their customs survived for so long. Their isolation raises some questions regarding the customs and standards that they seem to have shared with Western cultures who would not have had much opportunity to influence the Mosuo.

Cai Hua referred to the structure of Mosuo families as the lignée.¹⁵ The lignée was a group of people from different generations, but descending from a common ancestor, living under one roof.¹⁶ In this family structure, the passing generation left its inheritance to the next collective generation of the lignée.¹⁷ Each generation of a lignée worked, ate, and raised the sisters' children together. This process lasted for up to ten generations as the lignée expanded, and sometimes even longer. Two chiefs of opposite gender took on a leadership role in the Mosuo lignée. The female chief oversaw operations within the home, such as the distribution of clothing, management of finances, and preparation of meals. Male chiefs took charge of the lignée's duties in the outside world. This involved the care of livestock and the lignée's relationship with neighbors and other villagers. While the male chief acted as the provider for the family, Cai Hua remarked that the female chief often organized the work done in the fields.¹⁸ Yang Erche confirms in her memoir that families traditionally lived under the household of a maternal ancestor, and that decisions regarding the family were not made without consulting the other adults of the household.¹⁹

The dynamic in which a female chief oversaw work outside her own household was not limited to the matriarchal Mosuo; there have been patriarchal cultures where women could manage the outside work of men from the home. In 18th century Latin American culture, upperclass widows experienced work like the female Mosuo chiefs. While these

women were metaphorically incapable of leaving their home alone without causing a scandal, they often managed business from inside the home. This involved using male surrogates whenever possible: brothers, children, and other kinsmen.²⁰ Despite living in a patriarchal culture, and despite being unable to provide for herself, the Latin American woman was able to experience a kind of matriarchy through organizing the work of the men in her family.

Gender roles could be seen in the roles of the household chiefs and in the initiation ceremonies of the Mosuo people. Children typically wore gender-neutral garments until this rite, when they either received their skirt from their mother or their pants from one of their mother's brothers. During her initiation ceremony, a Mosuo girl may have held flax and jewelry. A boy's ceremony would replace these with items such as a silver ingot and a sword. The girl's jewelry and flax symbolized her beauty and her duty to provide the family with clothing. The boy's silver and weapon were a reminder of his duty to support the household with money and act as a guardian.²¹ Yang Erche Namu leaves a personal account of her own Skirt Ceremony in her memoir. She says that Skirt and Trousers Ceremonies always occurred during the New Year Festival. She describes how Mosuo women would braid their hair with long extensions so that it stretched below their hips, and how mothers typically took the role of changing their daughters into their girl clothes. In Yang Erche's case, neither of these events occurred according to tradition. To avoid lice while living with her uncle, Yang Erche's hair had been cut too short to braid. Instead of her mother changing Yang Erche's clothes, that role was passed to a friend of the family that the memoir names Cilatsuo. According to Yang Erche's mother, this was acceptable because Cilatsuo had a pleasant face and had been born during the year of the horse.²² It is clarified the beauty of the woman initiating the skirt ceremony was important, but Yang Erche does not

explicitly state why it was important that Cilatsuo had been born during the year of the horse. It is stated much earlier in her memoir that Yang Erche was born during the year of the horse, which may be the reason that her birth year made her more suitable.²³

The work done in Mosuo fields was not divided by a gendered barrier. Typically, Han Chinese men were responsible for manual labor such as plowing and carrying crops. Meanwhile, women transplanted seedlings to the rice fields. Chuan-Kang Shih states that Mosuo men and women performed the duties of pulling up, rinsing, and binding seedlings to be transplanted in the morning. They would then go out into the rice fields and plant them as a collective group, rather than dividing the labor in the manner of their Han Chinese neighbors.²⁴ Yang Erche describes this system as well. She points out how her mother's sisters helped run the house and worked in the fields with their brothers: plowing fields, chopping wood, sewing clothes, and butchering animals.²⁵ Despite the clearly established and culturally encouraged gender roles, boys and girls were offered the same opportunities and were treated as equally valuable when providing for their household.

Even though the two heads of the Mosuo household were male and female members of the same lignée, meaning that they were usually siblings or closely related cousins, the Mosuo people observed what anthropologists refer to as the incest taboo. It was their belief that two mouths eating from the same bowls should not engage in sexual congress and should not bear children.²⁶ One reason for this was to avoid the strain of economic bonds between romantic partners.²⁷ Yang Erche describes married women as miserable. She says that love outside her country seemed overly complicated, and that all Mosuo people seemed to share the same opinion of marriage.²⁸ Another reason for this distance between

family members was the presence of apparent defects in children born of incest. The Mosuo believed that incest was an animalistic act and that children born of such would perish early. They even believed that the effects of incest acted like a curse, taking cattle along with the child. To avoid implications of incest or emotional bonds that might have led to incest, Mosuo Mothers discouraged their children from discussing emotional issues with their siblings of the opposite sex. Mosuo culture was so strict in their avoidance of such bonds that it was even considered inappropriate for an uncle to discuss something emotional with his niece. When such subjects arose, he was to find a passerby and convey his messages to this person so that they might relate his message to his niece. Mosuo mothers, on the other hand, had the right to share such conversations with their sons so long as they did so discreetly.²⁹

In Ancient Rome, Cato expressed a similar sentiment in the case of Manilius. Manilius had simply kissed his wife in the presence of his daughter in daylight and was expelled from the senate for his indiscretion.³⁰ This sets the Roman standard for public behavior in an odd light, since it is unclear whether Manilius was expelled for being intimate with his wife in the presence of his daughter or for being intimate with his wife in public. However, it relates well to the discretion expected of Mosuo adults. The right of a Mosuo mother to have intimate conversations with her son in private extended the role of the mother and the importance of her body and the bond that she had with her children.

Since both the male and female chief had a certain degree of control over their household, one of the factors that defined the Mosuo as matriarchal was matriliney. During Cai Hua's ethnographic research, he said that he never discovered a word that even related to the concept of a father in Mosuo culture. Children were considered the offspring of the mother rather than of the two parents.³¹ In some cases, the

child's genitor was not even known, because furtive visits were carried out in such a way that a Mosuo woman's family was unaware of her lover's presence.³² Mosuo people considered the ong to be the carrier of hereditary and racial characteristics. They saw the ong as a product of the mother.³³ This is the reason that mothers were allowed to engage in intimate conversations with their sons; the bond between mother and child was linked to the very foundation of the human body. This connection was emphasized by the Mosuo creation story. Chuan-Kang points out that the Mosuo creation story claims all human beings descend from a celestial mother and a monkey who conned her into thinking she had lost her human lover. When her lover returned, he chose to raise her children by her side rather than neglecting her.³⁴ Just as they were in Mosuo culture, the mother's children were raised by her and received her name. Their genitor's importance in the creation story ended with the act of giving the mother her children.

Cai Hua says that the Mosuo did observe marriage, but not often. Even those that chose to cohabit still often engaged in furtive visits.³⁵ Mosuo people engaging in marriage and cohabitation found their children affected by their decision. While the children of an unmarried Mosuo woman would be considered of the same social class as their mother, children of a married couple inherited the status of the father. In the case of cohabitation between a common man and a woman of the upper class, the children were considered commoners. In the case of cohabitation between a man of the upper class and a common woman, the children of such a marriage experienced the upper-class advantages of their fathers.³⁶ In cases where a household faced extinction or lacked an heir of either gender, Chuang-Kang Shih notes that children could be adopted by their genitors' family.³⁷ Since this was meant to maintain the family line, this meant that even adopted children would be considered the

offspring of the family matriarch rather than their genitor.

Mosuo people engaged in a form of courtship that Cai Hua initially found peculiar. Younger people would make it known to their family that they wanted to visit one of the spaces set aside for dating. Because of the incest taboo, the Mosuo family ensured that relatives of the opposite sex were never present in the same dating space at the same time. At the time that Cai Hua conducted research in Yongning, this dating space was the theater. While a film was playing, young men would sit next to a woman and flirt with her. If she accepted a young man's advances, then he would take her in his arms. These rituals were more discreet in enclosed theaters, but they were largely the same with the young men almost always taking the initiative.³⁸ The tendency to view initiative as a masculine trait can be traced back to the Mosuo creation story, where the last human being professed his love to a celestial being and completed a series of tests to gain her parents' favor. Although she was depicted as intelligent and resilient, the mother of all living things in this story seemed to take on a very passive role, much like the girls in the theater.³⁹

The idea that initiative was a masculine trait could also be seen in western cultures. Patricia Simons stated how a case in Germany was conducted regarding the sex of a crossdressed woman or hermaphrodite. In Simons' own words, only men were allowed to be, "...roguish, assertive, insistent, and heated in character."⁴⁰ Socolow wrote, in her book on the lives of women in Latin America, that Iberian families cloistered their women from sexuality by never allowing them to leave the home without a man present. This was because of a belief that women were slaves to their carnal urges. The purity of a woman was related directly to the purity and honor of her father's or husband's house. In other words, Iberian societies judged the value of a household by the purity of its most vulnerable

members. Socolow attributes this perspective to the alternating Muslim and Christian conquest of Spain in previous centuries.⁴¹ The unique position of Iberian and Latin American women makes an even greater divide between Western culture and the behavior exhibited by Mosuo boys and girls at these theaters.

The difference in these interactions was little more than a nuance. Mosuo women came to the theater expecting and inviting sexual advances from Mosuo men. A young Mosuo woman had already taken the initiative by entering the theater. Mosuo boys entered the theater with the understanding that Mosuo girls in this space were seeking male attention. Therefore, the very act of entering the theater was equal to consent. When Cai asked about the practice, Mosuo boys informed him that the girls would be uncomfortable if such advances were not made.⁴² This was a feature of Mosuo culture that related to the way that the genders experienced sex. The man's role in sex was to simply enjoy himself. The act of intercourse was seen as a gift from him to the household of the woman, watering a seed in the woman's belly.⁴³ This was a stark contrast to Latin America, where sexual relations were restricted even in the confines of marriage. Sexual contact that did not lead to childbearing was prohibited, and certain sexual positions were considered animalistic because they were too carnally pleasing.⁴⁴ While the Mosuo people traded pleasure for new life, Latin Americans were denied pleasure for the sake of purity.

Like the Mosuo, most Europeans believed that sexual pleasure was a masculine trait. Men were meant to assert their dominance through sex acts, sexual pleasure, and the presence of healthy male features.⁴⁵ These features included the growth of a beard, aggression, and the ejaculation of seminal discharge.⁴⁶ This brand of masculinity had its roots in ancient Rome, where everything penetrative or simply associated with the phallus was considered masculine.⁴⁷ The Romans viewed penetration during

homosexual acts as an act reserved for a fully grown, bearded, masculine man. Boys who had not yet grown their full beard were considered less than men and were therefore on the receiving end of penetrative sex. These homosexual acts were only considered a danger to the giver's masculinity when the receiver was allowed to stimulate their own phallus.⁴⁸ The importance of a phallus and sexual pleasure to the Roman's masculinity is most clearly seen in the case of eunuchs. Roman writers often attributed eunuchs with *Mollitia*: a word for softness that was associated with feminine characteristics.⁴⁹ The fact that Romans and the Mosuo had both connected the importance of the male orgasm and sexual pleasure in childbearing to masculinity might cause researchers to wonder whether the two cultures had somehow mingled and shared this part of their culture one with the other, or if these two cultures separated by time and physical distance had somehow arrived at similar conclusions regarding the sex of men. Such a statement could be used in an argument that gender roles are natural, rather than socially constructed. It could also be a simple coincidence.

The Mosuo practiced another form of courtship outside of dating spaces like the theater. Going about their daily lives, a man or woman might have taken an interest in a person of the opposite sex. When this happened, the interested party would snatch away some object belonging to the person who had caught their attention. If a woman was approached in this manner: she could simply smile in agreement and allow the man to return her object later that night, or she could demand the immediate return of the stolen object. A man approached in this manner would either come into the woman's home later that night to retrieve his object or find some way to steal it back from her. The man also had the option of simply saying that he did not wish to visit her because she did not please him. Meanwhile, Cai Hua noted how the Mosuo women had crafted a standard response to men they did not want to entertain. This response

involved the woman claiming that some other man had already spoken for her on that night.⁵⁰ The implication here was that men were more likely to leave a woman be out of respect for another man, rather than out of respect for her wishes. While this arrangement seems patriarchal, this further implies man's animalistic nature and his inability to control himself. This is reminiscent of how Latin American culture viewed women as the carnal and roguish gender.⁵¹ The purposes woven into this interaction denote the ideals set down in the Mosuo creation story. The celestial mother is depicted as the more clever and steadfast of the characters, while her lover is depicted as wanting her so badly that he undertakes great labors to impress her family and raises another creature's children just to be with her.⁵² The Mosuo belief that women are inherently more rational and less prone to either throwing tantrums or arguing about such matters is a matriarchal nuance.

There were two other ways to reject an unwanted man, but they required that the woman let an unknown man into her home before rejecting him. The first was for her to retire to her mother's room. The second option was that she could scream in defense, telling the rest of the house that a thief had come into her room. Women did not tend to observe this option according to Cai's knowledge.⁵³ Once again, the fact that the woman would retire to her mother's room rather than trust the man to keep to himself implies that Mosuo women view men as the same roguish beings that Patricia Simons described.⁵⁴ In contrast, Latin American men faced a similar struggle in breaking off engagements. Once a promise had been made, a woman retained the right to break off an engagement because betrothal was not considered an obligation on her part. She could simply change her mind because she wanted to change her mind. On the man's part, betrothal was considered an obligation. In Latin America, it was unacceptable for a man to break off an engagement, unless his bride-to-be was not a virgin. While the

man had the power to propose engagement, he was near powerless to stop it in the same way that a Mosuo woman was near powerless to stop a man she had already allowed into her home.⁵⁵

The role of women in religion was also comparable between Mosuo culture and western cultures. It was common for women to become Daba, the religious leaders of a practice that is unique to the Himalayas, before 1940.⁵⁶ This was before World War II and long before the Cultural Revolution came to Yongning.⁵⁷ Cai Hua described the people of Yongning as devout Buddhists and said that Lignées always raised at least one of their boys to practice Tibetan Buddhism as a monk. This almost completely removed women from a position of religious leadership.⁵⁸ Chuang-Kang Shih relates the increasing importance of men in religion to the introduction of Tibetan Buddhist principles and beliefs into Mosuo society. One instance of Tibetan Buddhism's influence that he refers to is the common use of the Tibetan words that relate sun and moon to father and mother. This was in opposition to the traditional Mosuo view of the sun as a female: warm and capable of giving and sustaining life.⁵⁹ He blames the subtle and patient influence of the Tibetan Buddhists, the introduction of television in the 1980s, and the growing acceptance of consumer goods among Mosuo people for the rapid and dramatic changes that have occurred in Mosuo culture since his study began. Chuan-Kang even claims that these influences are causing the complete oncoming erasure of Mosuo culture.⁶⁰ The lack of female religious leaders was also noted in studies conducted by a team of researchers in 2015.⁶¹ However, the female chief of a lignée was the one to offer sacrifices to the ancestors.⁶² This implies that she had a closer relationship to the ancestors and was connected to her role as a matriarch and all of the past matriarchs of her lignée.

Carrie Chapman Catt remarks, in her diaries, that

Chinese women near Macao were quite important in religious places because they served more gods than their husbands. However, she never clarifies whether these women belonged to the Han Chinese ethnic group. This put women in a place of religious leadership, but also put them in a position of greater discipline. What's more, their prayers were often meant to aid their husbands in acts such as the dispatching of enemies.⁶³ Chinese society expected women to use their power and their standing with the gods to aid their men. Their position in religion was used to further remove agency from them. Religion had also been used to confine women in Latin America as late as the 19th century. Elite women were encouraged to either marry a man or marry God. Society saw the moving of an elite woman to the lifestyle of a convent as relieving society from the burden of sustaining one more woman.⁶⁴ Per these examples, the presence of women in religious leadership is not synonymous with religious liberation and can be a method of restraint.

Despite the numerous common themes in the gender roles of the Mosuo people when compared to patriarchal civilizations, evidence exists that Mosuo women experienced a higher quality of life than their Han Chinese neighbors. A woman living in China during the early 21st century remarked how she had never heard of rape among the Mosuo people. Meanwhile, it was a pervading issue among the other minorities of China in the Yunnan province where she lived.⁶⁵ This does not mean that rape was nonexistent in Mosuo culture, but at the very least it was not reported as often as in other Chinese minorities. It is likely that rape was far less common in a culture where women were not made prisoners of their own bodies and were free to engage in sexuality with male suitors. There was also an understanding that women would receive much more respect in a matrilineal culture than in a culture where they were seen more as a vehicle for the birth of a man's children.

A team of researchers set out to compare the quality of life of Mosuo women and Han Chinese women in a paper that was published in 2015. This study found that the climacteric symptoms, physiological symptoms that were often associated with menopause, in Mosuo women were more connected to the physical changes occurring within a woman's body. Meanwhile, Han women complained more consistently of anxiety, physical and mental exhaustion, and irritability than their Mosuo neighbors. The same study found that all the Mosuo women studied actively practiced Daba and Buddhism, while the Han Chinese women studied claimed to not observe any religious practice. Approximately 11% of the Mosuo women identified as part of labor force, in contrast to approximately 2% of the Han Chinese women. This greater presence in religion and the labor force offered women greater sense of agency and community, especially during the period in which they lost their ability to give birth. The researchers' hypothesis connected the reduced symptoms of anxiety, mental exhaustion, and irritability with the presence of strong social support from other women. In the conclusion of their research, the team found that Mosuo women experienced less severe climacteric symptoms, significantly higher self-esteem, and more social support. The consensus among these researchers was that these changes came from the tendency of Mosuo women to engage in more taxing work than Han Chinese women and the support of the blood-related Mosuo lignée during a woman's climacteric period rather than the family of the Han woman's husband.⁶⁶ In other words, they were simply in better shape and lived in a household of blood kin that understood and empathized with the changes their bodies were going through. The alleviation of psychological symptoms may have also been connected to the value placed on a woman's body after her climacteric period rendered her incapable of bearing children, but Cai Hua seems to argue that a human body's value declined after passing a certain age at which men and women were expected to cease

sexual activity. In one case; a young man very loudly pronounced shame on his own genitor for attempting what he referred to as raising a corpse.⁶⁷

In comparing Mosuo culture to patriarchal societies, researchers can see various common themes. The only truly outstanding difference between what is described as matriarchy and patriarchy existed within the unit of the family. This was especially true in matters of religion and community, where Mosuo men seemed to maintain most of the power. This should serve as a reminder that matriarchy, even when it is a cultural norm, only refers to the power of the woman within the home. Perhaps the most obvious factor that separated Mosuo matriarchy from outside patriarchy was the freedom that women had to engage in and experiment with sex. Even though they also had the opportunity to join the labor force, Cai Hua and the study of Climacteric symptoms in Mosuo culture both state how women rarely worked outside the home. These were examples of equality rather than examples of women exerting power over men. Even the structure of the home distributed power equally between the male and female chiefs. The only factor that made Mosuo culture overtly matriarchal was matriliney. Taking on a passive role in sexuality did not exclude the Mosuo woman from power. Taking on a nurturing and empathetic role towards the family was seen as an expression of power, rather than submission to a patriarchal figure. Most importantly, being a mother was seen as a Mosuo woman's duty to herself and her own lineage, rather than to a patriarch. The roles and characteristics associated with the female gender were not so different from those in patriarchal culture. It was the lens through which those roles were viewed that made Mosuo culture matriarchal.

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The Legality of Lustration within Transitional Justice: Does Political Exclusion Possess Legal Rationalizations that Preserve Effective Transitions to Democracy?

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ABSTRACT: Lustration is the method of using laws to restrict members of bygone repressive regimes from holding political positions. Lustration is put into place so that those who committed past human rights violations do not have the access or authority to cause more human rights abuses and place the state back under an abusive government. Opposers of lustration claim that such practices are incompatible with democratization by arguing that they deprive citizens of democratic rights, such as the right to pursue public office positions and other employment opportunities. Lustration is implemented to ensure past abuses are not repeated. Therefore, it is essential to understand whether political exclusion and regulation of certain rights violate one's rights. In this article, I investigate the legal, legislative, and judicial remedies for lustration (specifically political exclusion) that are put in place, discuss the implications of the arguments for lustration, and provide a framework that synthesizes prior legal arguments that justify lustration as a democratic way to prevent past human rights abusers from reentering official public positions.

Introduction

This article addresses the use of lustration, a mechanism in transitional justice to protect and stabilize structures of public offices, administrations, and institutions to prevent a relapse of authoritarian rule.¹ Lustration is an effort to ingrain democratic norms and values within countries suffering at the hands of abusive authoritarian governments. Transitional justice is a process of implementing legal, political, judicial, and cultural mechanisms to weaken the authority of unstable regimes as a means to reform and consolidate towards a stable, ideally democratic form of government.² Some instruments or mechanisms implemented within transitional justice include truth and reconciliation commissions, trials, reparations, providing amnesty, vetting, and the topic of this article, lustration.³ Commonly, formerly authoritarian regimes are encouraged to use transitional justice practices, as they have taken part in or are complicit in gross human rights violations. Despite the efforts of lustration practices, some views do not support this transitional justice mechanism due to claims that it violates fundamental constitutional and political rights granted under the democratic process, such as the

right to run for public office.⁴ In this article, I argue that lustration practices do not violate constitutional or political rights, and I will show the legal legitimacy of lustration.

This article proceeds as follows. First, I define lustration and explain the rationale and purpose for implementing these measures. Second, I present the dominant arguments that portray banning, dismissing, and demoting someone from holding public or political office as a violation of one's fundamental political and human rights. Third, I offer my counterarguments against these viewpoints and explain why it is acceptable for prospective democracies to exclude past perpetrators from holding public office and other public positions. Next, I will present how existing democracies enforce the rule of law during punishment and the consequences of those punishments to keep their democratic status intact. Then, I present a case study from the post-communist transitional period in Poland, where lustration was implemented and discuss its successes and failures. Lastly, I offer my recommendations to further protect and preserve the use of lustration to fulfill administrative and transitional justice.

Lustration and its Logic

Lustration is a legal approach to prevent participants of past regimes from being involved in public administrative roles and other employment positions.⁵ Vetting⁶ is a type of lustration, and while it is often accompanied by lustration, for reasons of space, I will focus on the implementation of lustration within this article. It is accomplished through investigations, screenings, and confessions of guilt to discover if such individuals took part in any gross human rights abuses under previous authoritarian or tyrannical regimes.⁷ Implicated individuals are then restricted from pursuing specific jobs, such as elected positions, university employment opportunities, legal and judicial positions, and other public and administrative roles

capable of enhancing or diminishing government structures.⁸ This form of oversight was especially done through extensive background checks by employers for potential employment opportunities.⁹ The overall goals of these lustration practices are to aid in democratization by re-establishing public trust and legitimacy in public administrations through rebuilding and reconciliation, enforcing accountability to improve governmental performance, and providing justice through political exclusion instead of through criminal prosecutions.¹⁰ The goals of lustration are accomplished by truth commissions, trials, victim compensation, and public opinion to introduce democratic values during transitional periods.¹¹

Considering the goal of transitional justice is to reform a nation and its public institutions, ultimately steering the country toward becoming a peaceful democracy, supporters argue that the action to exclude abusive leaders and their enforcers from running and holding public and political positions is rightfully justified and not a violation of one's rights. A goal of lustration within transitional justice is to reform the state. In that case, holding those in power accountable, removing them from office, and restricting them from future official capacity is compatible with those goals.¹²

Regarding accountability, lustration operates under the assumption that holding those responsible for certain crimes ideally results in a punishment proportional to the offense committed.¹³ The application of proportionality is rooted in common law, the foundation of the American legal framework,¹⁴ and further established by the Supreme Court of the United States in *Solem v. Helm*.¹⁵ The European Court of Human Rights affirmed the concept of proportionality in *Samsin v. Ukraine*.¹⁶ These notable judiciaries setting a precedent on the application of proportionality shows the importance of lustration to be proportional in practice. Relative to transitional periods, by applying the 'principle of

proportionality,’ punishment by depriving power after abuse of that power is just and reasonably proportional.¹⁷ Proper implementation of proportionality grants a level of authority to be taken away once that power is abused. The idea of proportionality is democratic, so as long as lustration is proportional, it is democratic.

Lustration advocates also note that in many consolidated democratic societies, punishments for wrongdoings can result in the inability to run for public office or hold government positions,¹⁸ of which has been deemed acceptable by the U.S. Constitution.^{19, 20} Essentially, present-day democracies have set a precedent to protect democratic values. This same application of punishment is enforced by way of lustration when former members of abusive authoritarian regimes engage in violence and commit gross human rights abuses that destabilize political and public institutions. Lustration is democratic as consolidated democracies and transitioning states implement similar applications restricting public officials from retaining official capacity after exploiting their positions.²¹

Finally, a democratic government must preserve a democratic state for the future. By lustrating people who have shown that they do not support democracy, the state is engaging in a legitimate self-protective measure. If allowed to return to the state apparatus, the conduct of those who upheld the authoritarian regime may corrupt the new democratic institutions, and this risk makes it both democratic and acceptable to use lustration upon individuals within political and public institutions.²² Furthermore, it is imperative that there are measures put in place so that perpetrators are not put in positions to abuse their access to power and influence again.²³ This is where lustration takes the course as a legal safeguard to avoid a repetition of authoritarian rule. The proactive use of lustration will ensure that public institutions are also not

abused.

The Common Controversies of Lustration Practices
Despite the logic discussed above, there are several objections to lustration. While lustration is a transitional justice mechanism used to achieve democratization, it is claimed that the denial of citizens to run or attain political and public positions undermines the democratic process.²⁴ It is presumed to violate one’s fundamental political right to run and hold public office.²⁵ Additionally, lustration laws have received input from international bodies questioning its constitutionality in respective transitioning countries.²⁶ They allege infringements on the right to political opinion, right to association, and freedom of expression.²⁷ Critics further claim there are infringements of certain rights and constitutional protections by implementing lustration laws. A major concern is that lustration laws would only cause citizens to distrust public institutions, which strays away from the long-term goal of lustration practices.²⁸

One other common criticism of lustration is related to retroactive justice. As lustration is typically implemented after the end of a repressive regime and during the transitioning period of a nation, lustrating states may be implementing retroactive justice, which is when someone is charged for a crime when the criminal act was not a crime when the action was conducted.²⁹ Critics refer to this as a legal irregularity that neglects criminal procedures.³⁰ Under common law and criminal law, retroactive justice reflects the concepts of *nullum crimen sine lege*, when there is no crime if there is no law establishing a crime, and *nulla poena sine lege*, when punishment cannot be enforced if there is not a law making the conduct unlawful.³¹ Using retroactive laws to punish offenders raises a concern that legal certainty and the process of democratic consolidation are neglected, and an abuse of criminal procedure is encouraged.³²

The Justification for Lustration

In this section, I offer rebuttals to these arguments within the previous section, which not only ignore the logic of lustration but also the following legal justifications that I provide. When it comes to addressing the claims that lustration laws violate one's political, civil, and human rights as well as protections under employment law, it is important to acknowledge and remember that those deprived of or limited of certain political rights, civil duties, and employment law protections have dedicated loyalty to regimes involved in gross human rights violations.³³ Essentially, past human rights violators have abused their privileges and deprived their victims of their rights and sense of security. When past perpetrators are not able to abuse citizens and public institutions, countries can restore their communities and institutions and gain public trust in the government.³⁴ Regarding potential employment discriminatory practices and policies, this form of 'discrimination' is a legal exception in employment law to prevent those responsible for causing political instability and repression from an authoritarian regime. In American employment law, barring someone from applying for or holding a position is not discriminatory if hiring that person would place an undue hardship upon employers and their business.³⁵ By welcoming past violators in workspaces that may disrupt the nature and operation of their business, an undue hardship is present, thereby making employment discrimination of those that would affect the nature and operation of the business legally justifiable. This is analogous to barring undemocratic human rights abusers from holding key positions in a new democracy. As it pertains to justified employment restrictions under lustration laws, even the United Nations has referred to employment vetting practices, a form of lustration, as "rule of law tools" meant to build trust from citizens and legitimize public institutions.³⁶

As for retroactive justice, lustration has opened avenues for retrospective laws, which can be used to

protect individuals that experience gross human rights violations in the future. Enforcing retroactivity operates as a remedy for past survivors of human rights violations who were subjected to crimes that could not be prosecuted when the offenses were committed due to unstable institutions.³⁷ Retrospectivity provides remedies for future abuses, so that enforcing retroactive laws is a minimized concern.³⁸ Retrospective laws can also go as far as to ensure abusers of powers are held liable for committing future human rights violations. Retrospective laws and legislation conflict with legal certainty because such rules are a response to past abuses. However, the legal justifications for this course of action are that such laws provide a sense of justice for victims of human rights violations from a former authoritarian government.³⁹ Retroactive justice encourages transitioning governments to provide legal remedies for victims and punish human rights violators influenced by previous authoritarian regimes.⁴⁰ Any legal process is bound to have supporters and detractors. Still, the opponents of lustration neglect to acknowledge that punishing perpetrators by depriving them of the privileges that gave them the capacity to abuse others helps nations shift away from unstable positions and reestablishes legitimate institutions by way of a transitional period. This serves democracy because it protects those that may be harmed by the government and holds the abusers accountable.

How are Current Democracies Successfully Implementing Political Exclusion?

Because lustration is a legal mechanism used to help transition authoritarian governments to democratic ones, lustration is not a common practice in countries that are already democratic. Although, in the context of comparative law, non-transitional contexts can still offer valuable examples of how to implement lustration, in principle, appropriately and democratically. Specifically, in the United States, there are procedures and laws put in place when political exclusion, a common component of

lustration, may need to be implemented. Political exclusion in democracies like the U.S. is enforced when everyday citizens, public servants, and political figures abuse the law, their fundamental rights/privileges, or their authority after committing certain crimes against the Constitution and state and federal law. This ensures that government institutions within the United States remain legitimate and preserve a democratic state. The U.S. Supreme Court has expanded this by responding to the issues where people affiliated with antidemocratic groups can be barred from certain activities.^{41, 42, 43} This same issue is questioned in transitioning countries where undemocratic conduct and affiliation to such conduct restricts one's ability to participate in political and employment opportunities.⁴⁴ As it relates to American law where the right to association is claimed to be infringed, I go through significant Supreme Court cases in turn: *Adler v. Board of Education of City of New York*,⁴⁵ *Keyishian v. Board of Regents*,⁴⁶ and *United States v. Robel*,⁴⁷ which addresses the issue of restrictions from political and employment opportunities due to an affiliation of undemocratic entities.

Under United States federal and state employment law, the right to certain civil duties and privileges is limited when offenses are committed.⁴⁸ Some limitations are disenfranchisement, the inability to be placed on a voting ballot, and revoking one's access to public services.^{49, 50} Regarding employment opportunities, under American federal law, in *Adler v. Board of Education of the City of New York*,⁵¹ people can be restricted from working for schools due to an affiliation to an unconstitutional political organization that intends to physically overthrow the government.⁵² This case emphasizes the measures the U.S. government takes to keep threatening individuals and groups away from valuable democratic institutions, like education systems, to prevent these people from diminishing such vital pillars of democracy. In regard to the judiciary of a

consolidated democracy like the U.S., the Supreme Court has successfully addressed and clarified measures to maintain its democratic state. These measures can be replicated similarly in transitioning countries pursuing democratization in efforts to refurbish public institutions and government entities.

The U.S. has placed limits on lustration. However, in light of the post-Cold War and the threat of communist organizations in the U.S., the Supreme Court addressed the issue of one's affiliation with communist organizations. An extension to the *Adler* case, *Keyishian v. Board of Regents*,⁵³ addressed legislation that punished individuals with an affiliation to an unconstitutional organization, despite not having aligned views nor endorsing the illegal intentions of the organization – this was declared a violation of constitutional limitations,⁵⁴ and in *United States v. Robel*,⁵⁵ further guidelines were set to protect those that had no active involvement nor agreed with the intentions and views of the organization, furthermore not imposing limitations on these individuals.⁵⁶ A common concern under the practice of lustration is the potential due process violations by acting on collective guilt or selectivity biases,⁵⁷ rather than considering and exercising individual guilt,⁵⁸ but in the cases of *Adler*,⁵⁹ *Keyishian*,⁶⁰ and *Robel*,⁶¹ the U.S. asserts due process considerations in the presence of vague associations to antidemocratic groups⁶² which have been implemented in countries pursuing transitional justice. These cases also establish that lustration laws and its counterparts cannot be excessive and that it does more harm than good. Furthermore, these cases show that for lustration to be compatible with democracy, lustration laws must abide by set principles and regulations.

As lustration focuses on politically limiting active participants of repressive authoritarian regimes that

commit gross human rights violations, it also acts to dismiss, demote, or exclude public officials who abuse their power and contribute to these violations.⁶³ Again, lustration is not commonly used in democratic societies. Still, there are procedures put in place when U.S. public officials abuse their power or commit acts that do not reflect the confinements of the law and Constitution.⁶⁴ In the U.S. Constitution, the President, Vice President, and other political figures like judicial officials can be removed from their positions through impeachment and the conviction of high crimes.⁶⁵ In matters of impeachment, tried by the U.S. Senate, judgment can consist of removal from official capacity and the ineligibility to hold office in future terms.⁶⁶ To preserve and protect the integrity of democracy, this is a legally just process to hold public officials accountable and maintain a stable and democratic government.⁶⁷ In the case of countries during transitional periods, lustration is designed to do the same thing: protect victims and the community, hold offenders accountable, and democratize.⁶⁸

Lustration from the Perspective of a Transitioning Country

Although lustration fits within democratic norms, these laws can be used undemocratically. In Poland, implementing lustration laws led to a legal dispute challenging the appropriate application of these practices. In the case of *Matyjek v. Poland*,⁶⁹ the Lustration Court acknowledges the 1997 Polish Lustration Act,⁷⁰ which gives the Court the authority to review declarations of collaboration with the secret police. The punishment for this offense could result in removal from public office and yearslong restrictions from other public positions.⁷¹ In this case, the applicant, a parliamentarian of the Polish government, was accused of collaborating with the secret police despite having proof otherwise. The Lustration Court denied the applicant's ability to obtain their case file.⁷² This put the applicant at a disadvantage, and they were later tried in court for

collaborating with the secret police, resulting in removal from the applicant's official seat as parliamentarian.⁷³ The matter from the *Matyjek* case sets a harmful precedent for implementing lustration laws.

The efforts by the Lustration Court were meant to protect the integrity of Polish institutions from collaborators. However, the applicant within the *Matyjek* case was not given adequate time or resources to prepare and build a defense since they were denied access to their case file. The European Court of Human Rights later reviewed and heard the *Matyjek* case. This Court unanimously agreed that this burden placed on the applicant violated Art. 6, §1 of the Constitution of the Republic of Poland,⁷⁴ stating that the Republic shall provide conditions for the people's equal access to cultural goods that consist of sources of identity and Art. 41,⁷⁵ a protection from personal inviolability or infringement of liberties. The parliamentarian was restricted from accessing personal cultural goods that would provide an opportunity to build a defense before the Lustration Court. The ruling from the *Matyjek*⁷⁶ case reflects the limits that need to be placed on lustration laws. Comparative to U.S. court cases, lustration laws must be enacted to protect its institutions alongside individuals. If lustration laws had infinite authority, then these laws would contradict the behavior lustration is designed to regulate. Thus, like all policies, lustration can be used in undemocratic ways. From a transitional justice standpoint, the undemocratic implementation of lustration would contradict the goals of governmental transitions. If countries and their public officials enforce lustration as intended within transitional justice, these government entities will complement the democratization process.

Recommendations and Conclusion

Political exclusion under lustration laws effectively restricts violators and rebuilds institutions affected

by their purview.⁷⁷ While it is important for nations and their institutions to reform, laws are the driving force that allows nations to do so. Lustration laws provide remedies to gross human rights abuses administered by their perpetrators and hold perpetrators accountable for their wrongdoings as a means to discredit their authority.⁷⁸ By excluding political actors that diminished their role from regaining any official capacity, they are barred from committing further human rights violations that may alter the transition of government.

However, lustration is not meant to permanently exclude past human rights abusers from participating in civic life. Laws can be designed in ways that allow certain privileges. A significant consideration during lustration enforcement is the duration of punishment imposed on those responsible for abusing their political authority. This would allow past violators a chance of reentry into society with minimal civic duties and minimal employment opportunities to provide some contributions to society. Despite successful rehabilitation, past violators will not be given reconsiderations for public, administrative, and political positions because putting former human rights violators back in positions of power builds resentment from civil society and harms civic trust.⁷⁹ The implementation of monitoring past violators in this way would be designed to further prevent them from repeating human rights offenses when reentering society.

Several measures can be taken to ensure that lustration laws are not abused. To ensure lustration laws do not default to a ‘tough on crime’ practice, the ‘principle of proportionality’ should be further enforced within lustration laws by assigning punishments proportional to certain abuses of power during human rights violations.⁸⁰ Incentives, such as relief from employment exclusion, should be implemented after making confessions of guilt and collaboration with a repressive authoritarian regime.⁸¹ The Lustration Courts should administer a

record system consisting of constitutional violations and confessions of guilt that is easily accessible to the public and private sectors: the public sector to review your records for personal or legal matters and the private sector, specifically for employers that wish to be aware of who they may be welcoming into their place of business.⁸² The creation of this resource and cultural good would prevent constitutional violations similar to those in *Matyjek v. Poland*,⁸³ and promote interpersonal trust in a post-authoritarian transition.⁸⁴ Establishing legal protections and trust between the government and its citizens are essential components in democracies and a goal of lustration laws. Therefore, implementing these democratic safeguards makes lustration practices legally valid for democratization. By implementing these benefits accompanied by lustration laws, lustration can be pushed further to facilitate democratic practices and values within the general public.

In light of building a new future, lustration is an investment for guaranteed accountability, reconciliation, institutional growth and stability, and civic trust.⁸⁵ Considering how decisive this is for transitional periods, lustration is a democratic tool for administrative and transitional justice. Implementing lustration laws deter future abuses from the government sector onto civic society, punish those that abuse their power and authority, and provide protections for victims from further abuse. This democratizing tool helps preserve countries’ progression in political and governmental turmoil in efforts to protect public institutions, government entities, and the community.

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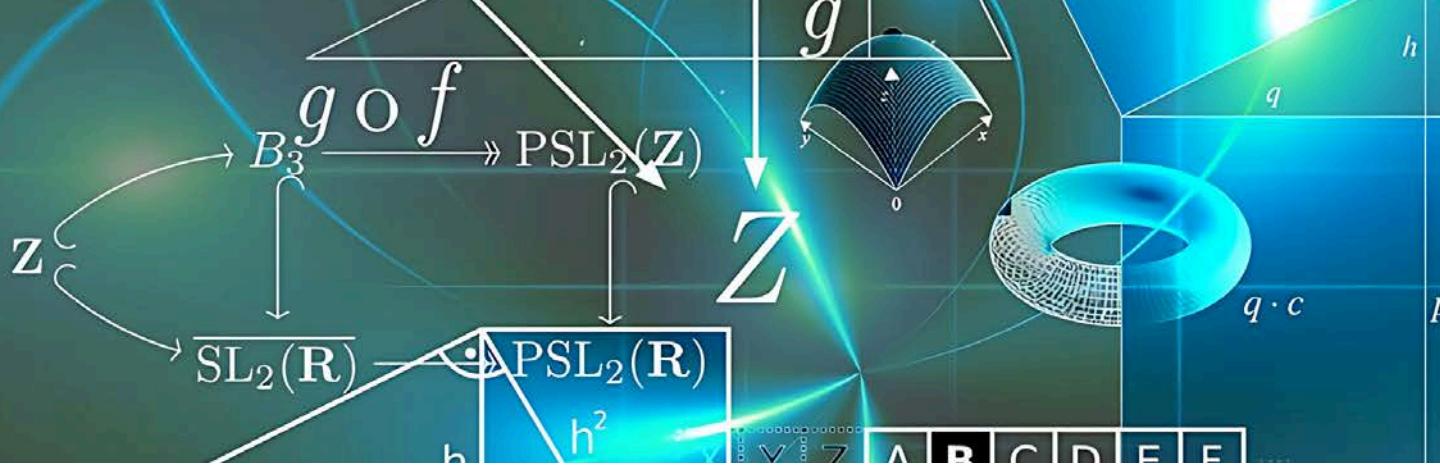
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On Improving Density Functional Theory Predictions for Rare-Earth Materials

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INTRODUCTION: Density functional theory (DFT) is a widely used method for calculating the electronic properties of materials. The method is based on the idea of approximating the many-electron wave function using the ground state electron density. While DFT is a very powerful tool, it has limitations, particularly when dealing with strongly correlated systems.¹ One way to address this issue and improve predictions is to introduce a correction term, known as the Hubbard U parameter, which accounts for the on-site Coulomb interactions among electrons in localized d or f orbitals.¹ In this report, we will discuss the importance of the Hubbard U parameter in DFT calculations, and research involving the calculation of the Hubbard U parameter of rare-earth materials using first-principles software and linear response theory.

The Hubbard Model

The Hubbard model is a simplified model of interacting electrons in a lattice system, first proposed by John Hubbard in 1963.² The model assumes that each site in the lattice has a single orbital, and the electrons can hop between adjacent sites with a hopping parameter t . The model also

includes an on-site Coulomb repulsion term U , which accounts for the interaction between two electrons occupying the same site.

The Hamiltonian for the Hubbard model is given by:

$$\hat{H} = -t \sum_{\langle i,j \rangle, \sigma} (\hat{c}_{i,\sigma}^\dagger \hat{c}_{j,\sigma} + \hat{c}_{j,\sigma}^\dagger \hat{c}_{i,\sigma}) + U \sum_{i,\sigma} \hat{n}_{i\uparrow} \hat{n}_{i\downarrow}$$

Here, $\hat{c}_{i,\sigma}^\dagger$ and $\hat{c}_{i,\sigma}$ are the creation and annihilation operators for an electron with spin σ at site i , $\hat{n}_{i\uparrow}$ and $\hat{n}_{i\downarrow}$ are the number operators for up and down spins, respectively, and the sum $\langle i,j \rangle$ runs over adjacent sites.²

The Hubbard model is a many-body problem that cannot be solved exactly for complex systems. However, there are several approximations that can be used to study the properties of the system. One common approach is the mean-field approximation, in which the electron-electron interactions are approximated by a static mean field. This mean field can be self-consistently determined by solving the resulting single-particle Schrödinger equation.

Another approach is the dynamical mean-field theory (DMFT), which treats the local correlations exactly and approximates the non-local correlations with a mean field. In DMFT, the lattice problem is mapped onto a single-impurity problem, which can be solved exactly using numerical techniques.³

The Hubbard model has been used extensively to study strongly correlated electron systems, particularly those involving localized d or f electrons. In these systems, the on-site Coulomb repulsion U can be very large, leading to the breakdown of traditional band theory.

In density functional theory calculations, the Hubbard U parameter is introduced as a correction term to account for the on-site Coulomb interactions among electrons in localized d or f orbitals, which are typically strongly correlated. The value of the Hubbard U parameter depends on the specific material being studied and can be obtained by fitting the calculated band structure to experimental data or by using first-principles methods, such as linear response theory.

The Hubbard U Parameter in Density Functional Theory Calculations

The Hubbard U parameter is an empirical correction term that is added to the DFT Hamiltonian. It accounts for the on-site Coulomb interaction among electrons in localized d or f orbitals, which are typically strongly correlated. The inclusion of the Hubbard U parameter is necessary for obtaining accurate electronic and magnetic properties of materials that involve localized d or f electrons.

The Hubbard U parameter is usually calculated by comparing the calculated band structures of a material with experimental data. However, in the absence of experimental data, the Hubbard U parameter can be calculated using first-principles methods. One such method is the linear response theory, which involves calculating the response of the

electronic structure of a material to an external perturbation. The Hubbard U parameter can then be obtained by fitting the response function to a model.

Importance of Rare Earth Metals

Rare-earth metals are a group of elements located near the bottom of the periodic table that have unique electronic and magnetic properties. These metals have a broad range of applications in modern technology, including in the production of high-strength magnets, optical fibers, electronic devices, and catalytic converters.⁴

Rare-earth metals are also widely used in the production of optical fibers. The fibers are essential components of modern telecommunications networks and help provide high-speed data transmission over long distances. Erbium is particularly important for this application, as it is used to amplify optical signals in fiber optic amplifiers.⁴

Another important application of rare-earth metals is in electronic devices, such as solid-state computer hard drives and cell phones. Gadolinium, another rare-earth metal, is used in the production of magneto-optical storage devices,⁴ which can store much larger amounts of data than traditional hard drives.

Rare-earth metals are also used as catalysts in a variety of chemical reactions, including the production of petroleum and the removal of harmful pollutants from exhaust gases. Cerium is an integral component of this application, as it is used to convert harmful pollutants, such as carbon monoxide and nitrogen oxides, into less harmful substances.⁴

Calculation of the Hubbard U Parameter for Rare-Earth Metals

Our research involves the calculation of the

Hubbard U parameter of cerium, terbium, and erbium using first-principles software and linear response theory.⁵ The first-principles software used is the Vienna Ab-Initio Simulation Package (VASP), which employs DFT to calculate the ground state properties of materials. The calculations are performed on the Frontera supercomputer located at the University of Texas at Austin and the Perlmutter supercomputer located at the University of California, Berkeley. To ensure proper convergence of the Hubbard U parameter, the calculations are performed on unit cell sizes ranging from 2 to 72 atoms. Additionally, calculations are also performed to determine how the Hubbard U evolves as a function of pressure, volume, and lattice parameter compression. These calculations are particularly important as rare-earth materials are being found to have novel applications in high-pressure environments.

Thus far, we have obtained a value of the Hubbard U for cerium supercells up to 36 atoms. The required convergence criteria and k-points density was much higher than predicted, making the calculations more computationally expensive and time consuming. Nonetheless, linear response theory was successfully applied to cerium and the data was fit to a linear plot.

Figure 1: Linear Response Functions for Ce Supercell

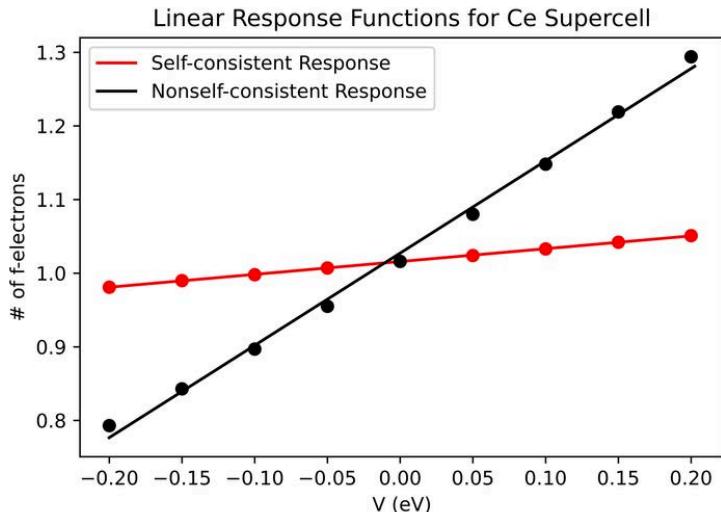


Figure 1. The Self-consistent (red) and Nonself-consistent (black) linear response functions for an 18-atom cerium supercell. The number of f-electrons is easily approximated as linearly proportional to the applied perturbation potentials.

Following, the process will be extrapolated to a maximum unit cell size of 72 cerium atoms. The computational time appears to scale exponentially with increasing atoms per unit cell, with many of the calculations already requiring thousands of CPUs and multiple hours on the Frontera and Perlmutter supercomputers. Once fully converged, the next step will be to investigate the behavior of the cerium Hubbard U as a function of pressure, cell volume, and lattice parameter compression.

Figure 1 - Accessible Data Table

Figure 1: Linear Response Functions for Ce Supercell

V(ev)	Number of Electrons: Self- Consistent linear response	Number of Electrons: Nonself- consistent linear response
-.20	0.981	0.793
-.15	0.990	0.843
-.10	0.998	0.897
-.05	1.007	0.955
0.00	1.016	1.016
0.05	1.024	1.080
0.10	1.033	1.148
0.15	1.042	1.219
0.20	1.051	1.294

Conclusions

The Hubbard U parameter is an essential correction term in DFT calculations, particularly when dealing with strongly correlated systems involving localized d or f electrons. Including the Hubbard U parameter into DFT is necessary for accurately predicting the electronic and magnetic properties of strongly correlated materials. This project involving the calculation of the Hubbard U parameter of cerium, terbium, and erbium using first-principles software and linear response theory is an important step

towards improving understanding of the electronic and magnetic properties of rare-earth materials, particularly in high-pressure environments.

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The Grown-Up Neighborhood: The Effect of Fred Rogers on Adult Beliefs About Benevolence

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ABSTRACT: Believing in a benevolent world contributes to positive emotions like joy and contentment, but also more satisfaction with life. Old age is positively associated with benevolent worldviews. Young adults 18-24 have the most cynical worldviews. Since media is readily available to young adults, studies have attempted to use positive content like acts of kindness to examine if it improves benevolent beliefs. Previous research has found that exposure to positive media is associated with increased benevolent behavior among children. The goal of the present study was to see if the intentional moralistic media figure Mister Rogers would improve beliefs in benevolency within the adult population. Eighty-two students from psychology 101 classes participated in the study. Three separate groups watched 10-minute videos then took a benevolence survey at the conclusion of their video. Rocky and Bullwinkle, humorous clips from Marx Brothers movies, and clips of Fred Rogers content was shown in these videos. Those in the Fred Rogers group scored the highest on the benevolence survey with statistical significance compared to the other two media groups. World-based items and authority-based

items revealed the largest gaps between the Fred Rogers group and the other two media groups.

Believing the world is a good place contributes to overall wellbeing. Those who believe in a benevolent world experience more positive emotions such as joy, affection, happiness, care, contentment, and love (Poulin & Silver, 2008). Those who believed in a benevolent world also reported higher levels of satisfaction in their life. However, the belief that others are trustworthy has declined in America. Only 34% of Americans agree with the statement “Most people can be trusted” (Miething et al., 2020). In the same study, Miething and colleagues (2020) discovered a lack of trust is positively associated with a 13% increase in a cardiovascular related death. Seemingly paradoxical, the belief in a good world grows as a person ages, even if they have endured more malevolence on average than a younger adult (Poulin & Silver, 2008). These authors believed the elderly understood the finality of their life, so they prioritized positive thinking compared to younger adults in the study. This belief aligns with Carstensen and colleagues (1999) work on the

socioemotional selectivity theory which claims older adults pursue emotional related goals versus knowledge-based goals as they age.

Even if a person has not been a victim of a malevolent act, screens give us increased access to seeing the evil side of the world both in non-fiction and fictional contexts (movies, TV, and video games). Much research has been devoted to understanding the negative impact of violent content on a person's belief system, propensity for violence, and desensitization towards violence. In a longitudinal study, children who were exposed early in life to violent television were more likely to become aggressive as they aged, and some displayed antisocial traits (Huesmann et al., 2003). Anderson and colleagues (2010) found that violent video games increase violent thoughts, aggressive behavior, and reduce prosocial empathetic behavior.

Less research has been conducted on positive influential people in the media and positive content to see if these things increase beliefs about the benevolence of the world and people. When showing positive entertainment to adults, studies often discuss elevation and physiological responses as the mediator to becoming inspired and wanting to live more virtuously such as a study done by Oliver and colleagues (2012). In this study, participants were asked to name their favorite films across multiple genres. The participants were also asked what bodily sensations they felt while watching. This was to gather information about physiological elevation felt during the film. In this same study, the participants picked emotions and motivations from a list to describe how the film made them feel. The virtuous films that elicited more emotional elevation were positively associated with the desire to be more moral when picking motivations from that list.

A study by Neubaum and colleagues (2020) showed video content to participants 6 days per week over the course of 6 weeks. There were 3 groups in the

experiment: neutral content, violent content, and acts of kindness content. The researchers hypothesized that exposure to random acts of kindness videos over time would increase prosocial activity, aid in psychological wellbeing, improve benevolent views of humanity, and this cohort would interact with stereotyped groups more often than the participants who watched other forms of content. Those watching the acts of kindness did not show a difference in prosocial activity, psychological well-being, benevolent beliefs, or greater interaction with stereotyped groups compared to the neutral and violent content groups. Their hypotheses were unsupported by the data.

A study by Coates and colleagues (1976) observed preschool aged children, and it was discovered that watching *Mister Rogers' Neighborhood* increased prosocial behavior with their peers and the adults in the classroom. The children used more positive reinforcement whether they were high reinforcers or low reinforcers at baseline prior to viewing the program. Being a high reinforcer meant the child was using encouraging language with their peers often while the low reinforcers were not engaging in this type of encouragement regularly. This behavior continued after the "treatment" phase into the posttest period when no content was shown. Overall, the television program increased social contacts.

Past literature establishes that believing in humanity's goodness improves quality of living. Nevertheless, finding ways to build this belief in the younger adult population proves difficult unless that person encounters a real-life act of altruism directly. Hoffman and colleagues (2020) recruited participants who received a real-life altruistic encounter and asked them to report how it made them think and feel. Palpable real-life selflessness was shown to have a positive effect on opinions about kindness (Hoffman et al., 2020). The act positively affected their views on humanity's kindness, it increased their own personal feelings of

empathy, and even bolstered their self-esteem, desire to help others, and made them feel valued in the world.

Fred Rogers embodied real-life altruism since he was not playing a character but was Mister Rogers in his daily living. When creating his show, Fred Rogers was intentional about affirmation and onscreen displays of kindness. Every episode he would look directly at the lens of the camera into the child at home and tell them “I like you.” Many of his songs were affirmation and empathy based because he was bullied. So, these themes became a core pillar of the show (Tuttle, 2019). In the present study, the Mister Rogers video acted as real-life altruism and positive media combined. The participants in the Fred Rogers group watched clips from his children’s show which displayed positive unifying moments of kindness between people and puppets living in his television neighborhood. Some clips had intimate affirmation-based messages directed at the viewer. This group also watched parts of his documentary which was created for adults. This film featured his positive impact on both children and adults in real life, not just within the confines of his television program.

The main question of the current research was if clips from *Mister Rogers’ Neighborhood* and his documentary *Won’t You Be My Neighbor?* would improve beliefs about benevolence in young adults since the show increased children’s prosocial activity (Coates et al., 1976). Fred considered simple messages to be universally helpful “I feel so strongly that deep and simple is far more essential than deep and complex,” he once said to his actual next-door neighbor. (Edwards, 2019). There are many publicly known anecdotal stories of his positive effect on adults like the *Esquire* journalist Tom Junod and the people who worked for him. There are also anecdotal stories of those who acquired a positive belief system from “befriending” him after his death by

reading his books and watching his content. Until the present study, there was no empirical data to support his positive effect on adults’ worldviews. It was hypothesized that those who watched Fred Rogers content would respond more positively about the world and mankind on a benevolence survey than those who watched other media content.

Method

Participants

120 participants were recruited from Psychology 101 courses at a southeastern university using the online SONA system. 38 participants were excluded for starting the survey and not finishing, skipping answers, or failing to answer basic quiz questions about the material in their group’s assigned video. 82 participants completed the study and demonstrated they paid attention to the content of their group’s assigned video when quizzed. Demographic data such as sex, age, race, ethnicity, and socioeconomic status was not obtained for this study. Participants earned course credit for participating.

Procedure

On the SONA system there were 3 separate studies listed with a coded name so the participants were unaware of what they were signing up to do and see. Each of these 3 studies represented a separate media group in the experiment: *Rocky and Bullwinkle*, The Marx Brothers, and Fred Rogers. The study opened on October 13th, 2022 and reached full capacity on October 25th, 2022. Each group contained 40 sign-up slots. There were sign-up restrictions set-up in SONA so that participants were denied access to sign up for more than one group of this study.

The participants completed the experiment using Qualtrics, an online survey and data collection tool. Each group followed the same steps in the same order. The only difference between groups was the media watched and the quiz questions about that

particular video. The participants watched the video clip for their specific group, they were asked 4 simple quiz questions about the content they watched. These questions spanned from the beginning of the video to the end and were story or theme based such as the name of the whale in the *Rocky and Bullwinkle* episode, how Harpo Marx drove away costumers from a rival food stand, and what Daniel Tiger's fear was when speaking to Lady Aberlin on *Mister Rogers' Neighborhood*. After answering these quiz questions, they took a benevolence survey. The final question for each group was a manipulation check with two possible answers. For *Rocky and Bullwinkle* that question was: Did you think (A) "The cartoon was something you wanted to watch more of" or (B) "The cartoon felt boring." For The Marx Brothers group: Did you think (A) "The humor style is harmless" or (B) "The humor style is at a person's expense." For the Fred Rogers group: Do you believe that Fred Rogers was (A) "A caring person" or (B) "Had wrong intentions."

The quiz revealed which participants watched the video in its entirety and paid attention to the content shown. If the participant missed 2 of the 4 quiz questions, their data was excluded. They were told in advance they would be quizzed on the content in the video. By missing more than 1 question, it was determined they may not have paid full attention to the video or only watched a portion. These questions covered the full duration of the video. After excluding participants in each of the 3 groups, there were 26 in the *Rocky and Bullwinkle* group, 26 in the Marx Brothers group, and 30 in the Fred Rogers group.

Measures

A pool of 28 statements from two scales were used to create the benevolence survey in this study. The first eight questions were from the benevolence section of the World Assumption Scale (Janoff-Bulman, 1989). These 8 statements are world and society focused such as "There is more good than evil in the world"

and "If you look closely enough you will see the world is full of goodness." The WAS also examines the innate traits of humankind, "Human nature is basically good." This section was chosen for its face validity to measure views on broad world and humanity-based goodness. The next 20 statements were items from the Belief in Human Benevolence Scale (Thornton & Kline, 1982). These statements are people-based items such as "People don't care what happens to other people" and "People will be kind to you if you are kind to them." All statements, in the order in which they were presented, are shown in Table 1. The survey was a Likert-type scale ranging from 1 = strongly disagree 2 = disagree 3 = somewhat disagree 4 = somewhat agree 5 = agree 6 = strongly agree. There was no neutral option. The survey was scored backwards for questions such as "It is natural for people to be nasty to each other."

Table 1

All 28 statements used in the benevolence survey

Statements	Scale
1. The good things that happen in this world far outnumber the bad	WAS
2. There is more good than evil in the world	WAS
3. If you look closely enough you will see the world is full of goodness	WAS
4. The world is a good place	WAS
5. People don't really care what happens to the next person	WAS
6. People are naturally unfriendly and unkind	WAS
7. People are basically kind and helpful	WAS
8. Human nature is basically good	WAS
9. People are basically trustworthy	BHB
10. People who run big companies don't care about the people who work for them	BHB
11. People are pleased when they see someone happy	BHB

12. When someone says something complimentary about you it means they want to get something from you	BHB
13. Businessmen are honest	BHB
14. People don't care what happens to other people	BHB
15. The way to get on in life is to be cooperate and friendly	BHB
16. People will take advantage of you if you work with them	BHB
17. People are basically unselfish	BHB
18. People are unwilling to make sacrifices for the sake of others	BHB
19. People will be helpful to you if you are helpful to them	BHB
20. Given the opportunity people are dishonest	BHB
21. Bosses do their best for the people who work for them	BHB
22. People enjoy hearing about other people's failures	BHB
23. In order to get anything worthwhile done you have to cooperate with people	BHB
24. People are unsympathetic to anyone who is unhappy	BHB
25. People are honest	BHB
26. The way to succeed is to disregard other people	BHB
27. People will be kind to you if you are kind to them	BHB
28. It is natural for people to be nasty to each other	BHB

Materials

The 3 groups viewed different forms of content. Each video clip was 10 minutes long. One group watched a segment of the 1960s cartoon *Rocky and Bullwinkle*. This media type was chosen because cartoons do not show actual human beings. The cartoon was meant to act like a control in that the cartoon was boring, however, the manipulation check revealed over 50% of the group chose option (A) “The cartoon was something you wanted to watch more of.” The cartoon had two sections. The first was Rocky and Bullwinkle finding out about a contest to catch “The wailing whale.” It was a whale the cartoon called “Maybe Dick” instead of “Moby

Dick.” The whale was tormenting the navy and an award was posted for whoever could catch the whale. The second section was a humorous version of the classic fairytale Rapunzel. In this adaptation, the prince could not use her hair. This led to him trying unconventional ways to get up the tower. He created a catapult using a tree and a large stone, and then lived among birds so he could learn how to fly.

The humor group watched two scenes of the Marx Brothers in their films *Duck Soup* and *Animal Crackers*. The Marx Brothers were slapstick vaudeville performers often using physical humor like kicking and falling but were also known for being tricksters within their films. In the first scene the brothers are harassing a man at a lemonade stand selling his lemonade next to their peanut cart. They purposely try to disorient the man by finding ways to switch their own hats with his hat throughout the scene. Harpo Marx steals the man’s hat and catches it on fire. Later that day in a new hat, the man retaliates by stealing a bag of peanuts from their cart in front of them. Harpo and his brother disorient him again and Harpo lights his hat on fire again on the peanut warming flame of their cart. The man pushes the peanut cart over so Harpo dunks his feet in the man’s vat of lemonade in front of his customers. After seeing this, they leave because they no longer want to drink the lemonade. In the second scene, the brothers are playing a game of bridge with two women. They cheat by showing cards while the women are looking down. They also throw unwanted cards across the room when the other players are not looking. They win by a large margin and when the women decide to leave, one of them realizes Harpo has stolen and is wearing her shoes.

The last group was the Fred Rogers group. This group watched portions of *Mister Rogers' Neighborhood* and his documentary *Won't You Be My Neighbor?* The first clip was from Mister Rogers' show. He asks a young boy named Jeff why he needs

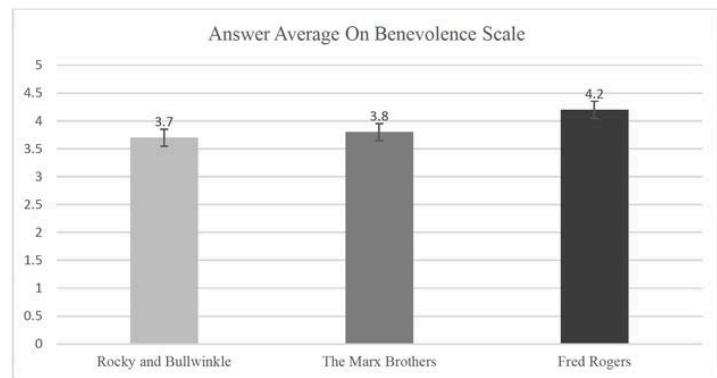
a wheelchair. Jeff explains his medical condition and then he and Mister Rogers sing the song “It’s You I Like” together. There was a portion of Mister Rogers singing his song “I Like You” as he looks at the camera swinging on the porch swing. This swing was part of his porch setup outside his classic television house. There is a clip from the documentary of actor Francois Clemmons (he played the police officer of the neighborhood) saying Fred was the first man to say “I love you” to him. Francois said neither his father nor his stepfather ever said it to him. The next clip is the puppet Daniel Tiger explaining how he is a mistake. He begins to sing about the fear of being different from everyone else. Lady Aberlin sings back to him and tells him that he is fine exactly the way he is. The final clip is Fred asking people to be grateful for the people in their lives and gives them a moment to think about those who loved them into loving or cared about them “beyond measure.”

Results

Overall Benevolence Survey Score Comparison

To compare the average group score on the benevolence survey, a one-way ANOVA was performed. This initial ANOVA revealed there was a statistical significance between the 3 media groups $F(2,81) = 7.97$, p less than .001. Means were plotted, descriptive statistics were obtained, and a Bonferroni correction was then run to observe the pairwise comparisons between the groups overall. The Rocky and Bullwinkle group had the lowest per item score average ($M = 3.7$). The Marx Brothers group had a slightly higher per item average ($M = 3.8$). The group with the highest average per item was the Fred Rogers group ($M = 4.2$). **Figure 1** visually presents the per question average for each of the 3 media groups when combining all 28 items on the survey together.

Figure 1
Per Item Average for Each Media Group



Note. This represents the average per question when combining all 28 items on the survey together.

Pairwise comparisons using a Bonferroni correction revealed the Fred Rogers group showed a very significant difference in survey scores per question when compared to the *Rocky and Bullwinkle* group (p less than .001). The Fred Rogers group was also significant when compared to the Marx Brothers group ($p = .027$). There was no statistically significant difference between the *Rocky and Bullwinkle* group and the Marx Brothers group ($p = .680$). **Table 2** shows descriptive statistics and post-hoc comparisons for each group on the benevolence survey.

Table 2

Descriptive Characteristics and Pairwise Comparisons

Group	n	M	SD	1	2	3
1. Rocky and Bullwinkle	26	3.7	.48		.680	less than .001*
2. The Marx Brothers	26	3.8	.52	.680		.027*
3. Fred Rogers	30	4.2	.53	less than .001* $</math>$.027*	

Note. M and SD represent mean and Standard Deviation per question, respectively.

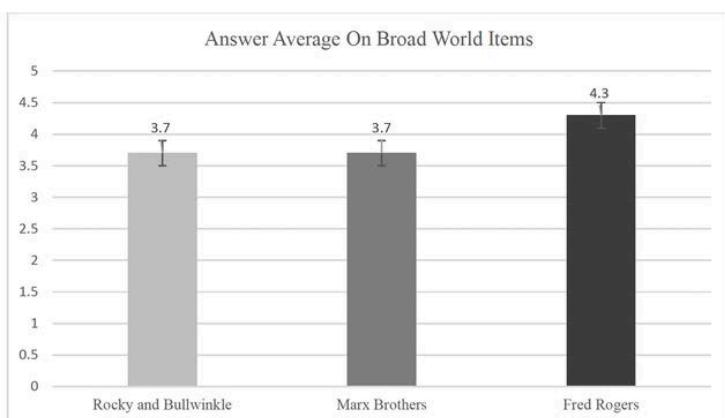
** p less than .05*

World-Based Items Score Comparison

As indicated in the measures section, the benevolence survey included multiple statement categories within one questionnaire. Post-hoc testing was performed to assess the differences between the groups on certain categories of statements. Items from the benevolence section of the World Assumption Scale (Janoff-Bulman, 1989) contained broad statements about the goodness in the world and human nature overall such as: "The good things that happen in this world far outnumber the bad." A one-way ANOVA was run on these 5 statements. This ANOVA also revealed a significant difference between the 3 media groups $F(2,12) = 6.85$, $p = .010$. The *Rocky and Bullwinkle* group and the Marx Brothers group had the same mean score per item ($M = 3.7$). The Fred Rogers group had the highest average on these statements ($M = 4.3$). Figure 2 presents the average answer on these items. The Fred Rogers group was statistically significant when comparing the groups using a Bonferroni correction ($p = .023$). The p-value was the same significance level $p = .023$ for both the *Rocky and Bullwinkle* group and the Marx Brothers group since they had the same mean score per item ($M = 3.7$).

Figure 2

Per Item Average On Broad Benevolent World Assumptions



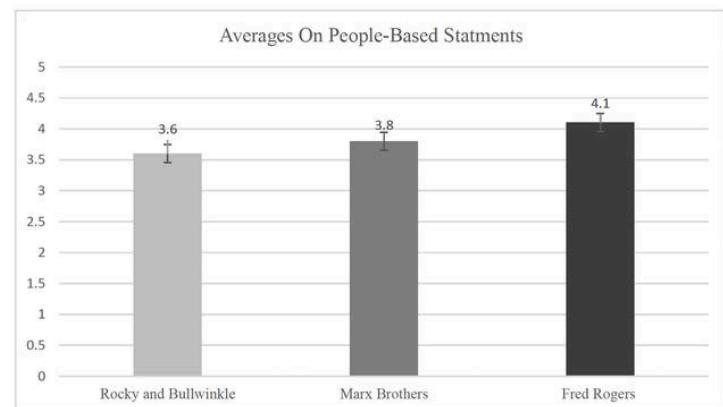
Note. This represents the average per statement on the 5 items about the world and humanity's overall goodness.

People-Based Items Score Comparison

On the benevolence survey there are 14 items specifically aimed at evaluating opinions about the benevolence of people. A one-way ANOVA was performed on these statements. The initial ANOVA yielded a significant result $F(2, 39) = 3.9$, $p = .027$. The *Rocky and Bullwinkle* group had the lowest answer average on people-based statements ($M = 3.6$). The Marx Brothers group had a slightly higher average than the *Rocky and Bullwinkle* group ($M = 3.8$). The Fred Rogers group had the highest mean on people-based items ($M = 4.1$). A Bonferroni correction was then used to compare the group averages. This post-hoc test revealed the Fred Rogers group was significant against the *Rocky and Bullwinkle* group ($p = .029$). The *Rocky and Bullwinkle* and the Marx Brothers group did not show any statistical significance ($p = 1.00$). The Marx Brothers and the Fred Rogers group also did not show statistical significance ($p = .159$). Figure 3 presents the answer averages for people-based items on the survey.

Figure 3

The Answer Averages for People-Based Benevolent Statements



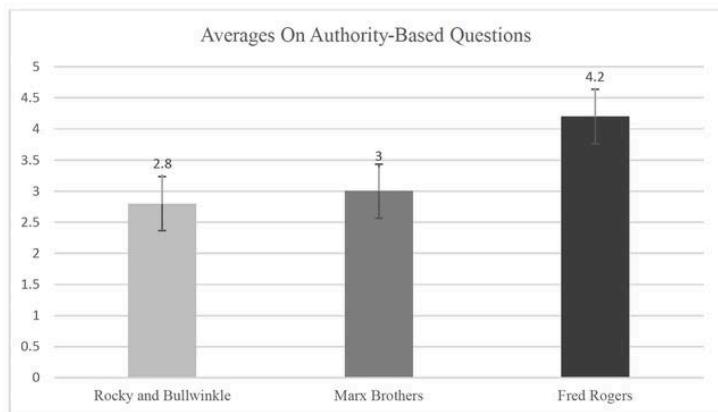
Note. This represents the average per statement on the 14 items about the benevolence of people.

Authority-Based Items Score Comparison

The benevolence survey contained 3 items concerning the benevolence of those in authority

such as: "People who run big companies don't care about the people who work for them." These types of statements are scored backwards so that more disagreement equates to a higher score. A one-way ANOVA was performed to compare the 3 media groups' average on authority-based questions. This initial ANOVA showed a significant result $F(2,6) = 11.4$, $p = .009$. The *Rocky and Bullwinkle* group had the lowest average on these items ($M = 2.8$). The Marx Brothers yielded a slightly higher average ($M = 3$). The Fred Rogers group had a substantially higher mean on items about the benevolence of authority figures than the other 2 groups ($M = 4.2$). After running a Bonferroni correction, the Marx Brothers group and the *Rocky and Bullwinkle* group were not statistically significant from each other ($p = 1.00$). The Fred Rogers group was significant when compared to the *Rocky and Bullwinkle* group ($p = .013$). The Fred Rogers group was also statistically significant compared to the Marx Brothers group ($p = .028$). **Figure 4** displays the average scores of the 3 groups on authority-based statements.

Figure 4
Per Item Average on Authority-Based Statements



Note. This displays the average per statement on the 3 items about the benevolence of authority.

Discussion

The present study aimed to investigate if watching Fred Rogers would positively affect adult opinions

on the benevolence of the world and people. Overall, the Fred Rogers group reported more positive views about the goodness of the world and mankind. This was particularly evident on items related to the goodness of the world and the benevolence of authority figures. The empirical results supported the hypothesis which predicted the Fred Rogers group would respond more positively on a benevolence survey than the groups who watched other content.

This result reflects a similar finding by Coates and colleagues (1976). However, in their study the sample consisted of children in preschool who displayed more prosocial behavior after watching *Mister Rogers' Neighborhood*. Although the present study did not observe adult behavior, the adults who watched the Fred Rogers video answered the survey with more positive prosocial worldviews than the other media groups. At the moment, it is unknown whether viewing Fred Rogers related content would increase prosocial behaviors in the adult population. Media, whether positive or negative, can affect behavior, beliefs, and motivations in both children and adults (Anderson et al., 2010; Coates et al., 1976; Huesmann et al., 2003; Oliver et al., 2012).

Neubaum and colleagues (2020) hypothesized the group in their study that watched random acts of kindness would report more positive views on humanity, but their hypothesis was not supported. The current study's hypothesis was supported, and this experiment did not include a violent content group. Each group in the current study viewed tame media, but the Fred Rogers video contained simple powerful messages along with a display of Fred's genuine kindness. A possible explanation of why the present study yielded a significant result is that Fred Rogers did not engage in random acts of kindness, but instead lived a life of kindness and empathy every day both on and off screen. Participants watched one person consistently caring in the Fred Rogers group, and not various strangers engaging in

altruistic acts. They also heard from adults in the documentary clips who personally worked with him and testified on behalf of his life built on intentional kindness.

An unexpected finding was that the Fred Rogers group displayed a significantly greater belief in the benevolence of authority figures such as businessmen, bosses, and those who run large companies. Fred Rogers was an authority figure because he created the television program. The participants in the Fred Rogers group watched a clip of Francois Clemmons (a main cast member on the show) discussing his powerful connection with Fred in the documentary clip. Francois says in the clip that Fred was the first man to tell him that he loved him. He claims his father, nor his stepfather, ever said "I love you" to him. Francois begins to cry in the clip and says, "I needed to hear it all my life. From then on, he became my surrogate father." Fred Rogers was Francois' boss but became a surrogate father to him. This is a possible explanation for why authority figures were seen as more benevolent in the Fred Rogers group. The participants in that group watched an authority figure's positive impact on an employee.

To the knowledge of the researcher, this was the first time Mister Rogers content was shown to adults in a psychological study. This was a major strength of the present study. Oliver and colleagues' (2012) study mentioned that components of filmmaking like powerful cinematic music compositions or cinematography can lead to enhanced elevation and inspiration. The Fred Rogers video focused on kindness, empathy, affirmation, and gratefulness. The main purpose of the video was not to induce physiological elevation, but to show positive prosocial behavior. At the end of the survey there was a manipulation check question which asked if the participants believed Fred Rogers had bad intentions or if he was a caring person. All participants in the Fred Rogers group selected the

answer that stated he was a caring person. The focus on simple human kindness in entertainment rather than the production itself is also a strength of the current study. Also, unlike Oliver and colleagues' (2012) study where participants listed their favorite films, Fred Rogers was a real person and not a fictional character in a movie. He represents what our best selves might look like through intention and dedication to others. This study featured one person's positive impact on many people instead of strangers engaging in acts of kindness which was the content shown in Neubaum and colleagues' (2020) experiment.

Despite these findings, there are limitations in the current study. The cohort of participants was quite small. 26 participants were in the Marx Brothers and *Rocky and Bullwinkle* groups and 30 were in the Fred Rogers group. When there is a small sample size in a group, a few participants can affect the overall outcome of that group's performance on a survey either positively or negatively. In addition, demographic data was not obtained. This data could have given insight into who Fred Rogers influences the most, or it might have shown that his content is universally effective. The environment in which the participants viewed the material is also a limitation. The videos were watched at the participant's convenience over the internet and not in a controlled space. Though they were able to answer the quiz questions correctly about the video, it is unknown whether they were in a quiet private place or in a public space. Viewing a video in a public setting may distract the viewer or distance them from Fred Rogers's message. Phone viewing might also be a factor. If the participant watched their video on a cellphone, this may create a different viewing experience because a phone screen is smaller than a computer screen. Since the videos were only 10 minutes long, this is a possible limitation as well. The runtime of a full episode of *Mister Rogers' Neighborhood* is roughly 30 minutes. The documentary *Won't You Be My Neighbor?* has a runtime of 1 hour and 34 minutes. A longer video

highlighting Fred Rogers and his show might have increased beliefs in benevolence, but there could also be a boredom or fatigue factor with longer videos since they were viewing those videos on their own computers or phones.

For future research it is imperative to recruit a larger sample size and do a replication study that includes the gathering of demographic information. A future study could also investigate each media type's effect on moral decision making. The participant could be given a set of fictitious moral decisions to make after viewing their assigned video. A longer-term study would be sensible as well. Neubaum and colleagues (2020) showed their video content to participants over the course of 6 weeks. Another potential type of replication study would be to show full length movies in a research lab environment. The cartoon group would watch a non-emotional animated film, the Marx Brothers group would watch a full-length Marx Brothers film, and the Fred Rogers group would watch the documentary *Won't You Be My Neighbor?* With this design there could be an immediate posttest and then a retest at a later date to check for long-term effects in the Fred Rogers group. There are also many other studies that could use the tenets of Fred Rogers's belief system or implement his daily routine to see if it aids in psychological flourishing and benevolent behavior.

Overall, this study revealed there are gaps in research concerning how to improve the belief in a benevolent world. It would be fruitful for the author and future scholars to expand upon this work and find ways to improve benevolent worldviews in the adult population. This is especially important now that we have easy access to the negative aspects of our world and mankind through technology.

"The media shows the tiniest percentage of what people do. There are millions and millions of people doing wonderful things all over the world, and they're generally not the ones being touted in the news." — Fred Rogers

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Any UAB undergraduate student participating in scientific research and/or any undergraduate student participating in research at UAB is invited to submit a manuscript to be considered for publication in the 2023-2024 issue of *Inquiro*. Papers will be subject to anonymous review by faculty and students.

The journal accepts submissions in the following categories:

Short reports: A short report should give a concise overview of an original research project. Its content is comparable to that of science posters. The suggested length is 1000 – 2000 words.

Long papers: A long paper should give a substantial description of an original research project. It should include detailed discussions of the methods utilized and the results obtained. The suggested length is 2500 – 4000 words.

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Initial submissions should follow these guidelines:

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2. Research papers should be written in third person. Research narratives should be written in first person.
3. Research papers should include a title, the full name(s) and affiliation(s) of the author(s), and the following sections: Abstract, Introduction, Materials and Methods, Results, Discussion, Conclusion, and References. Please consult the Manuscript Guidelines for Authors on our website for more specific instructions on each section.
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