Y Ddraig Goch:
An Interdisciplinary Honors Journal

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Table of Contents
Race and the Environment

Letter from Faculty Advisor

The following issue of *Y Ddraig Goch: An Interdisciplinary Honors Journal* is a creative intellectual testament to the tenacity and vision of our editorial team under Honors student editor Jenny Lois Francisco. Jenny and her team have brought together a dynamic new issue in the midst of the global pandemic which has compelled us to reimagine and readjust how we all connect, build community, and produce academic work and play together. Bravo to the editors and to the contributors, as well as to the faculty with whom they worked!

As with past issues of YDG, the current issue of the journal combines contributions from a range of disciplines, including from the social sciences, humanities, and natural sciences. And, as always, please send us your comments and suggestions. My e-mail is ohali@uncg.edu and those of the editorial team are on the next page.

Enjoy!
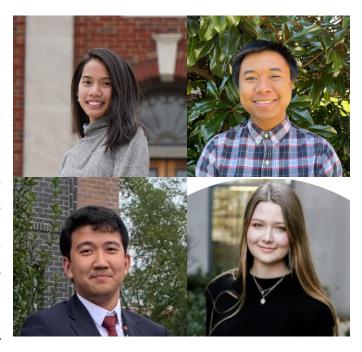
Omar H. Ali, Ph.D.
Dean and Professor, Lloyd International Honors College

Letter from the Editors

It is our pleasure to introduce the third issue of *Y Ddraig Goch: An Interdisciplinary Honors Journal*, featuring its first-ever special section that focuses on the topics of Race and the Environment.

We want to thank the authors who have contributed to this year's journal and for graciously sharing their work with all of us. We also want to express our gratitude to Destiny Brooks and Ethan San Pedro, who have pioneered the honors journal with great attention and dedication. As we wish them both the best for their future endeavors, we welcome two new associate editors, Beh Reh and Cameron Burke. The editorial team has worked diligently to create a journal that celebrates the production and critique of knowledge. We hope you enjoy this issue and may it spark you to learn, play, and share.

Please send us your comments and suggestions to Jenny at j_franci@uncg.edu .

Jenny Lois Francisco (top left), Editor-in-Chief

Ethan Eli T. San Pedro (bottom left), Associate Editor

Beh Reh (top right), Associate Editor

Cameron Burke (bottom right), Associate Editor

Xenotransplantation: Past, Present, Future

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Abstract

Xenotransplantation could provide an alternative to organ shortages for human allotransplantation. Porcine valves have been transplanted into human receivers for the past 50 years and are the best understood xenotransplant. Nevertheless, kidneys are the most needed organs and have been intensively researched in the context of xenografts. Unfortunately, organs if transplanted from one species to the next, cause a wide range of challenges amongst which are immunological issues, ethical and moral dilemmas. This review provides a detailed overview of the past, present, and future of xenografts by explaining the evolution of research in this field and giving insight into four major case studies. Amongst the observed findings, a major output of this study is that xenografting whole organs are not going to be available in the near future. Nonetheless, it is a promising field, and research may lead to viable alternatives to allogeneic transplantation.

Introduction

Organ failure is a prevailing issue in modern medicine. Fortunately, organ donations are increasing slightly as countries begin to make it so that deceased individuals are bound by law to donate unless they had opted out in writing. Nevertheless, fewer organs are available than required, as although these laws are implemented, the supply does not

meet the demand. Thus, these laws are not yet highly successful in terms of increasing organ donations. As an example, in the United Kingdom alone, 400 patients died in 2019 while awaiting a transplant, most of which required a kidney. Thus, xenotransplantation — the transplantation of organs between different species — could provide a viable alternative but similarly to allotransplantation — the transplantation of organs between humans — immune rejection can occur. Moreover, the organ being provided from a different species, this issue is heightened especially as some of the risks remain unknown to this day. Amongst the challenges that xenograft receivers face is contracting infection the animal may have screened negatively for, hyperacute rejection, or the capacity of the graft itself to 'attack' the receiver with the organ's own antibodies. Immunosuppressant drugs are available, but they carry their own risk. Indeed, they make the patient's immune system weaker, which helps to reduce the risk of rejection, but this, in turn, makes the individual more susceptible to diseases.

Along with the above-mentioned issues, ethical and moral questions arise: Is it ethical to genetically engineer animals, and allow them to suffer in order to save a life? Is it morally acceptable to risk the patient's life if an animal organ may have an undetected disease that the human may contract? Scientists and legislators are aware of these issues and are looking for ways to make xenotransplantation more ethical, but the challenges rejection poses make it difficult to do so.
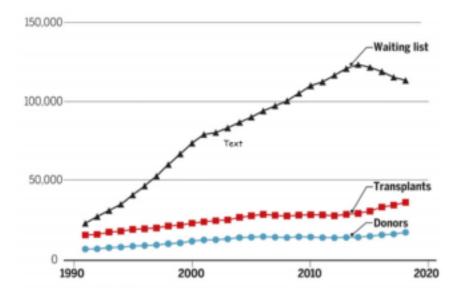
Many questions emerge in this context, and to answer these, this paper will contrast allo-transplants and xenografts and consider ethical issues. Moreover, four case studies of transplants are presented below, as they are useful to analyze the medical and ethical issues.

Allogeneic transplants and comparison to xenotransplants

Across the world, there is an organ shortage for human organ transplantation as demand outstrips the supply of donated organs. Evidently, the waiting list has been growing, as seen on figure 1, (from 20,000 to 120,000 patients) since the 1990s, but the number of donors seems to have stayed relatively stable. To address this shortage, scientists have been extensively researching xenotransplantation. However, as with allotransplantation, xenotransplantation presents immunological problems. (Sykes and Sachs, 2019)

Allogeneic transplantation is associated with three different types of rejection: hyperacute, acute, and chronic rejection. (Moreau *et al.*, 2013)

Figure 1: Graph of the growing organ shortage in the United States of America. (Sykes and Sachs, 2019). This figure shows the number of individuals on the transplant waiting list and the patients who have been transplanted.

Hyperacute rejection

The first type of rejection that can occur is hyperacute rejection. This occurs within minutes or hours post-transplantation. It is induced by antibodies to the antigen in the graft already present in the recipient. Thus, this produces immediate rejection of the transplant.

Acute rejection

Second, hyperacute rejection is acute rejection. The individual is most at risk in the first 3 months following the receipt of the organ, but rejection can occur in the first 6 months post-op. To some extent, this occurs in all transplants and is due to antibodies being produced in the human after it has detected the foreign graft. Immunosuppression can limit this, but it causes immunodeficiency which can be harmful and potentially lethal to the patient.

Chronic rejection

Finally, the third type of rejection is chronic rejection. It can be defined as the repetition of acute rejections by a host. Due to repeated rejections, the organ can transform into scarring tissue. Unfortunately, no cure is available: the only option is the removal of the graft.

Rejection mitigation

There is also a risk of "graft versus host reaction". This occurs when the graft is immune-competent and possesses antibodies to the receiver's antigens. This risk is heightened in stem cells grafts and blood transfusions.

Evidently, all types of rejection can be limited if the organ chosen corresponds tightly to the receiver. To begin, ABO blood groups are looked at extensively, to match the two individuals. Following this first step, tissue typing is executed to test the Human leukocyte antigen complex (HLA). HLA encodes proteins present on the surface of all human cells and are self-markers that signal the immune system that these cells should not be destroyed. All individual's HLA sets vary, as they have acquired recognition for certain proteins throughout their existence. The degree of similarity between HLAs is called histocompatibility. Cross matching is also done to verify compatibility. This is done by collecting blood samples of cells from the donor and mixing those with the serum of the recipient. The results are then analyzed.

Xenotransplantation rejection: what do we know about it?

Xenotransplants face similar challenges as human-to-human allografts. The ABO incompatibility issue is uncertain. In the Department of thoracic surgery at the University of Cape Town, studies were conducted between baboons and vervet monkeys (Reemtsma *et al.*, 1964). They transplanted hearts from baboons to the vervet monkeys by separating them into incompatible ABO groups (1) and compatible groups (2). The outcome was that the difference was not statistically significant, although hyperacute rejection occurred three times in group 1 and not in group 2, one heart was rejected in the day following the study in group 2. The experiment goes into further details, but the main result suggests that perhaps ABO compatibility simply prevents hyperacute rejection and not acute or chronic rejection (nevertheless, that may be the case, as the conclusion remains uncertain). Moreover, this experiment was conducted between primates, but the most likely xenotransplants will be between humans and pigs which leads to a belief that the disparity and rejection will be more acute.

The first xenotransplant of a whole internal organ done to humans was in the 1960s when a kidney from a chimpanzee was transplanted

into a human (Cooper, Ekser, and Tector, 2015). According to the ICUN red list, chimpanzees are an "endangered" species. For that reason, in the case that they were a viable option (for transplantation) with low risks for humans, it wouldn't be ethical to use their organs (Reemstma *et al.*, 1964). Thus, although non-human primates (NHP) are the closest to humans, pigs provide a better alternative. Pigs reproduce easily and have a gestation period of only 114 days. Moreover, their organs are of similar size and capacity to those of humans, therefore providing an alternative to NHP.

Although the pig is close to the human, the immunology issues remain. Genetic engineering (the process of genetically modifying the genome) could help overcome these issues. Additionally, it is possible to genetically engineer fibroblasts so that genes that can cause the organ to be rejected are "knocked out". For instance, *α-1,3-galactosyltransferase,* also known as GalT, is knocked out. The reason for this is that, although most mammals possess this enzyme that synthesizes *galactose-alpha-1,3- galactose,* the human species has experienced genetic mutations and thus no longer has this gene. Thus, as humans possess antibodies against *galactose-alpha-1,3-galactose*, if the pig organ still has this protein when transplanted, then the human receiver's immune system will attack it and reject the xenograft. Studies have proven that its removal will attenuate possible rejection.

Case studies of xenotransplantation
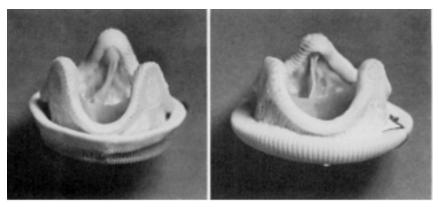
These case studies are presented in order to weigh up their biological, medical, and ethical considerations.

Case Study 1: Porcine valves

Amongst extensively researched xenografts are porcine valves. The grafting of such valves was first reported in 1969. In conjunction with xenografts, the mechanical prosthesis was compared and evaluated to secure the safest option for transplantation in the human body. Indeed, rejection and long-term duration (which are intrinsically linked) are the major concerns.

In some respects, porcine valves are more suited than mechanical prosthesis because they lead to lower rates of complications. Nevertheless, mechanografts do initially have less risk of hyperacute rejection especially as they do not possess an immune system with cells that can "attack" the human receiver cells. Mechanografts have a

durability of 20-30 years, (Macdonald, 1970) which in most patients, as they usually get grafts later on in life, is considered lifelong durability. Unfortunately, mechanografts can lead to blood clotting, which brings about the need for patients to take the anticoagulant Warfarin in order to prevent this.

Figure 2: The first image shows a bioprosthetic porcine xenograft prepared for the aortic position. The second image shows a bioprosthetic porcine xenograft for placement in the atrioventricular position. Bioprosthetic heart valves are created from the porcine pericardium and modified to fit the human heart. They provide an alternative to mechanografts (Macdonald, 1970)

On the other hand, bioprosthetic heart valves are more widely used. According to the American College of Cardiology, in the USA alone, 140,000 patients undergo surgery every year to receive a bioprosthetic valve in replacement for a damaged valve. The advantage of such valves over mechanografts is that they do not require anticoagulants. Nevertheless, they last for a significantly lesser amount of time (around 10-15 years) (Macdonald, 1970) thus require re-operation later in the life of the patient. For the above-mentioned reasons, bioprosthetic valves are mostly advised for older individuals, of minimum 60-65 years of age, and mechano-grafts for ages below that. In terms of degeneration of these valves, bioprosthetic valves, mostly degenerate in aortic and mitral emplacements but less so in the tricuspid position: this is an important factor to consider while deciding which type of graft to transplant in a patient.

With regards to porcine valves being transplanted, they first require some modifications to be prepared for transplants to humans. In the past, glutaraldehyde preservation was investigated and proven to be non-viable but stable. Two main possibilities exist. The first is formalin

(aldehyde) preservation. It is done by linking proteins together and cross linking. Formalin is an aldehyde mix, essentially formaldehyde preserved with methanol. The second is glutaraldehyde preservation. This is non-viable but strongly stable. Its cross linking is more effective, and epitopes of proteins would be less available. As proteins are altered, they can no longer be recognized: this allows for lesser immune rejection. The body is no longer able to recognize them and induce an inflammatory reaction,

Nevertheless, valve failure can occur and happen differently for the two types of fixations. For instance, formalin fixed valves have commissures (the leaflets of the heart valve where the junction occurs), seen in figure 2 that sometimes detach (Macdonald, 1970). These valves also experience separation of the graft from aortic valve position, perforation of leaflets at times, or some failure caused by a mild infiltration of macrophages, eosinophils, or plasma cells. On the other hand, glutaraldehyde valves experience none or little failure in the first years following the graft as no immune competent cells appear to be present. These stabilized-glutaraldehyde fixed valves "become a stable and complex polymer with excellent mechanical properties. We depend on the durability of this complex polymer, and not on its viability, to bring about unfailing function." (Zuhdi *et al.*, 1974) This citation highlights that although the tissue is "dead" it is stable and durable, therefore it is able to fulfill its function within the recipient's organ. Essentially, the transplantation of pig valves proves that xenotransplantation is possible and gives hope for the future.
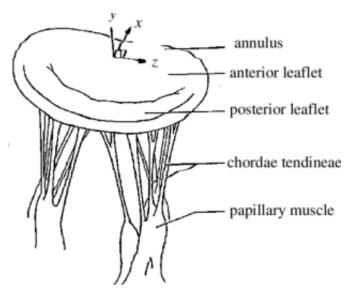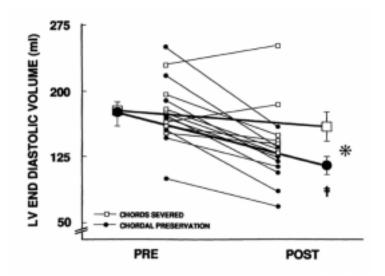
Figure 3: Structure of a mitral valve. The chordae tendineae (CT) is

shown above and attaches to the papillary muscles. It is also inserted into the leaflets. (Kunzelman, Einstein and Cochran, 2007). The CT allows for tension on the leaflets and keeps the leaflets in place when the systole ends.   The role of this structure is crucial to the proper functioning of the heart, as it holds in place the atrioventricular valves while the heart pumps blood.

In valve replacement, the issue of how the chordae tendineae will be reattached to the newly replaced valve is prominent. In mitral valve replacement, if the chordae tendineae (CT) is not preserved it can result in lower performance of the left ventricle's ejection mechanism (Hutchison and Rea, 2015).

In an experiment conducted on 8 patients, amongst these, half underwent mitral valve replacement with preservation of the chordae tendineae, and the rest of the cohort's CT were transected (Zuhdi *et al.*, 1974). In the graph below, left ventricle diastolic volume drops significantly post operation in the case of chordal preservation (CP) and stays closer to normal values in the case of the mean of severed chords.

The data of this experiment is slightly inconsistent: some of the data shows the LV end diastolic volume as having increased in the case of severed chords. However, the mean and other values do not show significant change. It is unclear what caused this inconsistency in data; however, it is important to bear in mind. As the end diastolic volume increases, this suggests that the heart is less able to pump blood outside of the heart, as more blood remains within and vice versa. This experiment demonstrates the importance of reattaching the chordae tendineae in valve replacement surgery.

Figure 4: This graph shows the pre- and post-operative left ventricular end diastolic volume of patients who underwent mitral valve replacement. Shown in squares are patients that experienced transaction of chordae tendineae, and in circles those with chordal preservation. Means are shows with wider, larger symbols (Rozich *et al.*, 1992)

Case Study 2: Kidneys

Kidneys are the most transplanted organ. Nevertheless, dialysis is an alternative to transplantation. Thus, xenotransplantation is not widely spread, as it may not necessarily be a better alternative than dialysis. Dialysis notwithstanding, kidney xenografts have been researched extensively in past years, due to their importance. However, transplantation of animal kidneys into humans is very scarce for the time being.

Pig kidneys are suitable for human receivers as they have similar size as well as filtration abilities. Unfortunately, due to the observed response in non-human primates, it is thought that a human receiver's immune cells would attack the sugars and proteins on the porcine kidney cell surfaces which can cause rejection and/or failure of the xenograft (Vagefi, 2018). For this reason, some attempts to engineer a modified pig kidney have been made. The researchers replaced certain proteins with human proteins to reduce the intensity of the immune response. Similar experiments were executed with macaque proteins and transplanted into the NHP (Servick, 2017). The results were that the macaque survived for about 400 days which is a significant finding but not sufficient to begin transplantation into humans. Thus, an immunosuppressive regime is necessary but genetic modifications may

also be required to reduce the immune reaction of the graft itself towards the donor.

Additionally, some hypercoagulation was observed in the macaques that were transplanted with porcine kidneys. Xenografts often show evidence of thrombosis and aggregation of platelets. (Cowan, Robson, and D'Apice, 2011). Nevertheless, the coagulation disturbances observed in macaques are not accurate representations of the human body's reaction as the monkeys are more hypercoagulable than humans and lack some anti-pig antibodies that humans have. For instance, humans possess antibodies for the carbohydrate N-glycolylneuraminic acid, and monkeys do not.

However, the monkey model remains very helpful. A study was conducted on 22 monkeys. These NHP were transplanted with human CD55 transgenic porcine kidneys. The mean survival time for the monkeys was around 41 days and consisted of a stable and unstable period. In the stable period, serum electrolytes were measured as well as creatinine — a waste product created by muscles and cleared by the kidneys — and albumin — a protein made by hepatocytes, playing a role in the homeostasis of blood oncotic pressure. The serum electrolytes (urea, Na, Cl, K, Ca) were within the normal range but creatinine increased while albumin decreased. An increase in creatinine generally signifies an impaired kidney function, while low albumin levels can be caused by an inflammatory response. However, in this case, there is no explanation as to why the levels of creatinine and albumin changed, but it remains an interesting observation, nonetheless. Additionally, the monkeys experienced anemia which was potentially caused due to the incompatibility of the porcine erythropoietin (produced by the transplanted kidney) with the primate EPo receptor (Cowan, Cooper and D'apice, 2014).

The American Society of Nephrology published a paper through which they have shown that kidney allo-transplantation is a procedure that has high risks. They noted that 40% of kidney transplants were lost due to the death of the patient, however, the graft itself was perfectly functioning (Shaw and Kirk, 2019). According to their research, this would be due to calcineurin inhibitors. As calcineurin stimulates the activation of immune system T Cells, they are suppressed in the context of the graft to reduce immune rejection. Unfortunately, it seems that the "aggressive chronic maintenance immunosuppression that is already characteristic of allotransplantation" (Shaw and Kirk, 2019) if heightened, is not tolerated by the human body. Thus, they demonstrated that although there is not any rejection, individuals can

often (indirectly) die of a kidney transplant.

In xenotransplantation, it seems as though more control of the recipient's immune system would be necessary. However, a multitude of drugs are already used in immunosuppression. For instance, pre-clinical transplants block the CD154 and CD40 pathways. CD40 and CD154 interact in order to stimulate immune B-cells and CD4+ T-cells. Thus, suppressing these pathways causes a conversion of the CD4+ T cells into regulatory T cells and downregulates the stimulation of B cells. This process allows for a healthier graft. (Lai, Luo and Ho, 2019). Nevertheless, it can lead to thrombotic issues which must be considered in the case of a particularly at-risk individual.

In the case of porcine xenografts, it is possible to develop pigs that lack the antigens that attack the human receiver. To do so, some potent antigenic carbohydrates are knocked out. These include N glycolylneuraminic acid and Sd(a) antigen. Although these are particularly strong, they only represent a portion of the xenoantigens, thus immune reactions still occur. Moreover, alpha 1,3 galactose is abundantly expressed on the surface of pig cells and is a protein absent in humans, but to which we have developed antibodies. This means that they should be more compatible with humans. (Cowan, Cooper and D'apice, 2014)

In order to transplant pig kidneys into humans, evidently, the organ needs to be as healthy as possible. However, as modifications increase, the pig is less healthy and so is the kidney, which could reduce the efficacy of the transplant.

Case Study 3: Stem cells

Embryonic stem cells are currently being researched to resolve the issues of organogenesis or tissue repair. Essentially, embryonic stem cells can divide into any type of cell. Xenocellular transplants could provide a strong option for organogenesis or tissue repair issues. However, it seems that the outcome of said research is that xenocellular transplants are on track to serve in a very tightly regulated number of sites. For instance, it may be that they could only be of service in non-vascularized tissues where the immune system is only slightly present and thus low immune suppression drugs are required. As in kidneys and heart valves, the best current option for donors of xenocellular transplants are transgenic pig cells. (Poncelet, Denis and Gianello, 2009)

Currently, in Israel, Professor Yair Reisner — along with his team — of Rehovot hospital department of Immunology, has used stem
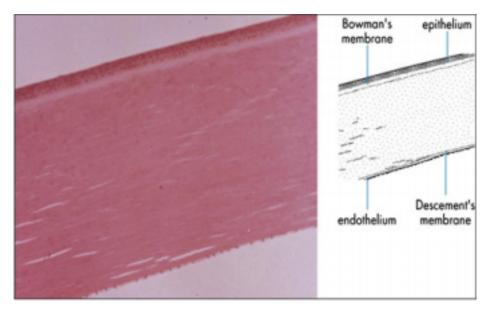
cells to "grow" organs and it has worked well in mice. However, Stem cells can divide more than expected and lead to the creation of tumors. For these reasons, scientists have found that a viable alternative would be to create "committed" stem cells, in order for them to create a specific organ without developing into a tumor. Nevertheless, this needs to be done early on and cannot take a very extensive period of time otherwise it will be rejected by the immune system. Reisner and his team proved that porcine pancreatic tissues were able to prosper and develop in mice (with very minor immune suppression) (Tchorsh-Yutsis *et al.*, 2009)

Case Study 4: Corneas

Corneal xenotransplants have been researched for the last two centuries, with Dr. Kissam issuing the first xenografted corneal transplant in 1844. He transplanted a porcine cornea onto a human. Unfortunately, the research was not sufficiently advanced, and the pig cornea was destroyed through necrosis.

Nevertheless, corneal xenotransplantation remains a strong alternative to human allografts and is currently thoroughly researched. The cornea has a higher potential of successful xenotransplantation due to its immune privilege (it is an avascular tissue and does not possess lymphatic drainage). The absence of antigens and antigen presenting cells flowing to that region makes it less prone to immune cells "attacking" the received xenograft.

The cornea is a collagenous tissue that consists of 3 layers and interfaces between said layers. The three layers are the epithelial layer, the stroma (containing keratocytes), and the endothelial cell layer. Between the epithelial layer and the stroma, Bowman's layer is found, and the Descemet membrane is the interface between the stroma and the endothelial cell layer. The structure of the cornea can be seen below, in figure 5. (DelMonte and Kim, 2011).

Figure 5: Diagram of a cornea, showing the epithelial and endothelial layer. The (not labeled) stroma is found in between these two. However, the interfaces (Descemet's membrane and Bowman's membrane) are labeled above. (DelMonte and Kim, 2011).

Corneal xenotransplants were performed in NHP in order to observe the reaction and understand how it would potentially be tolerated by the human body. Wild type pig corneas were transplanted to monkeys who rejected it in 15 days, however, they showed no sign of hyperacute rejection. Nevertheless, the endothelium appeared abnormal, and the stroma layer of the cornea was filled with inflammatory response cells. Thus, the study suggested that the endothelium may be a target of immune cells (such as macrophages, or T-lymphocytes). (Hara and Cooper, 2011)

However, the anterior chamber associated immune deviation (ACAID) is an immune suppression mechanism present in the cornea. This means that the ACAID is able to buffer the immune response to an antigen. During grafts, transplants are put in contact with the Anterior chamber. The chamber then induces the ACAID. The ACAID in its turn induces antigen specific T regulatory CD4 and CD8 cells, which are capable of suppressing the immune response, thus protecting the graft from rejection. (Streilein, 2003).

Nevertheless, immunological barriers to corneal xenotransplantation remain. Pigs constantly express galactose

alpha 1,3 galactose which human IgM antibodies react to. (Chen *et al.*, 2005). This might be overcome with Clustered regularly interspaced short palindromic repeats (CRIPSR)-Cas9 technology (Wang *et al.*, 2016) in order to genetically engineer pigs and knock out some genes that would lead to hyperacute rejection in human receivers. (Kim and Hara, 2015). The Wild type (WT) pigs express N glycan on the surface of their endothelial cells and keratocytes. Non gal antigens, (non-galactose-alpha terminating saccharides), have poorly defined structures, which consist of proteins and carbohydrates. (Breimer, 2011). Non gal antigens are also present on the surface of corneal endothelial cells and keratocytes such as N-glycol neuraminic acid (NeuGc) and N-acetyl sialic acid (NeuAc).

Knock out pigs (GTKO) that have no Gal epitopes (N-glycans) were made and are currently being tested for the possibility of a transplant due to the absence of Gal which implies no antibody immune response. The genetic engineering of the pigs is key to the success of a corneal transplant. As corneas are an immune-privileged site, if scientists can knock out the majority of genes causing rejection, then it seems that corneas will be effectively xenotransplanted.

Evidently, when attempting to xenograft a cornea, more immune cells mediate a response that can lead to rejection. Therefore, knocking out gal antigens is not sufficient but significantly reduces the changes of immune rejection. However, in the case that the immune barrier could be overcome, structural concerns arise. Although the porcine cornea shows similarity to that of humans, they do possess significant differences. The main question arising from these differences is: are they prohibiting the xenograft from functioning properly? Studies have compared pig corneas to human corneas in order to determine the degree of compatibility. The table below, figure 7, compares key characteristics of the corneas. (Hara and Cooper, 2011).

The diameter of pig corneas is significantly larger than that of humans (3.2 mm bigger horizontally, and 1.8 mm vertically). Although these show large differences, in corneal xenografts, only around 6-8 mm of the central part of the cornea is transplanted. Thus, making the pig cornea adequate for transplantation in this regard.

The thickness of corneas also varies significantly between

pigs and humans. There is a difference of 130 micrometers in the center, and 121 micrometers in the periphery. (Faber *et al.*, 2008). Nevertheless, although the thickness is different, it is divided into layers, with the same initial 3 layers and 2 interfaces (detailed above) of the human cornea. (Endo *et al.*, 2004). Amongst these layers, however, the epithelium seems to be the main variable, as it is thicker and consists of two extra layers compared to the human corneal epithelium. (Doughty and Zaman, 2000). It is unclear whether this is a major issue in transplantation, but it is an element that can be modified, possibly via the removal of epithelial layers. Other parameters present in figure 6, show differences in value but may be due to the experimental setting, such as storage conditions.

		Human	Pig
Diameter (mm)			
horizontally		11.7	14.9
vertically		10.6	12.4
Thickness(μm)			
center		536	666
periphery		593	714
Refractive power (Diopter)		43.0	40.4
Tensile strength (MPa)		3.81	3.70
Stress-strain	α	42.8	39.3
Pattern*	β	2.97	2.97
Stress-relaxation	P(x100)	85.6	64.6
Pattern**	K(-)	0.0165	0.0553
	1000s	32.0%	59.2%

Figure 6: Comparison between human and pig corneas. This comparison between corneas has been made in order to verify the compatibility between the species for xenotransplantation. In these measures, "� is used as a scale factor, ß represents the exponent of the nonlinear relationship between stress and strain, P is the value of G(t) at the end of the stress-relaxation test, K is the slope of fitted G (t)-in t line" (Hara and Cooper, 2011)

Thus, it appears that corneal xenografts have a higher chance of survival within human hosts than other types of xenografts. However, this immune privileged site is still prone to rejection. Moreover, the pig cornea, although better suited than most other species, is not a perfect match and leads to challenges in transplantation.

Ethics, the morality of xenotransplants

Xenotransplantation raises issues in terms of ethics, that for some had been explored when conducting human-to-human transplants. Nevertheless, the question of animal suffering and rights remains crucial in regard to this topic.

For instance, one of the main tenets of ethics stipulates that all cases need to be treated in an equal manner, regarded in the same light. Therefore, if we would not inflict needless pain to a human, then it should not be done to animals as well, unless it provided them with a specific benefit. Although animals are not our equals, they deserve to be treated with respect. The fact that animals feel pain is undisputed, and the morality of inflicting pain on them via genetic testing prior to using their organs for transplantations is arguable. Regarding the transplantation itself, it appears that the use of the organs for transplants is not what inflicts the most pain as the animals are put down in an ethical manner (in essence this implies that it is done in the most respectful and painless way). (Anderson, 2006)

Additionally, the organ may be rejected by the receiver and entails that the death and suffering of the animal have partly been in vain. This once again extends the moral dilemma of this practice.

There is also another moral dilemma that arises, in regard to religious practices. Some individuals practicing Islam, Judaism and Jainism may refuse an organ that is of porcine origin. However, although the Torah and the Quran mention a prohibition in terms of the consumption of pigs (as food) there is no mention of using them to replace a human organ. It is therefore uncertain if this would be an issue amongst these communities. (Paris *et al.*, 2018)

Regarding the ethics of xenotransplantation, the question of animal genetics hurting the human receiver through zoonoses also arises. For instance, in 2000, during a hepatitis C outbreak, a donor animal was infected and falsely screened negative. Thus, 8 of the 40 human receivers were infected. Scientists suggest that the animal may have tested negative because it had not yet developed a strong enough antibody response for detection. This event showcases the damage that xenotransplants can cause, and why it is so thoroughly controversial in

terms of morals. (Anderson,2006)

Xenotransplantation is in a "grey area" in regard to moral code and ethics. In my opinion, ethics are important to consider regarding xenotransplantation. As humans, we tend to believe that we are the only important species on the planet and that all other animals can be used for our benefit. I think that there should be limits to this use of species for the benefit of humankind. However, I still believe human health should be prioritized and if the animal's suffering is short and punctual then the practice is legitimate. If the pigs are "killed" in a way that causes them to suffer only for a brief instant, then using their organs could be acceptable. The extent as to how many pigs and how many organs we can use with this practice still being ethical is yet to be determined.

Conclusion

This review puts forth the challenges that xenotransplantation has brought in the past and in the present, and which of those will still be significant in the future. Evidently, large progress has been made, as it is possible to transplant porcine valves, but whole organs are not yet able to be transplanted. One of the main reasons for this is the complexity of these interventions. Organs are alive and produce proteins, contain cells, making the organ very prone to rejection by the host. However, for aldehyde fixed valves, the tissue is essentially dead, thus these concerns do not apply to the same extent. Moreover, scientists are working alongside moral and ethical restraints. Due to similarities between NHP and humans, it is seen as morally incorrect to use their organs for transplantations in humans. Thus, pigs are used, as they have organs that possess similar capacities to ours and present a lesser ethical dilemma. Nevertheless, researchers are attempting to genetically engineer pigs that would fit the immunology profile of human patients to reduce the possibility of hyperacute, acute, or even chronic rejection. Nevertheless, even if the organ is tailored to the human receiver, it may still carry some pathogens or genetic mutations that are currently unknown but will affect the patient once it receives the organ, this can occur in allotransplantation as well (Boneva, Folks and Chapman, 2001). Thus, research on xenotransplantation needs to be pursued further, to lower the risks. Xenocellular transplantation is promising and could allow for either engineering an organ or transplanting the porcine stem cells in the human body in order to repair tissues. Research has proven that stem cells can be committed and controlled so that it does not cause a tumor.

Finally, xenotransplantation is a promising field that can allow to "fix" the organ shortage, and end waitlists, and although it does present a series of challenges it can be expected in the near future due to genetic engineering.

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Impact of a Wellness Recovery Program on Balance for Individuals with Parkinson's Disease

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Abstract

The Parkinson's Wellness Recovery Program offered at a healthcare facility in North Carolina is a community-based recreation therapy program that provides neuroplasticity principles of exercise for participants with Parkinson's disease (PD). The program was designed to help individuals with PD restore and maintain function. A program evaluation was conducted to determine the efficacy of the program. The evaluation used a multiple single subject design that included two weeks of baseline data followed by 12 weeks of intervention. At the time of this report, one study participant had completed both baseline data and four weeks of program data before dropping out of the study. This analysis focused on the balance measures results. The balance measures were used to determine if the program improved balance and reduced falls. Results of the study found that the participant improved on the Five Times Sit-to-Stand test but did not improve on the Timed Up and Go or the Timed Floor Transfer test. Since the study participant did not complete the 12-week program, it was difficult to determine the impact of the Parkinson's Wellness Recovery Program on the participant. The study continues to enroll more participants to determine the effectiveness of this program.

Introduction

Parkinson's disease (PD) "is the second most common neurodegenerative disease after Alzheimer's disease".[1] Parkinson's disease is a progressive neurological disease that slows the production of dopamine. Prominent symptoms of PD are characterized by fundamental motor signs which include akinesia, rigidity, rest tremor, motor blocks, and postural instability.[2]

In the past, individuals who were diagnosed with PD were told that they would continue to lose physical functioning over time and the primary method of treatment was pharmacological interventions used to help control symptoms.[3] Current research studies suggest that symptoms of PD may be managed through exercise programs, specifically using principles of neuroplasticity that have the potential to slow or reverse some of the symptoms experienced. The principles of neuroplasticity allow the brain to change its structure and function.[4] According to Petzinger et al. (2013),

> Neuroplasticity is a process by which the brain encodes and learns new behaviours and is defined as the modification of existing neural networks by addition or modification of synapses in response to changes in behaviours or environment, which can encompass exercise.[5]

These findings can be more encouraging for individuals who have received a diagnosis of PD.

The purpose of this study was to determine whether a wellness recovery program would have an impact on balance for individuals with PD after participating in a 12-week community-based Wellness Recovery Program. It is hypothesized that the Wellness Recovery Program would produce a trend in improved balance scores for participants.

Review of Literature

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[1] Becky Farley et al., "Intensive amplitude-specific therapeutic approaches for parkinson's disease: Toward a neuroplasticity-principled rehabilitation model" *Topics in Geriatric Rehabilitation* 24, no. 2 (2008): 100. doi:10.1097/01.TGR.0000318898.87690.0d.

[2] Meara, Jolyon, and William C. Koller, eds. *Parkinson's Disease and Parkinsonism in the Elderly*. Cambridge: Cambridge University Press, 2000. doi:10.1017/CBO9780511585012.

[3] Norman Doidge, *The Brain's Ways of Healing*, (New York, New York: Viking, 2015), xvii.

[4] Doidge, *The Brain's Ways of Healing*, xv.

[5] Giselle Petzinger, "Exercise-enhanced neuroplasticity targeting motor and cognitive circuitry in Parkinson's disease" *The Lancet Neurology 12*, no. 7 (2013): 716. doi:10.1016/S1474-4422(13)70123-6.

According to the Parkinson's Foundation, an estimated one million people in the United States have PD. There are approximately 60,000 new cases of PD diagnosed each year. The foundation reports nearly $52 billion is spent on direct and indirect costs of PD annually in the United States (Parkinson's Foundation, 2019). The predominant age of onset for PD is between ages 55 and 75. It is estimated that by 2030, there will be 1.2 million people in the US with PD.

Previously, people diagnosed with PD were encouraged to engage in mild to moderate intensity exercise. However, new studies show that specific, high intensity exercise may be neuroprotective and even help achieve neuroplasticity, thus suggesting that the neuroplasticity model of exercise may be more effective in improving the symptoms of PD than traditional exercise programs (Farley et al., 2008; Petzinger et al., 2013; Hirsch, Hammond, & Hirsch, 2008). Exercises that work to achieve neuroplasticity may be neuroprotective and help rewire the dopamine-producing neurons.[6]

The most recent rehabilitation approach is that neuroplasticity exercises should include continuous, complex, difficult, novel, and repetitious exercises that are amplitude-specific (Farley et al., 2008). Physical and cognitive behaviors have been shown to improve with exercises used to create neuroplasticity. The neuroplasticity model additionally requires that clear and immediate feedback be provided in order to be most effective and target the desired behavior.

Mechanisms and Systems Affected

The neuromuscular system in the basal ganglia of the brain affects people with PD. Porter, Wiggins, and Haynes (2015) defined motor and non-motor symptoms as well as secondary complications of PD. Motor symptoms include asymmetric tremors, rigidity of muscles, bradykinesia, and postural instability. Non-motor symptoms include depression, cognitive changes, and orthostatic hypertension. Secondary complications include falls, pain, decreased activity, and decreased quality of life. Over three-quarters of patients have difficulty walking, rising from chairs, and completing daily tasks. Individuals with PD also report a lack of energy and clumsy movements. According to Ellis, Cress, Wood & Schenkman (2015), those with PD "…are more limited in activity than their non-PD

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[6] Doidge, *The Brain's Ways of Healing*, 37.

counterparts, and they are approaching a point where activity limitations also constrain participation".[7]

When individuals are diagnosed with PD, the substantia nigra, where dopamine neurons originate, has already lost 70 to 80 percent of function, which exceeds a critical threshold.[8] Dopamine plays a crucial role in reward systems for individuals to move or initiate movement, so when dopamine functions are lost, it can substantially impair life functions.[9] Dopamine stimulates individuals to function by seeking a reward, such as the reward of moving from one place to another or getting out of bed. Sequencing functions are often affected, such as the sequence used to wash one's hands. This can be due to a faulty dopamine system in the basal ganglia and when it becomes difficult to complete, what was once viewed as a simple task, the individual is less motivated to complete the task.[10] Sequencing is learned at an early age, which becomes automatic after it has been learned, therefore it can be difficult to reteach or awaken these systems. A strong exercise plan is imperative to create neuroplasticity.

The Hoehn and Yahr scale (Hoehn & Yahr, 1967) is often used in clinical settings for classifying the level of impairment to those with PD. Stage one is the earliest stage and symptoms are mild whereas stage five is the most advanced stage where individuals require assistance with activities of daily living (Hawkes et al., 2010, p. 80). Stage one of the Hoehn and Yahr Scale is characterized by unilateral symptoms of rigidity, slowness, or tremor, and usually involves minimal or no functional impairment (Hawkes et al., 2010, p. 80; Hoehn & Yahr, 1998). Stage two is characterized by bilateral tremors, rigidity, and akinesia. Stage three of the scale is the mid-stage where individuals with PD begin to experience poor balance and may be restricted in daily activities. At this stage, individuals with PD can still live independently and disability is considered moderate. At stage four, individuals with PD can walk and stand independently, but there is marked impairment (Hoehn & Yahr, 1998). During this stage, individuals with PD are more likely to fall, become dependent on others and decline cognitively (Hawkes et al., 2010, p. 80). The fifth and final stage is characterized by

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[7] Rebecca Ellis et al., "Exploring the relationship between activity and physical participation in older adults with Parkinson's disease," *Topics in Geriatric Rehabilitation* 31, no. 2 (2015): 149. doi:10.1097/TGR.0000000000000061.

[8] Farley et al.,"Intensive amplitude-specific therapeutic approaches for parkinson's disease: Toward a neuroplasticity-principled rehabilitation model" 100.

[9] Doidge, *The Brain's Ways of Healing*, 90.

[10] Ibid, 59.

being confined to a chair or bed and onset of dementia is likely (Hoehn & Yahr, 1998).

A Review of Wellness Recovery Programs for Individuals with Parkinson's Disease

Farley et al. (2008) suggest that exercise should begin as early as possible in the disease progression to slow down and possibly reverse the symptoms of the disease.[11] Neuroplasticity can target basal ganglia pathology through certain exercise mechanisms.[12]
It is critical that a neuroplasticity motor behavior program becomes the standard of practice regarding managing the disease. Several studies (Combs et al., 2013; Farley et al., 2008; Petzinger et al., 2013) have identified novel, high intensity exercises that are more effective than regular, non-specific exercise in achieving neuroplasticity for individuals with PD. Timing is additionally important for neuroplasticity to occur. In addition, Farley et al, (2008) introduced the concept of voice in the treatment of PD as individuals can experience communication problems such as hypokinetic dysarthria which is a speech disorder that "causes rigidity and slowness of the systems of communication including breathing, swallowing, voice and speech".[13] The Lee Silverman Voice Treatment (LSVT) LOUD are programs that have been developed to address communication difficulties.

For individuals with PD, exercise should be intentional and work to achieve desired and specific outcomes. Petzinger et al. (2013) studied exercise models for PD and suggested goal based and aerobic exercise would help achieve neuroplasticity.[14] They found that individuals with PD begin to have less autonomic control of sequenced functions, and therefore must try to achieve them consciously. Individuals with PD should practice goal-based exercise in the same way individuals learn, with "intensity, repetition, specificity, difficulty, and complexity" for optimum results, as these challenges and stimulates the brain and body.[15] Cognitive engagement is an additional component to exercise that may also have neuroprotective

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[11] Farley et al.,"Intensive amplitude-specific therapeutic approaches for parkinson's disease: Toward a neuroplasticity-principled rehabilitation model" 107.
[12] Ibid, 100.
[13] "Voice and Parkinson's Disease," Parkinson Canada, n.d.,
https://www.parkinson.ca/wp-content/uploads/Voice-and-PD.pdf.
[14] Petzinger, "Exercise-enhanced neuroplasticity targeting motor and cognitive circuitry in Parkinson's disease" 716.
[15] Ibid, 717.

effects.[16] Therefore, receiving feedback allows clients to make keen observations of the quality of their own movement. In an effort to increase cognitive stimulation, clients may also be asked to perform two tasks at once or be applauded for great achievement.[17] Aerobic exercise helps improve blood flow, facilitates neuroplasticity, and assists with behavioral function.[18]

Farley et al. (2008) looked at intensive amplitude-specific therapeutic approaches for PD which included the use of neuroplasticity exercise approaches that provided a challenge to compromised dopamine systems. They found that exercise works to stop or slow cell death, enhances behavioral recovery (e.g., successful navigation of rounding a corner), and protects against neural events of aging and neurodegeneration. Results found that novel exercise was linked to higher levels of Glial Derived Neurotrophic factor (GDNF). They suggested "progressively higher intensity, velocity, longer duration, practice, and task-specific paradigms may be required" (p. 101) to achieve these neuroplastic effects and elevated levels of GDNF. The release of GDNF supports plasticity in the dopamine system, therefore, awakening dopamine neurons. Farley et al. looked specifically at the LSVT/LOUD and BIG (Lee Silverman Voice Treatment) program which works on voice amplification (LOUD) and limb motor systems (BIG). They found it helpful in improving trunk rotation and stride length, gait and reaching velocity, as well as the quality of life (p. 105). The LSVT/LOUD and BIG program required a participant's perceived effort level of 8 out of 10 as well as intensive and repetitive practices that became progressively more difficult.

Combs et al. (2013) compared boxing and traditional exercise for individuals with PD. Participants were either assigned to a traditional exercise program or boxing classes. In the traditional exercise program, there was a 15-minute warm up of stretching, and active range of motion; one hour of strength, endurance and balance exercises; and a 15-minute seated cool down with breathing exercises, similar to the warmup (p. 118). The boxing program included a 15-minute warm up, much like the traditional group, an hour of boxing-specific activities, which was self-progressed, and participants were encouraged to do the maximum number of reps at the highest level of intensity they could (p. 119).

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[16] Petzinger, "Exercise-enhanced neuroplasticity targeting motor and cognitive circuitry in Parkinson's disease" 717.
[17] Ibid.
[18] Ibid, 716.

Functional Outcomes of Specific Programs Created to Achieve Neuroplasticity

There were several outcomes of the studies mentioned previously (Farley et al., 2008; Petzinger et al., 2013; Combs et al., 2013) that were notable or suggested areas for improvement in future research studies. Researchers were able to pinpoint some valuable aspects of their exercise programs as well as the limitations of their studies.

Previous studies have either looked at aerobic exercise or goal-based exercise for individuals with PD. The research by Petzinger et al. (2013) hypothesized that neuroplasticity would increase when participants with PD were involved in goal-based, aerobic exercise; the authors hypothesized that "the combination of these two types of exercise might provide synergistic benefits not seen with either alone".[19] Exercise promotes neuroplasticity and may help restore "automaticity of movements" which is the ability to execute a movement such as getting out of the bed. Studies suggest that aerobic exercise may be imperative in achieving neuroplasticity as a way of promoting the restoration of automaticity, however, further research is required to confirm the benefit of aerobic exercise to help restore automaticity. There is also evidence that the use of goal-based exercise and aerobic exercise combined can restore neuroplasticity in the striatal-thalamic-cortical-motor circuit, which is responsible for automaticity (Petzinger et al., 2013). The study demonstrated that aerobic exercises resulted in improvements in stride length and gait, and automatic manual dexterity.

The study by Farley et al. (2008) evaluated the LSVT/BIG program which consisted of 18 subjects in the LSVT/BIG exercise program and a control group of 11 individuals with untreated PD of the same age. All subjects were between stages one and three on the Hoehn and Yahr scale. The LSVT/BIG program's goal was to teach individuals with PD to move naturally in a way that would provide continuous exercise (Farley et al., 2008). The program was four days per week for four weeks, where therapists pushed participants to perform at a client perceived effort level of eight, strive for more repetitions, and complete complex exercises. The study

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[19] Petzinger, "Exercise-enhanced neuroplasticity targeting motor and cognitive circuitry in Parkinson's disease" 718.

evaluated the impact of the LSVT/BIG program on trained tasks which included trunk rotation and stride length, and untrained tasks which included gait and reaching velocity. Trained and untrained tasks improved significantly short term. In addition, improvements in preferred walking velocity, stride length, and functional axial rotation were also significantly different at a three-month follow-up compared to baseline. Subjects were also able to better complete dual tasks after follow-up than other individuals their age. Subjects with milder impairment made greater improvements in gait velocity than those in later stages on the Hoehn and Yahr scale.

The LSVT/BIG study was extended to target both speech and motor systems through LSVT/BIG and LOUD combined as one treatment. Researchers hypothesized that amplitude-specific voice and motor exercises delivered simultaneously would be complementary and enhance functioning in specific behaviors. Farley et al. (2008) proposed:

> LSVT/BIG and LOUD may be analogous to a paired motor training paradigm such that increased activation required for greater amplitude for on task (louder speech) may induce an increase in excitability of common circuitry that is further enhanced by the addition of another amplitude task (bigger whole-body movements; p. 108).

LSVT/BIG and LOUD program was completed by 11 individuals with early-stage PD. After participating in the program, there were significant improvements in loudness (vocal sound pressure) during sustained vowels and reading and increased velocity and stride length during preferred walking. Farley et al. (2008) report that the "gains in vocal loudness and gait were comparable to previously published data from earlier studies that targeted speech or limb movements independently".[20] In addition to specific speech and motor improvements, there was a 28% decrease in the severity of the motor symptoms of PD based on the Unified Parkinson's Disease Rating Scale and a 27% improvement in the quality of life of participants on the Parkinson's Disease Questionnaire-39. A 30% improvement on the Unified Parkinson's would be considered clinically significant, so this is evidence that neuroprotective agents should be investigated. Farley et al. suggested that further studies should be conducted to determine whether or not the studies have better effects when combined or delivered individually.

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[20] Farley et al., "Intensive amplitude-specific therapeutic approaches for parkinson's disease: Toward a neuroplasticity-principled rehabilitation model" 108.

Combs et al. (2013) completed a randomized control trial to compare the effects of a boxing intervention and a traditional exercise program. There was a statistically significant difference indicating that the traditional exercise group perceived more improvement in their balance confidence after the training. No other outcome measures demonstrated a significant difference, however, Combs et al (2013) reported a notable trend in gait endurance stating that the boxing group had a statistically significant increase in distance walked on the Six-Minute Walk Test and the traditional group had a decrease in distance walked. Both the traditional exercise group and the boxing group had statistically significant improvements in functional standing balance over time; standing and walking three meters; standing and walking three meters while counting backward, and quality of life. Further studies that are more specific in training regimen need to be conducted.

Characteristics of Wellness Recovery Programs for Individuals with Parkinson's Disease

Based on the findings of several research studies, it is recommended that individuals with PD engage in exercise Wellness Recovery Programs to work towards neuroplasticity and improvement in symptoms. An important note is that research has found the timing of these specific exercise programs to be vital to the ability of the brain to experience neuroplasticity and carryover (Farley et al., 2008, p. 105; Hirsch et al., 2008, p. 96). It is suggested that specific exercise should begin upon diagnosis to experience maximum benefits from exercising.[21]

There are many common qualities of effective exercise programs that have the greatest benefits for individuals with PD. First, task-specific exercises were found to have significant benefits. Farley et al. (2008), Hirsch et al. (2008), and Combs et al. (2013) found that tasks should be difficult and require skill acquisition. Petzinger et al. (2013) found that goal-based exercise, repetition, practice, and providing dual tasks were essential for the improvement in functional skills.[22] Additionally, Doidge (2015) described a man with PD who alleviated his symptoms through a specific walking program in which he re-trained his brain to walk correctly (p. 57).

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[21] Farley et al.,"Intensive amplitude-specific therapeutic approaches for parkinson's disease: Toward a neuroplasticity-principled rehabilitation model" 107.

[22] Petzinger, "Exercise-enhanced neuroplasticity targeting motor and cognitive circuitry in Parkinson's disease" 716.

Task-specific training can be completed with any task that needs improvement, but outcomes should be intentional and expected.

Exercise training for individuals with PD should be repetitive. As with learning any skill or memorizing a sequence, the more a person practices, the better he or she will become at that task. Doidge (2015) provides an example of how our actions when learning bypass, the basal ganglia, where sequencing comes from, when consciously paying attention. He uses the example of a child learning to play the piano. At first, the child must consciously think about the task and the sequence is not automatic, but as he or she practices more, this sequencing is stored in the basal ganglia, and he or she can play well-rehearsed notes with little conscious effort (p. 60). Another example of our actions bypassing the basal ganglia would be learning to ride a bike. A person learning to ride a bike must concentrate and put forth a significant amount of effort to keep balance, but after a bit of practice, it becomes a sequence that is stored in the basal ganglia and can be executed with minimal effort. Other studies by Farley et al. (2008) prescribed repetition to help generalize the task with one focus.[23] Petzinger et al. (2013) and Hirsch et al. (2008) also found that repetition played a role in creating neuroplasticity in their studies (p. 717, p. 94).

Most studies identified intensity as a key factor in creating neuroplasticity. Farley et al. (2008) suggested that normal training helps create neuroplasticity, however, for lasting effects of the exercise program, an increased intensity is imperative.[24] Combs et al. (2013) observed that functional capacity improved in two of three individuals in an intensive boxing program (p. 121). Hirsch et al. (2008) also found in their research that "regular bouts of high intensity may be neuroprotective" (p. 94). Petzinger et al. (2013) suggested that neuroplasticity is experience dependent and that high intensity was crucial to neuroplasticity and cognitive circuitry.[25]

Improving Balance for Individuals with Parkinson's Disease in Future Practice

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[23] Farley et al.,"Intensive amplitude-specific therapeutic approaches for parkinson's disease: Toward a neuroplasticity-principled rehabilitation model" 104.

[24] Ibid.

[25] Petzinger, "Exercise-enhanced neuroplasticity targeting motor and cognitive circuitry in Parkinson's disease" 717.

Often, individuals with PD experience challenges with balance due to shorter gait, freezing, or other factors. Particularly, adults with PD may be more likely to experience balance difficulties in the third stage of the disease. Exercise programs to enhance balance should be designed using evidence-based practices.

A study by Bloem, De Vries, and Ebersbach (2015) reviewed a total of 31 randomized control studies completed since 2013 that focused on nonpharmacological interventions for persons with PD. The major topics were categorized into physiotherapy and exercise (18 studies); dance interventions (3 studies); cognition and behavior (6 studies); occupational therapy (2 studies); and swallowing therapy (2 studies). The authors concluded that the studies provided "... increasing evidence base that places nonpharmacological treatments firmly within the integrated repertoire of treatment options in Parkinson's disease" (p. 1504).

Bloem et al. (2015) provided an understanding of how a variety of interventions can improve balance in individuals with PD. Studies that involved the execution of tasks with high intensity and strength training usually helped improve balance and reduced falls. Further studies need to be evaluated to determine how to best help individuals with PD improve balance. Bloem et al. (2015) suggested creating personalized interventions to avoid adverse events as well as individualize treatment approaches based on participant needs.

Strenuous Exercise Provides Neuroprotective Qualities

There are many benefits to exercising, such as maintaining a healthy weight, cardiovascular health, strength, and being able to complete various tasks. But it also has benefits that are perhaps even more appealing. Research suggests that individuals who exercise early in life are less likely to develop PD as they age.[26] Early nonuse may make degeneration of a person's capabilities in functioning more likely.[27] Furthermore, there are now programs such as RESCUE that strive for early detection and take a preventative approach of exercising in order to make individuals less likely to develop PD (Hirsch et al., 2008, p. 96).

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[26] Petzinger, "Exercise-enhanced neuroplasticity targeting motor and cognitive circuitry in Parkinson's disease" 716.

[27] Farley et al., "Intensive amplitude-specific therapeutic approaches for parkinson's disease: Toward a neuroplasticity-principled rehabilitation model" 105.

Animal studies found that animals forced to exercise before or upon onset of diagnosis of PD were more likely to experience neuroprotective effects which inhibited cell death and increased GDNF.[28] Another study on rats injected with PD required rats to exercise right after injection which resulted in the protection of dopamine neurons as well as less severe symptoms of PD (Hirsch et al., 2008, p. 93). Individuals who choose to exercise upon diagnosis of PD may be able to stop the progression of symptoms by exercising.[29] Because of neuroplastic principles, progression may be slowed or delayed, as exercise can re-awaken pathways.

PWR: An established Wellness Recovery Program for Individuals with PD

Parkinson's Wellness Recovery (PWR) program is an exercise-based program that uses evidence-based practices similar to those noted above to achieve neuroplasticity to "reduce symptoms, restore function, and improve quality of life, with the promise to slow disease progression" (Parkinson Wellness Recovery, 2018). Trainers can be recreation therapists, physical therapists, or occupational therapists working with individuals with PD. There are four basic moves this program uses that can be integrated into other exercise approaches to PD or can be used as they are in rehabilitation settings with task-specific training. The four basic moves are antigravity extensions, weight shifting, axial mobility, and transitions. These can be used to "improve mobility, increase physical capacity, or reduce freezing" and were proven to have protective effects for the brain and create neuroplasticity (Parkinson Wellness Recovery, 2018).

There are specific strategies that certified PWR Moves instructors utilize, that not surprisingly are similar to suggestions made by the research. PWR Moves instructors believe that "what you do matters" (Parkinson Wellness Recovery, 2018). They use the four basic PWR Moves for aerobic exercise and skill training. PWR Moves also places emphasis on how individuals with PD exercise. Much like Doidge (2015) explains that individuals should pay close attention to every detail of movement with a conscious mind, PWR Moves instructors also encourage their clients to pay attention to the quality of their movement and be continuously engaged and

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[28] Petzinger, "Exercise-enhanced neuroplasticity targeting motor and cognitive circuitry in Parkinson's disease" 721.

[29] Farley et al., "Intensive amplitude-specific therapeutic approaches for parkinson's disease: Toward a neuroplasticity-principled rehabilitation model" 101.

challenge themselves physically (Doidge, 2015, p. 57; Parkinson Wellness Recovery, 2018).

       Finally, Farley, the founder of PWR Moves, made suggestions for optimal brain change. First, there should be a challenge (Parkinson Wellness Recovery, 2018). Tasks should be unpredictable, complex, dual tasks, and require the client to make quick decisions. This will require the client to not only be reactive but take a proactive approach, which creates new ideas for themselves rather than going by a sequence, where they usually encounter "blocks". Exercise programs for individuals with PD should also require a substantial amount of attentional focus to provide a cognitive challenge; to pay attention to the quality of their movements; and to evaluate their physical performance (Parkinson Wellness Recovery, 2018). This will help individuals with PD become more aware of their actions and perhaps reawaken dopamine pathways.

Methodology

       The Parkinson's Wellness Recovery Program (PWR) is a community-based Parkinson's exercise program led by a certified and licensed Recreation Therapist and certified PWR Moves instructor. The study was a multiple single-subject designs in which each participant was new to the ongoing program so that baseline functioning prior to beginning the program could be established for each new participant. The inclusion criteria for this study were that the participant must have a diagnosis of PD. Exclusion criteria included individuals who did not have a diagnosis of PD or had not been cleared medically to participate in the study. This was a 14-week study; the first two weeks established baseline function in balance, quality of life, perceived stress, and social connectedness. The next 12 weeks of the PWR program included two sessions per week with measures at weeks 6, 10, and 14. The structure of the program began with a warmup including the four main PWR Moves and was followed by an exercise in which participants were moving and active, and ended with a cool down at the end. The four basic PWR moves included an antigravity extension, "PWR! Up"; weight shifting, "PWR! Rock"; axial mobility, "PWR! Twist"; and transitions "PWR! Step" (Parkinson Wellness Recovery, 2018). The purpose of the study was to determine the efficacy of the PWR intervention.

Subjects

Potential participants in the study continue to be recruited from the outpatient program at a regional hospital in North Carolina. Individuals with a diagnosis of PD, who have been medically cleared to participate in a high-intensity exercise program and met the entrance criteria were eligible to participate in this study. A study flyer contained information about the program and how to contact the principal investigator who then set up a meeting to review the study protocol and complete an informed consent form. Signed informed consent was obtained for each subject. At the time of this report, there was one participant that was evaluated; the participant met all criteria to be a part of this study. The participant completed four weeks of the study before dropping out. A total of six participants will be recruited for this multiple single-subject design study.

Assessment Instruments

During baseline (two weeks) and testing weeks, a balance was measured by three standardized balance assessments including the Timed Up and Go (TUG) test (Podsiadlo & Richardson, 1991), Five Times Sit-to-Stand test (Csuka & McCarty, 1985), and the Timed Floor Transfer Test (Murphy, Olson, Protas, & Overby, 2003).

The TUG test was used to assess mobility including the client's ability to balance as well as assess fall risk. The client was asked to stand from a standard armchair and walk three meters (10 feet) away from the chair (taped line) and then return to sitting in the chair. Older adults who take 12 or more seconds to complete this task are at a higher risk of falling and should receive interventions to improve their balance (CDC, 2018).

The Five Times Sit-to-Stand Test assessed lower extremity strength, balance, fall risk, and transitional movements. The client was asked to stand from a chair of standard height without armrests, and with his or her arms crossed over his or her chest five times in a row. For individuals with PD, they have considered a fall risk if it takes more than 16 seconds to stand and sit five times (Duncan, Leddy, & Earhart, 2011).

The Timed Floor Transfer test measures an older adult's ability to sit on the floor and stand up from the floor to assess their risk of falling. According to Murphy et al. (2003)

> A timed floor transfer is a clinical test of strength, flexibility, function, and problem solving; it measures the time necessary to transfer from standing to the floor and return to standing in any way that

participants are able. Some elders overestimate their ability to perform this task (p. 69).

If an individual is unable to return to a standing position without assistance, this is an indicator of fall risk (Murphy et al., 2003; Tinetti, Lui, & Claus, 1993).

Methods

Prior to beginning the exercise program, participants were tested twice (over two weeks) to establish baseline functioning. Participants in the study completed a 12-week program and were tested at three intervals (weeks 4, 8 and 12) to measure any change in balance, health-related quality of life, stress and social connectedness. Data was gathered each time a participant came to the program on whether any falls had occurred in the past week, the activities they participated in, their attendance, how they were feeling physically, if they were experiencing pain, and their perceived balance prior to engaging in the exercise program. Data analysis was based on one study participant that had enrolled in the study; three data points in terms of the balance scores were used in the analysis.

Results

One study participant was reviewed for this analysis. The participant was a female in her sixties and was diagnosed with PD approximately one year ago. She did not identify the Hoehn and Yahr stage of PD. She indicated she was more active rather than inactive in terms of physical activities, but she did not identify specific activities she engaged in. Her reason for participating in the group was to increase her balance. She reported that she held a job and did not experience any significant mobility issues during her time in the program. However, her scores on the Perceived Stress Scale were relatively high with Baseline 2 score of 20 which indicates high stress. At week 4 testing, this reverted to 16 (similar to Baseline 1) which is still elevated; a score of 13 is considered normal stress (Cohen, Kamarck, & Mermelstein, 1983). The participant completed a weekly journal once she started the intervention. She attended the program only on Thursdays due to her work schedule. The participant rated her balance prior to and after the intervention using an 11-point Likert scale from 0 (Very Unsteady) to 10 (Completely Steady). Her self-rated balance prior to the intervention was "unsteady" (3) on Weeks 1 and 2 and her self-rated balance after the intervention on these same weeks was "more unsteady" (2)

indicating her perceived balance was more impaired after participating in the program. This changed on Week 3 where balance before the program was rated "more unsteady" (2) and improved to "moderately steady" (5) after the intervention. Unfortunately, she did not complete the journal on Week 4.

   TUG Test. The participant completed the TUG test in 12.25 seconds during Baseline 1, which places the individual at risk for falls. The participant scored 9.56 seconds for Baseline 2, and 10.25 seconds for Week 4 testing. From Baseline 1 to Baseline 2, there was a decrease in time. From Baseline 2 to Week 4, there was a slight increase in time to complete the TUG test.
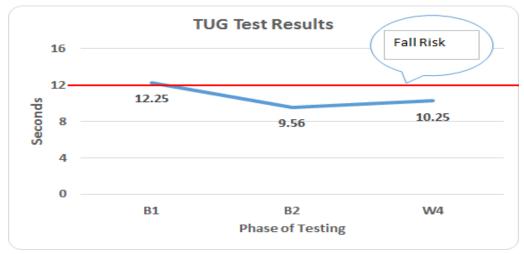
Figure 1. TUG Test Results

   Five Times Sit-to-Stand. The participant completed the Five Times Sit-to-Stand test in 9.94 seconds for Baseline 1; 8.78 seconds for Baseline 2; and 8.49 seconds for Week 4. From Baseline 1 to Baseline 2, the participant's time decreased and continued to decrease from Baseline 2 to Week 4 testing.
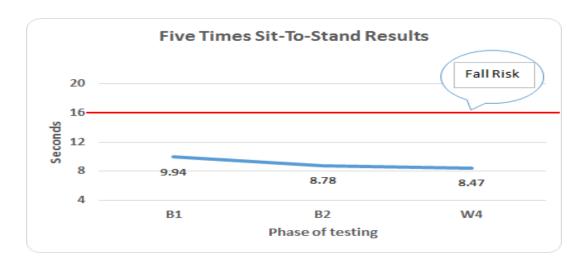
Figure 2. Five Times Sit-To-Stand Results

Timed Floor Transfer Test. The participant completed the Timed Floor Transfer test in 18.54 seconds at Baseline 1; 14.97 seconds at Baseline 2, and 27.54 seconds at Week 4 testing. The participant's time to complete the test from Baseline 1 to Baseline 2 decreased, but the time to complete the test from Baseline 2 to Week 4 testing increased. Unfortunately, the participant did not complete the weekly log to indicate her perceived balance prior to testing. Therefore, it is uncertain if her perceived balance prior to testing had declined based on her actual performance measure; this required more time to complete the task compared to Baseline 2. The large increase in time to completion of the Timed Floor Transfer test raises concerns for fall risks.
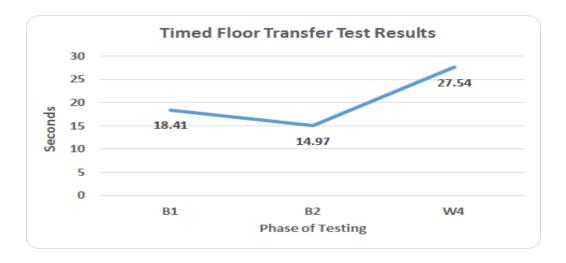
Figure 3. Timed Floor Transfer Test Results

Conclusions

The participant's results were inconsistent across the three balance measures. The participant's time decreased on the Five Times Sit-to-Stand test indicating an improvement in balance, transitions, lower extremity strength, and lower fall risk across the three testing periods. The participant's time initially decreased from Baseline 1 to Baseline 2 then increased at Week 4 testing on the Timed Floor Transfer test. The time almost doubled from Baseline 2 to Week 4 (84% increase in time). These results indicate decreased balance and a higher fall risk than at baseline. Results of the TUG test indicate a decrease in score from Baseline 1 to Baseline 2 with a slight increase in score to Week 4 which was a 7% increase in time but remains below the fall risk (12 seconds).

It is unclear now whether the participant would have improved on these measures since she only participated in three weeks of the program. The question remains whether her balance scores would stabilize or improve if she had continued in the 12-week program. The varying nature of PD may explain some of these perplexing/mixed performance measure results.

Future Implications

Although the PWR program was based on evidence-based practices, further studies need to be done to evaluate the effectiveness of the program for balance in individuals with PD. Due to the fact that only one study participant was available at the time of this analysis, no decisions can be made about the efficacy of the study at this time. The plan is to continue to

evaluate the program with additional participants and will be re-evaluated once multiple participants have completed the program.

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The Crumbling of the Russian-American Relationship: Russian Governmental Rhetoric as a Tool of Disengaging from the West, 2011-2014.

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Abstract

This paper examines the trajectory of the Russian-American relationship in 2011-2014, specifically the impact of the Russian legislative elections of 2011, the Russian presidential elections of 2012, and the Ukrainian crisis on the relationship. The Russian media coverage of the changing relationship is analyzed, as well as the public opinions of Russian citizens and how they were affected by the Russian government's coverage of the events. While the events mentioned above had a negative effect on the view of the US, the Kremlin's rhetoric on the issues at hand further damaged Russian citizens' opinion of the US. Thus, this paper discusses the questions: What were the effects of the Russian media coverage on the perceptions of the Russian citizens regarding the United States? How did the Kremlin attempt to justify the widely condemned actions in Ukraine, particularly during both the legislative and presidential elections? What is the correlation between the Russian grab for power and the policy of the Kremlin in blaming the US?

Introduction

The Russian-American relationship has experienced many changes over the years. The 20th century showcased the clash of the two superpowers, each state's regime the antithesis of the other, the ultimate race

of capitalism against communism. In the 20th century, years of the Cold War created a negative outlook of Russians in the United States. In the years after the fall of the Soviet Union, there was a general intent to put past mistakes behind. In the early 2000s, Russia experienced a fleeting period of spreading liberalism, economic growth, a rise in the middle class, and finally, great advancements in its relationships with the global powers. As the United States was prepared to start a new dialogue with a freshly established Russian Federation, pro-Americanism dominated official government policies and the attitudes of Russian citizens. After the events during the time period from 2011 to 2014, however, the former friendly relationship between the US and Russia went back to virtually the Cold War days.

　　　　During these pitfalls of the Russian-American relationship, we can trace the way the Kremlin, alongside Russian media, changed its narrative according to the events occurring at the time. The change from the Cold War, communist Russia to the democratic Russia, newly established Russia of the early 2000s, and then the aggressor Russia of the 2012-2014 has significantly changed the way Russian media portrays the United States and an average American. It is worth noting that the overall deterioration of the Russian-American relationship started before the analysis in this paper. The two major conflicts between Russia and the United States occurred during the Kosovo War (1998-1999) and the Iraq War (2003-2011). The Kosovo War, "the first major crisis of multilateralism in the international system after the end of the Cold War", has presented the Western powers, specifically the United States, with a possibility of increasing NATO presence in the region, while Russia, in its turn, saw Kosovo as a solution for the countering what it saw as a NATO crisis.[1] As we will see, the military conflict in Kosovo has set a precedent for Russia to annex the Crimean region and, moreover, provided the Kremlin with a means of justification to do so. Similarly, during the Iraq War, the United States was looking to increase its dominance on the world scale, spreading its world hegemony, and having unrestricted access to Middle Eastern oil. Russia and China, however, presented a challenge to the American interests in Iraq, and further intensified the crack in the Russian-American relationship. As March notes, "From a Russia that

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[1] James Hughes, "Russia and the Secession of Kosovo: Power, Norms and the Failure of Multilateralism." *Europe-Asia Studies* 65, no. 5 (July 2013): 993. doi:10.1080/09668136.2013.792448.

could only say "yes" in the 1990s, the West is apparently now confronting a Russia that can, and will, say "no."[2]

There have been many aspects of the deterioration of the Russian-American relationship in recent years, but for the sake of this paper, we will focus on how the Russian legislative and presidential elections (2011 and 2012 respectfully) and the subsequent Ukrainian crisis impacted the Russian-American relationship and the way Russian media depicts the United States.

Background

The late 20th century demonstrated the climax of the mutual distrust between the two countries with completely different political ideologies. After the end of World War II in which the USSR played a compelling role, the US and the rest of the Western world became apprehensive of the threat of communism's spread that the USSR presented. The following years were marked by the Cold War, the race for arms, the race to space, and many more aspects of American-Soviet rivalry, although never reaching an open military conflict. After the fall of the Soviet Union, however, the Russian-American relationship seemed to be experiencing a reset. During the 1990s Russia has been collaborating with the United States on many issues, especially due to the fact that "Boris Yeltsin, the new Russian president, and his foreign minister, Andrey Kozyrev, saw Russia's full integration into the "family of democratic nations" as an overriding priority".[3] After the disintegration of the Soviet Union, many in Russia viewed the United States as the apotheosis of a successful democratic nation: "many intellectuals believed that democracy and a market economy, of which the United States was the principal model, would help raise Russian living standards and make the country a full-fledged member of the privileged club of developed democracies." (Sokolov et al. 537)

In the joint statement issued on November 13, 2001 President George W. Bush and President Vladimir Putin both expressed hopes to further improve the relationships between the two countries and swore to "work together to build confidence in the climate for trade and investment between

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[2] Luke March, "Is Nationalism Rising in Russian Foreign Policy?: The Case of Georgia." *Demokratizatsiya* 19, no. 3 (2011): 187.
http://search.ebscohost.com.libproxy.uncg.edu/login.aspx?direct=true&db=a9h&AN=84186853&site=ehost-live.

[3] Svetlana Savranskaya, "Yeltsin and Clinton." *Diplomatic History* 42, no. 4 (2018): 564.
doi:10.1093/dh/dhy052.

our two countries" (Joint Statement). Russia witnessed the visit of an American business delegation, with Donald Evans, the US Commerce Secretary, as the head of the delegation. The delegation's agenda was to promote trade and business relationships of American companies in Russia (US Commerce Secretary). The Russian-American Dialogue, a business mechanism making trade with Russia easier for American companies, has been established, during a first report of which US trade law recognized Russia as a market economy (Russian-American Business Dialogue). Russia was busy building a new, democratic society, working on evolving the old Soviet economic order of state-controlled economy into a free market economy.

Vladimir Putin's speech at the Munich Security Conference on February 10th 2007 has been widely attributed to the beginning of the deterioration of the Russian relationship with NATO. In his speech, the Russian leader not only addressed what he perceived to be the "ideological stereotypes, double standards and other typical aspects of Cold War bloc thinking" against Russia in general and its external policies in particular, but most significantly, he underlined the Russian views on American hegemony,

> "However, what is a unipolar world? However one might embellish this term, at the end of the day it refers to one type of situation, namely one centre [sic] of authority, one centre [sic]... Incidentally, Russia—we—are constantly being taught about democracy. But for some reason those who teach us do not want to learn themselves… One state and, of course, first and foremost the United States, has overstepped its national borders in every way. This is visible in the economic, political, cultural and educational policies it imposes on other nations."[4]

The Russian President, however, did not simply address the perceived threat of the United States and NATO to Russia. In his Munich speech, Vladimir Putin has clearly stated that Russia is open to using its military might in its own interests, without the approval of the Western powers,

> "I am convinced that the only mechanism that can make decisions about using military force as a last resort is the Charter of the United Nations. And in connection with this, either I did not understand what our colleague, the Italian Defence Minister, just said or what he said

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[4] Vladimir Putin, "Diplomacy and External Affairs." *Vital Speeches of the Day* 73, no. 4 (Apr. 2007) 138. EBSCOhost, search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=24690337&site=ehost-live.

was inexact. In any case, I understood that the use of force can only be legitimate when the decision is taken by NATO, the EU, or the UN. If he really does think so, then we have different points of view. Or I didn't hear correctly. The use of force can only be considered legitimate if the decision is sanctioned by the UN. And we do not need to substitute NATO or the EU for the UN."[5]

The 2009 G20 Summit in London, on the other hand, signified a great leap in the Russian-American relationship and was promising further cooperation between the US and Russia. The President of Russia Dmitry Medvedev and President of the US Barack Obama agreed on promoting Russian-American relationships, with Obama stating that "a strong Russia is good for the United States… America wants a strong, peaceful and prosperous Russia" (Obama, 2009). The mutual understanding came at a time when both countries expressed similar opinions on the necessity of Iran meeting the internationally established standards on a nuclear program. The new START treaty was signed in 2010, reducing strategic offensive arms of both US and Russia and providing accountability to fully comply with it. The mutual agreement on North Korea's nuclear tests and the Afghanistan crisis showed cooperation between the US and Russia.

After decades of Cold War, mutual distrust, and stereotypical and oftentimes utterly absurd disinformation Russians received about the US and the American people, Russian people saw a change in attitudes towards Americans. A big part of this change was an increase in cultural, professional, and academic exchanges between Russians and Americans, partly due to the aid of the Education, Culture, Sports and Media Working Group of the U.S.–Russia Bilateral Presidential Commission. The first decade of the 2000s was, undoubtedly, the golden decade of Russian-American relations, "According to the Pew Research Center, the number of Russians with a favorable attitude towards the United States has increased from 44 percent in 2009 to 57 percent in June 2010. In another poll by the Moscow-based Levada Center, Russian favorable attitudes towards the United States increased from 38 percent in January 2009 to 60 percent in May 2010. According to Levada, the percentage of Russians with negative attitudes has decreased from 49 percent in January 2009 to 26 percent in May 2010" (U.S.-Russia Relations). Russian media at this period sticks to a neutral portrayal of the US. There are little to no metaphors or

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[5] Ibid, 139-40

adjectives used to describe the US. The coverage includes unbiased descriptions of the most prominent events in the US. The mood in the Russian society was optimistic, and many believed to have gained, after all this time, an important ally for future business, academic, and global cooperation. Therefore, the next four years' events came as a big shock for Russians, and the opinions of the confused public started to shift rapidly.

Russian Legislative Elections of 2011 and Presidential Elections of 2012

An already rocky relationship between Russia and the United States further deteriorated in 2011. Putin's expressed desire to rerun for presidency was the first sign of the deteriorating relationships. In March 2011, on his trip to Russia, Joe Biden expressed concern over human rights violations, specifically the high-profile cases of Mikhail B. Khodorkovsky and Sergei L. Magnitsky. During this trip, he tells the Kremlin that Putin should not run in the 2012 presidential elections and pressures Russians to demand fair, democratic elections with real competition (Plain Speaking from Biden, 2011). This is the first sign of the US being concerned with Russia's inner affairs since the fall of the Soviet Union.

The election itself was marked by many violations, with voters admitting that they were forced to vote for United Russia, a political party that both Putin and Medvedev are a part of, by their employers, schools, and professors. While foreign and independent Russian media point out violations at poll places, lack of opposition, and openly illegal voting scams, Russian "official" media expresses concerns over foreign interference.

The result of the elections was met with a huge backlash from Russian citizens, as well as from other countries. On March 11, 2012, an estimated 15-20 thousand people started a protest in Novy Arbat. Trust in elections and respect for human rights plummeted. As the protests due to the Duma elections spread throughout Russia just before the Presidential elections, the Kremlin decided to agree that the elections have indeed been violated, but instead of admitting blame, it proposed a different source of the violations. Putin publicly accused the US of interfering in the elections. Despite the backslash, Putin still ran for a President in 2012; the win marked his third term as a President. Putin's third term came after the controversial constitutional amendment of 2008, according to which starting from 2012 the presidential term is six, not the usual four years. The US, as well as many Russian citizens, grow anxious at the unprecedented time that Putin will stay as a President.

Washington expressed its uneasiness with Putin's party's actions. In response to the treatment of protesters, the American ambassador in Russia Michael A. McFaul tweets "Troubling to watch arrests of peaceful demonstrators at Pushkin square. Freedom of assembly and freedom of speech are universal values." (McFaul).

The legislative elections of 2011 and the presidential elections of 2012 hurt the Russian government's reputation like no other event since the fall of the Soviet Union. As the Kremlin underestimates the Russians' reaction to Putin's third term, it continues to paint Putin as a beloved, fatherly savior of Russia. When Putin gets booed by the Russians during a martial arts event, the Kremlin offers a quick explanation: the Russians were, naturally, booing the American wrestler, not their President, they claim. The lack of faith and support from Russian citizens further promotes the desire of the Kremlin to further denounce the United States, to find (or create) that common enemy to unite the opposition against, and to shift the blame from Putin's Russia. The Russian media, especially the state sponsored channels and newspapers, go as far as to declare that the American ambassador to Russia Michael McFaul was sent to Russia to start a revolution that will benefit the US, parroting the Kremlin's claim that the anti-Putin demonstrations were paid for by the US State Department (New US Envoy).

As the illegality of the legislative elections of 2011 was so evident, the Kremlin could do little to cover it up. Instead, Russia declares that all the violations were, in fact, due to the foreign interference. There is no reputable proof of that, but Putin and his party stick to the story, nonetheless. While "foreign interference" can imply the involvement of many countries, it is easy to see from the following actions of the Kremlin that what they really meant is "American interference". Keith Smith notes that "there is a widespread perception among Russians – fueled by Putin's narrative of Western hostility – that the U.S. and the EU were engaged in a major effort after 1990 to permanently weaken Russia." (Smith) The reason for blaming the US in the notoriously violated elections can be traced to the impending presidential elections of 2012. Many people in Russia believed that *United Russia* was behind the violations and illegal actions that took place at the legislative elections, and many more were worried about Putin's reluctance to leave his "throne". In the aftermath of the anti-election protests, the Kremlin grasped the possibility of uniting the angry Russians behind a common enemy. The tactic, of course, is not new. During the Soviet rule,

spreading lies about the United States and constantly portraying the US as the nemesis of the USSR and every Soviet was the number one tactic to make people forget about the quality of life in the Soviet Union and redirect their anger towards "corrupt capitalism".

After the legislative elections, the portrayed interference of the United States into Russia's inner affairs offers not only the explanation for the violations, but claims that Putin, and Putin only, can fight the foreign forces trying to crush Russia. It further offers a cover up for the unprecedented third term of Putin's presidency: it allows the Kremlin to sell it as a heroic loyalty to Russia's well-being, not a grab for more power. The move to blame the United States in the state of internal affairs in Russia is linked to the Kremlin's desire to disengage from the West and the influence of American culture and open borders. After the fall of the Soviet Union, Russian citizens were suddenly free to leave Russia, visit other countries, and learn from their example. The tourism of Russian citizens to the United States boomed, with many Russians now watching American movies and TV shows, listening to American music, and participating in cultural and business exchanges and trips to the United States. The exposure to a different culture and the way of living caused many to conclude that, while Putin improved the living conditions immediately after the fall of the USSR, Russia is no way near the other countries' standards of living. Furthermore, the autocratic rule of the *United Russia* directly contradicted the political climate in the US, and Russian citizens began to get weary of the stagnation of the Russian development.

In this climate, disengaging from the West and the United States became the only move for Putin to protect the autonomy of his virtually unrivaled party. By producing a vast amount of information in the press about the United States' hate of Russia and its people, the Kremlin spreads concerns over possible further cooperation with the US. The vilification of the United States in the Russian media and official statements of the Kremlin only start after it becomes clear that the US will not support Putin's rerun for a third term, as well as Russia's view of a "democratic" society (*Obama and Putin*). Having thus lost an ally, the Kremlin starts to move away from cooperating with the US and other Western countries, to forge closer relationships with countries that view autocracy as an acceptable political regime in the 21st century. Since the first BRICS summits in the 2000s, Russia has been continuously shaping the new partnership with the developing countries, the countries that would not intervene in Russia's

inner affairs, whether it is gay rights, women's rights, corruption, or the *United Russia*'s total control of the political structure. While this trend emerged in the aftermath of both the legislative and presidential elections of 2011-2012, it further advanced following the crisis in Ukraine and the Russian annexation of Crimea.

The Ukrainian Crisis

The Ukrainian crisis delivered another blow to the already weakened Russian-American relationship. As Russia and Ukraine share centuries of mutual history, the shift towards European Union in Ukraine rapidly became a cause for concern in Russia. Russia has displayed a strong interest in keeping Ukraine as pro-Russian as possible:

> "Common history and lives of common people (up to one-third of the Russian population has relatives living in Ukraine) make the two countries closely intertwined. This means that the Russian political elite and common people regard as unacceptable the efforts to draw Ukraine into NATO and association with the EU to detach it from Russia economically".[6]

Russian is widely spoken in some areas of Ukraine, and in some areas, it is the primary language (Ukraine's Sharp Divisions).

Seeking the engagement with NATO and European Union prompted Russia to act in a way that the US saw unacceptable. As Ukraine was preparing to sign the Ukraine-European Union Association agreement, which did not benefit Russian interests in the slightest, Russia tried to prevent it by means of trade wars and, after thus depleting Ukraine's resources, offering it more "aid" than its Western allies. Russia outbids the EU in the amount of loans offered to Ukraine to help stabilize the economy (partly weakened by Russia's actions): when EU offered 838 million US dollars, Russia was prepared to give Ukraine 15 billion US dollars; Ukraine was asking for 20 billion in total (Vladimir Putin Offers Ukraine Financial Incentives). All of this benefited Russian interests, and eventually made Ukraine do exactly what Russia wanted: halt the negotiations regarding the signing of the Association Agreement.

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[6] E Solovyov, "Regime Change in Ukraine and the Evolution of Russian-American Relations." *International Affairs: A Russian Journal of World Politics, Diplomacy & International Relations* 60, no. 6, (November 2014), 79. EBSCOhost, search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=100265475&site=ehost-live.

To explain the Russian involvement in Ukraine's dealing with NATO, the Kremlin expressed a dogmatic concern for the United States increasing its troops around Russia. The fact remains, however, that "at the time the Soviet Union collapsed, the number of U.S. troops in Europe was approximately 350,000. Fifteen years after that, only 30,000 American soldiers, sailors or airmen remained in Europe" (A New Cold War). Vladimir Putin has already stated in his Munich speech that Russia does not recognize NATO as the world policing force and does want it interfering in Russian affairs. The Kremlin, then, starts the rhetoric of convincing the Russians of a critical threat of NATO. Thus, Ukraine is seen as the perfect next geographical location for NATO to expand in order to surround the Russian Federation through its neighbors.

No doubt challenged by the Russian impact, Ukraine's negotiations with the West led by Victor Yanukovych were halted in November 2013. (Sotiriou) Western-oriented Ukrainians, on the other hand, did not agree with the government following pro-Russian policies. The first public protests took place on November 21, 2013, in Maidan Nezalezhnosti in Kiev; they subsequently gave the revolution its name, *Euromaidan*. The protests continued, which prompted the Ukrainian President Yanukovych to sign a deal with the European Union on February 21st, 2014. The deal included having new elections in December of 2014 and the cessation of the protests. Sotiriou notes that,

> "While the deal could have defused the situation, the President's dwindling legitimacy resulted in members of his own political party, the Party of Regions, distancing themselves and in the army being loath to intervene further in the uprising which was being carried on in violation of the deal".[7]

The unrest in Ukraine has instead intensified, and the opposition prompted the impeachment of the subsequent trial of pro-Russian Victor Yanukovych. While the crisis in Ukraine reached a critical state, Russia has been caught up in trying to increase its influence in the pro-Russian Crimean region.

While Russia claims that there were no Russian troops in Crimea, there is evidence that it is incorrect. Following the military operation in the region in February-March 2014, Russia annexed the Crimean region of Ukraine on March 18, 2014. The referendum on the issue was held in

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[7] Stylianos A Sotiriou, "The Irreversibility of History: The Case of the Ukrainian Crisis (2013–2015)." *Journal of Southeast European & Black Sea Studies* 16, no. 1 (March 2016):58. EBSCOhost, doi:10.1080/14683857.2016.1150700.

Crimea, with Ukraine and many Western powers calling it illegitimate. The Kremlin continuously stated that the move to annex Crimea was a necessary step to protect the ethnically Russian population residing in the area, as well as pro-Russian citizens of Crimea. While it is more likely that the Kremlin focused on retaking Crimea due to its geopolitical location, Russia was offered an for excuse the annexation by Ukraine itself. The fact that Ukraine repealed the status of the Russian language as one of the official languages in Ukraine "arguably alienated the predominantly ethnic Russian Crimea and was seized upon by Moscow to justify its claims to protect ethnic Russian interests in Ukraine" (McDermott 10).

The referendum to rejoin Russia was heavily influenced by the Russian military presence in the area. The seizing of the Simferopol parliament by the Russian special forces came shortly before the planned referendum was to take place. The local TV stations, airport, Ukrainian military bases in and around the Crimean region become mostly controlled by the Kremlin. By March 1, 2014 "reportedly 60 percent of Ukrainian Air Defense units in Crimea had been captured… Putin sought parliamentary approval in Moscow for the right to use troops in Ukraine to protect ethnic Russians." (McDermott 12)

Russian actions in Ukraine became a cause of concern for the US. NATO immediately responded to the Russian military threat by creating a 5,000-member joint task force, ready to be deployed in as early as 48 hours (Daalder). Washington condemned Russia's actions, specifically the referendum on annexing Crimea. The US Secretary of State John Kerry has talked to his Russian counterpart, Lavrov, multiple times during the conflict to continue the dialogue on fixing this issue. In one of his calls, he calls the Russian actions an act of aggression and the referendum illegal (Kerry Presses Russia).

To put pressure on Russia, Washington announces sanctions against Russia. At first, the individuals that had ties to the conflict, as well as certain government officials, were sanctioned and barred from entering the US. Soon, however, the US sanctions were extended to include some companies as well (Kazun, 2016).

As the world condemned the Russian annexation of Crimea, the Russian media started a vigorous campaign blaming the US for Ukraine's crisis. Many media outlets displayed (and continue to do so) articles expressing the view that the US has been meddling in Russia's affairs long

before the Ukrainian crisis began. Russian tabloid *Komsomolskaya Pravda* was one of the biggest sources of spreading such articles. In one of the articles it expressed the opinion that the United States has been planning to build a military base in Crimea, and the Russian annexation of the area made the US abandon this idea (US Planned to Build a Base). All of this fit into the image of a "Russian savior" that the Kremlin was trying to permeate.

To promote the lifting of the sanctions put on Russia by the US and its Western allies, Putin continues the policy of downplaying Russian aggression in Ukraine. During the meeting of the Shanghai Cooperation Organization with the BRICS countries, Putin declares that the sanctions "should not be used in world economics", and ironically underlines the ineffective foreign policy by the United States by negatively remarking upon the American intervention in Afghanistan, although Russia itself has supported and aided the mentioned intervention. Moreover, the Kremlin, alongside the media, continued stating that the United States has no authority to blame Russia for annexing Crimea, "One tactic, designed to present Americans as hypocrites in front of Russian and Russian-speaking Ukrainian audiences, was to claim that the United States had no moral standing to accuse the Soviet Union of genocide in the past because white police officers in the United States kill so many black citizens." (Irvin-Erickson)

The Effect of the Russian Governmental Rhetoric on the Attitudes of Russian Citizens Towards the United States

The Kremlin's move to discredit the United States and turn the Russians' rage over the illegal elections and the perception of foreign intervention, war in Crimea, and the general stagnation of the Russian economy into a rage over "foreign interference", has, undoubtedly, changed the way the majority of Russians see the United States. After several years of anti-American rhetoric from the government, the attitudes of Russian citizens towards the United States shifted dramatically. After the fall of the Soviet Union Russia has experienced an increase in cooperation with the United States, and the attitudes of Russians towards the US have improved as well. The White House expressing concern over undemocratic actions of the Kremlin before the Russian legislative elections of 2011 signifies a dramatic drop in the Russian-American relationship. As the Kremlin realized that, despite sharing similar interests in the Middle East and non-proliferation agendas, the United States were not prepared to overlook

Putin's growing grasp for power, it started a vigorous and coordinated campaign of disengaging from the West; vilifying and blaming the US played a big part in this effort. Instead, Russia moved to the states more tolerant to the autocratic regimes, the results are seen nowadays in the improved relationship between Russia, Saudi Arabia, and China, an increase in the BRICS engagement, and Russian disdain for the American and other Western sanctions. Moreover, the Russian governmental rhetoric targeted the Russian citizens as well as foreign states. Unlike their parents and grandparents, the young generation of Russians did not grow up listening to the Soviet anti-American propaganda and fearing that the US wanted to destroy the Soviet Union. Instead, they were exposed to the movies, books, and music unseen in the Soviet Union. Moreover, they were able to travel, learn foreign languages, and read Western media, which led to many Russians realizing the shifting dynamics of Putin's political agendas. By turning the US into an enemy determined to destroy Russia, the Kremlin turned some of the population away from the American position. It also allowed the Kremlin an excuse to continue violating the democratic model it professed to follow.

There are many examples of the Russian media denouncing the United States' response to the events of 2011-2014. The concern of the White House regarding the Russian legislative elections of 2011 and presidential elections of 2012, alongside the Kremlin's response, created a first wave of anti-American rhetoric in the media. For example, *Komsomolskaya Pravda* mocked the expressed concern of the White House over the ban of one of the opposition candidates, claiming that the White House used this lawful ban to discredit Russia.

Moreover, the media outlet echoed the rhetoric of the Kremlin that the United States regularly interferes in Russia's inner affairs and continuously funds the opposition to Putin. The United States government made their contribution to the Russian presidential elections. The fact that the Americans would snoop around the process sooner or later was indisputable. The only question was when it would happen. It probably happened a little earlier. The footage of the opposition leaders marching in straight rows to bend to the new US ambassador McFaul is still fresh in our memory. (*US State Department Is Disappointed by CEC Decision to Deny Yavlinskii's Registration*)

Even the fact that the elections have been violated numerous times has been linked by the media to the American interference. Thus, the Kremlin

redirected the concerns that Putin has illegally gained his third presidency into concerns that the United States is lying to take down Putin. Multiple media outlets claimed the videos of violations during the elections were faked. They further implied that the videos were made by the White House to discredit Putin once again in their coordinated attempt to harm Russia. According to the official representative of the Investigative Committee of the Russian Federation Vladimir Markin, the most remarkable thing is that all the "fake videos were dispersed from the same server located in the United States, in the state of California" (*The Investigative Committee of the Russian Federation" The Videos of Violations During the Elections)*

After the condemnation of Russian interference in Ukraine by the White House, many of the outlets started personally attacking Barack Obama and questioned not only his ability as a global leader, but his personal qualities as well. The language of the publications becomes more and more offensive, with some outlets joking and creating nicknames about the African-American president's racial heritage. An online media outlet *Tsargrad*, while posting many offensive and condemnatory articles about the United States itself, also posted a series of articles about the US president Barack Obama. All the articles share similar offensive language, calling Obama a "grifter" (*кидала*), who "blatantly deceived" Russian president Vladimir Putin in his actions towards Russia during Russian meddling in Ukraine.

The author of the articles Aleksandr Pokrovsky describes the United States:

> "There are things that the head of the state cannot allow himself. The head of a civilized state, that is. In particular, people in such positions cannot lie to each other. You can dodge the truth, pretend to "not hear" the respective question, not tell the whole truth, or change the subject. But you cannot lie to your colleague's face. Because whatever the head of the state said, the state itself said it. And if a state is caught in a lie, it is not a state, but…some sort of Ukraine." (*The US President is a Vulgar Grifter)*

The articles further state that Putin caught Obama in multiple lies, while Putin himself has never been caught in a lie as the President of the Russian Federation. The language of the articles uses many slang words to describe the United States and Barack Obama, ranging from offensive insults to street slang that is not usually spoken by the majority of the population.

Other outlets explain the worsening of the Russian-American relationship as a result of personal vendetta of President Obama with President Putin. By siding with the Kremlin's explanation that Russia had no choice but to interfere in the Ukraine crisis and annex the Crimea region, they state that the US understands that, and the only reason it put sanctions on Russia is Obama's personal hatred of Putin. Putin's own speeches, while refraining from personal attacks on the US president, continue to state that the referendum in Crimea was legitimate, and Russia had every right to annex it.

When addressing the response of the White House to the annexation of Crimea by Russia, Putin declares that the United States has been illegitimately using their strength as the superpower to use Russia's actions to their own advantage:

> "Like a mirror, the situation in Ukraine reflects what is going on and what has been happening in the world over the past several decades. After the dissolution of bipolarity on the planet, we no longer have stability. Key international institutions are not getting any stronger; on the contrary, in many cases, they are sadly degrading. Our western partners, led by the United States of America, prefer not to be guided by international law in their practical policies, but by the rule of the gun. They have come to believe in their exclusivity and exceptionalism, that they can decide the destinies of the world, that only they can ever be right. They act as they please: here and there, they use force against sovereign states, building coalitions based on the principle "If you are not with us, you are against us." To make this aggression look legitimate, they force the necessary resolutions from international organisations [sic], and if for some reason this does not work, they simply ignore the UN Security Council and the UN overall." (*Address by President of the Russian Federation*)

The comparison of the United States to an aggressor not only undermines the right of the United States to question Putin's actions in Ukraine in general and in Crimea in particular, but it also further disputes the American agenda in its handling of foreign affairs. The Kremlin's official position is, and has always been, that Crimea was legitimately annexed, and the Kremlin's course of action was to protect the citizens of the region. To further justify the annexation, Putin compares the annexation of Crimea to the precedent of Kosovo, which other Western powers supported,

"the Crimean authorities referred to the well-known Kosovo precedent – a precedent our western colleagues created with their own hands in a very similar situation, when they agreed that the unilateral separation of Kosovo from Serbia, exactly what Crimea is doing now, was legitimate and did not require any permission from the country's central authorities" (*Address by President of the Russian Federation*).

Putin further continues to express the view that the Ukrainian revolution has begun with the significant help from the White House with a single goal to undermine Russia's strength in the world area, "we understand that these actions were aimed against Ukraine and Russia and against Eurasian integration. And all this while Russia strived to engage in dialogue with our colleagues in the West." (*Address by President of the Russian Federation*) This notion is directly related to the perceived expansion of NATO to control Russia. Moreover, using the rhetoric of blaming the United States for the unwillingness to continue the dialogue with Russia helps to establish the necessity of the Russian government to seek allies elsewhere, specifically working on improving the relationships with China and other BRICs countries.

The Kremlin's campaign of discrediting the United States has been very successful in Russia. As we can see from figure 1 below, the post-elections Russia mostly viewed the United States as either an enemy or at least a rival of Russia. It is remarkable that the United States specifically is seen by the Russian citizens as the enemy of Russia, while Iran is 15% less likely to be seen as a threat, and only 7% of Russians see China as an enemy and 6% see Germany as an enemy at the time the poll is taken. Thus, we can see that the idea of a foreign enemy does not imply all Western countries, nor does it specifically target Western Europe. Rather, it is the United States that is seen as a hostile country, the main enemy of Putin's Russia. Over half of Russians view the United States as a state that Russia is confrontational with a remarkable 67% of the interviewed Russians put the US in the "enemy" or "rival" category. The percentage of Russians that view the United States as an ally is just 12%, with most of the population following the Kremlin's lead of branding the US as the sole enemy of Russia. The US has been described as an enemy trying to undermine Russia's value by the media, as well as the Kremlin, and the consequences of such rhetoric are clearly seen in the shifting attitudes of Russians believing in the anti-American campaign and supporting the Kremlin.
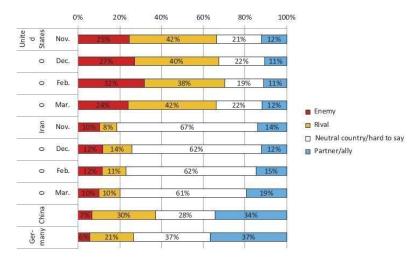
FIGURE 2   Views of Russia's relationships to specific foreign countries (Change over time not significant for China, Germany only asked about in post-Presidential survey).

Figure 1. Gerber, Theodore P. *Foreign Policy and the United States in Russian Public Opinion*.

Figure 2 shows further data on the attitudes of Russians towards the United States. As is seen in the figure, 70% of Russians have a negative overview of the United States (31% of the responders had a very negative attitude and 39% of the asked had mostly negative attitudes towards the United States). In Figures 3 and 4, Russian citizens were asked if the United States currently posed a threat to Russia. The same question was asked before the analysis in the paper event, in April 2007, and after the annexation of Crimea, in April 2015. In 2007, 42% of Russians did not see the United States as a threat to Russia, compared with only 32% in 2015. Similarly, the number of Russians that do believe that the United States is a threat to the Russian Federation increased from 47% to 59%. Similarly, to the data presented in Figure 3, Figure 4 shows data on the Russians' beliefs regarding the threats to Russia. However, Figure 4 considers the governmental rhetoric of Russia as well: it asks the responders if they believe the perception of foreign powers working on destabilizing Russia is a ploy by the Russian government itself. 23% of the responders said that "the stories about the enemies are simply a ploy to scare the whole country into obeying the government".

WHAT IS YOUR ATTITUDE TOWARD THE UNITED STATES?

	2014							2015			
	I	7-10 III	21-24 III	V	VII	IX	XI	I	III	V	**VII**
Very positive	2	2	1	3	2	1	1	2	2	1	**3**
Mostly positive	41	32	25	15	16	16	17	11	17	14	**16**
Mostly negative	36	44	41	40	34	43	42	42	38	41	**39**
Very negative	8	12	20	31	40	30	32	39	35	32	**31**
It is difficult to say	13	10	13	11	9	10	9	7	8	12	**11**

Figure 2. *What is Your Attitude Towards the United States?* Levada Center

We can see the numbers expressing negative attitudes towards the other countries, including the United States, and their perceived interference in Russian affairs rise steadily: the belief in a plethora of "internal and foreign enemies" rose from 42% in December 2007 to 61% in August 2014 and 63% in March 2015, immediately after the Ukrainian crisis and Russian annexation of Crimea. Moreover, the Russian governmental rhetoric glorifying Russian actions in Ukraine and permeating the spread of news regarding the hostility of United States towards Russia has clearly been working in favor of the Russian government's popularity: while in 2007 30% of Russians believed that the Russian government is creating the illusion of foreign enemies to redirect the population's attention from the government's inefficacy, the numbers go down to 27% in 2014 and 23% in 2015.

IN YOUR OPINION, IS RUSSIA ACTUALLY THREATENED BY INTERNAL AND FOREIGN ENEMIES, OR ARE THE STORIES ABOUT ENEMIES A PLOY TO SCARE THE COUNTRY INTO BLINDLY OBEYING THE GOVERNMENT?

	Dec. 07	Aug. 14	**Mar. 15**
Russia is actually threatened by many internal and foreign enemies	42	61	**63**
The stories about enemies are simply a ploy to scare the country into obeying the government	30	27	**23**
It is difficult to say	28	12	**14**

Figure 3. *Is Russia actually threatened by internal and foreign enemies*? Levada Center.

IN YOUR OPINION, DOES THE UNITED STATES CURRENTLY POSE A THREAT TO RUSSIA?

	Apr. 07	Apr. 15
Definitely yes	16	19
Probably yes	31	40
Probably no	32	26
Definitely no	10	6
It is difficult to say	11	9

Figure 4. *Does the United States currently pose a threat to Russia*? Levada Center

The confidence of the Russian citizens has experienced a dramatic plummet after the above-mentioned events as well. As the Kremlin started the anti-American campaign in the media, Russians slowly changed the way they see the American leadership and found blame in the US presidency. Figure 5 shows how Russians' confidence in the American presidents and their ability to improve the Russian-American relationship has been changing over the years. The confidence Russian citizens showed towards the United States' presidency increased by 2010 and started dropping after the legislative elections of 2011. It reached the lowest point immediately following the Ukrainian crisis and the Russian annexation of Crimea. In 2011, 41% of Russians expressed confidence in the US President Barack Obama. The results of the Russian anti-American rhetoric can be seen as early as in 2012, where the percentage of Russians confident in Obama's ability to respond correctly to world affairs dropped to 36%. The numbers further plummeted to 29% in 2013 and 15% in 2014. The Ukrainian crisis and the Russian annexation of Crimea had the most detrimental effect on the Russian-American relationship. In the immediate aftermath of the controversy of Russian meddling in Ukraine in 2014 and the following

condemnation of Russia's actions by the White House, the lowest 11% of Russian population remain confident in President Obama's ability to respond to global affairs.
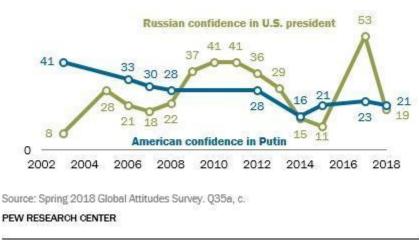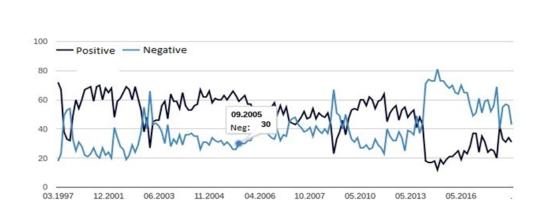
Figure 5. *Russian Confidence in the U.S. President*. Pew Research Center

A Russian independent, non-governmental research institute *Levada Center* has been tracking the dynamics of the Russians' attitudes towards the United States. Figure 3 shows that over 60% of Russian citizens expressed a positive attitude towards the United States in 2010, with this number slowly diminishing by 2013. The number of Russians having a positive overview of the United States plummeted by 2014, the time Russia annexed Crimea. The anti-American governmental rhetoric by the Russian government continued after the Ukrainian crisis, and we see the consequences of it to this day. Only 20% of Russians expressed positive views of the United States in May 2018, and in May 2019 the number stayed low at 31%.

'Attitudes towards the US

Overall, What Is Your Attitude Towards The US Now?

	05.2018	07.2018	09.2018	11.2018	02.2019	05.2019
Positive	20	42	33	31	34	31
Negative	69	40	55	57	56	43
Difficult to Say	11	18	12	12	11	16

Figure 6. *Attitudes towards the US.* Levada Center

The next figure shows the development of Russians' attitudes towards the foreign powers they believe to be the most hostile to Russia. As is seen from the data, before the analyzed events started unraveling in 2011, Russian citizens did not see the United States as the most hostile country. Instead, several countries of the former USSR were believed by Russians to present a threat to Russia: 49% of responders said that Latvia is the most hostile country to Russia, and 42% named Lithuania. The number of Russians viewing the United States as the most hostile to the Russian Federation has been rising, reaching its apogee in 2014 and 2015, where 69 and 73% respectively named the United States as expressing the most unfriendly relations to Russia. These numbers are especially significant when compared to the Russians' perception of Ukraine at the same time period. The Ukrainian conflict has deteriorated the relationship between Russia and Ukraine, and the subsequent annexation of Crimea by Russia has further intensified the negative perceptions of Ukraine. However, as seen from the

data, it is specifically the United States that is seen as the most hostile. In 2014, only 30% of responders named Ukraine as the most hostile country, related to 69% that named the United States. In 2015, the numbers for Ukraine rose to 37%, but are still smaller than the 73% for the US.

WHICH FIVE COUNTRIES WOULD YOU NAME AS HAVING THE MOST UNFRIENDLY AND HOSTILE RELATIONS TOWARDS RUSSIA? *(multiple answers given; answers ranked by the last measure)*

	2005	2007	2009	2010	2011	2012	2013	2014	2015
USA	23	35	45	26	33	35	38	69	73
Ukraine	**13**	**23**	**41**	**13**	**20**	**15**	**11**	**30**	**37**
Latvia	49	36	35	36	35	26	21	23	25
Lithuania	42	32	35	35	34	25	17	24	25
Poland	4	20	10	14	20	8	8	12	22

Figure 7. *Which Five Countries Have The Most Unfriendly and Hostile Relations Towards Russia?* Levada Center

The anti-American rhetoric seen in the Russian media and the statements of Russian government officials was a coordinated effort to disengage Russia from future cooperation with the West (and the United States in particular) and to reduce sanctions against Russia. The autocratic position of Vladimir Putin and his *United Russia* has made it necessary for Russia to turn away from the formerly friendly relationship with the US it established after the fall of the Soviet Union. Instead, Putin's Russia turned to the support from the other autocratic regimes known for little regard to human rights, fair and just elections, and Western condemnation. In recent years, Russia became more and more engaged with the BRICS states, Brazil, India, China and South Africa. Russia further deepened ties with Saudi Arabia, which continuously became the object of Western scrutiny over human rights violations, murders of the opposition leaders, and its treatment of women. It is easy to see, then, that Russia, at least Putin's Russia of today,

chose to disregard the democratic promises it had made after the collapse of the Soviet Union. While Putin's rhetoric or relocation of blame for the pitiful state of Russian economy, the falling standards of living, and more sanctions crippling the Russian people has worked in the past, it still remains to be seen how long this strategy will continue producing results for the benefit of the *United Russia*.

The Present Direction of the Russian-American Relationship

There has not been any improvement in the state of the Russian-American relationship in recent years. Even the 2015 Iranian nuclear power agreement, in which Russia played a big role, did not make the relationship better. The alleged meddling of Russia into the American presidential elections of 2016 delivers another blow to the countries' mutual understanding. Even with President Trump and President Putin, who is still serving his third term, both expressing a desire to reestablish the relationship between the US and Russia, no significant change has been seen. Russia continues to proclaim that the US is behind the condemnation of Russia in the West, while Putin continues to draw universal backslash for the war-stricken Ukraine, bombing of civilians in Syria, poisoning of Skripal in Britain, and many more. The recent deterioration of gay rights in Russia, as well as the decriminalization of domestic violence further show that Russia follows its own path to autocratic rule and is no longer afraid of the condemnation from the United States and the rest of the Western world. Having found allies in the states castigated for human right violations, Putin's Russia continues to move farther away from the hopeful, newly democratic state it was once in.

Russian media is still mimicking the official position of the Kremlin. 2019 marked the beginning of a Russian TV show production in response to HBO's critically acclaimed and praised for its historical accuracy *Chernobyl*. The TV show is going to try and implicate the US in the Chernobyl catastrophe, and is paid for by the Russian government.

Crimea remains a territory of Russia, while Russian government continues to talk about the American role in the Ukrainian crisis. In 2019, Yanukovich was found guilty of treason; he remains under Russian protection, further implicating the already fragile relationship with the US.

As both the Russian and American presidential elections are coming closer, the Russian-American relationship is becoming more strained. The White House is expecting Russia to interfere in the 2020 presidential

elections, while Russia is experiencing a surge in protests against the banning of the opposition leaders from running in the elections. The most prominent opposition to Putin's *United Russia*, Alexei Navalny, has been arrested multiple times for what the critics believe to be solely political reasons. The mass arrests and treatment of the protesters in Russia caused a backlash from the United States, in its turn making the Kremlin shift blame on the US.

Furthermore, Putin's success in annexing Crimea remains worrisome to the United States as it sets a precedent of Russia's aggression to other former Soviet States. Putin has already made a statement that Russia is justified in using its military force "to protect Russians everywhere":

> "I would like to make it clear to all: our country will continue to actively defend the rights of Russians, our compatriots abroad, using the entire range of available means – from political and economic to operations under international humanitarian law and the right of self-defence [sic]… I am referring to those people who consider themselves part of the broad Russian community; they may not necessarily be ethnic Russians, but they consider themselves Russian people." (*Conference of Russian ambassadors and permanent representatives*)

With no improvement in the Russian-American relationship, both states are yet to implement an effort to steady the relationship. The intensifying of the conflict will likely affect not just Russia and the US, but other global powers, "if Russia and the United States approach each other in starkly adversarial terms, the conflict will badly warp the foreign policies of both countries, damage virtually every important dimension of international politics, and divert attention and resources from the major security challenges of the new century" (Legvold).
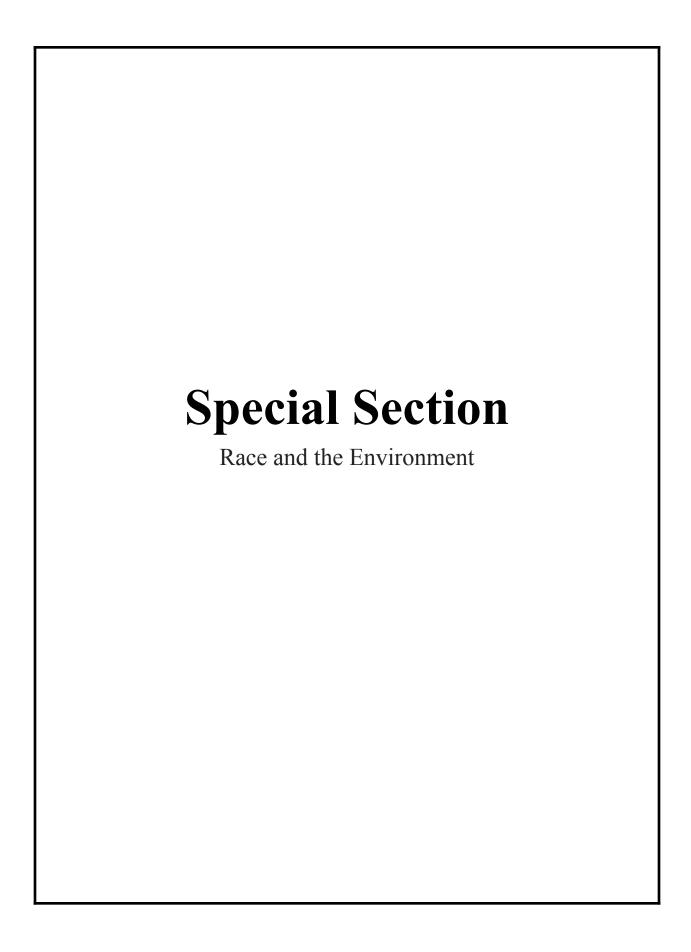
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Special Section

Race and the Environment

How Else Can We Weather the Storm?
An Exploration of Mental Health Effects of Hurricanes in Northeastern North Carolina

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Abstract

As scientists and researchers find new ways to help create more infrastructurally resilient communities affected by natural disasters, there needs to be a focus on building mental health resilience. In many communities, there is a stigma against those with mental illnesses and often the issue is ignored. Many individuals suffering from mental issues are not treated or even not identified as mentally ill. Our main aim at this research was to examine the prevalent mental health issues such as anxiety, depression, alcoholism/substance abuse in a hurricane-affected population. We also studied social support and access to mental health services in that population. We used a mixed-methods approach using surveys and interviews. The quantitative survey data were analyzed with a Kendall's Tau and Chi-Squared test of significance using IBM SPSS version 26.0. The results showed instances of substance abuse, depression, and anxiety in the selected sample of 231 adults. In addition, the interviews of stakeholders representing the community in different capacities indicated a general misunderstanding in the availability and access to mental health services. It is a preliminary study, with

limitations of random participant selection and sample size that necessitates further research on this topic.

Background

Recent scientific research has found that we only have a few more years before we really start to experience the effects of climate change; with coastal cities and islands being the first to experience these changes. NASA reports that 18 of the 19 warmest summers have occurred since 2001 and sea levels are rising 3.3 millimeters yearly over the past century.[1] The changes are evident in such areas as they have been experiencing natural disasters, such as hurricanes, earthquakes, floods, and tsunamis more frequently than in the last two decades. These calamities can cause destruction of someone's environment which can lead to "ecological grief"; where a person has a connection with their environment, whether it is because they have fond memories of their area or because they were born and raised there.[2] This especially applies to those who are displaced. It is expected that residents experiencing the effects of natural disasters directly or indirectly suffer from mental health issues that are ignored for many reasons.

Previous studies have demonstrated that people, especially the minority populations, rarely come forward to receive assistance even though there are efforts to treat mental health issues.[3] For the most part, many minorities look to their families and religious beliefs for support.[4] Secondly, there is a stigma of being diagnosed with a mental illness in these communities, so often those who need assistance do not get it for fear of

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[2] Ashlee Cunsolo, and Neville R. Ellis. "Ecological grief as a mental health response to climate change-related loss." Nature Climate Change 8, no. 4 (2018): 275. https://doi.org/10.1038/s41558-018-0092-2.

[3] Aram Dobalian, and Patrick A. Rivers. "Racial and ethnic disparities in the use of mental health services." The journal of behavioral health services & research 35, no. 2 (2008): 128-141; Benjamin L. Cook, Thomas McGuire, and Jeanne Miranda. "Measuring trends in mental health care disparities, 2000–2004." Psychiatric Services 58, no. 12 (2007): 1533-1540; Daniel E. Jimenez, Ben Cook, Stephen J. Bartels, and Margarita Alegría. "Disparities in mental health service use of racial and ethnic minority elderly adults." Journal of the American Geriatrics Society 61, no. 1 (2013): 18-25.

[4] Jamie D. Aten, Sharon Topping, Ryan M. Denney, and Tania G. Bayne. "Collaborating with African American churches to overcome minority disaster mental health disparities: What mental health professionals can learn from Hurricane Katrina." Professional Psychology: Research and Practice 41, no. 2 (2010): 167. https://psycnet.apa.org/doi/10.1037/a0018116

what their peers might think of them.[5] Also, many minorities experience mistrust towards mental health professionals.[6]

The literature in many areas of science failed to look at how minorities are affected by certain issues. This comes from the archaic, "one-size-fits-all" approach to mental and physical health in the scientific community.[7] Furthermore, few assessments explore how climate change and the resulting health vulnerability (psychological and physiological) can take a toll on a person.[8] Mental health resilience is challenging, especially as infrastructural resilience is achievable in a shorter amount of time than mental health resilience.

Areas of Interest

Physical Health. How a person recovers physically after a hurricane is determined by the person, health care/insurance coverage, and availability of resources. We find that here, and in many other areas of interest, socioeconomic status plays a key role. Some groups that are most likely to be affected physically in the event of a hurricane or other natural disaster are young children, the elderly, the disabled, the impoverished, and the homeless. An older study by Aguirre found that during a tornado in Saragosa, Texas, the poor and other minority groups suffered more injuries and a higher death rate due to warning systems not being aimed towards them.[9] Aguirre stated that many of the Saragosa residents were of Latino descent and mainly watched Univision, so they missed the tornado warning that was listed on other channels. As Fothergill and Peek cite, the low-cost, affordable housing leaves residents at a greater risk of injury due to the

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[5] Akihiko Masuda, Page L. Anderson, and Joshua Edmonds. "Help-seeking attitudes, mental health stigma, and self-concealment among African American college students." Journal of Black Studies 43, no. 7 (2012): 773-786. Retrieved from http://www.jstor.org/stable/23414696.

[6] Erica J. Wilkins, Jason B. Whiting, Marlene F. Watson, Jody M. Russon, and Allena M. Moncrief. "Residual effects of slavery: What clinicians need to know." Contemporary Family Therapy 35, no. 1 (2013): 14-28. https://doi.org/10.1007/s10591-012-9219-1

[7] Lee Knifton, Mhairi Gervais, Karen Newbigging, Nuzhat Mirza, Neil Quinn, Neil Wilson, and Evette Hunkins-Hutchison. "Community conversation: addressing mental health stigma with ethnic minority communities." Social psychiatry and psychiatric epidemiology 45, no. 4 (2010): 497-504. https://doi.org/10.1007/s00127-009-0095-4.

[8] Katie Hayes and Blake Poland. "Addressing mental health in a changing climate: Incorporating mental health indicators into climate change and health vulnerability and adaptation assessments." International journal of environmental research and public health 15, no. 9 (2018): 1806. doi:10.3390/ijerph15091806

[9] Benigno E. Aguirre, "The lack of warnings before the Saragosa tornado." International Journal of Mass Emergencies and Disasters 6, no. 1 (1988): 65-74.

low-quality construction of the home.[10] There is also the risk of indoor molds and mildews occurring due to water damage that may leave a person's immune and respiratory systems exposed.[11]

Additionally, when researchers examine physiological changes in a person following a hurricane or natural disaster, it may also be noted that Post-Traumatic Stress Disorder (PTSD) can also be developed. PTSD pertains to physical health as it is an anxiety disorder that brings with it many issues such as high blood pressure, heart disease, and depression. The vulnerable populations generationally experience stress due to trauma that can lead to PTSD being encoded into their DNA, otherwise known as epigenetics.[12]

Traumatic Events. As cited by Bistricky, Long, Lai, Gallagher, Kanenberg, Elkins, Harper, and Short, prior traumatic experiences have been linked to an increase of Post-Traumatic Stress Disorder (PTSD) symptoms in a future disastrous event.[13] These experiences include other natural disasters and abuse (sexual and physical). Also included are life-threatening accidents such as war or death of a family member.[14] An additional consequence of PTSD is a perceived sense of hopelessness, that is when repeated exposure to uncontrollable environmental stimuli leads to the belief that these situations are inescapable, so a person stops trying to get out of them.[15]

Mental Health. Mental health is still a taboo topic in modern society, though it is becoming more apparent that everyone from large corporations

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[10] Alice Fothergill, and Lori A. Peek. "Poverty and disasters in the United States: A review of recent sociological findings." Natural hazards 32, no. 1 (2004): 89-110. doi:10.1023/b:nhaz.0000026792.76181.d9

[11] Deborah N. Barbeau, L. Faye Grimsley, LuAnn E. White, Jane M. El-Dahr, and Maureen Lichtveld. "Mold exposure and health effects following hurricanes Katrina and Rita." Annual review of public health 31 (2010): 165-178. doi:10.1146/annurev.publhealth.012809.103643

[12] Erica J. Wilkins et al. "Residual effects of slavery: What clinicians need to know." 14-28.

[13] Steven L. Bistricky, Laura J. Long, Betty S. Lai, Matthew W. Gallagher, Heather Kanenberg, Sara R. Elkins, Kristina L. Harper, and Mary B. Short. "Surviving the storm: Avoidant coping, helping behavior, resilience and affective symptoms around a major hurricane-flood." Journal of affective disorders 257 (2019): 297-306. doi:10.1016/j.jad.2019.07.044

[14] Ibid.

[15] Christine D. Scher, and Patricia A. Resick. "Hopelessness as a risk factor for post‑traumatic stress disorder symptoms among interpersonal violence survivors." Cognitive behaviour therapy 34, no. 2 (2005): 99-107. https://doi.org/10.1080/16506070510008434; Lyn Y. Abramson, Gerald I. Metalsky, and Lauren B. Alloy. "Hopelessness Depression: A Theory-Based Subtype of Depression." Psychological Review 96, no. 2 (1989): 358–72. https://doi.org/10.1037/0033-295x.96.2.358; Richard T. Liu, Evan M. Kleiman, Bridget A. Nestor, and Shayna M. Cheek. "The Hopelessness Theory of Depression: A Quarter-Century in Review." Clinical Psychology: Science and Practice 22, no. 4 (2015): 345–65. https://doi.org/10.1111/cpsp.12125.

to family units is taking it more seriously. However, it should be noted that while the mental health of citizens following a natural disaster has started to become a topic of conversation, the mental health consequences of disasters (natural and man-made) for first responders, military health care workers, public health workers, and volunteer responders have yet to make it into major discussions.[16] This is important to discuss because these individuals have to assist others and have the training to do so, but they may not have the institutional support needed to address any mental health issues that may occur as it is as traumatic to see people hurt, dying, or dead and not being able to help them. They may even feel that if they had done something different there may have been a different outcome.

There are just as few articles that discuss the effects of disasters on adolescents. Children view these situations and even though they are not able to explain it, these instances influence them. As the children are cared for by adults and if the caring adult is experiencing psychological and physical health issues or economic issues that can directly affect the child. Adams, Sumner, Danielson, McCauley, Resnick, Grös, Paul, Welsh, and Ruggiero report that 6.7% of adolescents met the diagnostic criteria for PTSD, girls were more likely than boys to meet the diagnostic criteria for having major depressive episodes.[17] Injured family members and loss of services were also correlated with PTSD and major depressive episodes in both younger and older children, although there was an increase in older children. Moreover, continuous stress can alter an adolescent in terms of cognitive developments, understanding of social roles, sexuality, and individuation.[18]

Alcohol and Substance Abuse. Without a proper social support system or coping mechanism, some turn to illicit substances to deal with their pain. It has even been found that first responders use these substances to deal with what they have seen; in female firefighters, there is a reported higher binge

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[16] David M. Benedek, Carol Fullerton, and Robert J. Ursano. "First responders: mental health consequences of natural and human-made disasters for public health and public safety workers." Annu. Rev. Public Health 28 (2007): 55-68. doi:10.1146/annurev.publhealth.28.021406.144037; Michelle L. Pennington et al. "The Influence of Exposure to Natural Disasters on Depression and PTSD Symptoms among Firefighters." California English 23, no. 3 (2018). doi:10.1017/s1049023x17007026.

[17] Zachary W. Adams, Jennifer A. Sumner, Carla Kmett Danielson, Jenna L. Mccauley, Heidi S. Resnick, Kirstin Grös, Lisa A. Paul, Kyleen E. Welsh, and Kenneth J. Ruggiero. "Prevalence and Predictors of PTSD and Depression among Adolescent Victims of the Spring 2011 Tornado Outbreak." Journal of Child Psychology and Psychiatry 55, no. 9 (2014): 1047–55. https://doi.org/10.1111/jcpp.12220.

[18] Margaret Wright Berton and Sally D. Stabb. "Exposure to violence and post-traumatic stress disorder in urban adolescents." Adolescence 31, no. 122 (1996): 489.

drinking rate than male firefighters.[19] The post-disaster alcohol use disorder has been seen in those who had experienced drinking problems before the disaster, which becomes worse after a disaster.[20]

Social Support. The concept of social support comes up in resiliency because humans, like most social animals, fare better in groups. When we consider the other previous themes in the area of resiliency after a hurricane many of them can be alleviated with a strong support group. It is found that in many minority communities, specifically African American and Latino communities, communalism/ familism decreases depression and anxiety.[21] This is a specific type of social support that emphasizes the importance of interdependent relationships. In fact, throughout reviews of hurricane resiliency literature, it is found that social support, a psychosocial resource, diminishes many of the aftershocks experienced after a natural disaster.[22] Additionally, avoidant coping, or not dealing with what is perturbing, is associated with post-traumatic stress symptoms, which can lead to PTSD.[23] On the contrary, positive coping, or utilizing your support group is experienced by those with a strong support group prior to the natural disaster. This can be chalked up to the reality that humans are social animals and need social connections for their well-being.

From a literature review, it is apparent that the research on the ways to increase resiliency (other than infrastructural) following a hurricane, especially in mental health, is still relatively new to research. We see that

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[19] David M. Benedek et al. "First responders: mental health consequences of natural and human-made disasters for public health and public safety workers."55-68; S. B. Gulliver, R. T. Zimering, F. Dobani, M. L. Pennington, S. B. Morissette, B. W. Kamholz, J. A. Knight et al. "Alcohol use and mental health symptoms in female firefighter recruits." Occupational medicine 69, no. 8-9 (2019): 625-631.

[20] Carol S. North, Christopher L. Ringwalt, Dana Downs, Jim Derzon, and Deborah Galvin. "Postdisaster course of alcohol use disorders in systematically studied survivors of 10 disasters." Archives of general psychiatry 68, no. 2 (2011): 173-180. doi:10.1001/archgenpsychiatry.2010.131.

[21] Seth J Schwartz. "The applicability of familism to diverse ethnic groups: A preliminary study." The Journal of social psychology 147, no. 2 (2007): 101-118.
doi:http://dx.doi.org/10.3200/SOCP.147.2.101-118; Joanna Almeida, S. V. Subramanian, Ichiro Kawachi, and Beth E. Molnar. "Is blood thicker than water? Social support, depression and the modifying role of ethnicity/nativity status." Journal of Epidemiology & Community Health 65, no. 1 (2011): 51-56. https://doi.org/10.1016/j.socscimed.2009.02.029.

[22] Sarah R Lowe., Jessica L. Bonumwezi, Zerbrina Valdespino-Hayden, and Sandro Galea. "Posttraumatic stress and depression in the aftermath of environmental disasters: a review of quantitative studies published in 2018." Current environmental health reports 6, no. 4 (2019): 344-360.
https://doi.org/10.1007/s40572-019-00245-5; Anna Bokszczanin. "Social support provided by adolescents following a disaster and perceived social support, sense of community at school, and proactive coping." Anxiety, Stress & Coping 25, no. 5 (2012): 575-592. doi:10.1080/10615806.2011.622374.

[23] Steven L. Bistricky et al. "Surviving the storm: Avoidant coping, helping behavior, resilience and affective symptoms around a major hurricane-flood."297-306.

after Hurricanes Katrina and Sandy there is a rise in research related to natural disasters but there is still a high need to examine the personal and community disruptions that occur, especially in rural areas that are not as prepared as urban areas tend to have a better disaster preparedness and relief.[24]

Currently, the problem is to figure out the services needed to help those affected by hurricanes and how these services can reach those who really need them. Furthermore, it is important to know what is preventing these people from accessing the needed services. The purpose of this research was to investigate the mental health services available in the area, the services residents were aware of, and the hurdles preventing members of the community from utilizing the available services. Based on the findings of previous research, the study hypotheses are: (1) that factors such as stigma, lack of knowledge, and lack of transportation will be hurdles in receiving treatment, and (2) those with stronger social support will report less substance abuse.

Community Resilience Theory

The community resilience theory examines "the existence, development, and engagement of community resources by community members to thrive in an environment characterized by change, uncertainty, unpredictability, and surprise".[25]   The first concept of this theory is that a system should be able to absorb a disturbance and reorganize in the aftermath. Afterward, the system should easily retain the same function and structures. Another concept is the emphasis on individual mental health and personal development as community resilience is considered a continuous process of having personal development when dealing with adversity through adaptation.   While the concept of community-level resilience is mentioned in articles spanning to the early 2000s, community resilience theory was authored by Berkes and Ross.[26]   The characteristics that they conclude that play a role in a community developing resilience are social networks/support, community problem-solving, the ability to cope, etc.

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[24] Shirley A. Morrissey, and Joseph P. Reser. "Natural disasters, climate change and mental health considerations for rural Australia." Australian Journal of Rural Health 15, no. 2 (2007): 120-125.
[25] Kristen Magis. "Community resilience: An indicator of social sustainability." Society and Natural Resources 23, no. 5 (2010): 401-416. doi:10.1080/08941920903305674
[26] Fikret Berkes, and Helen Ross. "Community resilience: toward an integrated approach." Society & Natural Resources 26, no. 1 (2013): 5-20. doi:10.1080/08941920.2012.736605

Community resilience theory is salient to mental resilience following a natural disaster since these events cause collective trauma.

Methodology

 Participants. We used a multimethod cross-sectional survey approach collecting quantitative and qualitative data with structured questionnaires from the hurricane-affected populations with diverse backgrounds. We chose two coastal North Carolina counties for our research locations since we wanted to compare an area that has been affected in the past (County 1) with an area that was recently affected (County 2), and the counties with different demographics (see Table 1.1). Participants from the two counties were recruited from churches, offices, and county events using a sample of convenience.

Table 1.1. Study Population Demographics

	County 1	County 2
Population	19,913	9,637
Poverty	22%	26.4%
Median Age	45	46
Income	$31,287	$37,256
Black	61%	36%
White	16.3%	70.6%
Female	49.5%	51.4%
Male	50.5%	48.6%

Source: www.census.gov/quickfacts

Materials

Two instruments were used to collect information from participants:

 The Post-Hurricane Health Effect Assessment (PHHEA). This 61-item questionnaire has been adapted from the PSID 2007 Katrina Supplement. It has sections on social support, physical health, traumatic life events, alcohol and substance abuse, and mental health, in addition to demographic information.

 PHHEA Interview Questionnaire. This questionnaire has five questions for free-response interviews linked to hurricane-related mental health experiences, availability and accessibility of mental health services, and hurdles in accessing mental health services.

Procedure

After Institutional Review Board approval, the PHHEA was administered to hurricane-affected residents by approaching them in county offices, events, and churches. Data collection ran from June 2019 to July 2019. The participants were instructed to respond to the questionnaires and deposit them anonymously either in a box with a slit during in-person group data collection or mailed in a postage paid in a sealed envelope. The second group of participants from the administration, mental health professionals, and civic area leaders were asked to respond to the interview questions individually. The option of collecting survey data via Qualtrics survey link was also used.

We combined the data from both counties due to smaller numbers and computed Kendall's Tau and Chi-squared test of significance on the nominal and ordinal responses using IBM SPSS Version 26. All correlations with significance levels of 0.05 and 0.01 were included in our discussion. For descriptive responses to some items on the questionnaire and interview questions, we used theme analysis with three coders. Chi-squared test of significance indicated a significant association of age, gender, injury, or illness (personal, family, and acquaintances), home damage, and displacement due to hurricanes with many mental health and alcohol and substance abuse items. Kendall's Tau also indicated associations of demographic variables with hurricane effects, alcohol and substance abuse, and mental health.

Table 1.2 Study Sample Demographics

	County 1 Paper	County 1 Online	County 2 Online
n	190	14	27
Male	27%	38%	3.8%
Female	71%	62%	96.15%
Black	64%	23%	30.77%
White	31%	77%	61.54%
Age	85% 35 to 64+	91% 35 to 64+	80% 25 to 64+

Table 1.3. Kendall's Tau b

Variables	τ	p	Interpretation
Age – Home Damage	.386**	0.002	Older people tend to report more damage

Age – Community Use	.225*	0.029	Older people perceive increase use of drugs/alcohol in general and after hurricane
Race - Residency	.309**	0.002	African Americans staying longer in area
Race – Mental Health Score	.201*	0.033	African Americans experience more mental health issues
Income - Parent	.290**	0.003	Single parents tend to have lower income
Marital Status – Home Damage	.248*	0.018	Single people tend to report more hurricane damage to their homes
Income - Injury	-.242**	0.014	Low income tends to have more hurricane-related injury and illness
Home Damage – Community Use	.292*	0.13	Home damage and increased perceptions of substance abuse issues in the community
Alcohol/Substance Abuse Score – Community Use	-.231*	.019	Higher substance abuse score believes there is problem in community

*p<0.05; **p<0.01

Table 1.4 Chi Squared Test of Significance

Variable Pair	χ	df	p-value
Single Parent * Bad-tempered	14.065a	4	0.007
Annual_Income * Access to Services	44.983a	20	0.001
Hurricanes_Experienced * Medication Overuse-misuse	77.002a	48	0.005
Hurricanes_Experienced * A little interest or pleasure	94.712a	44	0.000
Displacement * Personal Responsibility	12.335a	4	0.015
Displaced to * Medication Overuse-misuse	53.612a	18	0.000
Displaced to * Lied to Health Professional	48.175a	18	0.000

home damage * Depend on Me	34.395a	8	0.000
Gender * Alcohol and Drug Interference	36.224a	8	.000
Age * Physical Reactions to Hurricane	42.239a	20	0.003

The qualitative data indicated the prevalence of mental health issues including alcohol and substance abuse in both counties affected by repeated hurricanes that included lying to doctors, relying on and misuse of prescription medicines, and symptoms of anxiety and depression. The data suggested that African Americans shared more poverty and poor mental health. The hurdles reported in qualitative data and evident in the quantitative analysis include low level of awareness of services, transportation, stigma, lack of providers, lacking diagnosis, insurance/cost, and interpretation of government policy/changes on healthcare. The resilience from repeated hurricanes over decades in these communities lies in strong family and community support.

Discussion

The findings that the stigma of being labeled with mental illnesses, lack of knowledge about mental health issues, and lack of transportation to access the mental health facilities are hurdles in receiving treatment for mental health issues and the relationship between exposure to hurricanes and substance abuse support the first hypothesis. The results of this study do not support the relationship between stronger social support and substance abuse occurrences. The qualitative responses suggest that the people feel strong community bonding and that support is a crucial factor in the resilience of the community from repeated hurricanes. The participants mentioned support from immediate family and faith-based organizations.

We found that the individuals reporting higher annual income believed that they had access to needed disaster relief services. Also, the data indicate that those participants reported experiencing more hurricane exposures, the more they found little interest and pleasure in things that they used to find pleasure in the past. They also reported having

misused/overused medication prescribed to them by a doctor. Older people tend to perceive a drug abuse problem in their area. This may be because older people could bounce back faster from a recent traumatic event if they had experienced one before.[27] Also, with age we gain maturity and wisdom from experiences, so older people may have better, more positive coping mechanisms so they gained resiliency which lowered their depressive symptoms.[28] But younger people may not have acquired these coping skills yet and therefore utilize more negative coping mechanisms that lead to their relying on substance abuse.

The data also point to the fact that the participants realized that they could have done more to protect themselves from the hurricanes they had experienced and that they had lied to medical health professionals about being in pain to receive medication. This indicates how displacement is associated with unresolved mental trauma.[29] During the data collection process, a county official recounted how due to a hurricane an entire trailer park was flooded out which led to numerous families being displaced and even having to move to different counties making it hard for their children since they had to leave behind essentially all that they had known causing lasting stress for them.[30]

Though many of the participants of this study self-described themselves as African American, it would be unforgivable and careless to use this data to assert race-based claims of inequity in the experience of psychological issues and access to mental health services. Nevertheless, when we examine the research done in the area of mental resilience following a hurricane/ natural disaster minority are seldom the focus. This is especially egregious when we consider that African Americans are more inclined to depressive symptoms because of stigma around mental illness

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[27] Amit Shrira, Yuval Palgi, Yaira Hamama-Raz, Robin Goodwin, and Menachem Ben-Ezra. "Previous exposure to the World Trade Center terrorist attack and posttraumatic symptoms among older adults following Hurricane Sandy." Psychiatry: Interpersonal and Biological Processes 77, no. 4 (2014): 374-385.
[28] Steven L. Bistricky et al. "Surviving the storm: Avoidant coping, helping behavior, resilience and affective symptoms around a major hurricane-flood" 297-306.
[29] Elizabeth Fussell and Sarah R. Lowe. "The impact of housing displacement on the mental health of low-income parents after Hurricane Katrina." Social Science & Medicine 113 (2014): 137-144. doi:10.1016/j.socscimed.2014.05.025.
[30] Jennifer A. Reich and Martha Wadsworth. "Out of the floodwaters, but not yet on dry ground: Experiences of displacement and adjustment in adolescents and their parents following Hurricane Katrina." Children youth and environments 18, no. 1 (2008): 354-370.

and their physical environment (i.e. prone to crime, impoverished areas, other perceived neighborhood problems).[31]

Limitations

Due to limited time and contacts in the study population areas, we could not reach a representative sample from the population. The lack of a random sample and small sample size of 231 against the expected sample of 500 respondents limits the interpretation of the findings in this preliminary study. Since our data collection was held at public events that may have discouraged some participants from completing the entire questionnaires truthfully as they did not want to miss the events. We noticed that in the online Qualtrics questionnaires there was full engagement with the questions and even complete responses to the hard to answer sections, such as the one asking about previous traumatic events.

Future Research

Most of the research on resilience after a hurricane is on emergency management issues, but more research and discussion are needed on the psychological vulnerability of the hurricane-affected communities.

Recommendations. The efforts towards complete resilience from repeated hurricanes may include training members of the communities in mental health and substance abuse issues so that they can educate and assist the residents to access the appropriate professional services. Due to the changing insurance policies, communities could also have expert sessions that explain the often difficult to understand the language of the policies.

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[31] Kosuke Tamura et al. "Physical activity-mediated associations between perceived neighborhood social environment and depressive symptoms among Jackson Heart Study participants." 1-13.

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Inequalities in Gifted Education Selection as a Source of Systemic Racism in the United States

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Abstract

Since the brutal killings of George Floyd and countless other Black individuals by police in the summer of 2020, systemic racism has become an increasingly important aspect of the American social dialogue. Here, I propose that one of the primary mechanisms for systemic racism is inequalities in gifted education. The origin of the underrepresentation of students of color and low-income students in gifted education is teacher bias and parental identity. The vast majority of teachers in the United States are White, and studies have shown that White teachers are more likely to underestimate students of color. Therefore, teachers are biased in recommending students for gifted education programs. Parental income and level of education indicate the capacity and inclination of parents to be engaged in their child's education. Parental involvement is correlated with student success. Therefore, parental identity influences a student's level of success. Low-income parents and parents who did not receive a college degree, who are more likely to be of marginalized identities, are more likely to be less involved in their child's education, so low-income and minority students are less likely to be successful and identified as gifted. In these ways, teacher bias and parental identity cause students

of color and low-income students to be underrepresented in gifted education. This underrepresentation influences the perpetual inequality and lack of social mobility in the American economic system. Many issues associated with systemic racism, including environmental issues, can be reasonably attributed to the inequalities in gifted education.

Introduction

In the summer of 2020, the United States experienced a social reckoning with systemic racism on a level unseen since perhaps the Civil Rights Movement of the mid-20th century when videos of the brutal killings of George Floyd, Breonna Taylor, Daniel Prude, and countless other Black men and women by police officers made their way into the mainstream. Fueled by increased social and political awareness due to the 2020 election cycle and the COVID-19 pandemic, millions took to the streets in the U.S. and across the world to protest these blatant acts of racism. Since then, there has been increased social dialogue regarding the role of systemic racism in the United States' social environment. Indeed, that term itself, systemic racism, has emerged as one of the defining issues in American society today. Systemic or structural racism refers to the prejudices and biases inherent to society's social, governmental, and economic structures and the impact that those prejudices and biases have on marginalized identities. This work focuses on one of the mechanisms by which systemic racism is perpetuated, if not the primary one: gifted education and education as a whole.

Gifted education programs exist primarily at the elementary, middle, and high school levels of the American educational system, though it could be argued that university honors programs are also a form of gifted education. Nonetheless, I am certain most readers have encountered a gifted education program, even if they have not been a part of one. In elementary school, it might be a separate program that removes certain students from normal classes every few weeks, such as the Academically and Intellectually Gifted program in North Carolina. In middle school, it might be advanced core classes in language arts and math. In high school, it might be honors and Advanced Placement or International Baccalaureate courses. There are also specific schools dedicated to educating gifted students, such as the Louisiana School for Math, Science, and the Arts in Natchitoches, Louisiana, or the North Carolina School of Science and Mathematics in Durham, North Carolina.

Whatever form it takes, gifted education is a staple of the American educational system, and they are extraordinarily beneficial for the students involved with them. In almost every way, gifted education programs have been shown to result in a better quality of life after a student's educational career. For instance, Lubinski et al. found that gifted students identified before the age of 13 pursued doctoral degrees 50 times more often than the "standard" student.[1] Academic competitions, an alternative form of gifted education, have also been shown to have a long-term positive impact on a student's success.[2] 52% of the 345 subjects studied who competed in the competitions in question achieved doctoral degrees, a much higher rate than average. Chetty et al. showed that early test scores, a common gifted identifier, are "highly correlated with outcomes such as earnings at age 27, college attendance, homeownership, and retirement savings."[3] In perhaps the most drastic example, a clear association has also been established between the level of education and mortality rates.[4] The impacts go on and on.

Since gifted education programs lead to a higher quality of life, it is important to understand how gifted education programs select which students are gifted. The students' gifted education programs select are more likely to be successful later in life, so the gifted identification process indirectly identifies the students that will achieve advanced degrees and have financial and residential stability. Of course, this is a gross generalization, but there is a relationship between gifted identification and future quality of life that cannot be ignored. This selection or identification occurs very early on in a child's education, and typically children who go unidentified early are less likely to be identified later.[5] The question of how gifted students are identified is also a question of how successful people are put on the path to success. If biases or inequalities exist in how gifted students are selected,

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[1] David Lubinsk et al. "Top 1 in 10,000: A 10-Year Follow-up of the Profoundly Gifted." *Journal of Applied Psychology* 86, no. 4 (2001): 718–29

[2] James Reed Campbell and Herbert J. Walberg. "Olympiad Studies: Competitions Provide Alternatives to Developing Talents That Serve National Interests." *Roeper Review* 33, no. 1 (December 2010): 8-17.

[3] Chetty, R. et al. "How Does Your Kindergarten Classroom Affect Your Earnings? Evidence from Project Star." *The Quarterly Journal of Economics* 126, no. 4 (November 2011): 1593, http://dx.doi.org/10.1093/qje/qjr041.

[4] Woolf, Steven H. et al. "Giving everyone the health of the educated: an examination of whether social change would save more lives than medical advances", *American Journal of Public Health* 97, no. 4 (2007): 679–683. https://doi.org/10.2105/AJPH.2005.084848

[5] Tonya R. Moon and Catherine M. Brighton. "Primary Teachers' Conceptions of Giftedness." *Journal for the Education of the Gifted* 31, no. 4 (October 2008): 447-480.

this will inevitably cause inequalities in students' quality of life after their educational career.

Unsurprisingly, there are significant inequalities in gifted education and have been a subject of study for decades. Students of color, especially Black and Hispanic students, along with low-income students, are underrepresented in gifted education programs. Many readers of this work who have attended demographically diverse schools will have noticed differences in the racial and socioeconomic makeup of standard and accelerated courses. My own "success story" in gifted education becomes Lubinski, David, et al. "Top 1 in 10,000: A 10-Year Follow-up of the Profoundly Gifted." Journal of Applied Psychology 86, no. 4 (2001): 718–29. more complicated by the fact that I have always attended schools where the majority of the student body is Black and Hispanic, but my accelerated classes have had only a handful of Black and Hispanic students in them, if any. Meanwhile, White students have been in the minority of my standard courses. The underrepresentation of Black, Hispanic, and low-income students is not purely anecdotal. There is overwhelming statistical evidence for this underrepresentation that will be discussed in depth later on.

While the underrepresentation of Black, Hispanic, and low-income students is widely accepted among gifted education scholars, little work has placed this underrepresentation explicitly in the context of the systemic racism inherent to the American social landscape. This issue is what motivates this work. In this paper, I offer a theory of why students of marginalized identities, especially Black, Hispanic, and low-income students, are underrepresented in the early gifted identification process, namely that this discrepancy is caused by teacher bias and parental identity, specifically parental income and education level. I then propose a direct relationship between these biases in the gifted education identification process and the greater social, economic, and environmental issues associated with race and socioeconomic status.

Contemporary Statistics on Race and Socioeconomic Status in Gifted Education Programs

At the risk of being redundant, it is first important to understand the nature and scope of the issue in question. Selection for and subsequent participation in gifted education programs indicates the future quality of life characteristics, such as income at age 27 and mortality rate, so threats to the

equality and fairness of the selection process are inherently threats to the overall societal equality.[6] The defining threats to the equality of the selection process are racial and socioeconomic biases. More specifically, Black, Hispanic, and low-income students are less likely to be identified as gifted.

Firstly, students of color, especially Black and Hispanic students, are underrepresented in gifted education. According to the Office of Civil Rights Data Collection, in the 2011-12 academic year, Blacks, Hispanics, and Native Americans/Alaska Natives comprised 8.9%, 16.8%, and 1.0% of gifted education programs, respectively.[7] Meanwhile, White and Asian students comprised 59.9% and 9.5% of students identified as gifted, respectively. Though the percentage of Asian students is not high, it is nearly twice the total percentage of Asian individuals in the United States, according to the United States Census Bureau.[8] These statistics demonstrate the underrepresentation of Black, Hispanic, and Native American/Alaska Native students in gifted and talented programs in the United States, as shown more clearly in Figure 1. The rest of this work will focus on Black and Hispanic students primarily due to the lack of literature pertaining specifically to Native American and Alaska Native students, though many of the principles set forth can be applied to Native American and Alaska Native students as well. Certainly, the lack of discussion surrounding Native American and Alaska Native students should not be interpreted as minimizing or normalizing individuals' problems in their educational careers.

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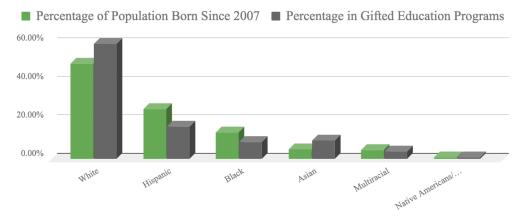
[6] Chetty, "How Does Your Kindergarten Classroom Affect Your Earnings? Evidence from Project Star.", 1593-660; Woolf, Steven H. et al. "Giving everyone the health of the educated: an examination of whether social change would save more lives than medical advances", 679–683.

[7] Office of Civil Rights Data Collection, "2011-12 Gifted and Talented Enrollment Estimations." accessed January 2019, https://ocrdata.ed.gov/StateNationalEstimations/Estimations_2011_12.

[8] United States Census Bureau, "Decennial Census by Decades." (2010) https://www.census.gov/programs-surveys/decennial-census/decade.html

Racial Makeup of American Population vs. Racial Makeup of Gifted Education Programs

■ Percentage of Population Born Since 2007   ■ Percentage in Gifted Education Programs

Figure 1. Racial Makeup of American Population Born Since 2007 vs. Racial Makeup of Gifted Education Programs

Low-income students are also underrepresented in gifted and talented programs. Research has shown that students from low socioeconomic backgrounds are less likely to learn how to read at a young age.[9] Early literacy is also correlated with the number of books owned and the general availability of literature.[10] There is strong evidence to suggest that early literacy is associated with early academic success.[11] Early academic success is, of course, correlated with gifted identification. Thus, the lower a student's socioeconomic status, the less likely they will be identified as gifted.

Race and socioeconomic status are highly correlated with one another, so students of marginalized social identities are often doubly disadvantaged. According to the Child Trends Databank, 31% of Black students and 27% of

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[9] Jennifer Buckingham et al. "Why Poor Children Are More Likely to Become Poor Readers: The School Years." *Australian Journal of Education* 57, no. 3 (Nov. 2013), 190–213.

[10] Nikki L. Aikens and Oscar Barbarin, "Socioeconomic Differences in Reading Trajectories: The Contribution of Family, Neighborhood, and School Contexts." *Journal of Educational Psychology* 100, no. 2 (2008): 235-51; van Bergen, Elsje, et al. "Why Are Home Literacy Environment and Children's Reading Skills Associated? What Parental Skills Reveal." *Reading Research Quarterly* 52, no. 2 (Apr. 2017): 147–60.

[11] Margaret L. Kern and Howard S. Friedman. "Early Educational Milestones as Predictors of Lifelong Academic Achievement, Midlife Adjustment, and Longevity." *Journal of Applied Developmental Psychology* 30, no. 4 (2008): 419–30.

Hispanic students are living in poverty, compared to 11% of White and Asian students.[12] Black and Hispanic students are also more likely to attend high-poverty high schools.[13] Based on 2010 census data, the American Psychological Association concluded that "the relationship between SES, race, and ethnicity is intimately intertwined." [14]

The connection of race and socioeconomic status means that much of what is discussed with respect to race is applicable to socioeconomic status as well, and vice versa. As a case study, The News & Observer, the primary newspaper in Raleigh, North Carolina, conducted research on the bias of the 3rd-grade gifted identification process in Wake County schools[15]. It was shown that low-income 4th graders are much less likely to be placed into rigorous courses than more affluent students, despite equal or superior test scores. Over a six-year period from 2009-2015, this "resulted in 9,000 low-income children in North Carolina being counted out of classes that could have opened a new academic world to them." Clearly, there is a racial and socioeconomic bias against students of color and low-income students in the gifted identification process, but what is the origin of this discrepancy?

The Influence of Adult Figures in Child Education

Students of marginalized identities are at a disadvantage in the gifted identification process from very early on in their educational careers. This discrepancy extends up through the entire educational system, and by extension, the entire economic and social system of our society. It is not difficult to see how lack of academic opportunity can extend beyond a person's educational career. Certainly, a student's GPA and degrees lose their value after a certain amount of time in the workforce but consider how the attitude with which somebody faces their work and life is affected by the attitude with which they faced their education. All of this begins early on in a child's education. It follows that inequality for marginalized identities in early education not only perpetuates systemic discrimination against

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[12] Child Trends Databank, "Children in Poverty." (2018)
https://www.childtrends.org/indicators/children-in-poverty.
[13] National Center for Education Statistics, "Status and Trends in the Education of Racial and Ethnic Minorities", accessed May 20, 2018.
[14]American Psychological Association, "Ethnic and Racial Minorities & Socioeconomic Status." (2016)
https://www.apa.org/pi/ses/resources/publications/minorities.
[15] Joseph Neff et al. "Why have thousands of smart, low-income NC students been excluded from advanced classes?" The News & Observer, May 18, 2017,
https://www.newsobserver.com/news/local/education/article149942987.html.

minorities and lower-income individuals but is one of the origins of such discrimination. It is important, then, to consider the source of this discrepancy. Students of marginalized identities are placed at a disadvantage by the adult figures who have the most influence over a student's educational path: their teachers and parents

Teacher Bias

Teachers are among the most important influences on the path of a child's education. One of the most common methods through which gifted children are identified is teacher referral. Teacher referral is when a teacher recommends that a student be admitted to a gifted education program based on that student's perceived merits. This system is not inherently problematic. Teachers work directly with the student to cultivate both knowledge and an interest in learning. They assess students' test scores, fundamental learning skills, and classroom engagement to determine how to best serve that student. In addition, teachers know the kind of student it takes to be successful in education, having been successful in their own extensive educational careers. Teachers perhaps have the most accurate idea of if a student needs or would be successful in an accelerated curriculum.

That said, teacher referral is often one of the first steps to a child's gifted identification, so it is important to consider the biases teachers have in recommending students. This is especially important given that, according to the U.S. Department of Education, in the 2011-12 school year, 82% of educators in the U.S. were White.[16] The biases a teacher has are inherently related to their background and identity. A White teacher from a wealthy family will view a low-income student of color differently than a teacher of color from a low-income family would because the latter teacher can identify with the student's experience more than the White teacher can. Overall, teachers are biased towards white and affluent students in recommending students for gifted identification programs.

This is not simply a theoretical bias based on racial differences. The racial bias of White teachers against minority students has been scientifically documented. Researchers at Johns Hopkins University found that "White and other non-Black teachers were 12% more likely than Black teachers to

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[16] U.S. Department of Education, "The State of Racial Diversity in the Educator Workforce",(2016). https://www2.ed.gov/rschstat/eval/highered/racial-diversity/state-racial-diversity-workforce.pdf.

predict Black students wouldn't finish high school." [17] A White teacher is also about 30% less likely than a Black teacher to predict that the same Black student will achieve a four-year degree. When 82% of teachers in the United States are White, this becomes a very powerful discrepancy[18]. This bias is very influential on the gifted identification process especially.

This is most clearly depicted in a study conducted by Card and Giuliano in 2015 on the effect of a universal screening process on the characteristics of students identified for a school district's gifted education program.[19] Previously, the referral process of this unnamed "large and diverse" school district in Florida was up to teachers and parents. 1st and 2nd-grade students who were referred by their teachers for the gifted program took a free IQ test, while students who were nominated by their parents took an IQ test paid for by their parents. Students who scored over 130 on the IQ test were placed into the gifted program, with a reduced score of 115 for English as a second language students and students who qualified for free or reduced lunch. In this study, teacher referral and parental nomination were completely removed from the gifted identification process. Every student took a Naglieri Non-Verbal Ability Test (NNAT) very similar to an IQ test for placement into the gifted education program. Teacher referral and parental nomination were completely taken out of the picture.

The study concluded that "a comparison of the newly identified gifted students to those who would have been identified even without screening shows that black and Latino students, free/reduced-price lunch participants, English language learners, and girls were all systematically "under-referred" to the gifted program." [20] The statistics are striking: 180% more students who qualified for free or reduced lunch, 130% more Latinos, and 80% more Black students were identified for the gifted education program than prior to universal screening. These results confirmed similar conclusions from studies decades ago.[21]

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[17] Seth Gershenson et al. "Who Believes in Me? The Effect of Student–Teacher Demographic Match on Teacher Expectations." *Economics of Education Review* 52, (June 2016): 209–24.
[18] "The State of Racial Diversity in the Educator Workforce"
[19] David Card and Laura Giuliano. "Universal Screening Increases the Representation of Low-Income and Minority Students in Gifted Education." *Proceedings of the National Academy of Sciences* 113, no. 48 (Nov. 2016): 13678–83.
[20] Ibid, 83.
[21] Maximino Plata and William G. Masten. "Teacher Ratings of Hispanic and Anglo Students on a Behavior Rating Scale." *Roeper Review* 21, no. 2 (December 1998): 139–44; Del Siegle, "Teacher Bias in Identifying Gifted and Talented Students" *Institute of Education Sciences*, (Apr. 2001)

This study shows that the source of the discrepancy in this school district was not that low-income students or students of color were less gifted, but rather that they were less likely to be referred by their teachers or nominated by their parents (see the later section on Parental Influences). If the IQ test itself is considered objective, though it certainly is not, the test identifies the students that should have been referred or nominated and identified of all students in the district. Without universal screening, where referral is up to parents and teachers, 180% more students who qualified for free or reduced lunch, 130% more Latinos, and 80% more Black students should have been referred or nominated. Inarguably, without universal screening, the system got it wrong. Teacher referral and parental nomination got it wrong. Teacher referral and parental nomination were biased towards white and affluent students. The subconscious biases held by White teachers against students of marginalized identities were so pronounced in this study that they actually suppressed the academic potential of students, rather than cultivated or encouraged such potential as teachers and educational institutions should.

Parental Influences

Parental involvement in their child's education is very important to their child's success. The Waterford Institute rightfully claims that "the best predictor of student success is the extent to which families encourage learning at home and involve themselves in their child's education."[22] Parent involvement increases student test scores, increases the likelihood of high school graduation, and enhances the development of soft skills such as self-confidence, motivation, social skills, and classroom behavior.[23] Broadly speaking, there is overwhelming evidence to suggest that students are more likely to be successful if their parents are engaged with their child's education in schools and at home.

In schools, parental involvement is most important for developing a relationship with a student's teacher. Parents and teachers can serve their

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[22] Waterford Institute, "How Parent Involvement Leads to Student Success." (2018).https://www.waterford.org/education/how-parent-involvment-leads-to-student-success/.
[23] American Psychological Association,"Parent Engagement in Schools" (2016). https://www.apa.org/pi/lgbt/programs/safe-supportive/parental-engagement;"What Is Parental Engagement?" Grand Rapids Public School District accessed 5 Jan. 2019, https://www.grps.org/parental-engagement; Mburu Josephine Wairimu et al. "Analysis of Parental Involvement And Self-Esteem On Secondary School Students In Kieni West Sub-County, Nyeri County, Kenya" *Journal of Education and Practice* 7, no. 27 (2016): 82-98.

child or student best by working together. Even the familiarity of knowing each other's names paves the way for a conversation about how a student is doing in class and what can be done to improve their success. For instance, "By participating in parent-teacher conferences and volunteering at school, [parents] may encourage staff to attend to their children's individual needs." [24] That form of parental involvement allows teachers to most effectively address a student's needs. This increases their ability to succeed.

At home, parental engagement involves being available to help students with homework, provide motivation for students to succeed in their education and praise that success, and provide resources to aid in their education. Typical resources may be books or online resources, such as TestingMom.com.[25] However, these resources could also be trips to a museum or summer camp that can further engage a student outside the classroom. These resources can develop a lifelong love of learning for a child, which is more valuable than any test score. Parental engagement with their child's education increases their child's success, so it is important to explore the factors that influence the degree to which parents are available or inclined to engage. Parental engagement is closely associated with parental identity. Some parents may even have the social capital to influence their child's gifted identification directly. The two most significant characteristics of parental identity that influence their involvement in their child's education are income and education level.

4.2.1　Parental Income

Income is one of the major socioeconomic factors that affect the gifted identification process because it affects the degree to which parents can provide resources for their child's education. Students coming from low-income homes or who have low-income parents are less likely to be identified for gifted education programs because they do not have access to as many educational resources as affluent students. Additionally, low-income parents may not have jobs suited to being involved with their child's education.

Books are one of the most important resources for young students. Studies have shown that student success and gifted identification are

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[24] Anna J. Egalite, "How Family Background Influences Student Achievement." *EducationNext* 16, no. 2 (Spring 2016): 70-78.
[25] Karen Quinn, "TestingMom", TestingMom, accessed January 2019, testingmom.com.

correlated with the number of books in the home.[26] Low-income parents are more likely to have trouble affording resources like books because they must focus on providing food for their family or paying rent. More affluent families, on the other hand, can afford to spend money on books.

Books are not the sole advantage affluent students have over low-income students. Online educational resources are becoming increasingly popular and available to aid in early educational development. One such resource is TestingMom.com, a website whose slogan is "Involved Parents. Successful Kids".[27] Though this slogan is perhaps a little oversimplified and on-the-nose, it reflects a very important trend. TestingMom About Us page warns of the incredible importance of gifted education and admissions tests for students, that they could "impact their entire educational future" (Quinn), implying not so subtly that parents must act now to make sure their child is admitted to whatever accelerated program is available. TestingMom believes that "a parent is a child's most important teacher and advocate. No one will work with your child to build his/her abilities the way you will. We will show you how." (Quinn). TestingMom's resources come at a price, however, ranging from $15 for a book written by "the Testing Mom" Karen Quinn, to $250 for a private phone consultation with Quinn. Not all parents can afford resources like these. Though I might argue some of the rhetoric this website uses is extreme, especially in that it recommends parents make decisions on behalf of students all the way up to choosing a university to attend, it does provide valuable and legitimate resources to students whose parents can afford them. This gives affluent students an advantage over low-income students in the gifted identification process.

Students whose parents work unskilled or low-paid jobs are also less likely to be identified as gifted students. Parents with unskilled or low-paid occupations may not have the time to dedicate to using resources like TestingMom.com, let alone the income to afford them. Low-income workers are more likely to have inescapably rigid working hours. They may be discouraged from taking an active role in their child's education for fear of losing their job. The hours they work may also prevent them from attending school functions or being home to help their child with their homework.

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[26] Aikens and Barbarin, "Socioeconomic Differences in Reading Trajectories: The Contribution of Family, Neighborhood, and School Contexts," 235-51; van Bergen, "Why Are Home Literacy Environment and Children's Reading Skills Associated? What Parental Skills Reveal.", 147-60.
[27] Quinn, "TestingMom".

According to Kominiak, "Low-income families who support themselves on hourly wages with few options for paid time off often have no choice but to miss out on school events. And parents who work irregular shifts often don't have the chance to engage with their children or their teachers about schoolwork." [28] Positions like housekeeping staff, for example, often involve working late into the evening after everyone else is done for the day. Even a housekeeper who cleans the school their child attends may have difficulties finding ways to be involved in their child's education. Middle- or high-income workers are more often able to take time for their student's education. They may be able to take off work to meet with teachers or attend school functions. They may be home each evening to help their child do their homework or study for gifted identification tests. There may even be a stay-at-home parent who can be the ideal form of encouragement that their child needs to become the best student they can be. Parents who work low-income jobs are often unable to do this in the same way that more affluent families can.

4.2.2 Parental Education Level

Parents are more likely to be engaged with their child's education if they are highly educated. According to Child Trends, 87% of parents who received a bachelor's degree or higher attended a school-sponsored event, while only 54% of parents who did not graduate high school attended such an event.[29]Zedan also found "a clear correlation between the educational level and socioeconomic status of the parents and the degree of their involvement" in their child's education.[30] In summary, students are more likely to be successful if their parents are engaged with their education, and highly educated parents are more likely to be engaged with their child's education. Therefore, children of highly educated parents are more likely to be successful.

Additionally, students of educated parents are generally more prepared to begin school than those of less-educated parents. Highly educated parents tend to use a more complex vocabulary, which exposes their child to a far broader base vocabulary than children of less-educated parents. They are

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[28]Todd Kominiak, "When It Comes to Parent Involvement, Income Matters." TrustED, accessed May 2019, https://www.k12insight.com/trusted/comes-parent-involvement-income-matters/.

[29] Child Trends Databank, "Parental Involvement in Schools." (2018). https://www.childtrends.org/indicators/parental-involvement-in-schools.

[30] Raed Zedan, "Parent Involvement According to Education Level, Socio-Economic Situation, and Number of Family Members." *Journal of Educational Enquiry* 11, no. 1 (2011): 13–28.

also more likely to read to their children regularly. In these ways, students of more highly educated parents have a far more advanced vocabulary going into elementary school, allowing for accelerated development and academic achievement. These students are then more prepared for gifted education programs when it comes time for teachers to identify gifted students.

This dynamic of parental education level and child academic success is racialized as well. Data from the U.S. Census Bureau shows that 36.2% and 53.9% of White and Asian adults respectively achieved a bachelor's degree or more, compared to 22.5% and 15.5% of Black and Hispanic adults in 2015.[31] This correlates to socioeconomic status as well. Level of education increases with socioeconomic status.[32] In these ways, parental education level and child success are heavily influenced by their identity.

Egalite cites parental education as "the single strongest correlate of children's success in school, the number of years they attend school, and their success later in life." [33] Students are more likely to be identified as gifted if they achieve early academic success. Therefore, the likelihood that students will be identified as gifted increases with the level of education their parents received. This creates a bitter cycle as children of less-educated parents are at a greater risk of becoming less educated themselves, and their children less educated, and so on. Of course, lack of education generally leads to lower-paying jobs and quality of life. This is at the root of systemic racism in the United States.

4.2.3 Standardized Testing: A Case Study

Standardized testing is an excellent case study of parental influences on a child's gifted identification. Standardized tests, like IQ tests or the Cognitive Abilities Test (CogAT), are often one of the steps that students take in their gifted identification process. While teacher referral is often the first step to being identified as a gifted student, high test scores are often the second. As TestingMom reports, the CogAT is often administered to all elementary school students as an initial measure of giftedness.[34] In the study

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[31] Camille L Ryan and Kurt Bauman, "Educational Attainment in the United States: 2015", United Census Bureau, 2016, https://www.census.gov/content/dam/Census/library/publications/2016/demo/p20-578.pdf.
[32] American Psychological Association, "Education and Socioeconomic Status." 2016, https://www.apa.org/pi/ses/resources/publications/education.
[33] Egalite, "How Family Background Influences Student Achievement.", 70-78.
[34] Karen Quinn, "CogAT Test (Cognitive Abilities Test)", TestingMom, accessed January 2019, https://www.testingmom.com/tests/cogat-test/.

discussed earlier conducted by Card and Giuliano, IQ tests were used as an "objective" measure of giftedness.[35]

Affluent students have advantages in preparing for such testing. Parents who are more involved in their child's education become aware of testing much earlier than parents who are unable to be involved in their child's education, if they are aware of the testing at all. Students who come from middle or upper-class homes are more likely to have involved parents, as are students with highly educated parents. Parents who have jobs that allow them to be home in the evenings or full time will be able to help their child study for such tests. Families with the income to afford resources like those from TestingMom.com can provide practice questions and study tools for their child to be more prepared for tests like the CogAT. Less affluent students will be seeing CogAT questions for the first time. This is an incredible advantage that produces higher test scores for more affluent students, which manifest themselves in the form of more frequent gifted identification, as has already been discussed.

Moreover, even if more affluent students do not succeed on the identification tests in the first round, there are other options open for identification. In some cases, tests may be retaken outside of the initial testing session. The parents that are most likely to be aware of this are parents who are very involved with the school. These tests cost money, so only families who can afford for their child to take a placement test multiple times have access to this resource. If students do well enough on this assessment, their scores can be presented to a gifted education program as proof of a student's giftedness. This score is just as valuable as any other in that it demonstrates a student's academic ability, but in some senses, it can be more valuable because it shows a gifted education program that a student has the familial, social, and financial support structure needed to be successful. This student then has access to all of the resources gifted education offers, even though they are not necessarily more "gifted" than any other student, they just had the resources to demonstrate their abilities as best they could.

In the study discussed previously by Card and Giuliano from 2015, prior to universal screening, parents who nominated their child had to pay for the IQ test they took, while students who were referred by their teachers

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[35] Card and Giuliano, "Universal Screening Increases the Representation of Low-Income and Minority Students in Gifted Education.", 13678-83.

took the test for free.[36] Low-income parents, no matter whether or not they believed their child to be gifted or not, may not have been able to afford to nominate their student due to the fee associated with the IQ test. As soon as that fee was removed and low-income students took the test, 180% more students who qualified for free or reduced-price lunch were identified as gifted. This is staggering evidence that indicates a bias against low-income parents as they attempt to advocate for their child's education.

Conclusion

I have shown that the underrepresentation of students of color and low-income students in the early gifted identification process is caused by teacher bias towards white and affluent students, and the insufficient involvement of low-income and uneducated parents in their child's education. These adult characteristics, the biases of teachers, the income level of parents, and the education level of parents, are indicative and causal of inequalities in the gifted identification process, and by extension, society as a whole.

The under-identification of gifted Black, Hispanic, and low-income students early in the gifted identification process becomes a self-fulfilling prophecy. Students who are not identified for gifted education early are less likely to be identified later, and those who are identified early have been shown to achieve far more success than those who are not identified. Disproportionately, Black, Hispanic, and low-income students are not identified in the early gifted identification process. Therefore, Black, Hispanic, and low-income students are generally less successful than their more affluent counterparts by no fault or natural deficiency of their own. Those who are identified early, generally affluent students, are encouraged to be successful and engaged with their education. Those who are not may be left behind.

Another dimension to this issue beyond the statistics and material issues at play here is the psychological or mental aspect. Imagine, or perhaps you don't have to, the toll it takes on a student's self-esteem to be told that they are somehow less than another student. As Papageorge put it, "If I'm a teacher and decide that a student isn't any good, I may be communicating that to the student. A teacher telling a student they're not smart will weigh heavily on how that student feels about their future and perhaps the effort

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[36] Ibid, 13678-83.

they put into doing well in school." [37] Beyond even this, imagine how students of marginalized identities must react to the first day of the Academically and Intellectually Gifted program at their school in 3rd grade when most of the students who get up for their special curriculum don't look like them, and most of the students left behind do. This is what systemic racism means. This is how systemic racism becomes so inherent to and embedded in the individuals, organizations, and processes that construct the American social environment. If 8-year-old students are told by their teachers, 82% of whom are white, that certain students who typically look and talk a certain way (most often like the teacher) are somehow better than everyone else, how can we be surprised when those divisions continue to appear once we've left school?

Consider then how this issue perpetuates itself. First, a generation of students are identified or not identified as gifted students. In general, the students who are identified as gifted are then more successful in their educational careers than their unidentified counterparts. Students that are less successful in school are less likely to find well-paying jobs. As has been demonstrated throughout this paper, the children of parents who work low-paid or unskilled jobs and who don't achieve an advanced degree are less likely to be identified as gifted as well. Then the cycle begins again. This intergenerational success gap must be considered as part of an explanation for the perpetuating American economic system in which social mobility is difficult, if not impossible, especially for people of color.

The importance of these biases cannot be overstated. Given the connection between inequalities in the gifted identification process and quality of life, countless societal inequalities can reasonably be attributed to teacher bias and parental identity. Take environmental issues, for instance. Researchers at Yale recently determined that low-income communities and communities of color are disproportionately affected by air pollution[38]. More specifically, "The greater the concentration of Hispanics, Asians, African Americans or poor residents in an area, the more likely that potentially dangerous compounds such as vanadium, nitrates, and zinc are in the mix of fine particles they breathe." Low-income housing is typically located in

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[37] ScienceDaily, "Race biases teachers' expectations for students", March 30, 2016, https://www.sciencedaily.com/releases/2016/03/160330123500.htm.

[38] Cheryl Katz, "People in Poor Neighborhoods Breathe More Hazardous Particles", Scientific American, November 1, 2012, https://www.scientificamerican.com/article/people-poor-neighborhoods-breate-more-hazardous-particles/

highly urban areas where exhaust from vehicles and other forms of pollution are more common. The ability to afford safe housing is naturally associated with income, both of which are benefits of gifted education.[39] Thus, inequalities in gifted education manifest in the inequality of safe housing and living environment. Obviously, an ideal world would not contain serious environmental issues like air pollution, but it is nonetheless unjust that environmental issues disproportionately affect individuals of color and low-income individuals. It is yet another manifestation of the systemic racism that has partially dominated the social dialogue in 2020, systemic racism that is perpetuated by the inequalities in the gifted identification process.

I certainly cannot claim that rectifying the issues in gifted education will solve America's race and socioeconomic issues, not by a long shot. At the same time, however, the progress that can be made by solving these issues is extensive and wide-ranging. Inarguably, combating systemic racism in the United States must involve addressing the inequalities in gifted education.

Opportunities for further research lie in aspects of a student's background beyond their race, socioeconomic status, and parents. There is research to suggest that teachers are biased based on gender, for example. In addition, location is a very important factor in how successful a student is, and how they are placed in gifted programs. Many parents, generally more educated parents, may actually take the quality of school districts into account when choosing where to live. Understanding the relationship between parental identity and this choice could lead to more answers regarding how student background affects their gifted identification. More definitive research must also be done on the correlation of discrepancies in the early gifted identification process on future economic characteristics and the makeup of the workforce.

To conclude, I must acknowledge that I have been lucky. Since I was first identified as a gifted student in the 3rd grade, I have always been encouraged to view school not as a tedious necessity that all children are subjected to before they can properly call themselves adults, but as an opportunity for learning, growth, and exploration. My attitude towards education and the world, really, is that it is a beautiful mystery teeming with

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[39] Chetty, "How Does Your Kindergarten Classroom Affect Your Earnings? Evidence from Project Star.", 1593-660.

unanswered questions. How much of that attitude is natural in me, and how much has been cultivated in me by the wonderful adult mentors and parents I've had? I would encourage the reader to consider their attitude towards their education and uncover its origins. I would then ask the reader to consider how the student who has been left behind might view the educational system that has, in many ways, rejected them as inadequate. This is not to discredit myself or other successful individuals for their hard work, but I believe every student, no matter their background, should be given the opportunity to view their education and the world in the same way I and other gifted students view them. Certainly, no student should be held accountable for the shortcomings or, alternatively, the exceeding success of their parents, nor should they have to be the manifestation of the biases of their teachers. Certainly, no student should bear the brunt of systemic racism as early as elementary school. Horace Mann, one of the founders of American gifted education, once called education "the great equalizer of men". It is time we made his vision a reality.

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Hegemony and Hierarchy: The Implementation of The Great Chain of Being

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Abstract

Environmentalism movements date back as far back as the Medieval era with the ontological concept of The Great Chain of Being, establishing a deity as a supreme higher power and traces organisms in the environment (down to dirt, slime, and rocks) through a hierarchical framework. In this paper, it explores the works of David Pepper and others, who look at the modernism of environmentalism, but juxtapose the modernity of the travesties committed on the environment and how it evolves from the past. Through this theoretical lens, this paper asks: if God is at the top of the Chain, and therefore superior, where does man fall? Then, theoretically, since man created the concept of the Chain, where in the Chain did man create the distinctions for race? What are the criteria for superiority if the supreme being is God, specifically in the eighteenth century during the Transatlantic slave trade? This paper funneled these inquiries into my research, discovering ideologies developed from scientific racism, pseudoscience and physiognomy, and found examples of medical procedures against enslaved people in abolitionist literature. Yes, the enslavement practices were deplorable because of what happened on plantations. However, it affected the environment through a sense of morality warped by scientific racism, putting hegemony and oppression in a different context. Even more so, it is difficult to grapple with the fact that many scientifically racist preconceptions that were established are still things that the black community struggle with, proving that equality in nature and the environment is still nonexistent.

Race has been a complicated issue in American society dating as far back as the Middle Passage, the Transatlantic slave trade, and the establishment of chattel slavery in the American colonies. America has been, foremost, a capitalist and oppressive nation from its colonization, taking what it could from nature, items like cotton and sugar, and trading it forward for profit. The slave trade and the practices of chattel slavery on plantations in the southern states permeate these capitalist values with racism and dehumanize enslaved people, creating a sense of inferiority within American society. With the ideas of The Great Chain of Being descended for generations, America developed deterministic views of what was humble in nature and, therefore, could be utilized as capital. These views spread through colonization when the Puritans arrived, and the Puritans used the Chain to enforce their superiority over indigenous people, which then enveloped Christianity through the expansion of the colonies. With this frame of mind, the ontology of The Great Chain of Being evolved over time and the implementation of it became a racist methodology for American society in the eighteenth century, further justifying the Transatlantic slave trade and the execution of chattel slavery.

In order to understand how the implementation of the Chain is a racist methodology, we must first dissect its initial inception. The Chain originated in the medieval era, where it defined the world and nature in relation to a deity, a supreme God that is set above all things in nature because He was the model of perfection for all other organisms and beings. David Pepper defines the Great Chain of Being in his book, *The Modern Roots for Environmentalism,* where "In the medieval version [of the Chain] everything was alive, including stones, earth, and 'slime'—given by the overflowing of the Soul from the perfect God at the head of the hierarchy."[1] This version of the Chain suggests that things in nature are all alive, but fall beneath God, and that man falls somewhere in the middle between God and animals of nature. However, according to Pepper*,* the Chain was "mutually dependent,"[2] which means all parts of the Chain were interdependent and essential for nature to function; and every person, animal, stone, etc., that existed under God had its purpose—yet man could also function on his own. This concept is especially vital to understand how man coexists with nature interdependently while also being able to praise an almighty being.

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[1] David Pepper, *The Roots of Modern Environmentalism* (London: Croom Helm, 1984), 43.
[2] Pepper, 43.

This medieval ontology opened the door for us to discuss how man can intrinsically be in nature, while also asking: what is the value of each living thing in nature and the role it plays? The concept of the hierarchy of the Chain led to an idea that the hierarchy that exists in nature also must exist in society[3] and that "the universe is filled by diverse living things."[4] The word "diverse" could refer to distinct populations of people or manifolds of plants within nature, however, according to the Oxford English Dictionary, there is a usage for *diverse* that originates in 1590; where someone can be "turn[ed] aside, diverge[d], be diverted."[5] This etymological evidence helps to explain how medieval Christianity could morph into the racist rhetoric of the eighteenth century, further justifying tyranny and oppression. During this time, Pepper suggests that American society modified its ways of thinking about the Chain in order to legitimize terror, saying "[enslaver's] deterministic, hierarchical and racist ideas…appealed to the *status quo* in society, but the 18th and 19th centuries were characterized by a reforming zeal...which discarded the Chain of Being."[6] Since American society was predominantly Christian and theological, it accepted the concept of hierarchical nature passed down from the Chain. However, even though the rationale of the Chain was still widely accepted until this point,[7] science developed over time, "refining [the] animal classification (into invertebrates, fish, reptiles, birds and mammals)."[8] Modern biology finds that all humans are mammals, but, in the eighteenth century, enslaved people were categorized as animals by their enslavers and were often grouped with horses and other livestock. Therefore, society could use this classification to dehumanize other humans.

According to Mark J. Brandt and Christine Reyna in their article "The Chain of Being: A Hierarchy of Morality*,*" in order to understand the Chain, it is paramount to surmise the metaphysics of the Chain, as well as its social ramifications. They define the dimensions of morality and the dehumanization of people through a vertical continuum they refer

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[3] Pepper, 192.

[4] Ibid, 69.

[5] "Diverse, v." Oxford English Dictionary, accessed March 2020, https://www.oed.com/view/Entry/56047?rskey=xk93KD&result=2&isAdvanced=false#eid.

[6] Pepper, 71.

[7] Ibid, 68.

[8] G.W. Trompf. "The Classification of the Sciences and the Quest for Interdisciplinarity: a Brief History of Ideas from Ancient Philosophy to Contemporary Environmental Science," *Environmental Conservation*, vol. 38, no. 2 (2011): 113–126, https://www.jstor.org/stable/44519542, 118.

to as the "social cognitive chain of being" (SCCB).[9] The SCCB is similar to Pepper's description of the ontology of the Chain; however, it focuses on the social aspects of morality and how that impacts society. The major difference between the Chain's sense of morality and the SCCB is that the perceptions of the hierarchies are not fixed, as Brandt and Reyna suggest:

> "It is important to note that the perceived location of a social target along the chain of being is not fixed—it can be changed depending on a perceiver's current motivational state or a person's perception of the morality of a target's behaviors across time. Thus, entities can acquire or fall from grace depending on the morality of their actions."[10]

From this proposition, we can gather that, in a social context, society is susceptible to disregard the initial Chain's deterministic views and alter them to fit their hegemonic praxis. Rather than fabricate a theological determinist view that had been predicted for generations, society would amend its beliefs of what the Chain would represent with *facts,* supporting their racist conventions and suppressing their sense of morality.

While the Chain is regarded as a hierarchy, race plays a role in the system and the subjugation of enslaved people. In his book, *Racism: A Short History,* George M. Frederickson delves deeper into white supremacy and antisemitism in the eighteenth and nineteenth centuries, stating that "the modern concept of races as basic human types classified by physical characteristics (primarily skin color) was not invented until the eighteenth century."[11] This fact, along with the morality of the SCCB and theology of the Chain, explains how the determinist and racist perspectives of the eighteenth century come to fruition. As time progresses and science develops, the way society perceives the Chain begins to change, thus the implementation of the Chain in society changes. For example, physiognomy is a pseudoscience, or as Chinoy refers to it, "junk science," utilized in the eighteenth century as a means to "use facial structure and head shape to assess character and mental capacity."[12] Scientists used this form of biological pseudoscience to rationalize racism and the subjugation of races, by drawing distinctions

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[9] Mark J. Brandt and Christine Reyna, "The Chain of Being: A Hierarchy of Morality," *Perspectives on Psychological Science*, vol. 6, no. 5 (2011): 428–446, https://www.jstor.org/stable/41613515, 428.

[10] Brandt and Reyna, "A Hierarchy of Morality," 430.

[11] George M Frederickson. *Racism: A Short History* (Princeton University Press: Princeton, 2002), https://www.jstor.org/stable/j.ctvc779fw.7, 52.

[12] Shilol Chinoy. "The Racist History Behind Facial Recognition." last modified July 19, 2019, https://www.nytimes.com/2019/07/10/opinion/facial-recognition-race.html.

between skin color and head shape, among other comparisons. The Chain initially depended on morality, but philosophers and scientists were vilifying the enslaved and giving credence to the Chain's systemically oppressive dichotomy.

Although a European movement, the Enlightenment greatly impacted American society in the eighteenth century. Science and philosophy instigate discussions about how people could rally against tradition; however, "the scientific thought of the Enlightenment was a precondition for the growth of a modern racism based on physical typology,"[13] or scientific racism. This notion of scientific racism allows philosophers and scientists to come to this overall conclusion: that white people were the more desirable race. What exactly is scientific racism? There are two schools of thought: monogenesis and polygenesis. Monogenesis is based on a more biblical standpoint and states that man comes from Adam. Polygenesis is a more "degenerated" state of being and man: "specifically Africans...had evolved from pre-Adamite man, a subhuman strain of *Homo sapiens* that developed before biblical Adam and his descendants in Europe."[14] As a result, polygenesis is the more racist point of view, following the conceptualization of *white beauty* and enabling the dehumanization of the enslaved.

Johann Friedrich Blumenbach, a philosopher dedicated to creating the division of races, said that enslaved people could be perceived as "nearer the apes than other men"; Blumenbach also defined the term Caucasian as "'the most handsome and becoming,' having 'the most beautiful form of the skull'."[15] In many ways, physiognomy and the methodology of scientific racism allow for the establishment of *the missing link* theory in modern biology, a theory that is meant to separate the human and primate genus in evolution and remains unexplained. Blumenbach attempted to explain the gap by dehumanizing Africans and enslaved people "from human to ape or half-ape status that...revealed how a purely naturalistic chain of being could be employed to deny full humanity to non-Caucasians."[16] Yet, there remain other executions stripping enslaved people of their humanity, where science oppresses and robs them of dignity in order to signify society's need to maintain dominance.

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[13] Frederickson, *Racism: A Short History,* 56.

[14] LaRose T Parris. *Being Apart: Theoretical and Existential Resistance in Africana Literature* (University of Virginia Press, Charlottesville; London, 2015), https://www.jstor.org/stable/j.ctt15hvzcs.5, 26.

[15] Frederickson, *Racism: A Short History,* 57.

[16] Frederickson, *Racism: A Short History,* 57.

There are many accounts where we can see scientific racism at play, justifying dominion over the enslaved by claiming their inferiority. The consequences of scientific racism were so severe that abolitionist literature warned society against its brutality. In William Wells Brown's narrative, *Clotel, or the President's Daughter,* Brown wrote a scene where the characters, Mr. Peck, the parson and enslaver, and Carlton, the caretaker of Mr. Peck's land, are discussing an advertisement from doctors at a college for sick enslaved people:

> "These are for dissection, then?" inquired Carlton with a trembling voice. "Yes," answered the parson. "Of course they wait till they die before they can use them." "They keep them on hand, and when they need one they bleed him to death," returned Mr. Peck. "Yes, but that's murder." "Oh, the doctors are licensed to commit murder, you know, and what's the difference, whether one dies owing to the loss of blood, or take too many pills? For my own part, if I had to choose, I would rather submit to the former."[17]

These questionable actions against enslaved people bring us back to an original concept: that since enslaved people were classified as animals, this treatment was deemed justified. The change in classification from human to animal further explains the level of dehumanization. This type of treatment of white people would have been considered deplorable, yet advertisements were placed for enslaved persons to study. The deviation from the Chain allows us to see how much of an impact scientific racism had on creating practices of slavery and the slave trade, and the ethical implications of "goodness."

In 2010, the theory of "environmental goodness" was proposed by Sandra Jane Fairbanks in her article "Environmental Goodness and the Challenge of American Culture." With this article, we learn about the theory of environmental goodness and how it applies to nature, which helps us realize how it refutes the white supremacist implementation of the Chain. Fairbanks inspects the concept of environmental goodness through western philosophies and religions: "[that nature] further requires a virtue of humility with regard to our place in nature. This virtue involves accepting the intrinsic value of nature and seeing oneself as an equal member of an interrelated biotic community."[18] How does this

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[17] William Wells. Brown. *Clotel, or the President's Daughter.* London: Penguin, 2004.

[18] Sandra Jane Fairbanks. "Environmental Goodness and the Challenge of American Culture," *Ethics and the Environment*, vol. 15, no. 2 (2010) 79–102. https://www.jstor.org/stable/10.2979/ete.2010.15.2.79, 84.

relate back to The Great Chain of Being and its hegemonic implementation in America during the eighteenth century? It does not. In fact, it completely negates these philosophies. For example, if we implement environmental goodness upon the Chain, there are no hierarchies in our society. In theory, if American society in the eighteenth century had adopted environmental goodness, everyone would have been considered equal. The theory of environmental goodness would have eliminated scientific racism and its questionable practices eradicated chattel slavery and the inferiority of enslaved people. Environmental goodness "requires us to recognize the intrinsic good of nonhuman living things, natural objects, and the biotic community."[19] If eighteenth-century society had accepted the theory of environmental goodness it would have disregarded the notion of the Chain and would not have developed philosophies of enslaved people as animals, inferior beings, etc.

When we think of The Great Chain of Being, it renders the impression of something that is an unchangeable part of history. Since the Chain is an ontological concept in medieval Christianity, it explains the origins of the universe and nature; therefore, the Chain cannot be racist. So, whose universe and nature does it explain and benefit? In fact, it is conducive to human existence that we develop opinions, theories, and philosophies. As history will show, man will "thus [create] the subjugation-based… dehumanization and dehistoricization of the African, may also be read as a Western hegemonic imperative, for the influence of a dominant racist ideology."[20] As a result, the Chain ultimately became an argument to support systemic racism because it proposed that humans were permitted to establish distinctions in the Chain, creating the concept of race and thus the conception of white supremacy. We like to think that we have surpassed these elements of hegemony, yet we see instances of police brutality and people of color being imprisoned for menial crimes. We live in a world where Congress passed a bill banning lynching as a federal offense and there were still four votes against passing the bill.[21] This seems like a marginal number qualitatively to the representatives held in Congress, yet people of color are still lynched as an intrinsic, natural occurrence that is swept under the rug in the name of *Patriotism*.

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[19] Fairbanks, "Environmental Goodness," 84.

[20] Parris, *Being Apart,* 28.

[21] Felicia Sonmez. "House Passes Historic Anti-Lynching Bill after Congress's Century of Failure," last modified February 26, 2020, https://www.washingtonpost.com/
politics/house-poised-to-pass-historic-anti-lynching-bill-after-more-than-a-century-of-failure/2020/02/2
6/33df91ae-58ae-11ea-9000-f3cffee23036_story.html.

When will society eliminate hierarchy and treat people of color with dignity and respect? It will not. Is there such a thing as *equality* within nature? There is not. Until we face the facts that there is a system of oppression within nature we will never develop and evolve from it. It is our duty, as those who implemented the Chain, to re-educate and legislate our environment, to create opportunities and equity for everyone. Otherwise, Americans will be stuck in a white supremacist past.

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Social Inequalities in the Time of COVID-19

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Abstract

With the recent outbreak of the Coronavirus pandemic, daily life is being drastically impacted, whether it is compromising someone's health, laying off a large portion of our workforce, or moving our youth to indefinite online schooling. With these struggles, many social inequalities are being exacerbated, due to inaccessibility of resources and lack of resources being accessible to lower social groups. Previous research has shown that low-income populations are less likely to have health insurance, making them unable to receive proper medical care. Additionally, while more than half of our workforce is without a job, low-income populations usually work in hourly-paid jobs that remain essential during the pandemic, putting them more at risk. Previous research also notes that low-income students are disproportionately affected by technological troubles and a lack of meals provided by the school system. The current study analyzed healthcare, economic, and educational disparities occurring since March 2020, when the pandemic hit. The main comparison of interest was between 3 different income groups: <$10,000 to $39,999, $40,000 to $79,999, and $80,000 to >$150,000.

Introduction

In March of 2020, the United States was introduced to a new disease called COVID-19, which was quickly labeled as a global pandemic. The dictionary definition of the word "pandemic" is, "An outbreak of a disease that occurs over a wide geographic area (such as multiple countries or

continents) and typically affects a significant proportion of the population: a pandemic outbreak of a disease." According to the World Health Organization (WHO), the Coronavirus, or COVID-19 for short, is an invasive disease that spreads through droplets expelled by the nose when a person coughs or sneezes. Many people who contract this disease will only be mild to moderately affected by respiratory symptoms, such as dry cough, headache, fever, and loss of taste or smell (World Health Organization). Concern starts to arise when COVID-19 is contracted by older populations and populations with underlying health problems. These populations experience more serious and life-threatening symptoms, such as difficulty breathing and shortness of breath, chest pain and pressure, and loss of speech and movement (World Health Organization). From January 21st, 2020 until November 17th, 2020, there have been a total of 10,984,398 confirmed cases and 245,470 total deaths in the United States, with numbers increasing daily (Centers for Disease Control and Prevention). Even though not everyone is directly affected by the Coronavirus, everyone is being impacted by this ruthless disease in some way.

This research will focus on how COVID-19 has rapidly transformed daily life since March of 2020, through compromising someone's health, increasing the proportion of the workforce that is laid off, or forcing students to attend virtual schooling. As with any disaster, social inequalities are exacerbated, and those with a lack of resources struggle more. With cases of COVID-19 rapidly increasing every day, these inequities will only continue to become more prominent over time. This paper will be assessing 3 notable social inequalities: access to healthcare, economic disparities, and access to education, by comparing the prevalence of inequality between social groups. The following is a review of the literature providing information on healthcare, education, and the economy, in relation to the current pandemic.

Literature Review
Healthcare

Research on COVID-19 in relation to healthcare disparities has found that African American and Hispanic populations are disproportionately affected by the Coronavirus. Azar et al. (2020), found that in California, African Americans make up 33% of patients hospitalized from the disease, which is more than double that of white patients. Within this same body of research, it was also found that the death rate for African Americans is higher than their representation in the population; while this group

comprises 6% of the population, they have a 10% mortality rate. Brown et al. (2020) discovered that African Americans, who represent 13% of the total United States population, are twice as likely to die from the Coronavirus than other populations and account for one-third of the total number of cases. Similarly, Hispanic populations are shown to be the largest minority group in the United States, comprising around 18% of the population. Within this population, research has shown that COVID-19 affects 28.4% of the population (Macias Gil et al. 2020).

 The reason behind these statistics being so disproportionate, compared to other populations, begins with health insurance coverage. When assessing health insurance for minority populations, it was shown that Hispanics have the lowest rates of health insurance coverage when compared to other minority groups. While only 5.4% of Whites were uninsured in 2018, 19.8% of Hispanics were uninsured. Noonan, Velasco-Mondragon, and Wagner (2016) found that the percentage of African American adults without health insurance has been decreasing rapidly, and at a similar rate as that of Hispanic populations without health insurance. Additionally, it was found that holding an immigrant status instills fear or mistrust towards public health services, meaning that these populations are more likely to be excluded from public insurance coverage, such as Medicaid (Macias Gil et al. 2020). Unfortunately, people who use Medicaid, or who reported having no health insurance, had twice the odds of being admitted to the hospital for Coronavirus than people who reported using commercial health insurance (Azar et al. 2020).

There has been constant concern that our medical system is unable to support the number of patients being brought into hospitals. For example, the number of ICU beds and ventilators needed to aid patients is disproportionate to the number of Coronavirus cases being admitted. For several months in 2020, patients have been exceeding the current hospital capacity in a number of cities, making it hard to provide proper care (Kang et al. 2020). Sheykhi (2020) found that because of how high the numbers of people being admitted for Coronavirus are, non-Coronavirus patients are unable to receive normal treatment. Lack of hospital beds, medication shortages, and a reduction of medical staff due to their own contraction of the virus, are just some of the ways that hospitals are being impacted by COVID-19. The public health system has been reported as underfunded for decades, and therefore was not prepared for the challenge that the Coronavirus presented.

One of the most common inequalities contributing to a lack of healthcare is poverty. Poverty and low socioeconomic status are shown as highly correlated with negative health outcomes, high morbidity, and high mortality rates, with mortality being independent of any other risk factor (Noonan, Velasco-Mondragon, and Wagner 2016; Yancy 2020). People who are living in low-accessibility, impoverished areas are more vulnerable to high Coronavirus mortality rates because of their socioeconomic status, housing type, and access to transportation (Kang et al. 2020). For example, in minority communities, health screenings and drive-through testing are not always readily available, or convenient, due to lack of transportation, technology, and geographic segregation, meaning that these populations are not receiving the same access to resources as their more affluent counterparts. Additionally, recommendations to "social distance" or "shelter-in-place" are less effective for minority populations, as this is a form of privilege for middle to upper-class communities. Low socioeconomic status populations do not get the luxuries of paid sick leave and working from home, because many of them work in essential services (e.g. food service). If these employees do not get paid leave, and are unable to work due to sickness, they risk the possibility of losing employment completely. Even if it is advised that these employees stay home when they are sick or at risk for contracting COVID-19, remaining at home might not financially be an option (Brown et al. 2020; Macias Gil et al. 2020; Webb Hooper, Nápoles, and Pérez-Stable 2020).

Economy

In addition to healthcare disparities, the economic system is also struggling to accommodate the imbalance inflicted by the Coronavirus. Globally, the workforce is composed of approximately 3.3 billion people. Because of the virus, it has been estimated that more than four out of five people, or 80% of the total workforce, have been impacted by full or partial closures of the workplace (Savić 2020). These workplace closures are not just occurring in a few sectors of our economy, they are spanning across a wide range of jobs and businesses. Some of the most significantly impacted workplaces include retail, wholesale, and service sectors, which include tourism, entertainment, and transportation. Because the pandemic has impacted so many different interconnected economic sectors, it has triggered what has been termed as an "economic contagion," meaning that there have

been major disruptions to trade, tourism, energy, and finance (Lenzen et al. 2020).

As a result of a numerous number of people being out of a job, there has been a rise in the number of applications for unemployment insurance nationally, which supplies workers with a state-provided, calculated income every week based on what they were previously earning. These state unemployment programs are in high demand, with more than 40 million people applying for these benefits as of July 2020 (Galea and Abdalla 2020). Because the numbers are so high, the online system has become overwhelmed because of the increase in applicants, causing payments to be delayed, or even missed in some cases. Unemployment numbers this high have not been seen since the 1930s Great Depression era (Galea and Abdalla 2020; Saloner et al. 2020). Along with unemployment insurance payments, there are other state and federal relief programs that are being relied on during this time. The problem with these relief efforts is that they are not readily available to all populations. Temporary Assistance for Needy Families (TANF) has been limited to certain groups because of income eligibility and work requirements. These requirements include, TANF can provide funds for no longer than 5 years, TANF cannot be used to assist legal or illegal immigrants until they have been in the state for 5 years, and families must meet federal work rates, which are 20 hours per week for single-parent families and 35 hours a week for two-parent families (Center on Budget and Policy Priorities). In April 2020, the national government stimulus of $1,200 was granted to "eligible" adults, whose income was under $99,000 ($198,000 for joint filers) and awarded an additional $500 per dependent child under the age of 17, or up to $3,400 for a family of 4 (U.S. Department of the Treasury). Dependents who were living on their own, such as those in college, were unable to receive the stimulus, even if they were out of a job. These assistance programs were only given a one-time boost as a part of the Coronavirus Aid, Relief, and Economic Security (CARES) Act, but have not been supplemented since April 2020, even as unemployment rates increased (Saloner et al. 2020).

Unemployment insurance might be a concern for those out of a job, but for a lot of lower-income populations, their role in our economy cannot afford to stop. In research conducted by Lenzen et al. (2020) on socioeconomic losses from the pandemic, it was found that the Coronavirus has deepened socioeconomic vulnerabilities, widened wealth gaps, and placed burdens on lower-income populations. Additional research found that

the risk of acquiring COVID-19 has been greater for minority and low socioeconomic status populations and that it is disproportionately affecting these groups in comparison to middle and upper-class populations (Bonaccorsi et al. 2020; Galea and Abdalla 2020). The reason behind this inequity is that these lower-class populations have been shown to work in more of the essential service sectors of our economy such as food, factory, and agricultural systems. The workers who make up this critical part of our economy are more likely to work in overcrowded conditions and have less access to protective equipment to stop the spread of the virus. Because of these conditions, these essential workers may be unable to follow social distancing policies properly (Lee et al. 2020). While some salaried positions allow their employees to work from home, allowing for safe social distancing, these hourly workers have no other choice but to go into work with these risky conditions every day.

Savić (2020) defines working from home as having 4 essential characteristics: "(1) a person who is an employee of a company or a staff member of an organization; (2) actual work engagement with a company or an organization on specific tasks; (3) work being performed outside the company's physical premises; and (4) telecommunication with the employer." For many fortunate populations, this has become a mandatory practice to ensure safety among employees. One of the biggest benefits of working at home is that parents are able to stay home with their children. Since the Coronavirus has led to the shutting down of schools and childcare centers, many children have no other choice than to stay at home with their parents (Markey 2020). While this may be seen as a positive occurrence for most privileged families, problems arise when working-class parents are unable to stay home with their children during the day. This inequality is especially prominent in regard to the quality of education that children are receiving through staying at home, whether it is being taught by their parents, or being self-taught.

Education

In most of the research on educational disparities in the time of COVID-19, the biggest problem with online schooling is that there is not enough access to the internet and proper technologies. Studies have shown that 18% of students do not have access to broadband internet, and for those who do have access to the internet, more than half report poor network connection (Anderson 2020; Dushkevych 2020). Even if students do have

access to a stable internet connection, it is not certain that they have the proper technology or knowledge of technology, to complete all of their assignments for school. It is assumed in our technologically driven world that most students are digitally literate and can easily adapt to using technology to complete their work, but that is not always the case. Because of this, parents and teachers are spending more time learning online educational programs themselves and teaching their children how to use the technology they need to be able to learn (Chang 2020; Kaup 2020). When students are forced to complete numerous virtual assignments, while also dealing with internet problems and weak signals, this stress puts students at risk for depression (Mowad 2020).

Aside from internet trouble, there are many other factors that influence the effectiveness of online learning. One of the main factors impacting learning is a distraction. By sitting at a computer screen all day, students are more likely to be distracted by computer games, social media, and other online content that is readily available to them (Chang 2020). In order to try and combat this problem, some classes have been virtually synchronous, meaning that everyone meets at the same time online, rather than doing your work at your own pace. While this method is meant to be more engaging, teachers are having trouble continuously capturing the attention of children in these synchronous settings, since they cannot physically be there to stop distractions (Kaup 2020). Teachers and students alike are having trouble navigating the unknowns of virtual learning since this is a fairly new occurrence for most populations. In a study conducted by Roy et al. (2020), 80% of students were not in favor of continuing online learning in a post-Coronavirus era.

Technology considerations are just one part of the educational inequalities that are being highlighted by the current pandemic. Anderson (2020) argues that children from communities of color or from high poverty/low-income areas depend on their schools a lot more than other populations. Students receive safety, security, one-on-one attention, and adequate food from their schools, and Coronavirus has taken that away from them. Schools normally provide a safe space for children to go during the day while their parents are at work and allow them to potentially receive two meals if they are unable to receive meals from home. Anderson (2020) comments on the problem of providing nutritional meals to children during this crisis, saying that a lot of school systems usually provide children-in-need with breakfast, lunch, and meal bags to take home. With

schools being shut down, children's only option is to eat at home. Luckily, many school districts have realized this disparity and began to use buses to provide meals to students that are delivered to the home, bus stop, or community. It was also shown that families in this socioeconomic group lack the resources and background knowledge to properly homeschool their children, resulting in a widening of the educational achievement gap in minority groups across the United States. Adding to this gap, individual school districts have been given the flexibility to determine how students are evaluated, resulting in inconsistencies in standardized teaching, learning, and testing (Anderson 2020).

Previous research has shown that because of the Coronavirus pandemic, many social inequalities are being exacerbated. As seen through the literature on healthcare, COVID-19 is disproportionately affecting African American and Hispanic communities, which are communities that are less likely to have health insurance to cover their medical bills. In addition, people living in low-income areas are also less likely to have health insurance or close access to healthcare facilities. For those who are able to receive healthcare, we have seen that hospitals are surpassing full capacity and do not have enough supplies to properly support everyone. The literature on the economic impacts of the Coronavirus has shown that more than half of our workforce has been without a job since the pandemic began and has had to rely on government relief to support themselves. Unfortunately, low socioeconomic status populations cannot afford to be without a job, so these people have no other choice to continue working through the pandemic. Problems arise when these populations are having to work in close conditions with others and are not provided with adequate protection against the spread of the virus. Finally, research on education has shown that internet and technology accessibility are two of the biggest inconsistencies with online education. In addition to technological trouble, children are having a hard time staying focused and learning new material online. For low socioeconomic groups, these inequalities are only more prevalent, with the addition of lack of meals provided by the school system. Because of this sudden pandemic, the inequity in our society is more prominent than ever before.

Methods

Data

Survey data was collected from a convenience sample of 123 participants between the months of August and September 2020. Participants were recruited through emails to professors and organizations at the University of North Carolina at Greensboro, and through posts about the survey shared on Facebook. Inclusion criteria allowed for only ages 18 and older to complete the survey. Those who expressed interest in the survey virtually, through email or social media, were asked to click on the link provided to them, which then directed them to the anonymous survey. The survey began with an age screener for 18+ and was followed by a consent form before the questions begin. Those who gave consent were then asked to complete a four-part survey that began with demographic questions and was followed by information about healthcare, economic, and educational challenges they are facing. The survey consisted of 51 questions and averaged around 10 minutes to complete. Being that this survey was completely virtual, no in-person interaction was required. Tables 1-6 show the demographic characteristics of the sample.

Sample

Table 1: Sex of Study Sample

Label	N	Percent
Female	79	76.70%
Male	21	20.39%
Nonbinary	3	2.91%
Total	103	100%

As shown in Table 1, 76.70% of respondents (N=79) responded that they were female. 20.39% of respondents (N=21) responded that they were male. 2.91% of respondents (N=3) responded that they were nonbinary.

Table 2: Ethnicity of Study Sample

Label	N	Percent

Hispanic or Latinx	9	8.74%
Not Hispanic or Latinx	94	91.26%
Total	103	100%

As shown in Table 2, 8.74% of respondents (N=9) responded that they were of Hispanic or Latinx ethnicity. 91.26% of respondents (N=94) responded that they were not of Hispanic or Latinx ethnicity.

Table 3: Race of Study Sample

Label	N	Percent
White	82	75.23%
Black or African American	17	15.60%
American Indian or Alaska Native	3	2.75%
Asian	3	2.75%
Native Hawaiian or Pacific Islander	0	0.00%
Other	4	3.67%
Total	109	100%

As shown in Table 3, 75.23% of respondents (N=82) responded that they were of the White race. 15.60% of respondents (N=17) responded that they were of the Black or African American race. 2.75% of respondents (N=3) responded that they were of American Indian or Alaskan race. 2.75% of respondents (N=3) responded that they were of the Asian race. 0.00% of respondents (N=0) responded that they were of Native Hawaiian or Pacific Islander race. 3.67% of respondents (N=4) responded that they were of another race. For the measure of race, participants were allowed to select all that apply.

Table 4: Age of Study Sample

Label	N	Percent
18 - 24	56	54.4%
25 - 36	11	10.7%
37 - 48	16	15.5%
49 - 60	13	12.6%
≥ 61	7	6.8%
Total	103	100%

As shown in Table 4, 54.4% of respondents (N=56) responded that they were 18 to 24 years of age. 10.7% of respondents (N=11) responded that they were 25 to 36 years of age. 15.5% of respondents (N=16) responded that they were 37 to 48 years of age. 12.6% of respondents (N=13) responded that they were 49 to 60 years of age. 6.8% of respondents (N=7) responded that they were 61 years of age or older.

Table 5: Education Level of Study Sample

Label	N	Percent
Some high school	0	0.00%
High school graduate	12	11.65%
Some college	34	33.01%
2-year degree	17	16.50%
4-year degree	24	23.30%
Master's degree	12	11.65%
Doctoral degree	4	3.88%
Total	103	100%

As shown in Table 5, 0.00% of respondents (N=0) responded that they had completed some high school. 11.65% of respondents (N=12) responded that they had graduated high school. 33.01% of respondents (N=34) responded that they had completed some college. 16.50% of respondents (N=17) responded that they had completed a 2-year degree. 23.30% of respondents (N=24) responded that they had completed a 4-year degree. 11.65% of respondents (N=12) responded that they had completed a master's degree. 3.88% of respondents (N=4) responded that they had completed a doctoral degree.

Table 6: Average Household Income of Study Sample

Label	N	Percent
< $10,000	18	17.6%
$10,000 - $19,999	8	7.8%
$20,000 - $29,999	9	8.8%
$30,000 - $39,999	7	6.9%
$40,000 - $49,999	5	4.9%
$50,000 - $59,999	6	5.9%
$60,000 - $69,999	7	6.9%
$70,000 - $79,999	5	4.9%
$80,000 - $89,999	9	8.8%
$90,000 - $99,999	6	5.9%
$100,000 - $149,999	13	12.7%
≥ $150,000	10	9.8%
Total	102	100%

As shown in Table 6, 41.1% of respondents (N=42) responded that they had a household income of less than $10,000 to $39,999. 22.6% of respondents

(N=23) responded that they had a household income of $40,000 to $79,999. 37.2% of respondents (N=38) responded that they had a household income of $80,000 to more than $150,000. For the remainder of the analysis, data has been aggregated into 3 income groups.

Results

Tables 7-10 present the percentage of responses for specific survey questions. The percentages are broken down by income brackets. These brackets indicate one-third of the total range of average household income responses, allowing for comparison between low-, middle-, and high-income groups. The low-income bracket includes those with an income of less than $10,000 to $39,999. The middle-income bracket includes those with an income of $40,000 to $79,999. The high-income bracket includes those with an income of $80,000 to over $150,000. There were 42 respondents in the low-income group, 21 respondents in the middle-income group, and 37 respondents in the high-income group.

Table 7: Healthcare Data by Income Bracket

Category	Percent for Income Bracket <$10,000 to $39,999	Percent for Income Bracket $40,000 to $79,999	Percent for Income Bracket $80,000 to >$150,000
Do you rely on any of the following public healthcare services for assistance?			
Medicare	5%	9%	11%
Medicaid	23%	9%	0%
Children's Health Insurance Program (CHIP)	0%	0%	0%
Other	15%	5%	3%
I do not rely on any of these public healthcare services	59%	68%	83%
Unknown	3%	9%	6%

Category	Percent for Income Bracket <$10,000 to $39,999	Percent for Income Bracket $40,000 to $79,999	Percent for Income Bracket $80,000 to >$150,000
Has a lack of money kept you from going to the doctor?			
Yes, it has	49%	35%	23%
No, it has not	51%	65%	77%
How satisfied are you with the care you received at your last medical visit?			
Extremely satisfied	26%	45%	46%
Somewhat satisfied	33%	32%	46%
Neither satisfied nor dissatisfied	13%	14%	3%
Somewhat dissatisfied	10%	0%	3%
Extremely dissatisfied	3%	0%	0%
I have not had any medical visits since March 2020	15%	9%	3%
How satisfied are you with accessibility to treatment (if needed)?			
Extremely satisfied	23%	18%	46%
Somewhat satisfied	18%	64%	31%
Neither satisfied nor dissatisfied	8%	0%	3%
Somewhat dissatisfied	23%	9%	9%
Extremely dissatisfied	10%	0%	3%
I have not had any medical visits since March 2020	18%	9%	9%

When asked whether or not they rely on certain public health services, 83% of high-income respondents said that they did not rely on any public healthcare services. 11% of high-income respondents relied on Medicare, and 3% relied on other forms of public services. For the middle-income group, 68% of respondents did not rely on any public healthcare services. 9% relied on Medicare, 9% relied on Medicaid, and 5% relied on other forms of public services. Low-income respondents relied the most on public healthcare services, with 5% receiving Medicare, 23% receiving Medicaid, and 15% receiving another form of healthcare service. 59% of the low-income group did not rely on any services. When asked if a lack of money has kept them from going to the doctor, 23% of high-income respondents said "yes, it has," while 77% said, "no, it has not." 35% of middle-income respondents said a lack of money has kept them from going to the doctor, while 65% said it has not. For low-income respondents, almost half (49%) responded that a lack of money has kept them from going to the doctor, while 51% responded that it has not. When looking at medical visit satisfaction, 46% of high-income respondents were extremely satisfied, and 0% responded that they were extremely dissatisfied. 45% of middle-income respondents were extremely satisfied, while 0% were extremely dissatisfied. Finally, only 26% of low-income respondents were extremely satisfied with medical care, while 3% were extremely dissatisfied. For accessibility to treatment satisfaction rates, 46% of high-income respondents were extremely satisfied, while 3% were extremely dissatisfied. Only 18% of middle-income respondents were extremely satisfied, while 0% were extremely dissatisfied. 23% of low-income respondents were extremely satisfied, and 10% were extremely dissatisfied. Trends in the data show that it is more likely for the lowest income bracket to rely on public health services. Those in the lowest income bracket are also less likely to be able to pay for a doctor's visit, and when they do receive care, they are more likely to be dissatisfied than the middle and high-income groups.

Table 8: Economic Data by Income Bracket

Category	Percent for Income Bracket <$10,000 to $39,999	Percent for Income Bracket $40,000 to $79,999	Percent for Income Bracket $80,000 to >$150,000

Are you currently employed?			
Yes	56%	48%	64%
No	44%	52%	36%
Does your job provide you with hourly pay or a salary?			
My job pays me by the hour	100%	80%	19%
My job pays me a salary	0%	20%	81%
Does your job allow you to work from home?			
Yes, and I am currently working from home	10%	20%	62%
Yes, but I am not working from home	5%	10%	5%
No, my job does not allow me to work from home	85%	70%	33%
Unknown	0%	0%	0%
Do you work in any of the following essential industries?			
Food and agriculture	35%	0%	5%
Emergency services	5%	0%	0%
Transportation, warehouse, and delivery	5%	10%	0%
Industrial, commercial, residential facilities and services	20%	10%	0%
Category	Percent for Income Bracket <$10,000 to $39,999	Percent for Income Bracket $40,000 to $79,999	Percent for Income Bracket $80,000 to >$150,000
Healthcare	0%	10%	14%
Government and community services	5%	0%	10%

Communications and IT	0%	0%	5%
Financial sector	5%	0%	5%
I do not work in any of these essential industries	40%	70%	67%
Did you become unemployed due to the pandemic?			
Yes, I became unemployed because of the pandemic	25%	27%	25%
No, I became unemployed for other reasons	75%	64%	75%
Unknown	0%	9%	0%
Are you receiving unemployment benefits?			
Yes, I am currently receiving unemployment benefits	13%	9%	17%
I was receiving unemployment benefits, but I am not anymore	0%	0%	0%
No, I am not receiving unemployment benefits	81%	91%	83%
I have applied for unemployment benefits, but have not started receiving them yet	6%	0%	0%

When asked if they were currently employed, 64% of high-income respondents were employed, and 36% were unemployed. 48% of middle-income respondents were employed, and 52% were unemployed. 56% of low-income respondents were employed, while 44% were unemployed. Of those who were employed, 19% of high-income respondents said their job pays them by the hour, and 81% said their job pays them a salary. For middle-income respondents, 80% said their job pays them by the hour, and 20% said their job pays them a salary. 100% of low-income respondents said their job pays them by the hour, with none of these respondents receiving salaried pay. For those who are working, 62% of

high-income respondents are allowed to work from home and are working from home, while 33% are not allowed to work from home. 20% of middle-income respondents are allowed to work from home and are working from home, while 70% are not allowed to work from home. 10% of low-income respondents are allowed to work from home and are working from home, while 85% are not allowed to work from home.

When asked whether or not they worked in any essential industries (food and agriculture; emergency services; transportation, warehouse, and delivery; industrial, commercial, residential facilities and services; healthcare; government and community services; communications and IT; financial sector), 5% of high-income respondents worked in food and agriculture, 14% worked in healthcare, 10% worked in government and community services, 5% worked in communications and IT, 5% worked in the financial sector, and 67% said they did not work in any essential industries. For middle-income respondents, 10% worked in transportation, warehouse, and delivery, 10% worked in industrial, commercial, residential facilities and services, 10% worked in healthcare, and 70% did not work in any essential industries. 35% of low-income populations worked in food and agriculture, 5% worked in emergency services, 5% worked in transportation, warehouse, and delivery, 20% worked in industrial, commercial, residential facilities and services, 5% worked in government and community services, 5% worked in the financial sector, and 40% did not work in any essential industries.

For those who answered that they were unemployed, 25% of high-income respondents became unemployed because of the pandemic, while 75% became unemployed for other reasons. 27% of middle-income respondents became unemployed because of the pandemic, while 64% became unemployed for other reasons, and 9% did not know why they became unemployed. 25% of low-income respondents became unemployed because of the pandemic, and 75% became unemployed for other reasons. Additionally, 17% of high-income respondents were receiving unemployment benefits and 83% were not. 9% of middle-income respondents were receiving unemployment benefits and 91% were not. 13% of low-income respondents were receiving unemployment benefits, 81% were not receiving unemployment benefits, and 6% had applied for these benefits, but were not receiving them at the time of the survey. Trends in the data show that since the pandemic hit in March 2020, the highest income group is more likely to be employed than the low and middle-income

groups. This group is also more likely to receive salaried pay, while the lowest income group is more likely to be paid by the hour. The highest income group is also more likely to be working from home and receiving unemployment benefits than the middle and low-income groups.

Table 9: Parent-Reported Education Data by Income Bracket

Category	Percent for Income Bracket <$10,000 to $39,999	Percent for Income Bracket $40,000 to $79,999	Percent for Income Bracket $80,000 to >$150,000
Did you stay home with your children, or did you have to work?			
I was able to stay home full time	100%	100%	62%
I was able to stay home part time	0%	0%	15%
I was unable to stay home	0%	0%	8%
My children are old enough to stay home alone	0%	0%	15%
In school, did your children qualify for free/reduced meals?			
Yes, my children qualified for free/reduced meals	100%	33%	0%
No, my children did not qualify for free/reduced meals	0%	67%	92%
My children did not attend a school with meals provided	0%	0%	8%
During online school, how did your children receive meals?			
I provided meals for my children	0%	75%	93%
My children provided meals for themselves	0%	0%	0%
My children's school provided meals	0%	25%	7%

through drop off/pick up			
My children received meals another way	100%	0%	0%
My children did not receive meals during online school	0%	0%	0%

When asking parents if they stayed home with their children, or if they had to work, 62% of high-income respondents were able to stay home full time, 15% were able to stay home part-time, 8% were unable to stay home, and 15% said their children could stay home alone. 100% of middle-income and low-income respondents were able to stay home with their children full time. 0% of high-income respondents said their children qualified for free/reduced meals, 92% said their children did not qualify, and 8% said their children did not attend a school with meals provided. 33% of middle-income respondents said their children qualified for free/reduced meals, 67% said their children did not qualify, and 0% said their children did not attend a school with meals provided. 100% of low-income respondents said their children qualified for free/reduced meals. As far as receiving meals, 93% of high-income respondents said they were able to provide meals for their children and 7% said their children's school-provided meals. 75% of middle-income respondents said they were able to provide meals for their children and 25% said their children's school-provided meals. 100% of low-income respondents said their children received meals in some other way. Trends in the data show that children of the low-income group were more likely to qualify for free/reduced meals than children in middle- and higher-income groups. It was also more likely for parents in the higher income bracket to prepare meals for their children than parents in the low and middle-income bracket.

Table 10: Student-Reported Education Data by Income Bracket

Category	Percent for Income Bracket <$10,000 to $39,999	Percent for Income Bracket $40,000 to $79,999	Percent for Income Bracket $80,000 to >$150,000
How difficult was your transition to online schooling?			

Extremely easy	6%	50%	20%
Somewhat easy	26%	7%	30%
Neither easy nor difficult	13%	14%	10%
Somewhat difficult	42%	29%	20%
Extremely difficult	13%	0%	20%
Did you learn more taking classes online than you would in a classroom?			
Much more	3%	0%	10%
Somewhat more	3%	7%	0%
About the same	32%	64%	30%
Somewhat less	35%	7%	40%
Much less	26%	21%	20%
How easy was it for you to communicate with your instructor if you had a question?			
Extremely easy	19%	79%	10%
Somewhat easy	55%	14%	70%
Neither easy nor difficult	10%	0%	10%
Somewhat difficult	16%	0%	10%
Extremely difficult	0%	7%	0%

When asking students about their transition to online schooling, 20% of students living in a high-income household responded that their transition was extremely easy, while 20% responded that it was extremely difficult. 50% of students living in a middle-income household responded that their transition was extremely easy, while 0% responded that it was extremely difficult. 6% of students living in a low-income household responded that their transition was extremely easy, while 13% responded that it was extremely difficult. 10% of students living in a high-income household

responded that they learned much more online than they would in a classroom, and 20% responded that they learned much less online. 0% of students living in a middle-income household responded that they learned much more online than they would in a classroom, and 21% responded that they learned much less online. 3% of students living in a low-income household responded that they learned much more online than they would in a classroom, and 26% responded that they learned much less online.

10% of students living in a high-income household responded that communication with their instructor was extremely easy, while 0% responded that it was extremely difficult. 79% of students living in a middle-income household responded that communication with their instructor was extremely easy, while 7% responded that it was extremely difficult. 19% of students living in a low-income household responded that communication with their instructor was extremely easy, while 0% responded that it was extremely difficult. Trends in the data show that for the lowest income group, the transition to online school was harder than it was for students in middle- and higher-income groups. Higher-income students were more likely to report that they learned more through online school than middle and low-income groups. Across all three income groups, most of the students were able to communicate with their instructor if they had a question.

Discussion
Findings

The current study analyzed healthcare, economic, and educational disparities occurring since March 2020, when the Coronavirus pandemic hit. The main comparison of interest is between 3 different income groups: low (<$10,000 to $39,999), middle ($40,000 to $79,999), and high ($80,000 to >$150,000). The survey examined whether individuals in these income groups relied on public healthcare services if these individuals' incomes had held them back from going to the doctor, and how satisfied they were with the treatment provided to them and their accessibility to that treatment. The survey further examined the jobs held by respondents in each income group, inquiring whether or not they were currently employed or had been laid off if they had hourly or salaried pay, if they were receiving unemployment benefits, and if they were able to work from home. Students and parents were also asked separately about parental ability to stay home with children, how children received their meals (if not from school), access to online

education resources, the transition to online, how much students learned, and how easy it was to communicate with the instructor.

Some of the general findings of healthcare from this survey are that the low-income sample was more likely to rely on Medicaid and other public healthcare services than the middle and high-income samples. Additionally, the low-income sample was less likely to say that they relied on no public healthcare services than the middle and high-income samples. The low-income sample was more likely to report that money has kept them from going to the doctor than the middle and high-income samples. The low-income sample was less likely to be satisfied with the care they received at their last medical visit than the middle and high-income samples. The low-income sample was also more likely to be dissatisfied with accessibility to treatment than the middle and high-income sample. One surprising finding was that the highest income group was more likely to be receiving Medicare benefits than the middle and low-income groups. Based on previous research, it was expected that the lowest income group would be more likely to receive all public healthcare services.

When looking at the economy, the high-income sample was the most likely to be employed, but less likely to work in an essential industry than the low-income sample. The low-income sample was the most likely to work in an essential industry, with food and agriculture being the most likely position this sample holds. The low-income sample was the most likely income group to be paid by the hour, while the high-income sample was the most likely to be paid a salary. The low-income sample was the least likely to work at home, while the high-income sample was the most likely to work from home. The percentage of income groups being unemployed due to the pandemic was similar in all three samples. The high-income sample was more likely to receive unemployment benefits than the low and middle-income sample. The low-income sample was more likely to have applied for unemployment benefits, but not receive them, than the middle and high-income sample. One surprising finding was that the majority of respondents became unemployed due to other factors than the pandemic. Based on unemployment rates since the pandemic, it was expected that the pandemic would contribute to unemployment rates more than other factors would.

For education, parents in the high-income sample were less likely to stay home with their children than the low and middle-income samples. The low-income sample was more likely to report that their children qualified for

free/reduced lunch than the middle and high-income samples. The high-income sample was the most likely to be able to provide meals for their children during online school. For students, those from the low-income sample were less likely than middle and high-income student samples to report that their transition to online schooling was easy. The low-income student sample was also the most likely to say that this transition was difficult. The low-income student sample was the most likely to say that they learned less taking online classes than they would in a classroom. Finally, the low-income student sample was more likely than the middle and high-income student samples to say that it was difficult to communicate with their instructor if they had a question. One surprise finding was that lower and middle-income groups were more likely to stay home with their children than the high-income group. Based on previous research, it was expected that the highest income group would be the most likely to stay home with their children. There were no surprise findings in the student-reported education data.

Importance

By addressing the impacts of the Coronavirus pandemic on various social inequalities, such as healthcare, economic, and educational disparities, we can better understand what populations are being disproportionately affected. This paper chose to assess how 3 different income groups, low (<$10,000 to $39,999), middle ($40,000 to $79,999), and high ($80,000 to >$150,000), were impacted by the virus. For the majority of the questions in this survey, the low-income sample showed that they were affected more than the middle and high-income samples. Once we start to see patterns of who is being impacted the most by this virus, our society can begin to understand where attention is needed and provide the correct resources to help those who are struggling. By providing proper aid, we might be able to reduce the number of disparities faced by our society and prevent this inequity from being amplified in future global crises.

Limitations

This study is subject to several limitations. First, data for this survey was collected between the months of August and September 2020. Since the Coronavirus is constantly evolving, the data collected might not be generalizable to future time periods, which may see an even greater presence of inequalities. Second, the size of the sample for each income group

(low-income: N=42; middle-income: N=21; high-income: N=37) was relatively small. Future research on income inequalities should be done with larger sample sizes, in order to be more generalizable to the population. In addition to the size of our sample groups, future research should also make sure that there is an equal number of respondents in each sample so that the comparison between the two groups can be more accurate. Third, even though this survey had a total of 103 participants, not all of the questions were required to be answered, resulting in a lower number of respondents in some categories. If a survey like this is conducted in the future, participants should be encouraged to answer every question, or there should be a set number of respondents for each category. Fourth, since this study recruited participants through a convenience sample, the majority of the participants were of the white race. Future research should make sure that it obtains responses from a wider variety of races when assessing inequality. Fifth, the original plan for this study was to distribute paper copies to low-income populations, who may not have access to technology. Because of the pandemic, this research had to be conducted virtually, leaving out a large number of expected participants. If this research is replicated in the future, making this survey accessible to populations who do not have access to technology would provide more accurate data in regard to that disparity.

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CONTRIBUTORS

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Aileen Dawkins is a graduate from the University of North Carolina Greensboro, class of 2019. She received a Bachelor's degree in Community and Therapeutic Recreation. She has been involved in fieldwork and research projects that allowed her to develop a passion for helping people with neurological challenges. She is now pursuing a Doctorate in Occupational Therapy at Wingate University.

Jaida Ellis graduated from Elizabeth City State University with a Bachelors in psychology. She assisted in a Department of Homeland Security funded project that examined the mental health effects of hurricanes in Northeastern North Carolina. Jaida plans to pursue her Ph.D. in Social Psychology with a concentration on cultural and environmental concepts.

Ekaterina Khokhrin is a graduate from UNCG, majoring in International and Global Studies with a concentration in Russian Studies. Before transferring to UNCG, she attended Ulyanovsk State University in Ulyanovsk, Russia. She has worked as a tutor for the Academic Achievement Center and a Peer Facilitator at the Global Village. After graduating in May, Ekaterina hopes to continue her studies in graduate school.

Aidan Keaveney is a junior at Appalachian State University, studying applied physics and mathematics. Keaveney first began studying gifted education programs at the North Carolina School of Science and Mathematics, where he was mentored by Dr. David Cantrell. Keaveney intends to pursue advanced degrees in experimental physics, and a career in academia and research.

Alexandra M. McCourt is a recent graduate of The University of North Carolina of Greensboro. McCourt was an undergraduate English and Theater major with a minor in Rhetoric and Public Advocacy. She will be attending North Carolina State University in Fall 2021, where she will be a graduate assistant while getting a Master of Arts in English with a focus in Rhetoric and Composition.

Hayley Robertson graduated from the University of North Carolina at Greensboro with a major in Sociology and minor in Psychology and Music. At UNCG, Hayley was member of the University Marshals, the Alpha Kappa Delta Sociology Honors Society, and a Research Assistant with the Interactions and Relationships Lab. She plans to attend Columbia University in the fall to receive a MSW in clinical social work.

Y ddraig goch means "the red dragon" in Welsh. First recorded around 829 C.E. in *Historia Brittonum*, the red dragon has long been a symbol of Wales and appears on the Welsh flag. The red dragon is also the mascot of Lloyd International Honors College in honor of its benefactress, Rebecca A. Lloyd, whose parents came to the United States from Wales. In 2013, the Honors College began a tradition of sending students abroad with a small red dragon to take a picture with and send back. See the *There Be Dragons* Honors College student blog at lihcdragonblog.blogspot.com.

May 29, 1929-May 21, 2013

REBECCA A. LLOYD was a 1950 graduate of Woman's College (the name for the University of North Carolina at Greensboro prior to 1963). In 2006 she gave her family's name and her financial support to establish and endow Lloyd International Honors College by donating $4 million, the largest alumni gift the university has ever received. Of her support for the Honors College, Lloyd said, "The Honors College will give students the international viewpoint that's needed in their education. To the extent that my gift can help world peace come about, I'm happy to be making it."

THE HONOR SOCIETY OF PHI KAPPA PHI

Founded in 1897, The Honor Society of Phi Kappa Phi is the nation's oldest and most selective honor society for all academic disciplines. The organization inducts approximately 30,000 students, faculty, professional staff, and alumni annually from more than 300 select colleges and universities in North America and the Philippines. Membership is by invitation only to the top 10 percent of seniors and graduate students and 7.5 percent of juniors. Faculty, professional staff, and alumni who have achieved scholarly distinction also qualify. Since its founding, more than 1.5 million members have been initiated into the ranks of Phi Kappa Phi. Phi Kappa Phi awards nearly $1 million each year to qualifying students and members through study abroad grants, graduate fellowships, funding for post-baccalaureate development, member and chapter awards, and grants for local, national and international literacy initiatives.

The UNCG Chapter (#352) of The Honor Society of Phi Kappa Phi was established and installed on March 13, 2019 and welcomed its inaugural and founding class of Chapter members on April 11, 2019 and will welcome its second class in Fall 2019. For detailed information on the Society and the benefits of membership, please visit https://PhiKappaPhi.org.

UNC Greensboro-McNair Scholars Program

The UNCG-McNair Scholars Program (UNCG-McNair) is a federal *TRiO* program funded by the U.S. Department of Education. Designed to prepare undergraduate students for the pursuit of a Ph.D. UNCG-McNair provides 25 UNCG undergraduate students with opportunities to complete research with faculty mentors, attend the UNCG-McNair Summer Research Institute, explore graduate school options, and prepare for graduate-level studies. Ultimately, the goal of UNCG-McNair is to diversify faculty demographics across the nation by providing experience and training to students typically under-represented in the academy.

Benefits of the Program

- Mentoring from faculty and staff for graduate school preparation
- Financial planning for graduate school success
- Professional and academic conferences
- An empowering and supportive community
- Research opportunities
- Research presentation experience
- Graduate school preparation
- Summer Research Internships including stipends

Eligibility Requirements

To qualify for UNCG-McNair, you must:
- be a **first-generation** college student [parent(s)/guardian(s) do not have a 4-year college degree] **AND** come from a modest or low-income family (based on Dept. of Education's Income Guidelines)
- **OR,** be a member of a group this is traditionally under-represented in graduate studies (African-American, Hispanic/Latino, Alaskan Native/American Indian, or Pacific Islander)

Website: studentsuccess.uncg.edu/uncg-mcnair-scholars-program

LLOYD INTERNATIONAL HONORS COLLEGE
The University of North Carolina at Greensboro

Call for Submissions: Outstanding Student Papers

22nd ANNUAL UNDERGRADUATE HONORS SYMPOSIUM

Friday, March 25, 2022
Virtual Conference

The Honors Symposium offers outstanding undergraduates the opportunity to participate in a virtual academic conference with concurrent sessions. **We welcome submissions from all UNC Greensboro undergraduate students or any Honors student from a North Carolina Honors Program or Honors College**. Papers should be research-based and can be written in any discipline, but presentations should be geared toward a general audience. Students may submit a paper that has been completed for a course or write a paper for the Symposium. Students may submit more than one paper for consideration to the Symposium. A group of students may also submit a presentation. December 2021 UNCG graduates are also allowed to submit papers for consideration to the Symposium.

Students can submit a paper by:

> Submit your paper for consideration **via Google Forms** at:
> https://tinyurl.com/LIHCSymposium by **December 20, 2021 at 11:55 p.m**. Students should plan a 10 to 15-minute summary presentation and Q&A to follow.

Faculty can get involved by:

- Suggesting a panel of student papers from one of your current courses.
- Encouraging students with excellent work to submit a paper.
- Offering to serve as session Chairs at the Symposium.
- Virtually attending the Symposium, bringing your class virtually to the Symposium, and encouraging students to attend virtually as individuals as well.
- Create assignments for students in your spring courses that include attending the Symposium.

The Honors Symposium Prizes, sponsored by UNC Greensboro's Lloyd International Honors College, are awarded for outstanding papers submitted to the Symposium. This year prizes dedicated to the encouragement of high-quality academic writing will include **monetary awards of $250, $150, and $100** in one category for Visiting Honors students and in two categories for UNCG students: Arts & Humanities, and Sciences & Professional Schools. Award decisions are based on the papers submitted, not the presentation of the papers. Papers must be presented at the Symposium to be eligible for a prize.

There is **no registration cost** to present or attend. We encourage friends and family to attend as audience members. For **more information** about the Symposium, students and faculty may contact Dr. Angela Bolte, Assistant Dean in Lloyd International Honors College, at akbolte@uncg.edu.

Call for Papers
Y Ddraig Goch: An Interdisciplinary Honors Journal

On behalf of the Lloyd International Honors College, we invite you to submit a paper for possible inclusion in the fourth issue of *Y Ddraig Goch: An Interdisciplinary Honors Journal.*

Y Ddraig Goch: An Interdisciplinary Honors Journal is published by Lloyd International Honors College of The University of North Carolina-Greensboro. The journal aims to provide a platform for interdisciplinary research at the undergraduate level. We hope that you take this opportunity to share, as it may inspire and empower others to do the same. Submissions on all topics are welcome.

Submission Guidelines

For a submission to be considered:

- Must be granted permission by a faculty mentor
- Include your name, department, and email
- Include a cover page: title; author's name(s) as should appear in publication; name of department/program of study; abstract (300 words max)
- May include sections for an Abstract, Introduction, Methods, Results, Discussion, References, and Figures/Tables
- Citations must be in Chicago Style
- Must include footnotes, a bibliography and an abstract
- Copyedited and free from typographical or grammatical errors

Questions or submissions may be addressed to Jenny Francisco at j_franci@uncg.edu.
Submission Deadline is January 31, 2022.